United Nations
Educational, Scientific and
Cultural Organization

IHP/IC-XXI/NR
Paris, 20 June 2014
Multilingual

International Hydrological Programme

21st session of the Intergovernmental Council
(Paris, 18 – 20 June 2014)

NATIONAL REPORTS OF THE NATIONAL COMMITTEES FOR THE IHP (2012 – 2014)

SUMMARY

The following National Reports of the National Committees for the IHP cover the activities for the intersessional period between the 20th and the 21st sessions of the Intergovernmental Council of the IHP (June 2012 - May 2014).

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

The texts reproduced herewith stand exactly as submitted by the National Committees, in their original language, except for minor editing in some cases exclusively for presentation purposes. Thus, the contents of the reports have not been modified and remain the sole responsibility of the respective National Committees.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

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

- The Belgian committee of IHP has been reactivated in December 2012.
- New internal rules of procedure have been designed and adopted (http://www.ihp-belgium.be/index.php/en/official-documents).
- Membership is regulated by new internal rules of procedure. Currently 116 members (physical persons and organizations) are on the IHP-BE member list.
- A Chair (Prof. Marnik VANCLOOSTER, UCL, Louvain-la-Neuve) and a Vice-Chair (Prof. W. BAUWENS, VUB, Brussels) have been elected by the General Assembly. A secretary, (Dr. C. GRAINDORGE, UCL, Louvain-la-Neuve) have been designated by the Chair.

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

- A new IHP-BE website was launched. This website is now the communication platform for all IHP-BE activities. The web site is available for the public at http://www.ihp-belgium.be. An intranet is available for internal members.
- A General Assembly meeting was organized in October 2014. The minutes of this meeting are available on the intranet of the committee.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

IHP-BE endorsed the following internal meetings:

- **06/06/2012, Brussels, Unesco-liaison office. IHP-BE launching event**.
  The Flemish Commission for UNESCO and the Belgian French and German Speaking Commission for UNESCO joined forces to re-activate the Belgian International Hydrological Programme Committee (BE-IHP) after several years of inactivity. No less than 25 water experts from all over the country attended the opening session at the UNESCO Liaison Office in Brussels. This meeting took place in the presence of Ms Roudil, Director of the UNESCO Liaison Office, Professor Vervenne, President of the Flemish Commission for UNESCO and Honorary Rector of the KU Leuven and Mr Busquin, President of the Belgian French and German Speaking Commission for UNESCO and Minister of State. Professor Marnik Vanclooster has been elected as President of this Commission. Professor Willy Bauwens will be his Vice-President. In

their introductory speech, both Professors expressed their intention to make this Committee a very active, but also very inclusive Committee, with the participation of an as broad as possible range of stakeholders.

- **30/05/2013, Louvain-la-Neuve, UCL. Gestion des ressources en eau en Belgique : Enjeux climatiques et sociétaux**
  IHP-BE organized an event on water management in Belgium: Facing climatic and societal challenges. The program is available at http://www.ihp-belgium.be/symposium/. The program encompassed interventions of Prof. J .P. van Ypersele (UCL, vice-président GIEC), Prof. P. Goderniaux (Umons), le Prof. F. Rossillon (ULG) et Ir. M. Ruelle (SWDE, Direction) and was followed by a debate. 78 people participated to the symposium. The proceedings of the meeting are available on the intranet.

- **11/10/2013, Brussels. Topical meeting: Interuniversity cooperation of Belgian universities in the water domain**. IHP-BE organized a topical meeting on interuniversity cooperation of Belgian universities in the water domain. The program is available at http://www.ihp-belgium.be/index.php/en/news/66-general-assembly-and-topical-meeting-of-the-belgian-committee-of-unesco-ihp . 48 people participated to the meeting. The meeting was followed by a meeting of the General Assembly of IHP-BE. Proceedings and minutes are available on the intranet.

- **19/3/2014, Louvain-la-Neuve. Festival international de l'eau.**
  IHP-BE actively participated to the international film festival on water. The full programme is available at http://www.suec.be/ . The Chair of IHP-BE was president of the jury.

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

- Contacts were taken with the NHV (the Dutch Hydrological Organisation, Chair Gé van den Eertwegh) to jointly organize events in autumn 2014.
- Contacts were made with the Dutch National Committee of IHP (Prof. P. Van Der Zaag, UNESCO-IHE) to jointly organize events in autumn 2014.
- A proposal was made by the 'Fondation du dialogue Sud-Nord Méditerranée' (www.dialoguehiwarmed.org) to organize an event on water policy and rural development in autumn 2014.
- A proposal was made to co-organize the Belgian Hydraulic Days in autumn 2014.
- Contacts were taken with ICE (International Centre for Eremology) with UNESCO Chair on Eremology (Prof. D. Gabriels), to organize an event on "DESERTIFICATION AND LAND DEGRADATION. A 'water' problem: scarcity or excess" in spring 2015.

1.2.3 Other initiatives.

Before the reactivation of IHP-BE at the end of 2012, Flanders developed already a Trust Fund (FUST) to support UNESCO's activities in the field of science. Information is available at http://fust.iode.org/completed-projects
Four significant projects were developed within the IHP framework:

- The UNESCO project « Capacity building and training on environmental training and management in Palestine » (1998 – 2007), in collaboration with Al Azhar University in Gaza and a network of universities, ministries and NGO's in Palestine
- The FRIEND Nile FUST Project was initiated by UNESCO in March 1996 and aims at creating better understandings and quantification of the river Nile system to enhance the management of the Nile water resources and to improve the planning of water resources projects in the Nile Basin countries.
- The Framework Programme for Research, Education and Training in Water (FETWater) is a programme for effective cooperation in research, education, training and capacity building initiatives to achieve integrated water resource management in South Africa.
- Assessment of the Cazalac-UNESCO Flanders Phase II Final Report.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses. Nihil.
1.3.2 Organization of specific courses. Nihil.
1.3.3 Participation in IHP courses. Nihil.

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

Informal contacts were made with IHE staff members (Dr. N. Van Cauwenbergh, Dr. A. Van Griensven, Pr. P. Van der Zaag) and suggestions were made to improve capacity building programs for French speaking countries. This can be done by linking IHE activities with master programs on water resources in French (e.g. http://www.ihp-belgium.be/index.php/en/teaching-programmes-and-courses).
In 2014, F. Kilonzo successfully defended his PhD, entitled "Assessing the impacts of environmental changes on the water resources of the upper Mara, Lake Victoria basin" at UNESCO-IHE. The research was carried out under the joint supervision of UNESCO-IHE and the VUB. The PhD diploma was granted by the latter university.

1.5 Publications. Nihil

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country. Nihil.

1.6.2 Participation in meetings abroad
IHP-BE participated to

- UNESCO Strategic and High-Level Meeting on Water Security and Cooperation, 11-13 September 2013, Nairobi, Kenya. A press release was published on (http://www.unesco-vlaanderen.be/2013/9/26/vlaanderen-ondersteunt-intenties-tot-

globale-samenwerking-rond-water). Minutes are available at the intranet.

- Fifth Regional Consultation, UNECE Region, Groundwater governance. The Hague Institute for Global Justice, 19-21 March 2013. The Hague, Netherlands. Minutes are available at the intranet.
- Regional Meeting Europe & North America, UNESCO IHP, Oslo, Norway, 21-22nd of October 2013. Minutes are available at the intranet.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation. Nihil.

1.7.2 Completed and ongoing scientific projects. See section 1.2.3

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

See section 1.2.2

- 6/10/2014. Co-organization of the Belgian Hydraulic Days.
- 6/11/2014. Co-organization 'Fondation du dialogue Sud-Nord Méditerranée' (www.dialoguehiwarmed.org) on water policy and rural development.
- December 2014. Co-organization of event on water evapotranspiration with NVH, followed by General Assembly meeting.

2.2 Activities foreseen for 2015-2016

See section 1.2.2

Contacts were taken with ICE (International Centre for Eremology) with UNESCO Chair on Eremology (Prof. D. Gabriels), to organize an event on "DESERTIFICATION AND LAND DEGRADATION. A 'water' problem: scarcity or excess!" in the spring of 2015.

2.3 Activities envisaged in the long term

Possibilities of future activities depend very much on available funds.

Running activities of IHP-BE have so far been sponsored by

- The Flemish Community , EWI. Support for participation of IHP Chair and Vice-Chair to IHP meetings.
- UNESCO commission Belgium. Support for hosting launching event and conception of the web site.
- FNRS. Support for participation of organizing scientific events (IHP-BE is considered as a contact group of FNRS).
- UCL. Support for organization of scientific event related to climate change and water resources.

In addition, project activities of Flemish members of IHP-BE have been supported by the Flemish Trust Funds (see section 1.2.3).

For increasing the level of activities, a Unesco IHP-BE fund has been created. In the coming years, fund raising will be envisioned to develop activities with a larger impact. Such activities could be

- Reinforcement of capacity building programs in water resources engineering and management, in particular in French speaking developing countries;

- Science and development programs for Belgian scientists.

Rapport BENIN

21ème Session du Conseil Intergouvernemental du Programme Hydrologique International : PHI-UNESCO (18 au 20 Juin 2014, Paris, France)

Organisation des Nations Unies pour l'éducation, la science et la culture

Programme Hydrologique International

COMITE NATIONAL PHI-BENIN

Avec l'implication de : Institut National de l'Eau, Centre Béninois de la Recherche Scientifique et Technique, Direction Générale de l'Eau, Direction Générale de l'Environnement, Direction Nationale de la Météorologie, Partenariat National de l'Eau et de plusieurs autres institutions béninoises

RAPPORT D'ACTIVITES 2012-2014

Dr. Emmanuel Agnidé LAWIN,
M. Souradjou NOUHOUN-TOURE
Dr. Arnaud Bruno ZANNOU
M. François KINDOHO
Dr. Eric A. ALAMOU

JUIN 2014

Par le Comité PHI-Bénin, Mai 2014

TABLE DES MATIERES

Résumé

La République du Bénin est membre du Programme Hydrologique International (PHI) de l'UNESCO. A ce titre, le Bénin dispose d'un Comité national PHI dont le fonctionnement normal permet de participer non seulement à des activités initiées ou soutenues au niveau national mais également à des activités PHI au plan international.

Le présent Rapport, qui est élaboré dans le cadre de la 21ème Session du Conseil Intergouvernemental du PHI-UNESCO du 18 au 20 juin 2014 à Paris en République Française fait un aperçu sur les activités du Comité national PHI-Bénin au titre de ses engagements vis-à-vis du PHI. Ainsi, il aborde les activités menées par le Bureau du Comité PHI-Bénin au cours de la période Juin 2012 à Mai 2014. Par ailleurs, ce rapport aborde les perspectives pour le reste de l'année 2014 et pour les deux prochaines années.

1. ACTIVITES ENTREPRISES PENDANT LA PERIODE JUIN 2012 – MAI 2014

1.1. Réunions du Comité national du PHI

1.1.1. Décisions sur la composition du Comité national du PHI

La période de Juin 2012 à Mai 2014 a été marquée par le renouvellement du bureau du Comité national PHI-Bénin. En effet, à l'initiative de son premier Président, le Professeur Abel AFOUDA, le Comité s'est réunit le 17 Octobre 2013 en assemblée élective. A la suite du vote, le nouveau bureau est composé comme suit :

Président: LAWIN Agnidé Emmanuel, hydrométéorologue, Enseignant-Chercheur à l'Institut National de l'Eau (INE), Université d'Abomey-Calavi.

Vice-Président: NOUHOUN - TOURE Souradjou, Directeur Général de l'Eau (DGEau), au Ministère de l'Energie, des Recherches Pétrolières et Minières, de l'Eau et du Développement des Energies Renouvelables (MERPMEDER).

Secrétaire: ZANNOU B. Arnaud, Hydrologue, Coordonnateur du Projet Systèmes d'Alerte Précoce au PNUD, en service à la DG-Eau

Secrétaire Adjoint chargé du suivi des normes hydrologiques: ALAMOU Adéchina Eric, hydrologue, Enseignant-Chercheur à l'Ecole des Sciences et Techniques du Bâtiment et de la Route (ESTBR) de l'Université Polytechnique d'Abomey (UPA).

Secrétaire Adjoint chargé du suivi des projets de recherche FRIEND: KINDOHO François, météorologue à la Direction Nationale de la Météorologie (DNM)

1.1.2. Bilan des activités du PHI-VII (y compris les activités du PHI-VIII le cas échéant)

1.2. Activités nationales dans le cadre du PHI

1.2.1. Réunions scientifiques et techniques au niveau national ou local

Au plan scientifique et technique, le comité PHI-Bénin a participé à :

- l'atelier national de renforcement de capacités et de préparation d'un programme national sur la prévision et la gestion des risques liés aux inondations en Mars 2013 à **Cotonou, Bénin** (financement UNESCO);
- l'atelier de lancement du projet Système d'Alerte Précoce (SAP-Bénin)

1.2.2. Participation à des Comités directeurs ou des groupes de travail du PHI

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

Le comité PHI participe de façon active aux activités du projet de recherche AMMA (Analyse Multidisciplinaire de la Mousson Africaine) dont un site d'observation méso-échelle est situé au Nord du Bénin

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

Il existe un projet de recherche Jeune équipes associés financé par l'Institut français de Recherche pour le Développement (IRD) avec lequel nous collaborons au niveau du Bénin. Ce projet porte sur la caractérisation géophysique des aquifère de socle en milieu soudanien pour l'amélioration de la connaissance des ressources en eu souterraines.
Par ailleurs, des collaborations existent avec le programme doctoral WASCAL West African Science Service Center on Climate Change and Adapted Land Use.

1.2.5. Autres initiatives

1.3. Cours d'éducation et de formation

1.3.1. Contribution aux cours du PHI

Sur la période 2012-2013 le Bénin n'a pas été associé au Cours du PHI

1.3.2. Organisation de cours spécifiques

Pour renforcer l'expertise nationale en matière d'hydrologie, et compte tenu des compétences des membres du comité PHI-Bénin certains sont chargés d'unités d'enseignements dans le la Licence le Master Professionnel en Hydrologie à l'Institut National de l'Eau, notamment sur :

- la Gestion Intégrée des Ressources en eau (GIRE) ;
- la gestion des risques hydrologiques et plus largement des risques climatiques ;
- les changements climatiques et leurs impacts sur les ressources en eau ;
- l'hydrologie de surface ;
- l'hydrologie statistique ;
- la géostatistique appliquée aux sciences de l'eau.

1.3.3. Participation aux cours du PHI

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

Dans le cadre de la coopération avec l'Institut UNESCO-IHE pour l'éductaion relative à l'eau, l'ancien Le professeur Afouda co-supervise une thèse de Doctorat sur la modélisation des inondations à Cotonou avec un autre de l'UNESCO-IHE à Delft.

1.5. Publications

Dans le domaine des publications scientifiques voici quelques papier impliquant des membres du comité PHI-Bénin :

1. Avahounlin Ringo F., **Lawin Agnidé Emmanuel**, Alamou Eric, Chabi Amédée and Afouda Abel (**2013**). Analyse Fréquentielle des Séries de Pluies et Débits Maximaux de l'Ouémé et Estimation des Débits de Pointe. ***European Journal of Scientific Research***. *107 (**3**) pp 355-369*.

2. **Emmanuel Agnidé Lawin**, Abel Afouda, Philip G. Oguntundé, Thierry Lebel and Marielle Gosset (**2012**). Rainfall Variability at Regional and Local Scales in the

Ouémé Upper Valley in Bénin. ***International Journal of Science and Advanced Technology***. *2 (6) pp 46 – 55*.

3. **Emmanuel Agnidé Lawin**, Sounmaïla Moumouni, Moïse Adjahouinon and Abel Afouda (**2012**). Variabilité spatiale récente des pluies à Cotonou. ***Revue Spéciale des Journées Scientifiques de la FLASH***, *2 (6) pp 93 – 102*.

4. **Agnidé Emmanuel Lawin**, P. B. Irénikatché Akponikpè, Abdulai Jalloh, Gerald C. Nelson and Timothy S. Thomas (**2013**). Chapter 3: Benin. pp. 53 – 77. **In West African Agriculture and climate change: A comprehensive analysis**. *Edited by Abdulai Jalloh, Gerald C. Nelson, Timothy S. Thomas, Robert Zougmoré, and Harold Roy-Macauley*. 408p

5. Zoubeida Bargaoui, Yves Tramblay, **Emmanuel A. Lawin** and Eric Servat (**2014**). Seasonal precipitation variability in regional climate simulations over Northen basins of Tunisia. ***International Journal of Climatology***. *34 (1) pp 235 – 248. DOI: 10.1002/joc.3683.*

6. Agassounon D. T. M, N C. Kèlomè, **Lawin A. E.**, F.L. Ayi, D. G. Anago, D. Mama, O. B. M. L. Bocodaho, R. Capo – Chichi, C. Ahanhanzo (**2012**). Qualité des eaux de forage utilisée sur le campus d'Abomey – Calavi au Bénin. ***Africa Geoscience Review*** *19 (2) pp 93 – 102*.

7. Raoul Kpegli, Flavien Dovonou, Nicaise Yalo, **Emmanuel Lawin** et Boukari Moussa (**2012**). Cartographie des zones potentielles de mobilisation de la ressource en eau souterraine pour l'AEP dans la commune d'Aplahoué au Bénin. ***Les cahiers du CBRST***, *n°**2**, pp 92 – 112.*

8. Yalo N. **Lawin A. E.**, d'Almeïda G. A. F., Gonçalves T. P. et Dagba G. F. (2013). Contribution de la gravimétrie à l'étude de la partie sud du bassin sédimentaire côtier onshore du Bénin. *Africa Geoscience Review 20 (3&4) pp 67 – 81*.

1.6. Participation aux réunions scientifiques internationales

1.6.1. Réunions tenues dans le pays

Les rencontres organisées ou soutenues par le Comité national PHI-Bénin se résument comme suit :

- l'atelier national de renforcement de capacités et de préparation d'un programme national sur la prévision et la gestion des risques liés aux inondations en Mars 2013 à **Cotonou, Bénin** (financement UNESCO);
- atelier de lancement du Projet (SAP-Benin) de Renforcement de l'information sur le climat et systèmes d'alerte précoce en Afrique pour un développement résilient au climat et adaptation aux changements climatiques (Projet n°00086748), 16 Janvier 2014 à Cotonou ;
- atelier de renforcement des capacités sur l'«Économie de l'adaptation, la sécurité en eau et le développement résilient aux changements climatiques» en Afrique (2013-2015) du 26 au 27 Décembre 2013 à Grand-Popo.

1.6.2. Participation à des réunions à l'étranger

Le comité PHI-Bénin a contribué par sa participation à diverses réunions scientifiques et techniques parmi lesquelles on peut citer:

1. Les deux réunions du groupe d'experts UNESCO (PHI et FRIEND) sur la révision des normes hydrologiques en Avril 2011 et 2013 à **Ouagadougou au Burkina-Faso** ;
2. le 1er Atelier des bassins du Projet HELP situés en Afrique au Sud du Sahara à **Johannesburg** (**Afrique du Sud**) en novembre 2013 ;
3. l'atelier de démarrage du Laboratoire Mixte International PICASS Eau du 7 au 11 Janvier 2013 à **N'Gaoundéré, Cameroun** ;
4. l'atelier régional d'échange d'expérience sur l'analyse du climat en Afrique de l'Ouest du 05 au 08 Février 2013 à **Niamey, Niger** ;
5. l'atelier régional d'évaluation des rapports de synthèses et des politiques d'adaptation aux changements climatiques dans les secteurs Agriculture, santé et zones urbaines en Afrique de l'Ouest, le 12 Juillet 2013 à **Dakar, Sénégal** ;
6. la mission de visite de systèmes d'alerte existants et fonctionnels du 24 au 29 Mars 2014 à **Nairobi au Kenya**; et du 04 au 11 Avril 2014 **à Delft et Lelystad aux Pays-Bas**.

1.7. Autres activités au niveau régional

1.7.1. Coopération ou relations institutionnelles

1.7.2. Projets scientifiques achevés ou en cours

Le comité PHI-Bénin appuie l'implémentation de certains projets/programmes au niveau national à travers l'implication de ses membres notamment : le projet de Promotion de la Connaissance et de Capitalisation de la Recherche sur l'Eau PCREau, le programme AMMA-CATCH (suivi et connaissance du cycle hydrologique du bassin de l'Ouémé), le Projet Systèmes d'Alerte Précoce (SAP-Bénin).

2. ACTIVITES FUTURES

2.1. Activités planifiées jusqu'à décembre 2014

Activité 1 : organiser des réunions semestrielles de bilan des activités du comité ;
Activité 2 : participer aux réunions scientifiques et techniques de l'Institut national de l'eau (INE);
Activité 2 : participer à l'atelier formation « Rain Cell Africa » sur l'utilisation des ondes commerciales de téléphonie cellulaire pour l'estimation des précipitations à Ouagadougou du 11 au 14 Novembre 2014;

2.2. Activités prévues pour la période 2015-2016

Les axes prioritaires d'intervention du PHI-Bénin au niveau national se résument ainsi qu'il suit :

- ✓ renforcement des réseaux de collecte de l'information hydrologique (météorologie, hydrométrie) ;
- ✓ révision des normes hydrologiques au niveau national.
- ✓ renforcement des capacités en matière d'alerte précoce aux risques hydrométéorologiques notamment en matière de prévision des :
    - o phénomènes d'inondation ;
    - o séquences sèches dans la saison des pluies ;
    - o vagues de chaleur.

Ainsi, les activités nationales prévues au titre des deux prochaines années se résument comme suit :

- *Activité 1* : organiser des réunions semestrielles de bilan des activités du comité ;
- *Activité 2* : participer aux activités des projets à caractère hydrologique : projet Système d'Alerte Précoce (SAP-Bénin, PNUD/DG-Eau), projet AMMA-CATCH (IRD/DG-Eau/UAC), Projet PCREau (DG-Eau) ;
- *Activité 3* : organiser un atelier international à Cotonou sur le thème : « *contribution de l'hydrologie à la gestion intégrée des ressources en eau* » ;
- *Activité 5* : participer à des colloques internationaux sur les risques climatiques et plus spécifiquement hydrologiques ;
- *Activité 6* : participer à la collecte et au traitement des informations hydrologiques du pays ;
- *Activité 7* : participer à l'implémentation du projet de rédaction de la troisième communication nationale du Bénin sur les changements climatiques notamment dans le secteur des ressources en eau ;
- *Activité 8* : participer au projet PHI-UNESCO de révision des normes hydrologiques au niveau national et régional ;
- *Activité 9* : participer aux cours d'éducation et de formation du PHI.

2.3. Activités envisagées à long terme

A long terme, le Comité PHI-Bénin vise :

- ✓ le renforcement de la coopération sur les bassins transnationaux partagés à travers les autorités de bassin ;
- ✓ l'amélioration de la connaissance des ressources en eau ainsi que les tendances actuelles et futures impliquées par les changements climatiques

Conclusion

Le présent Rapport est élaboré dans le cadre de la 21ème Session du Conseil Intergouvernemental du PHI-UNESCO du 18 au 20 juin 2014 à Paris en République Française. L'objectif du rapport a été de donner un aperçu sur les activités du Comité national PHI-Bénin au titre de ses engagements vis-à-vis du PHI. Ainsi, nous avons abordé les activités menées par le Bureau du Comité PHI-Bénin au cours de la période Juin 2012 à Mai 2014. Par ailleurs, ce rapport aborde les perspectives pour le reste de l'année 2014 et pour les deux prochaines années.

MINISTERE DE L'EAU, DES AMENAGEMENTS HYDRAULIQUES ET DE L'ASSAINISSEMENT

****

SECRETARIAT GENERAL

BURKINA FASO

Unité- Progrès- Justice

RAPPORT NATIONAL DU BURKINA FASO SUR LES ACTIVITES DU PHI

21e session du Conseil Intergouvernemental du PHI

Paris, 18-20 juin 2014

Présentation : **Seydina Oumar TRAORE**
Directeur Général des Aménagements Hydrauliques

1. ACTIVITES ENTREPRISES PENDANT LA PERIODE JUIN 2012 - MAI 2014

1.1. Réunion du Comité National du PHI

1.1.1. Décisions sur la composition du Comité national du PHI

- le 07 mai 20014, le Conseil des Ministres du Burkina Faso a adopté un décret portant, création, attribution et composition d'un Comite National sur le Programme Hydrologique International(PHI) de l'UNESCO.

- Les projets de décrets portant création, attributions et composition d'un Comité National du Programme Hydrologique International (PHI) du Burkina Faso et d'arrêté interministériel portant organisation et fonctionnement dudit Comité ont été rédigés et soumis en signature.

1.1.2. Bilan des activités du PHI-VII (y compris les activités du PHI-VIII le cas échéant)

1.2. Activités nationales dans le cadre du PHI

1.2.1. Réunions scientifiques et techniques au niveau national ou local
1.2.2. Participation à des comités directeurs ou des groupes de travail du PHI
1.2.3. Projets de recherche de base ou appliquée, aidés ou patronnés
1.2.4. Collaboration avec d'autres organisations ou programmes nationaux ou internationaux
1.2.5. Autres initiatives

1.3 Cours d'éducation et de formation

1.3.1 Contribution aux cours du PHI
1.3.2 Organisation de cours spécifiques
1.3.3 Participation aux cours du PHI

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

1.5 Publications

1.6 Participation aux réunions scientifiques internationales

1.6.1 Réunions tenues dans le pays
1.6.2 Participation à des réunions à l'étranger

1.7 Autres activités au niveau régional

1.7.1 Coopération ou relations institutionnelles
1.7.2 Projets scientifiques achevés ou en cours

2. ACTIVITES FUTURES

2.1. Activités planifiées jusqu'en décembre 2014

- Gouvernance du comité national : structuration du comité par la nomination des membres de l'assemblée générale ainsi que ceux du bureau exécutif**.**
- Elaboration du programme d'activité pour le dernier semestre et la période 2015-2016

2.2. Activités prévues pour la période 2015-2016

- Mise en œuvre des activités programmées pour la période 2015-2016

2.3. Activités envisagées à long terme

Les activités envisagées à long terme seront celles définies et arrêtées par le Comité National et cela, conformément aux textes qui le régissent.

Canadian National Committee Report to the 21st Session of the Intergovernmental Council of the UNESCO International Hydrological Program
Paris, 18-20 June 2014

Key National Activities

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

Completed Programs/National Assessments

Environment Canada's National Scientific Assessments

The Water Science and Technology Directorate (WSTD), led and published scientific assessments of priority freshwater issues in Canada. Written by experts from government (federal, provincial, territorial, municipal), universities and industry, these assessments provide a synthesis of scientific knowledge, trends, and information and program needs with the intent of providing knowledge to assist water science decision-makers, managers and the research community in setting research priorities, making informed decisions, and in developing sound management policies and practices. Although the series of assessments ended in 2007, we include them in this report as they are still relevant to present day issues, and with regards to IHP VIII themes and focal areas. For more information, please visit http://www.ec.gc.ca/inre-nwri/default.asp? lang=En&n=CD9F99ED-1#sars.

There are eight reports in the series:

1. Threats to Sources of Drinking Water and Aquatic Ecosystem Health in Canada (2001)
2. National Assessment of Pulp and paper Environmental Effects Monitoring Data (2003)
3. Threats to Water Availability in Canada (2004)
4. A Decade of Research on the Environmental Impacts of Pulp and Paper Mill Effluents in Canada (1992-2002) (2004)
5. National Assessment of Pulp and Paper Environmental Effects Monitoring Data: Findings from Cycles 1 through 3 (2005)

6. Research into Action to Benefit Canadians (2005)
7. Microbial Source Tracking in Aquatic Ecosystems: The State of the Science and an Assessment of Needs (2006)
8. Pharmaceuticals and Personal Care Products in the Canadian Environment: Research and Policy Directions (2007)

Agriculture and Agri-foods Canada Programs

Agriculture and Agri-foods Canada (AAFC) and its Prairie Farm Rehabilitation Administration (PFRA) Branch continue their national roles for environmental and water management programming related to Canadian agriculture and water. Over recent years, a number of key programs that could inform IHP VIII have concluded, including: Environmental Farm Planning; National Farm Stewardship Program; National Water Supply Expansion Program; Prairie Shelterbelt Program; Greencover Canada Program; Watershed Evaluation of BMPs. For information on these programs and their outcomes, please visit http://www.agr.gc.ca.

Canadian Drought Research Initiative

The Canadian Drought Research Initiative (Canada DRI) was a Research Network that brought together many university and federal/provincial government researchers to address Canadian drought with expertise encompassing the atmospheric, hydrologic, land surface, and predictive aspects of droughts at a variety of spatial and temporal scales. Because of the enormous economic, environmental and societal impacts, the Drought Research Initiative (DRI) was established in 2005 to coordinate and integrate drought research in Canada. To make progress on this critical issue, DRI focused on the drought (1999-2004/05) over the Canadian Prairies. The objective of DRI was to better understand the physical characteristics of and processes influencing Canadian Prairie droughts, and to contribute to their better prediction. This initiative has now successfully concluded. The final report from Canada DRI (2011) is available at http://www.drinetwork.ca/final_report.php.

Improved Processes and Parameterisation for Prediction in Cold Regions

Improved Processes and Parameterisation for Prediction in Cold Regions (IP3) was a Canada-wide Research Network (comprised of several dozen investigators and collaborators from across Canada, the US, and Europe) devoted to an improved understanding of surface water and weather systems in cold regions, particularly in Canada's Rocky Mountains and western Arctic regions. These issues are of key importance to agriculture and urban and industrial

development in the Prairies and Canadian northwest. IP3 developed an improved understanding of cold regions hydrometeorology and tested advances in atmospheric and hydrological prediction in the Rocky Mountains and the Arctic along a transect of high latitude and high altitude instrumented research sites that characterize the cold regions of Canada. IP3 was a component of the International Polar Year (IPY), the Climate and Cryosphere project (CliC) of the World Climate Research Programme, and the International Decade for Prediction in Ungauged Basins (PUB). IP3 drew to its successful completion in March 2010. For more information, please visit http://www.usask.ca/ip3/.

Canadian International Polar Year (2007-2011)

The International Polar Year (IPY) 2007-2008 marked the largest-ever international program of scientific research focussed on the Arctic and Antarctic regions. The Canadian IPY program was a 4-year program (2007-2011). Canada played an important global leadership role for IPY, and beyond, through the support of multi-national research collaborations, the participation of leading Canadian scientists and its role as host to top research teams from around the world. Canada delivered an ambitious program for IPY, providing support of $150 million for 44 Canadian IPY projects, for its scientific effort to create a more complete scientific understanding of the North that can be applied to address issues related to our environment and the well-being of Northern communities. Highlights of the Government of Canada Program for IPY include:

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

For more information, please visit http://www.api-ipy.gc.ca/pg_IPYAPI_071-eng.html.

Western Canadian Cryospheric Network

The Western Canadian Cryospheric Network (WC^2N) was a consortium of six Canadian universities, two American universities and government and private scientists who examined the links between climatic change and glacier fluctuations in western Canada. The aim of WC^2N was to understand the behaviour of the climate system and its effects on glacier mass balance in the mountain ranges of British Columbia and western Alberta. This research, without duplication, was aligned with other proposed and ongoing cryospheric research and monitoring networks in Canada and elsewhere. Taken together, these networks and the resultant synergies yielded a nationwide assessment of the past, present, and future response of Canadian glaciers to changing climates. WC^2N was concluded successfully in January 2010. For more information, please visit http://wc2n.unbc.ca/

Contributions to International Programs/Assessments

Arctic Monitoring and Assessment Program

The Arctic Monitoring and Assessment Program (AMAP), one of five working groups under the Arctic Council (AC), had initiated (April 2008) an international scientific assessment entitled "Climate Change and the Cryosphere: Snow, Water, Ice, and Permafrost in the Arctic (SWIPA)", which was to act as a follow-up assessment about the cryosphere since completion of the Arctic Climate Impact Assessment (ACIA). SWIPA was coordinated by AMAP, IASC, WMO (WCRP-CliC) and IPY, and assessed current scientific information on changes in the Arctic cryosphere, including the impacts of climate change on the ice, snow, and permafrost characteristics of the Arctic, which have potentially far-reaching implications for both the Arctic and the Earth as a whole. Canadian scientists were major contributors to SWIPA chapters. This assessment was published in 2011, and in turn contributed to the Fifth Assessment Report (AR5) of the UN Intergovernmental Panel on Climate Change (UNIPCC). For more information on AMAP and SWIPA, please visit http://www.amap.no/.

Arctic Council - Conservation of Arctic Flora and Fauna (CAFF)

Conservation of Arctic Flora and Fauna (CAFF) is a working group under the Arctic Council (AC) with the mandate to address the conservation of Arctic biodiversity, and communicate the findings to the governments and residents of the Arctic, helping to promote practices which ensure sustainability of the Arctic's living resources. Canada continues to contribute to CAFF by: (i) co-leading with Sweden the Freshwater Expert Monitoring Group (FEMG) of the Circumpolar Biodiversity Monitoring Program (CBMP) and development of a circumpolar monitoring

network/program; (ii) lead, co-lead and contributing Canadian authors to chapters of the Arctic Biodiversity Assessment (ABA 2013). For more information on CAFF, CBMP, and the ABA, please visit http://www.caff.is/.

Arctic Freshwater Biodiversity Monitoring Plan

The Arctic Freshwater Biodiversity Monitoring Plan (The Freshwater Plan) details the rationale and framework for improvements related to the monitoring of freshwaters of the circumpolar Arctic, including ponds, lakes, their tributaries and associated wetlands, as well as rivers, their tributaries and associated wetlands. The monitoring framework aims to facilitate circumpolar assessments by providing Arctic countries with a structure and a set of guidelines for initiating and developing monitoring activities that employ common approaches and indicators. The Freshwater Plan is part of the Circumpolar Biodiversity Monitoring Program (CBMP) of the Conservation of Arctic Flora and Fauna (CAFF) that is working with partners to harmonize and enhance long-term Arctic biodiversity monitoring efforts in order to facilitate more rapid detection, communication and response to significant trends and pressures. Canada co-leads this initiative with Sweden). For more information on the CBMP, please visit http://www.caff.is/.

The Climate and Cryosphere Project

The Climate and Cryosphere (CliC) Project was established in 2000 under the World Climate Research Program (WCRP) to stimulate, support, and coordinate research into the processes by which the cryosphere interacts with the rest of the climate system. The CliC project's principal goal is to assess and quantify the impacts that climate variability and change have on components of the cryosphere and its overall stability, and the consequences of these impacts for the climate system. Canada currently chairs CliC, and has led the theme “The Terrestrial Cyrosphere and Hydrometeorology of Cold Regions” and now leads a new cross-cutting theme “Arctic Freshwater Synthesis” (see below). For more information, please visit http://www.climate-cryosphere.org/.

Arctic Freshwater Synthesis

Over the next two years, the World Climate Research Programme’s (WCRP) Climate and the Cryosphere Project (CliC), the International Arctic Science Committee (IASC), and the Arctic Council’s Arctic Monitoring and Assessment Program (AMAP) are supporting the production of

an internationally authored Arctic Freshwater Synthesis (AFS) as a contribution to the 3rd International Conference on Arctic Research Planning (ICARP III), the WCRP's Grand Challenges, and AMAP's Adaptation Actions for a Changing Arctic. The overall goal of the AFS is to synthesize our current scientific understanding of Arctic freshwater *sources, fluxes, storage and effects*, with the project structured around 5 major components: atmosphere, ocean, terrestrial hydrology, terrestrial ecology and resources. Canada has the lead scientific role for the production of the AFS and has established lead and contributing authors for it. For more information, please visit http://www.climate-cryosphere.org/.

New and Ongoing Programs/Activities

Academia

ArcticNet

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

Canadian Water Network

The Canadian Water Network (CWN) is a national Network of Centres of Excellence focused on research and knowledge mobilization on three core water management challenges: protecting public health, protecting watersheds and ecosystems, and ensuring sustainable water infrastructure. Primarily federally-funded, CWN has invested over $41 million over 14 years in research, leveraging the capacity of Canadian academic researchers to address knowledge

needs in strategic areas of:

- Management of land use and resource development impacts on watersheds;
- Municipal water management, infrastructure and technologies , including drinking water, wastewater, and storm water;
- Small, remote and Aboriginal community water management and governance issues; and
- Protection of the quality and quantity of source water security for a range of uses.

CWN uses a collaborative consortium-based approach to focus research and knowledge mobilization activities to address broad national issues prioritized by collective public and private sector end users. This approach attracts partner co-investment and facilitates the development of research-based solutions that are actionable for end users and result in better informed decision-making on investments, policies, practices, and risk management strategies. Email contact: Dr. Simon Courtenay, Scientific Director, scourtenay@cwn-rce.ca.

Global Institute for Water Security

The Global Institute for Water Security (GIWS) at the University of Saskatchewan was created in 2011, with $30 million initial funding from the award of a Canada Excellence Research Chair in Water Security to Dr. Howard Wheater. Working in close partnership with Environment Canada, GIWS current membership includes 78 Faculty and senior researchers and 87 students, and it supports 157 personnel. GIWS's core themes are closely aligned with UNESCO's IHP initiatives, and its members are actively involved in UNESCO activities. Key examples of GIWS IHP VIII-related activities include: IHP Theme 1, 5 - improving prediction of water resources under environmental change, particularly for high latitudes and cold regions.; IHP Theme 2 – improved understanding of uncertainties associated with groundwater supply and management in agricultural landscapes; IHP Theme 3 – exploration and modeling of the effects of agricultural and urban land and water management on water quality and water movement through a watershed, as well as the potential for agricultural beneficial management practices (BMPs) to mitigate adverse effects; IHP Theme 6 – significant emphasis is placed on education and training of future water scientists. Dr. Wheater continues to co-Chair G-WADI, and will be a key-note speaker at the 2014 Kovacs symposium. Two key initiatives are (a) establishment of the 340,000 km^2 Saskatchewan River Basin (SaskRB) as a large-scale observatory and Regional Hydroclimate Project (RHP) of the World Climate Research Programme's Global Energy and Water Exchanges (GEWEX) initiative, and (b) leadership of the Changing Cold Regions Network, which is focused on diagnosis and prediction of environmental change in the Saskatchewan and Mackenzie River Basins in western Canada. For more information on GIWS, please access the

founding research report available at: http://www.usask.ca/water/documents/GIWS_Research_Report_2011-13.pdf; or contact GIWS Email: water.security@usask.ca.

NSERC HydroNet

NSERC HydroNet is a national research network aimed at promoting sustainable hydropower and healthy aquatic ecosystems in Canada. The general objectives of the network are to increase our understanding and develop new tools to better assess, minimize, and mitigate the effects of hydropower on fish and their habitats. NSERC HydroNet is supported by the NSERC (Natural Sciences and Engineering Research Council of Canada) to develop the partnerships to strengthen the scientific basis of decisions regarding hydropower generation effects on the environment. The research program will provide scientifically defensible and transparent tools to assess, mitigate and minimize potential impacts of hydropower generation on aquatic ecosystems, improve the decision-making process associated with hydropower operations, and reduce conflict among water resource users. For more information, please visit http://www.hydronet.umontreal.ca/.

Government

Environment Canada

Environment Canada (EC) has the mandate to conduct regional and national operational monitoring programs on water quantity (Meteorological Service Canada – Water Survey of Canada Program) and water quality (Water Quality Monitoring and Surveillance – Water Sciences and Technology Directorate). The Water Survey of Canada (WSC) is the national authority responsible for the collection, interpretation and dissemination of standardized water resource data and information in Canada. In partnership with the provinces, territories and other agencies, WSC operates over 2800 active hydrometric gauges across the country. Working with other government agencies/departments, EC contributes to integrated ecosystem and watershed management approaches that draw on sustainable development principles. These are designed to ensure that decision making reflects the interests of many stakeholders and balances a range of goals, including sustainable water and aquatic resource management; protection from water quality-linked health threats; protection of aquatic ecosystems and species; and reduction of the health, economic and safety impacts from floods and droughts. In addition, EC is Canada's lead department in freshwater research, focusing on

the generation of new scientific knowledge needed to sustain Canada's water resources and freshwater ecosystems. For more information see: http://ec.gc.ca.

Environment Canada's Priority Ecosystem Programs/Initiatives

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

- Atlantic Coastal Action Program, is centred on community-based leadership and delivery to address environmental and sustainable development issues in ecosystems involving watersheds and coastal areas throughout Atlantic Canada;
- St. Lawrence Action Program, which addresses quantity and quality aspects of river flow originating from the upstream Great Lakes system, and biodiversity conservation;
- Great Lakes Program, which addresses water quality/contaminants and the development of remedial action plans. This program has links to International Joint Commission priorities about shared water resources between Canada and the United States;
- Lake Simcoe/ South–eastern Georgian Bay Clean-Up Fund, the Government of Canada has established a renewed and expanded 2012-2017 Lake Simcoe/South-eastern Georgian Bay Clean-up Fund. The extension and expansion of the program will reduce phosphorous inputs into Lake Simcoe and South-eastern Georgian Bay, improve water quality, and conserve critical aquatic habitat and associated species in these waters;
- Georgia Basin Action Plan, located primarily in the Fraser River Basin of British Columbia, that focuses on water quality/quantity and integrated watershed management; and
- Lake Winnipeg Basin Initiative, which takes a science-based approach to better understand how to solve the serious water quality issues facing this vital watershed.

More information on Environment Canada's Programs/Initiatives is available at http://ec.gc.ca/nature/default.asp?lang=En&n=2C63408C-1.

Federal Sustainable Development Strategy (FSDS)

The FSDS fulfills the requirements of the *Federal Sustainable Development Act,* passed by Parliament in 2008, by rendering environmental decision-making more transparent and accountable to Parliament. The FSDS goals, targets and implementation strategies are organized under themes, including a theme on maintaining water quality and availability (http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1).

Canadian Environmental Sustainability Indicators (CESI)

CESI measure the progress of the Federal Sustainable Development Strategy, report to Canadians on the state of the environment, and describe Canada's progress on key environmental sustainability issues. The indicators, built on rigorous methodology, are added and updated as new, high quality data become available. There are several indicators related to water quantity and quality and regional ecosystems (http://www.ec.gc.ca/indicateurs-indicators/).

Canada Water Act and International River Improvements Act Reporting

Environment Canada leads the legislative reporting requirements for the Canada Water Act (CWA) and the International River Improvement Act (IRIA). The CWA report summarizes a wide range of federal activities under the authority of the Act, including participation in federal-provincial-territorial agreements and undertakings, significant water research and water-related public information programs. The goal of the IRIA is to ensure that Canada's water resources in international river basins are developed and used in the best national interest. The CWA and IRIA annual reports can be obtained at: www.ec.gc.ca/eau/water.

Effluent Management Program

Environment Canada is the Government of Canada lead for effluent management to minimize the risks to the environment and human health from water pollution. It does this by developing, implementing and administering pollution prevention and control strategies and programs, such as pollution prevention plans, regulations, codes of practice, guidelines and environmental performance agreements. It works under the Canadian Environmental Protection Act, 1999 and the Fisheries Act. These programs address waste discharges and substances of concern from industrial and public sectors, including but not limited to the mining and processing, forestry, wastewater and other sectors. Key activities include conducting research and risk analysis; developing and implementing regulations and other control instruments; assessing the results of environmental effects monitoring conducted by regulated facilities and providing technical advice to environmental assessments. Key regulations administered under this activity include the Wastewater Systems Effluent Regulations, the Metal Mining Effluent Regulations, and the Pulp and Paper Effluent Regulations under the Fisheries Act. There are shared, and to a certain extent, overlapping

water pollution control related powers for federal and provincial governments in Canada. Inter-governmental cooperation is a necessity in managing water pollution. For more information, please contact the program by e-mail at FPFA-PFLP@ec.gc.ca.

Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring

The oil sands are a strategic natural resource for Canada, and a key driver of economic development. However, the expansion of oil sands development has led to the need for a better understanding of the potential cumulative environmental effects. The Government of Canada and the Government of Alberta are working together on a phased and adaptive approach to monitoring to ensure that this important resource is developed in an environmentally responsible way.

The joint plan strengthens environmental monitoring programs for air, water, land and biodiversity in the oil sands region. It will result in improved knowledge of the state of the environment in the oil sands area and an enhanced understanding of cumulative effects and environmental change, including future impacts arising from multiple stressors, which will become more important to understand as development continues. Monitoring enhancements are already underway and will continue to be phased in over the next three years to ensure installation of necessary infrastructure, incremental enhancement of activities and appropriate integration with existing monitoring activities in the region.

By the time the three-year plan is fully-implemented in 2015:

- the number of sampling sites will be higher and over a larger area;
- the number and types of parameters being sampled will increase;
- the frequency (how many times) that sampling occurs each year will be significantly increased;
- the methodologies for monitoring for both air and water will be improved; and
- an integrated, open data management program will be created.

A Canada-Alberta Oil Sands Environmental Monitoring Information Portal has been established (http://www.jointoilsandsmonitoring.ca). On this portal, information related to the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring, including maps of the monitoring region, details of the monitoring sites, the most up-to-date data collected by scientists, and scientific analysis and interpretation of the data and results can be obtained. As

more data becomes available over the coming months, this site will evolve with new updates and features, and become more comprehensive. As it grows, the environmental monitoring data and information available on this site will enable concerned parties to conduct their own analysis and draw their own conclusions.

Other Federal Water Programs

Agriculture and Agri-foods Canada Programs

Agriculture and Agri-foods Canada (AAFC) and its Prairie Farm Rehabilitation Administration (PFRA) Branch continue their national roles for environmental and water management programming related to Canadian agriculture and water. Some of their key programs and support related to agriculture and water include: Canadian Agricultural Adaptation Program; Community Pasture Program; Drought Watch; Geospatial Products Program to view such things as drought conditions, soil types, etc.; National Land and Water Information Service; Pesticide Risk Reduction Program. http://www.agr.gc.ca.

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

The National Land and Water Information Service (NLWIS) is an Internet-based service developed to provide on-line access to agri-environmental information to help Canadians make responsible land-use decisions. The federal government invested $100.1 million over four years (2005-2009) to implement the new service. The service is now online, continues to be supported by Ag Canada, and is free for anyone to use. The NLWIS is recognized as Canada's source of information, analysis and interpretation of agri-environmental data on land use, soil, water, climate and biodiversity to assist land-use decision makers. These land-use decision makers include governments, community groups, researchers, producers and industry. Development of the National Land and Water Information Service was built on other efforts to reduce agricultural risks and better use Canada's land, soil, water and biodiversity resources. Among these efforts are initiatives to: (i) identify beneficial management practices (BMPs) that protect land from wind and water erosion, improve water supply and quality, enhance biodiversity and increase carbon sequestration in the soil; (ii) help producers adopt these BMPs for soil, nutrient and livestock management; and (iii) measure and track the environmental performance of Canadian agriculture. http://www.horizons.gc.ca/eng/content/aafc-geomatics-

%E2%80%93-national-land-and-water-information-service-nlwis.

International Joint Commission

The International Joint Commission (IJC) is a binational institution established under the 1909 Boundary Waters Treaty to help prevent and resolve disputes between the United States of America and Canada. The IJC continues to act as an independent and objective advisor to the two governments, pursuing the common good of both countries. The IJC acts impartially in reviewing problems and deciding on issues, rather than representing the views of their respective governments. Through the IJC, the two countries continue cooperate to manage shared waters wisely and to protect them for the benefit of today's citizens and future generations. The Government of Canada funds the Canadian Section of the IJC, and also provides in-kind contributions of expertise, supplying the IJC with experts in engineering, hydrology, and other fields to serve on the IJC's various boards. These experts assist the IJC in regulating water levels and flows, and contribute to other work under the Commission, including recent work related to water level extremes in the Great Lakes. For more information, please contact the International Affairs Branch, Environment Canada, Government of Canada.

NRCan Groundwater Program

Groundwater is important to health, economy and ecosystems in Canada. It provides drinking water to about one third of all Canadians and up to 80% of the rural population. In the face of growing pressure on water resources due to urbanization, economic development and growing energy demand, Canada needs a consistent and coordinated approach to groundwater management. The Geological Survey of Canada through NRCan's Groundwater Geosciences Program assesses Canada's key aquifer systems and makes the data available through a national groundwater portal (the Groundwater Information Network (GIN)) that links several databases to provide baseline information useful to stakeholders (government, private sector, industry, water management agencies, and well owners) in their decision-making process. The aquifer assessment and characterization activities are a combination of geological mapping, regional hydrogeological assessments, and groundwater modeling that form an inventory of the main regional aquifers of Canada. They are intended to advance groundwater management across Canada The data from the assessment activities are made available through the GIN. The GIN aims to improve knowledge of groundwater systems and enhance groundwater management through increased access to groundwater information. It connects databases

from NRCan's key aquifer information and several provinces and territories. For more information on NRCan's groundwater program, and access to numerous reports and publications, please visit http://www.nrcan.gc.ca/earth-sciences/resources/federal-programs/groundwater-geoscience-program/10909.

NRCan's Contribution to other UNESCO Programs

Dr. A. Rivera (NRCan) participates in the UNESCO/IGRAC program on groundwater Meta-Information Module (MiM) to facilitate online conversation between its networks of groundwater professionals, contributes to the UNESCO/IAH Groundwater Governance Program, and is a Member of the Permanent Consultation Mechanism of the Groundwater Governance Project: A Global Framework for Action.

Major Hydrological Sciences Societies

Canadian Geophysical Union - Hydrology Section

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

Canadian Water Resources Association

The Canadian Water Resources Association (CWRA) is a national organization of individuals and organizations from the public, private and academic sectors that are committed to raising awareness of the value of water and to promoting responsible and effective water resource management in Canada. CWRA membership consists of water users and water resource professionals including managers, administrators, scientists, academics, students and young

professionals. CWRA objectives are to: (i) stimulate awareness and understanding of Canada's water resources; (ii) encourage recognition of the high priority and value of water; (iii) provide a forum for the exchange of information and opinion relating to the management of Canada's water; and (iv) participate with appropriate agencies in international water management activities. Association activities include organizing conferences, symposiums and workshops dealing with a wide range of water management issues, quarterly publication of Canadian Water Resources Journal and the newsletter, Water News, as well as publishing papers and reports. Affiliated with CWRA are the Canadian National Committee on Irrigation and Drainage (CANCID), Canadian Society for Hydrological Sciences (CSHS), and the Project WET which is an international, interdisciplinary, water education program for formal and non-formal educators of kindergarten to grade 12 students intended to supplement a school's existing curriculum.
For more information, please visit http://www.cwra.org.

Canadian Meteorological and Oceanographic Society

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

International Association of Hydrogeologists and the Canadian National Chapter

The International Association of Hydrogeologists (IAH/AIH) is a scientific and educational charitable organization for scientists, engineers, water managers and other professionals working in the fields of groundwater resource planning, management and protection. Founded in 1956, it has grown to a world-wide membership of more than 4000 individuals. IAH aims to be a leading international society for the science and practice of hydrogeology and to be a

globally recognized information source and facilitator for the transfer of groundwater knowledge. IAH endeavours to raise awareness of groundwater issues and work with national and international agencies to promote the use of groundwater to ensure ready access to safe drinking water. IAH also promotes the protection of aquifers against pollution, the improvement of aquifer storage and the management of groundwater resources to assure the sustainability of groundwater-dependent ecosystems. The current President of IAH is a Canadian, Professor Ken Howard (University of Toronto). For more information on IAH, please visit http://iah.org.

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

Contributions to UNESCO Meetings/Sponsored Workshops

UNESCO-ISARM Americas Workshops and Expert Meetings

Alfonso Rivera (NRCan) continues to participate in UNESCO-ISARM workshops (2005-present) as the national coordinator of Canada. His contributions to ISARM over the past years have included: leading a working group charged with preparing a strategy for sustainable management of the transboundary aquifer systems of the Americas (TAS) – the vision and mission of the strategy were accepted endorsed by the National Coordinators (NCs) in December 2008; and in September 2009 the results of the working group on the strategy were presented and endorsed by the NCs at the meeting in Quito. The Quito meeting also helped complete the 3rd book of the UNESCO-ISARM series to which he made significant contributions. In 2014, he was editor, and made contributions as a co-author to the Book IV of the UNESCO-ISARM series, entitled *Regional Strategy for the Assessment and Management of the Transboundary Aquifers Systems (TAS) in the Americas* (in press).

Fifth Regional Consultation: UNECE Region

Alfonso Rivera (NRCan) was invited as the UNESCO's Rapporteur for the Fifth Regional Consultation: UNECE Region, The Hague Institute for Global Justice, 19-21 March 2013, and provided an extensive rapport of the meeting.

IHP UNESCO Region 1 Meeting

Canada participated in the IHP UNESCO Region 1 Meeting held in Oslo, Norway, on 21-22 October 2013. At the meeting it reported on current and relevant Canadian hydrological and ecohydrological activities that contribute to and /or inform IHP themes and focal areas.

Contributions to UNESCO Hydrological Reports and Publications

Aquatic Habitats in Sustainable Urban Water Management (Science, Policy and Practice)
Edited by Iwona Wagner, ***Jiri Marsalek*** and Pascal Breil (2008)
UNESCO-IHP Urban Water Series – UNESCO Publishing / Taylor & Francis

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

Managing Water Resources - Methods and Tools for a Systems Approach
By ***Slobodan P. Simonović*** (2009)
UNESCO Studies and Reports in Hydrology Series – UNESCO Publishing / Earthscan

This volume describes the 'systems approach' and its application to contemporary water resources management, focusing on three main sets of tools: simulation, optimization and multi-objective analysis. This approach is presented in the context of sustainable planning and development under conditions of uncertainty. There are two particular features of Managing Water Resources: its introduction of system dynamic simulation as a tool for integrated modeling and its coverage of the use of fuzzy sets for incorporating objective and subjective uncertainties. The book combines theory and practical examples, and includes programs and

exercises on an accompanying CD-ROM. It constitutes both an advanced text for students of water resources and civil or environmental engineering and a practical guide for professionals.

Braun, L.N., Hagg, W., Severskiy, I.V. and ***Young, G.***, (eds), 2009. Assessment of Snow, Glacier and Water Resources in Asia Papers from Workshop held in Almaty, Kazakhstan, 28-30 Nov. 2006; Joint Publication of UNESCO-IHP and the German National Committee for IHP/HWRP, 242pp.

ISARM-Americas 2010. *Socioeconomic, Environmental and Climatic aspects of the TAS in the Americas.* Book III of the UNESCO-ISARM series, UNESCO/OAS - ISARM AMERICAS Program. ***Alfonso Rivera*** and others contributed significantly to this ISARM-Americas publication

Rivera, A. 2009a. Terms of reference. Working Group on Strategy for the TAS of the Americas. October 2, 2009. Report submitted to UNESCO on October 2, 2009.

Rivera, A. 2009b. Summary of the discussions of the working group on the strategy of TAS held on September 17, 2009 in Quito. Report submitted to UNESCO on October 2, 2009.

Rivera, A. et al, 2010. Towards a regional strategy for the management of the transboundary aquifer systems in the Americas. Paper presented at the UNESCO-ISRAM International Conference in Transboundary Aquifers to be held in Paris in December 2010.

Rivera, A. 2014. Regional Strategy for the Assessment and Management of the Transboundary Aquifers Systems (TAS) in the Americas. Alfonso Rivera (ed.), Book IV of the UNESCO-ISARM series, UNESCO/OAS - ISARM AMERICAS Program. (in press).

Young, G. J. 2009. The elements of high mountain hydrology with special emphasis on Central Asia. Proceedings of Workshop held in Almaty, Kazakhstan, 28-30 Nov. 2006; Joint Publication of UNESCO-IHP and the German National Committee for IHP/HWRP, 9-18.

Status and Future Directions

Through its various hydrological programs led or funded by Government Departments and Agencies, Granting Councils, Universities and Industry, Canada is positioned to address many of the core programme themes and related focal areas of the eighth phase of the IHP (2014-2021). Areas of proposed contribution are identified by an *:

Theme 1: Water-related Disasters and Hydrological Change

* 1.1 Risk management as adaptation to global changes
* 1.2 Understanding coupled human and natural processes
* 1.3 Benefiting from global and local Earth observation systems
* 1.4 Addressing uncertainty and improving its communication
* 1.5 Improve scientific basis for hydrology and water sciences for preparation and response to extreme hydrological events

Theme 2: Groundwater in a changing environment

* 2.1 Enhancing sustainable groundwater resources management
* 2.2 Addressing strategies for management of aquifers recharge
* 2.3 Adapting to the impacts of climate change on aquifer systems
* 2.4 Promoting groundwater quality protection
* 2.5 Promoting management of transboundary aquifers

Theme 3: Addressing Water Scarcity and Quality

* 3.1 Improving governance, planning, management, allocation, and efficient use of water resources
* 3.2 Dealing with present water scarcity and developing foresight to prevent undesirable trends
* 3.3 Promoting tools for stakeholders involvement and awareness and conflict resolution
* 3.4 Addressing water quality and pollution issues within an IWRM framework - improving legal, policy, institutional, and human capacity
* 3.5 Promoting innovative tools for safety of water supplies and controlling pollution

Theme 4: Water and human settlements of the future

4.1 Game changing approaches and technologies
4.2 System wide changes for integrated management approaches
4.3 Institution and leadership for beneficiation and integration
4.4 Opportunities in emerging cities in developing countries
4.5 Integrated development in rural human settlement

Theme 5: Ecohydrology, engineering harmony for a sustainable world

* 5.1 Hydrological dimension of a catchment – identification of potential threats and

opportunities for a sustainable development

* 5.2 Shaping of the catchment ecological structure for ecosystem potential enhancement — biological productivity and biodiversity
* 5.3 Ecohydrology system solution and ecological engineering for the enhancement of water and ecosystem resilience and ecosystem services
* 5.4 Urban Ecohydrology – storm water purification and retention in the city landscape, potential for improvement of health and quality of life
* 5.5 Ecohydrological regulation for sustaining and restoring continental to coastal connectivity and ecosystem functioning

Theme 6: Water Education, key for Water Security

* 6.1 Enhancing tertiary water education and professional capabilities in the water sector
* 6.2 Addressing vocational education and training of water technicians
* 6.3 Water education for children and youth
* 6.4 Promoting awareness of water issues through informal water education
* 6.5 Education for transboundary water cooperation and governance

Prepared by:

Dr. Fred J. Wrona, National Canadian IHP Chair and Chief Delegate (fred.wrona@ec.gc.ca)
Dr. Terry D. Prowse, Science Advisor (terry.prowse@ec.gc.ca)
Mr. Peter di Cenzo (Program Secretariat) (peter.dicenzo@ec.gc.ca)

Water Science and Technology Directorate, Environment Canada

On behalf of the Canadian National Committee

Rapport du Comité national canadien à la 21e session du Conseil intergouvernemental du Programme hydrologique international de l'UNESCO
Paris, 18 au 20 juin 2014

Principales activités nationales

Ces quelques dernières années, le Canada a mené à bien un certain nombre de grands programmes et initiatives hydrologiques et en a ajouté à sa liste. Le présent rapport d'ensemble cite des exemples (la liste est forcément incomplète) de programmes et d'activités clés du Canada en hydrologie. Ils proviennent d'un éventail de programmes et de recherches portant sur l'eau au Canada et représentant un apport ou un éclairage possible pour les priorités et les axes d'étude du PHI de l'UNESCO.

Programmes et bilans terminés sur le plan national

Évaluations scientifiques nationales à Environnement Canada

La Direction des sciences et de la technologie de l'eau (DSTE) a dirigé et publié des évaluations scientifiques des questions prioritaires concernant les eaux douces au Canada. Rédigés par des spécialistes des administrations publiques (niveaux fédéral, provincial, territorial et municipal), des universités et de l'industrie, ces bilans livrent une synthèse des connaissances scientifiques, des tendances et des besoins en renseignements et en programmes en vue d'aider les décideurs, les gestionnaires et les chercheurs de la science de l'eau à établir leurs priorités en recherche, à adopter des décisions éclairées et à élaborer des politiques et des pratiques saines de gestion. Bien que cette série d'évaluations ait pris fin en 2007, le présent rapport en fait état car elles ont gardé leur actualité et intéressent les thèmes et les axes d'étude de la phase VIII du PHI. Pour plus de renseignements, prière de composer http://www.ec.gc.ca/inre-nwri/default.asp? lang=Fr&n=CD9F99ED-1#sars.

La série compte huit rapports :

1. Menaces pour les sources d'eau potable et les écosystèmes aquatiques au Canada (2001).
2. Évaluation nationale des données provenant des études de suivi des effets sur l'environnement des fabriques de pâtes et papiers (2003).
3. Menaces pour la disponibilité de l'eau au Canada (2004).
4. Dix ans de recherches sur les effets environnementaux des effluents des fabriques de pâtes et papiers au Canada (1992-2002) (2004).

5. Évaluation nationale des données provenant des études de suivi des effets sur l'environnement des fabriques de pâtes et papiers : Résultats des cycles 1 à 3 (2005).
6. La recherche, fondement de décisions prises pour le bénéfice des Canadiens (2005).
7. Le dépistage des sources de pollution microbienne dans les écosystèmes aquatiques : état de la science et évaluation des besoins (2006).
8. Les produits pharmaceutiques et de soins personnels dans l'environnement au Canada : Directions de la recherche et des politiques (2007).

Programmes d'Agriculture et Agroalimentaire Canada

Agriculture et Agroalimentaire Canada (AAC) et son secteur de l'Administration du rétablissement agricole des Prairies (ARAP) continuent à jouer leur rôle national sur le plan des programmes de gestion environnementale et hydrique dans tout ce qui est agriculture et eau au Canada. Ces dernières années, un certain nombre de grands programmes susceptibles d'éclairer la phase VIII du PHI sont parvenus à leur conclusion, notamment la Planification environnementale à la ferme, le Programme national de gérance agroenvironnementale, le Programme national d'approvisionnement en eau, le Programme des brise-vent des Prairies, le Programme de couverture végétale du Canada et l'Évaluation des pratiques de gestion bénéfiques à l'échelle des bassins hydrographiques. Pour plus de renseignements sur ces programmes et leurs résultats, prière de visiter le site Web suivant : http://www.agr.gc.ca.

Initiative de recherche sur la sécheresse au Canada

Le Réseau canadien de recherche « Initiative de recherche sur la sécheresse » (IRS Canada), qui réunit maints chercheurs des universités et des paliers fédéral et provincial, aborde la question de la sécheresse au pays avec des compétences englobant les aspects atmosphériques, hydrologiques, topologiques et prévisionnels des sécheresses à diverses échelles spatiotemporelles. À cause des répercussions énormes des sécheresses sur l'économie, l'environnement et la société, l'IRS a vu le jour en 2005 pour une coordination et une intégration des recherches qui se font au Canada dans ce domaine. Voulant progresser dans ce dossier essentiel, l'IRS s'est attachée aux conditions de sécheresse (de 1999 à 2004-2005) dans les Prairies canadiennes. Elle vise à mieux faire comprendre les caractéristiques physiques des phénomènes qui influent sur les sécheresses dans cette région canadienne, ainsi qu'à contribuer à l'amélioration des prévisions aridologiques. Cette initiative a été couronnée de succès. On peut consulter le rapport définitif d'IRS Canada à http://www.drinetwork.ca/final_report.php.

Improved Processes and Parametrisation for Prediction in Cold Regions

Ce qu'on appelle l'IP3 (« Improved Processes and Parametrisation for Prediction in Cold Regions ») est un réseau pancanadien de recherche (de plusieurs douzaines de chercheurs et de collaborateurs de partout au Canada, aux États-Unis et en Europe) qui se propose d'enrichir notre compréhension des eaux de surface et des systèmes météorologiques dans les régions froides, plus particulièrement dans les Rocheuses et l'Ouest de l'Arctique au Canada. C'est là un enjeu de premier plan pour l'agriculture et le développement urbain et industriel dans les Prairies et le Nord-Ouest du Canada. L'IP3 a mené à une meilleure compréhension de l'hydrométéorologie des régions froides. Il a mis à l'épreuve les avancées du domaine des prévisions atmosphériques et hydrologiques dans les Rocheuses et l'Arctique grâce à un transect de stations de recherches instrumentées sur les hautes latitudes et les hautes altitudes caractéristiques des régions froides du pays. L'IP3 constitue un volet de l'Année polaire internationale (API), du projet Climat et cryosphère (CliC) du Programme mondial de recherches sur le climat (PMRC) et de la Décennie internationale de la prévision dans les bassins hydrographiques non jaugés. L'initiative s'est terminée avec succès en mars 2010. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.usask.ca/ip3/.

Année polaire internationale au Canada (2007-2011)

L'Année polaire internationale (API) 2007-2008 a accueilli le plus vaste programme international de recherche scientifique qui ait porté sur les régions arctiques et antarctiques. Au Canada, il s'est agi d'un programme sur quatre ans (2007-2011). Le Canada a été un important chef de file international, à l'intérieur et au-delà de l'API, par son appui à des collaborations multinationales en recherche, la mobilisation de scientifiques canadiens de premier plan et son accueil d'équipes de chercheurs de pointe de partout dans le monde. Le Canada a conçu un programme ambitieux pour l'API, fournissant 150 millions de dollars à 44 projets canadiens et soutenant le progrès des connaissances scientifiques sur le Nord pour pouvoir les appliquer aux problèmes liés à notre environnement et au bien-être des collectivités nordiques. Voici des traits marquants du programme consacré à l'API par le gouvernement du Canada :

- programme ciblé de science et de recherche qui, s'appuyant sur les programmes, les réseaux et les installations en place et les soutenant à son tour, s'attache à deux grands défis pour les régions nordiques au pays;
- programme de participation active des jeunes scientifiques et des collectivités nordiques à une formation sur le terrain en science et en recherche, ce programme devant susciter une

nouvelle génération de scientifiques du milieu polaire, notamment parmi les habitants du Nord et les Autochtones, pour la réalisation de solides programmes de recherches nordiques dans les décennies à venir;

- programme de communication et de sensibilisation pour une meilleure connaissance des régions et des enjeux nordiques et polaires et une consécration des réalisations nordiques, autochtones et scientifiques; l'API associera les habitants du Nord à la planification et aux activités en science et en recherche par des programmes de formation et des activités de communication, ainsi qu'à la gestion et l'administration du programme.

Pour plus de renseignements, prière de visiter le site Web suivant : http://www.api-ipy.gc.ca/pg_IPYAPI_071-fra.html.

Western Canadian Cryospheric Network

Le Western Canadian Cryospheric Network (WC^2N) était un consortium réunissant six universités canadiennes et deux universités américaines avec des scientifiques des secteurs public et privé en vue d'une étude des liens entre les changements climatiques et les variations de la masse des glaciers dans l'Ouest canadien. Le but était de comprendre le comportement du régime climatique dans ses effets sur le bilan massique des glaciers de montagne en Colombie-Britannique et dans l'Ouest de l'Alberta. Ces travaux menés sans double emploi ont respecté les activités d'autres réseaux, en chantier ou en cours, de recherche et de surveillance cryosphériques au Canada et à l'étranger. Collectivement, ces réseaux dans leur synergie ont permis une évaluation pannationale de la réaction passée, présente et future des glaciers du pays à l'évolution du climat. L'initiative WC^2N a été menée à bien en janvier 2010. Pour plus de renseignements, prière de visiter le site Web suivant : http://wc2n.unbc.ca/.

Apports aux programmes et aux bilans internationaux

Programme de surveillance et d'évaluation de l'Arctique

Le Programme de surveillance et d'évaluation de l'Arctique (PSEA), un des cinq groupes de travail relevant du Conseil de l'Arctique (CA), a entrepris une évaluation scientifique internationale sous le titre « Changements climatiques et cryosphère : neige, eau, glace et pergélisol dans l'Arctique » (« Snow, Water, Ice, and Permafrost in the Arctic » ou SWIPA). Il s'agit d'un bilan de suivi de l'étude de la cryosphère depuis la fin de l'« Arctic Climate Impact Assessment » (ACIA). Dans une coordination par le PSEA, le CISA, l'OMM (Programme mondial de recherches sur le climat – Climat et cryosphère) et l'API, le groupe SWIPA a évalué l'état de

nos connaissances scientifiques sur les changements de la cryosphère arctique. Il a notamment consacré ce bilan aux répercussions des changements climatiques sur la glace, la neige et le pergélisol arctiques, ce qui pourrait avoir de vastes conséquences tant sur l'Arctique que sur le reste de la planète. Les scientifiques canadiens ont apporté une contribution de taille aux chapitres de l'étude SWIPA. Le bilan a été publié en 2011, contribuant à son tour au cinquième rapport d'évaluation du Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC) des Nations Unies. Pour plus de renseignements sur le PSEA et l'étude SWIPA, prière de visiter le site Web suivant : http://www.amap.no/.

Conseil de l'Arctique – Conservation of Arctic Flora and Fauna (CAFF)

Le groupe de travail « Conservation of Arctic Flora and Fauna » (CAFF), qui relève du Conseil de l'Arctique (CA), a pour mandat d'étudier la conservation de la biodiversité arctique et de communiquer les résultats des travaux aux gouvernements et aux habitants de l'Arctique de manière à promouvoir des pratiques de durabilité des ressources vivantes de la région. Le Canada continue à apporter sa contribution : (i) il codirige avec la Suède le groupe d'experts en surveillance des eaux douces (« Freshwater Expert Monitoring Group » ou FEMG) dans le cadre du Programme de surveillance de la biodiversité circumpolaire (PSBC) avec la mise en place d'un réseau de surveillance circumpolaire; (ii) il dirige ou codirige l'Évaluation de la biodiversité dans l'Arctique (EBA, 2013) et soutient la rédaction de certains chapitres de ce bilan en y affectant des auteurs canadiens. Pour plus de renseignements sur le CAFF, le PSBC et l'EBA, prière de visiter le site Web suivant : http://www.caff.is/.

Plan de surveillance de la biodiversité en eau douce dans l'Arctique

Le Plan de surveillance de la biodiversité en eau douce dans l'Arctique décrit en détail la raison d'être et le cadre des progrès en matière de surveillance circumpolaire des eaux douces de l'Arctique, c'est-à-dire des étangs, lacs, tributaires et marécages et des cours d'eau, affluents et zones humides. Le cadre de surveillance vise à faciliter les bilans circumpolaires en fournissant aux pays de l'Arctique des structures et des lignes directrices permettant d'entreprendre et de développer des activités de surveillance à l'aide de méthodes et d'indicateurs communs. Le Plan fait partie du Programme de surveillance de la biodiversité circumpolaire (PSBC) de Conservation of Arctic Flora and Fauna (CAFF), lequel se propose avec les partenaires d'harmoniser et de renforcer les activités à long terme de surveillance de la biodiversité arctique afin de faciliter une constatation, une communication et une prise en charge rapides des tendances et des pressions importantes. Le Canada codirige cette initiative avec la Suède.

Pour plus de renseignements sur le PSBC, prière de visiter le site Web suivant : http://www.caff.is/.

Projet Climat et cryosphère

Le projet Climat et cryosphère (CliC) a été créé en l'an 2000 dans le cadre du Programme mondial de recherches sur le climat (PMRC). Il vise à stimuler, soutenir et coordonner les activités de recherche sur les processus par lesquels la cryosphère entre en interaction avec le reste du régime climatique. Son but premier est d'évaluer et de chiffrer l'incidence de la transformation et de la variabilité du climat sur les constituants de la cryosphère et sa stabilité générale, ainsi que les conséquences de cette incidence sur le système climatique. À l'heure actuelle, le Canada préside le CliC. Il a dirigé le traitement du thème « Cryosphère terrestre et hydrométéorologie des régions froides » et dirige maintenant l'étude d'un nouveau thème transversal « Synthèse sur les eaux douces de l'Arctique » (voir ci-après). Pour plus de renseignements, prière de visiter le site Web suivant : http://www.climate-cryosphere.org/.

Synthèse sur les eaux douces de l'Arctique

Dans un horizon de deux ans, le projet Climat et cryosphère (CliC) du Programme mondial de recherches sur le climat (PMRC), le Comité international des sciences de l'Arctique (CISA) et le Programme de surveillance et d'évaluation de l'Arctique (PSEA) du Conseil de l'Arctique appuient la production internationale d'une synthèse sur les eaux douces de l'Arctique comme contribution à la troisième conférence internationale de planification de la recherche sur l'Arctique (ICARP III), aux « Grands Défis » du PMRC et à l'initiative du PSEA sur les mesures d'adaptation aux changements de conditions dans l'Arctique. Le but d'ensemble de cette synthèse est de dresser le bilan de notre compréhension scientifique actuelle des eaux douces de l'Arctique. Le projet se divise en cinq grands volets consacrés respectivement à l'atmosphère, à l'océan, à l'hydrologie terrestre, à l'écologie terrestre et aux ressources. Le Canada est responsable scientifiquement de la production de ce bilan et y a affecté des auteurs principaux et des collaborateurs. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.climate-cryosphere.org/.

Programmes et autres activités, nouveaux ou permanents

Secteur universitaire

ArcticNet

ArcticNet est un réseau de centres d'excellence qui, au Canada, réunit des scientifiques et des gestionnaires des sciences naturelles et sociales et des sciences de la santé humaine avec leurs partenaires des organisations inuites, des collectivités nordiques, des organismes fédéraux et provinciaux et du secteur privé en vue d'une étude de l'incidence des changements climatiques sur le littoral arctique canadien. ArcticNet a pour objectif de base de contribuer à la création et à la diffusion des connaissances nécessaires à l'élaboration de stratégies d'adaptation et de politiques nationales destinées à aider les Canadiens à faire face aux répercussions et aux possibilités liées à la transformation du climat et à la mondialisation dans l'Arctique. Par des études intégrées d'impact régional (on en compte plus de 20) sur les sociétés et les écosystèmes marins, terrestres (et dulçaquicoles) et littoraux des régions nordiques du Canada, ArcticNet fournit un cadre multidisciplinaire et intersectoriel unique pour la formation de la prochaine génération de spécialistes du Nord et du Sud dans la gestion de l'Arctique canadien de demain. Pour plus de renseignements sur ArcticNet, prière de visiter le site Web suivant : http://www.arcticnet.ulaval.ca/.

Réseau canadien de l'eau

Le Réseau canadien de l'eau (RCE) est un réseau national de centres d'excellence s'occupant avant tout de mobilisation des recherches et des connaissances sur trois défis primordiaux en gestion de l'eau, à savoir la sauvegarde de la santé publique, la protection des bassins hydrographiques et des écosystèmes et la mise en place d'une infrastructure de durabilité de l'eau. Ce réseau est principalement financé par le gouvernement fédéral et a investi en 14 ans plus de 41 millions de dollars en recherche, agissant comme levier sur la capacité des chercheurs universitaires au pays à combler les besoins de connaissances dans les domaines stratégiques suivants :

- gestion de l'utilisation des terres et des effets de la mise en valeur des ressources sur les bassins hydrographiques;
- gestion des eaux, des infrastructures et des technologies municipales avec l'eau potable, les eaux usées et les eaux pluviales;

- enjeux de la gestion et de la gouvernance de l'eau dans les collectivités de petite taille, éloignées et autochtones;
- sécurité de l'eau de source en qualité et en quantité pour une variété d'utilisations.

Le RCE recourt à une collaboration en consortium pour axer les activités de mobilisation de la recherche et de la connaissance sur les grands enjeux nationaux que privilégient collectivement les utilisateurs finals des secteurs public et privé. Cette stratégie attire des investissements complémentaires de partenaires et facilite l'adoption de solutions de recherche que les utilisateurs finals sont en mesure d'appliquer et qui permettent des décisions plus éclairées en matière d'investissements, de politiques, de pratiques et de stratégies de gestion des risques. Personne-ressource (courriel) : D^{r} Simon Courtenay, directeur scientifique, scourtenay@cwn-rce.ca.

Global Institute for Water Security

Le Global Institute for Water Security (GIWS) a vu le jour en 2011 à l'Université de la Saskatchewan. Sa dotation initiale a été de 30 millions de dollars grâce à la création d'une chaire d'excellence en recherche du Canada en matière de sécurité de l'eau à l'intention du D^{r} Howard Wheater. Le GIWS travaille en étroite collaboration avec Environnement Canada et compte actuellement 78 enseignants et chercheurs principaux; son personnel est de 157 personnes. Ses thèmes de base s'accordent de près avec les initiatives du PHI de l'UNESCO et ses membres prennent une part active aux travaux de cette organisation internationale. Citons les grands exemples suivants d'activités liées au cadre thématique de la phase VIII du PHI : thème 1, 5 – amélioration de la prévision des ressources en eau dans le contexte de la transformation du milieu, plus particulièrement dans les hautes latitudes et les régions froides; thème 2 – amélioration de la compréhension des incertitudes entourant l'alimentation en eaux souterraines et leur gestion dans les paysages agricoles; thème 3 – exploration et modélisation des effets de la gestion agricole et urbaine des terres et des eaux sur la qualité et la circulation de l'eau dans un bassin hydrographique, ainsi que des perspectives d'adoption de pratiques de gestion bénéfiques (PGB) propres à atténuer les effets négatifs; thème 6 – accent nettement mis sur l'éducation et la formation des futurs scientifiques de l'eau. Le D^{r} Wheater continue à coprésider le programme G-WADI. Il sera conférencier d'honneur au Colloque Kovaks de 2014. Mentionnons deux initiatives de premier plan : a) création d'un observatoire à grande échelle et d'un projet hydroclimatique régional (PHR) dans le bassin hydrographique de 340 000 km^{2} de la rivière Saskatchewan dans le cadre de l'initiative « Global Energy and Water Exchanges » (GEWEX) du Programme mondial de recherches sur le climat; b) direction du réseau de

recherche sur l'évolution des régions froides, qui vise à diagnostiquer et prévoir l'évolution écologique des bassins de la rivière Saskatchewan et du fleuve Mackenzie dans l'Ouest canadien. Pour plus de renseignements sur le GIWS, prière de consulter son rapport fondateur de recherche à l'adresse http://www.usask.ca/water/documents/GIWS_Research_Report_2011-13.pdf; on peut aussi communiquer par courriel avec le GIWS à l'adresse water.security@usask.ca.

HydroNet du CRSNG

L'HydroNet du CRSNG est un réseau national de recherche voué à la promotion de la durabilité de l'hydroélectricité et de la santé des écosystèmes aquatiques au Canada. Il vise généralement à enrichir notre compréhension de la situation et à concevoir de nouveaux outils en vue de mieux évaluer, atténuer et neutraliser les effets de l'hydroélectricité sur le poisson et ses habitats. Par ce réseau, le Conseil de recherches en sciences naturelles et en génie du Canada a développé des collaborations pour étoffer les bases scientifiques des décisions relatives à l'incidence de la production hydroélectrique sur l'environnement. Ce programme de recherche procurera des outils scientifiquement défendables et transparents par lesquels on pourra atténuer les effets possibles de cette production sur les écosystèmes aquatiques, améliorer les décisions liées à l'exploitation hydroélectrique et apaiser les conflits entre les utilisateurs des ressources hydriques. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.hydronet.umontreal.ca/.

Secteur gouvernemental

Environnement Canada

Environnement Canada (EC) a pour mandat de réaliser des programmes fonctionnels de surveillance régionale et nationale de la quantité (Service météorologique du Canada, Relevés hydrologiques du Canada) et de la qualité des eaux (Monitoring et surveillance de la qualité de l'eau, Direction des sciences et de la technologie de l'eau). Relevés hydrologiques du Canada (RHC) est l'autorité nationale responsable de la collecte, de l'interprétation et de la diffusion des données et autres renseignements normalisés sur les ressources en eau au pays. En partenariat avec les provinces, territoires et autres autorités, RHC maintient un réseau hydrométrique de plus de 2 800 stations sur tout le territoire national. De concert avec d'autres ministères et organismes publics, EC apporte sa contribution à des stratégies de gestion

intégrée des écosystèmes et des bassins hydrographiques qui s'inspirent des principes de développement durable. Celles-ci visent à garantir que la prise de décisions trouvera un équilibre entre une diversité d'objectifs et tiendra compte des intérêts des nombreux intervenants, qu'il s'agisse de la gestion durable de l'eau et des ressources aquatiques, de la protection contre les menaces pour la santé liées à la qualité de l'eau, de la protection des écosystèmes et des espèces aquatiques ou de l'atténuation des répercussions des crues et des sécheresses sur la santé, l'économie et la sécurité. Ajoutons qu'EC est le ministère responsable de la recherche sur l'eau douce au Canada, s'employant à produire le nouveau savoir scientifique nécessaire au maintien des ressources hydriques et des écosystèmes dulçaquicoles du pays. Pour plus de renseignements, prière de visiter le site Web suivant : http://ec.gc.ca.

Programmes et initiatives écosystémiques prioritaires d'Environnement Canada

Environnement Canada (EC) a ajouté un programme élargi du lac Simcoe à son réseau national des initiatives écosystémiques régionales. Tous les éléments de ce réseau ont pour priorité les ressources en eau et appliquent un cadre multi-parties prenantes pour résoudre les questions de recherche, de science et de politiques régionales concernant les bassins hydrographiques. Voici des exemples de grandes initiatives lancées :

- Plan d'assainissement du littoral atlantique : programme à direction et à exécution communautaires pour les questions d'environnement et de développement durable qui intéressent les bassins hydrographiques et les zones côtières dans toute la région de l'Atlantique;
- Plan d'action Saint-Laurent : programme qui porte sur les aspects quantitatifs et qualitatifs des débits du réseau amont des Grands Lacs, ainsi que sur la conservation de la biodiversité;
- Programme des Grands Lacs : programme qui porte sur la qualité et les contaminants de l'eau et l'élaboration de plans de mesures d'assainissement; il est lié aux priorités de la Commission mixte internationale dans la gestion des ressources hydriques communes au Canada et aux États-Unis;
- Fonds d'assainissement du lac Simcoe et du sud-est de la baie Georgienne : le gouvernement du Canada a créé le Fonds d'assainissement renouvelé et élargi 2012-2017 pour le lac Simcoe et le sud-est de la baie Georgienne; grâce à cette double mesure de prolongation et d'élargissement du programme, on réduira les charges de phosphore dans ces plans d'eau, améliorera la qualité hydrique et assurera la conservation d'un habitat aquatique essentiel et des espèces présentes dans ces eaux;

- Plan d'action du bassin de Georgia : programme réalisé principalement dans le bassin du fleuve Fraser en Colombie-Britannique et portant sur la qualité et la quantité de l'eau et une gestion intégrée du bassin hydrographique;
- Initiative du bassin du lac Winnipeg : programme où on mène une démarche scientifique pour comprendre la meilleure façon de résoudre les graves problèmes de qualité de l'eau auxquels se heurte ce bassin hydrographique d'un intérêt capital.

Pour plus de renseignements sur les programmes et initiatives d'EC, prière de visiter le site Web suivant : http://ec.gc.ca/nature/default.asp?lang=Fr&n=2C63408C-1.

Stratégie fédérale de développement durable (SFDD)

La SFDD répond aux exigences de la *Loi fédérale sur le développement durable*, adoptée par le Parlement en 2008, en rendant les décisions environnementales plus transparentes et en tenant leurs auteurs plus responsables devant le Parlement. Les objectifs, cibles et stratégies de mise en œuvre de la SFDD s'articulent autour de divers thèmes, dont celui du maintien de la qualité et de la disponibilité de l'eau (http://www.ec.gc.ca/dd-sd/default.asp?lang=Fr&n=CD30F295-1).

Programme des Indicateurs canadiens de durabilité de l'environnement (ICDE)

Les ICDE mesurent les progrès dans l'application de la Stratégie fédérale de développement durable, rendent compte aux Canadiens de l'état de l'environnement et décrivent le cheminement canadien dans les grands dossiers de durabilité environnementale. Ces indicateurs fondés sur une méthodologie rigoureuse sont enrichis et mis à jour lorsque de nouvelles données de grande qualité deviennent disponibles. Il existe plusieurs indicateurs de la quantité et la qualité des eaux et des écosystèmes régionaux (http://www.ec.gc.ca/indicateurs-indicators/).

Production de rapports dans le cadre de la Loi sur les ressources en eau du Canada et de la Loi sur les ouvrages destinés à l'amélioration des cours d'eau internationaux

Environnement Canada est responsable de la production de rapports au Parlement dans le cadre de la *Loi sur les ressources en eau du Canada* (LREC) et de la *Loi sur les ouvrages destinés à l'amélioration des cours d'eau internationaux* (LOACEI). Le rapport LREC résume une grande gamme d'activités fédérales relevant de cette loi : participation aux concertations et aux collaborations fédérales-provinciales-territoriales, programmes importants de recherche et

d'information publique sur l'eau, etc. La LOACEI a pour but de garantir que les ressources hydriques canadiennes appartenant à des bassins hydrographiques internationaux seront mises en valeur et exploitées au mieux des intérêts nationaux. On peut consulter les rapports annuels LREC et LOACEI à l'adresse www.ec.gc.ca/eau/water.

Programme de gestion des effluents

Environnement Canada (EC) se charge pour le gouvernement du Canada de la gestion des effluents de manière à atténuer la menace de la pollution des eaux pour l'environnement et la santé humaine, et ce, par l'élaboration, l'application et l'administration de stratégies et de programmes de prévention et de réduction de la pollution (plans de prévention, règlements, codes de pratique, lignes directrices, ententes de rendement écologique, etc.). EC exerce cette activité dans le cadre de la *Loi canadienne sur la protection de l'environnement de 1999* et de la *Loi sur les pêches*. Les programmes en question visent les rejets de déchets et les substances préoccupantes de l'industrie et du secteur public, ce qui comprend l'extraction minière, la transformation, la foresterie, les eaux usées et autres secteurs. Il s'agit notamment de mener des recherches et des analyses de risques, de concevoir et appliquer des règlements et autres instruments de contrôle, d'évaluer les résultats de la surveillance des effets environnementaux par les établissements réglementés et de donner des conseils techniques aux fins des évaluations environnementales. Au nombre des règlements de premier plan qui sont administrés dans le cadre de cette activité, on compte le *Règlement sur les systèmes d'assainissement des eaux usées*, le *Règlement sur les effluents des mines de métaux* et le *Règlement sur les effluents des fabriques de pâtes et papiers*, lequel se rattache à la *Loi sur les pêches*. Au Canada, les gouvernements fédéral et provinciaux exercent des pouvoirs partagés et qui, d'une certaine manière, se recoupent en matière de contrôle de la pollution de l'eau. La coopération intergouvernementale représente une nécessité en gestion de la pollution de l'eau. Pour plus de renseignements, prière de consulter le programme par courriel à l'adresse FPFA-PFLP@ec.gc.ca.

Plan de mise en œuvre conjoint du Canada et de l'Alberta pour la surveillance visant les sables bitumineux

Les sables bitumineux constituent une ressource naturelle stratégique pour le Canada et un grand moteur de son développement économique. Toutefois, l'expansion de leur exploitation a fait naître le besoin de mieux comprendre les éventuels effets cumulatifs sur l'environnement.

Les gouvernements du Canada et de l'Alberta travaillent de concert à une approche progressive et adaptative en matière de surveillance, voulant faire en sorte que cette importante ressource soit exploitée d'une façon respectueuse de l'environnement.

Le plan conjoint renforce les programmes de surveillance environnementale pour l'air, l'eau, le sol et la biodiversité dans la région des sables bitumineux. Il améliorera notre connaissance de l'état de l'environnement dans cette région et notre compréhension des effets environnementaux et de l'évolution du milieu. Sont notamment visés les effets futurs des facteurs multiples de stress environnemental qu'il importera encore plus de comprendre à mesure que se poursuivra cette exploitation. La surveillance se renforce depuis déjà un certain temps et s'accentuera au cours des trois prochaines années si on veut assurer la mise en place de l'infrastructure nécessaire, l'amélioration progressive des activités et une bonne intégration aux activités de surveillance qui existent dans la région.

Au moment où ce plan sur trois ans sera en application intégrale en 2015 :

- le nombre de sites d'échantillonnage sera plus élevé et disséminé sur une plus grande superficie;
- le nombre et les types de paramètres d'échantillonnage s'accroîtront;
- la fréquence d'échantillonnage chaque année augmentera nettement;
- les méthodes de surveillance tant de l'air que de l'eau s'amélioreront;
- un programme intégré et ouvert de gestion des données aura été créé.

On a établi un Portail d'information Canada-Alberta sur la surveillance environnementale des sables bitumineux (http://www.jointoilsandsmonitoring.ca). Celui-ci livre les données les plus à jour recueillies par les scientifiques et met à disposition une analyse et une interprétation scientifiques des données et des résultats. Au cours des prochains moins, le site aura des mises à jour et des fonctions nouvelles et se fera plus complet au gré de la disponibilité de nouvelles données. Dans leur croissance, les données et autres renseignements de surveillance environnementale disponibles sur ce site permettront aux intéressés de procéder à leurs propres analyses et de tirer leurs propres conclusions.

Autres programmes fédéraux de l'eau

Programmes d'Agriculture et Agroalimentaire Canada

Agriculture et Agroalimentaire Canada et son secteur de l'Administration du rétablissement agricole des Prairies (ARAP) continuent à jouer leur rôle national sur le plan des programmes de gestion environnementale et hydrique dans tout ce qui est agriculture et eau au Canada. Voici un certain nombre de programmes et de services clés dans ce domaine : Programme canadien d'adaptation agricole, Programme de pâturages communautaires, Surveillance de la sécheresse, Programme des produits géospatiaux (conditions de sécheresse, types de sol, etc.), Service national d'information sur les terres et les eaux, Programme de réduction des risques liés aux pesticides. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.agr.gc.ca.

Agriculture Canada – Service national d'information sur les terres et les eaux (SNITE)

Le Service national d'information sur les terres et les eaux (SNITE) est un service Internet conçu pour un accès en ligne à l'information agroenvironnementale en vue d'aider les Canadiens à prendre des décisions d'utilisation des terres en toute responsabilité. Le gouvernement fédéral a investi 100,1 millions de dollars sur quatre ans (2005-2009) pour implanter ce nouveau service qui, toujours soutenu par Agriculture Canada, est sans frais pour l'utilisateur. Le SNITE est reconnu comme étant la source canadienne par excellence d'information, d'analyse et d'interprétation des données agroenvironnementales sur l'utilisation des terres, le sol, l'eau, le climat et la biodiversité comme aide aux décisions d'aménagement du territoire. Les décideurs de ce domaine sont notamment les gouvernements, les groupes communautaires, les chercheurs, les producteurs et l'industrie. Dans sa mise en place, le SNITE s'est appuyé sur d'autres efforts visant à réduire les risques agricoles et à faire un meilleur usage des ressources que représentent les terres, le sol, l'eau et la biodiversité au pays. Mentionnons notamment les initiatives visant (i) à concevoir des pratiques de gestion bénéfiques (PGB) qui protègent les terres contre l'érosion éolienne et hydrique, améliorent l'alimentation en eau et sa qualité, renforcent la biodiversité et accentuent le captage du carbone dans le sol, (ii) à aider les producteurs à adopter ces PGB en gestion des sols, des éléments nutritifs et des cheptels et (iii) à mesurer et suivre le rendement écologique de l'agriculture canadienne. Pour plus de renseignements, prière de visiter le site Web suivant :

http://www.horizons.gc.ca/fra/contenu/agrogéomatiques-le-service-national-dinformation-sur-les-terres-et-les-eaux-snite.

Commission mixte internationale

La Commission mixte internationale (CMI) est une institution binationale établie par le Traité des eaux limitrophes de 1909 qui aide à prévenir et à régler les différends entre les États-Unis et le Canada. La CMI continue à donner des conseils indépendants et objectifs aux deux gouvernements pour le bien commun des deux pays. Elle apporte une aide impartiale aux questions à étudier et aux décisions à prendre dans les dossiers plutôt que de représenter les vues propres à l'un et l'autre des gouvernements. Par la CMI, les États-Unis et le Canada continuent à collaborer à une sage gestion des eaux communes et à leur protection pour le bénéfice des citoyens d'aujourd'hui et des générations à venir. Le gouvernement du Canada finance la section canadienne de la CMI et apporte une contribution en nature sous forme de compétences avec des spécialistes du génie, de l'hydrologie et d'autres domaines pour les divers conseils relevant de la Commission. Ces experts aident la CMI à réguler les niveaux et les débits des eaux et participent à d'autres travaux de la Commission, notamment aux travaux récents concernant les niveaux extrêmes des eaux des Grands Lacs. Pour plus de renseignements, prière de consulter la Direction générale des affaires internationales, Environnement Canada, gouvernement du Canada.

Programme des eaux souterraines de Ressources naturelles Canada

Les eaux souterraines sont importantes pour la santé, l'économie et les écosystèmes du Canada. Elles constituent une source d'eau potable pour le tiers environ de toute la population canadienne et pour jusqu'à 80 % de la population rurale. Devant les pressions qui s'avivent sur les ressources hydriques par l'urbanisation, le développement économique et la montée de la demande énergétique, le Canada a besoin de se doter d'une stratégie cohérente et coordonnée de gestion des eaux souterraines. Grâce au Programme géoscientifique des eaux souterraines de Ressources naturelles Canada (RNCan), la Commission géologique du Canada évalue les grands aquifères canadiens et rend les données disponibles par un portail national (Réseau d'information sur les eaux souterraines (RIES)) qui relie un certain nombre de bases de données et livre une information de base utile aux intervenants (gouvernement, secteur privé, industrie, organismes de gestion de l'eau et propriétaires de puits) dans les décisions qu'ils doivent prendre. Les activités d'évaluation et de caractérisation des aquifères combinent la cartographie géologique, le bilan hydrogéologique régional et la modélisation des eaux

souterraines dans un inventaire des principaux aquifères régionaux du pays. Le but est l'avancement de la gestion des eaux souterraines à l'échelle du pays. Les données des activités d'évaluation sont mises à la disposition des gens par le RIES. Ce réseau vise à améliorer la connaissance des systèmes phréatiques et à renforcer la gestion des eaux souterraines par un accès élargi à l'information. Il met en interconnexion les bases de données sur les aquifères de RNCan et de plusieurs provinces et territoires. Pour plus de renseignements sur le programme des eaux souterraines de RNCan et un accès aux nombreux rapports et publications dans ce domaine, prière de visiter le site Web suivant : http://www.rncan.gc.ca/sciences-terre/ressources/programmes-federaux/programme-geoscientifique-eaux-souterraines/10910.

Apports de Ressources naturelles Canada à d'autres programmes de l'UNESCO

Le D[r] A. Rivera participe au programme de l'UNESCO portant sur le Module de méta-information (MiM) sur les eaux souterraines en vue de faciliter les entretiens en ligne entre les réseaux de professionnels du domaine dans cette organisation internationale. Il apporte une contribution au programme de gouvernance des eaux souterraines de l'UNESCO/Association internationale des hydrogéologues (AIH). Il est membre du mécanisme permanent de consultation du projet de gouvernance des eaux souterraines « A Global Framework for Action ».

Grandes sociétés des sciences hydrologiques

Section de l'hydrologie de l'Union géophysique canadienne

Fondée en 1993, la Section de l'hydrologie de l'Union géophysique canadienne (SH-UGC) réunit des scientifiques de toutes les disciplines de l'hydrologie. Elle vise (i) à promouvoir l'hydrologie comme science géophysique, (ii) à favoriser la compréhension et l'application de l'hydrologie et des sciences connexes, (iii) à lancer des programmes de recherche et d'éducation dans ce domaine et à y participer, (iv) à promouvoir la collaboration nationale et internationale entre organismes scientifiques et techniques s'occupant d'hydrologie et (v) à diffuser les résultats de la recherche et les connaissances acquises au public par les discussions scientifiques, les réunions et conférences, les publications et autres moyens d'information et de transfert technologique. La Section de l'hydrologie est aussi l'organisme-cadre du comité des prix de l'AISH. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.cgu-hs.ca/.

Association canadienne des ressources hydriques

L'Association canadienne des ressources hydriques (ACRH) est un organisme national réunissant des particuliers et des groupes qui, dans les secteurs public, privé et universitaire, se vouent à la sensibilisation à la valeur de l'eau et à la promotion d'une gestion responsable et efficace des ressources hydriques au Canada. Elle se compose d'utilisateurs de l'eau et de professionnels des ressources hydriques comme les gestionnaires, les administrateurs, les scientifiques, les chercheurs, les universitaires, les étudiants et les jeunes professionnels. Ses objectifs sont (i) de stimuler la conscience et la compréhension des ressources hydriques au Canada, (ii) d'encourager la reconnaissance de la priorité et de la valeur par excellence de l'eau, (iii) de fournir une tribune aux échanges de renseignements et d'avis sur cette même gestion et (iv) de participer avec des organismes appropriés aux activités internationales de gestion hydrique. Au nombre de ses activités, on compte l'organisation de conférences, de symposiums et d'ateliers sur une grande diversité de thèmes en gestion de l'eau, la publication trimestrielle de Canadian Water Resources Journal et du bulletin d'information Water News et la parution d'études et de rapports. Sont affiliés à l'ACRH, le Comité national canadien de l'irrigation et du drainage (CNCID), la Société canadienne des sciences hydrologiques (SCSH) et le projet WET, programme international et interdisciplinaire d'éducation sur l'eau qui est destiné aux éducateurs formels et informels de la maternelle à la 12^{e} année, en complément des programmes d'études. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.cwra.org.

Société canadienne de météorologie et d'océanographie

La Société canadienne de météorologie et d'océanographie (SCMO) est une association nationale de particuliers et de groupes qui se consacrent à l'avancement des sciences de l'atmosphère et de l'océan et aux disciplines écologiques qui s'y rapportent au Canada. Son but est de promouvoir la météorologie et l'océanographie au pays. C'est là une importante organisation non gouvernementale au service des intérêts des météorologues, des climatologues, des océanographes, de limnologues, des hydrologues et des spécialistes de la cryosphère au Canada. Elle s'occupe d'un large éventail de questions nationales et internationales de météorologie et d'océanographie : climat et ses extrêmes, réchauffement planétaire, amincissement de la couche d'ozone, qualité de l'air troposphérique dans leurs effets sur tous les aspects de la vie au Canada (forêts, agriculture, pêches, etc.). Au sein de la SCMO, des groupes d'intérêt s'attachent aux aspects météorologiques de l'hydrologie, de

l'agronomie et de la foresterie, à la météorologie à méso-échelle et à la météorologie opérationnelle. Pour plus de renseignements, prière de visiter le site Web suivant : http://www.cmos.ca/.

Association internationale des hydrogéologues et section nationale canadienne

L'Association internationale des hydrogéologues (AIH) est un organisme de bienfaisance qui s'occupe de science et d'éducation pour les scientifiques, les ingénieurs, les gestionnaires de l'eau et autres professionnels des domaines de la planification, de la gestion et de la protection des ressources en eaux souterraines. Fondée en 1956, elle compte aujourd'hui plus de 4 000 membres dans le monde. L'AIH se veut une association internationale d'avant-garde pour la science et la pratique de l'hydrogéologie, une source d'information reconnue dans le monde entier et un agent de facilitation de la transmission du savoir sur les eaux souterraines. Elle a entrepris de mieux sensibiliser les gens aux enjeux des eaux souterraines et, de concert avec des organismes nationaux et internationaux, de promouvoir l'utilisation de la nappe phréatique pour un accès immédiat à une eau potable saine. L'AIH fait aussi la promotion d'une protection des aquifères contre la pollution, de l'amélioration du stockage en formation aquifère et de la gestion des ressources en eaux souterraines comme garantie de durabilité pour les écosystèmes qui dépendent de la nappe phréatique. Le président actuel de l'AIH est un Canadien, le professeur Ken Howard, de l'Université de Toronto. Pour plus de renseignements sur l'AIH, prière de visiter le site Web suivant : http://iah-aih.org.
La Section nationale canadienne de l'Association internationale des hydrogéologues est un organisme qui met à la disposition des membres toutes sortes de conférences, séminaires, activités de réseautage et conférences dans les domaines liés à la science et à la gestion des ressources en eaux souterraines. Elle comprend des hydrogéologues, des scientifiques, des ingénieurs et des gestionnaires des ressources hydriques. On peut se renseigner sur les grandes activités de la Section nationale canadienne à l'adresse suivante : http://www.iah-aih.ca/.

Apports aux réunions et aux ateliers de parrainage de l'UNESCO

Ateliers et réunions d'experts de l'UNESCO-ISARM Amériques

Alfonso Rivera (de Ressources naturelles Canada) continue à participer aux ateliers de l'UNESCO-ISARM (il le fait depuis 2005) comme coordonnateur national pour le Canada. Parmi

ses apports à l'ISARM depuis quelques années, on peut mentionner la direction d'un groupe de travail chargé d'élaborer une stratégie de gestion durable des aquifères transfrontaliers des Amériques (ATA). Précisons à cet égard que cette stratégie a été entérinée dans sa vision et sa mission par les coordonnateurs nationaux (CN) en décembre 2008 et que, en septembre 2009, les résultats de ces travaux stratégiques ont été présentés et appuyés par les CN à leur réunion de Quito. Cette rencontre a en outre aidé à mettre la dernière main au troisième ouvrage de la série UNESCO-ISARM à laquelle M. Rivera a apporté une contribution de taille. En 2014, il a été directeur de publication et coauteur du livre IV de la série UNESCO-ISARM sous le titre « *Regional Strategy for the Assessment and Management of the Transboundary Aquifers Systems (TAS) in the Americas »* (sous presse).

Cinquième consultation régionale : région de la CEE

Alfonso Rivera (RNCan) a été invité à titre de rapporteur de l'UNESCO à la cinquième consultation régionale pour la CEE, The Hague Institute for Global Justice, du 19 au 21 mars 2013. Il a produit un vaste rapport sur cette réunion.

Réunion de la région 1 du PHI de l'UNESCO

Le Canada a participé à la réunion de la région 1 du PHI de l'UNESCO à Oslo (Norvège) les 21 et 22 octobre 2013. Il y a rendu compte des activités d'intérêt qui s'exercent actuellement au Canada en hydrologie et en écohydrologie et qui représentent un apport et/ou un éclairage pour les thèmes et les axes d'étude du PHI.

Apports aux rapports et autres publications de l'UNESCO en hydrologie

Aquatic Habitats in Sustainable Urban Water Management (Science, Policy and Practice)
Sous la direction d'Iwona Wagner, ***Jiri Marsalek*** et Pascal Breil (2008)
Urban Water Series du PHI de l'UNESCO – Éditions UNESCO / Taylor & Francis

L'ouvrage *Aquatic Habitats in Sustainable Urban Water Management* est le fruit d'une collaboration entre le Programme hydrologique international de l'UNESCO et le Programme de l'homme et de la biosphère. Il vise à améliorer notre compréhension des habitats aquatiques, des biens et services écosystémiques qui s'y rattachent et des questions de conservation et d'exploitation durable en mettant l'accent sur leur intégration dans le cadre d'une gestion de

l'eau dans les villes. En première partie, l'ouvrage passe en revue les concepts et les questions de base des habitats aquatiques urbains, ainsi que les stratégies de leur intégration à ce cadre de gestion de l'eau dans les villes. En deuxième partie, il examine les mesures techniques de gestion et de rétablissement des habitats, de leur intégration à l'urbanisme et de leur rôle dans la santé humaine. En dernière partie, il se penche sur les enjeux actuels de l'habitat aquatique urbain et sur les moyens pratiques d'y apporter des solutions par la lorgnette d'études de cas réalisées partout dans le monde.

Managing Water Resources: Methods and Tools for a Systems Approach
Par ***Slobodan P. Simonović*** (2009)
Études et rapports de l'UNESCO dans la Série Hydrologie – Éditions UNESCO / Earthscan

Cet ouvrage décrit l'« approche systémique » et son application à la gestion contemporaine des ressources hydriques en s'attachant à trois grandes trousses d'outils, celles de la simulation, de l'optimisation et de l'analyse d'arbitrage des objectifs. Il la situe dans le contexte de la planification et du développement durables dans des conditions d'incertitude. Il s'intéresse à deux caractéristiques de la gestion des ressources hydriques, à savoir l'adoption de la simulation dynamique de systèmes comme outil de modélisation intégrée et le traitement analytique par ensembles flous des incertitudes d'ordre objectif et subjectif. L'ouvrage combine des exemples théoriques et pratiques et présente des programmes et des exercices dans un cédérom d'accompagnement. Il se veut à la fois ouvrage avancé pour les étudiants en ressources hydriques et en génie civil ou environnemental et guide pratique à l'usage des professionnels.

Braun, L.N., Hagg, W., Severskiy, I.V., et ***Young, G.***, (dir.), 2009. *Assessment of Snow, Glacier and Water Resources in Asia Papers from Workshop held in Almaty*, Kazakhstan, 28-30 Nov. 2006; copublication du PHI de l'UNESCO et du comité national allemand du PHI/PHRE, 242 p.

ISARM Amériques 2010. *Socioeconomic, Environmental and Climatic aspects of the TAS in the Americas.* Livre III de la série UNESCO-ISARM, UNESCO/OEA – programme ISARM AMÉRIQUES. ***Alfonso Rivera*** et d'autres ont collaboré dans une large mesure à cette publication ISARM Amériques.

Rivera, A. 2009a. *Terms of reference*. Working Group on Strategy for the TAS of the Americas. Rapport présenté à l'UNESCO le 2 octobre 2009.

Rivera, A. 2009b. Summary of the discussions of the working group on the strategy of TAS held on September 17, 2009 in Quito. Rapport présenté à l'UNESCO le 2 octobre 2009.

Rivera, A. et coll., 2010. *Towards a regional strategy for the management of the transboundary aquifer systems in the Americas.* Document présenté à la Conférence internationale de l'UNESCO sur les aquifères transfrontaliers qui a eu lieu à Paris en décembre 2010.

Rivera, A. 2014. *Regional Strategy for the Assessment and Management of the Transboundary Aquifers Systems (TAS) in the Americas*. Alfonso Rivera (dir.), livre IV de la série UNESCO-ISARM, UNESCO/OEA – programme ISARM AMÉRIQUES (sous presse).

Young, G. J. 2009. *The elements of high mountain hydrology with special emphasis on Central Asia.* Proceedings of Workshop held in Almaty, Kazakhstan, 28-30 Nov. 2006; copublication du PHI de l'UNESCO et du comité national allemand du PHI/PHRE, 9-18.

Situation actuelle et orientations futures

Par ses divers programmes hydrologiques dirigés ou financés par les ministères et organismes publics, les conseils subventionnaires, les universités et l'industrie, le Canada est bien placé pour aborder un grand nombre des thèmes et des axes d'étude de la phase VIII du PHI (2014-2021). Il a marqué d'un astérisque les axes d'étude auxquels il se propose d'apporter une contribution :

Thème 1 : Les catastrophes liées à l'eau et le changement hydrologique

* 1.1 La gestion des risques comme moyen d'adaptation aux changements planétaires
* 1.2 Comprendre l'association des processus humains et des processus naturels
* 1.3 Tirer parti des systèmes mondiaux et locaux d'observation de la Terre
* 1.4 Traiter les incertitudes et améliorer la communication à ce sujet
* 1.5 Améliorer la base scientifique de l'hydrologie et des sciences de l'eau pour la préparation et la réponse aux phénomènes hydrologiques extrêmes

Thème 2 : Les eaux souterraines dans un environnement en évolution

* 2.1 Développer la gestion durable des ressources en eaux souterraines
* 2.2 Étudier les stratégies de gestion de la recharge des aquifères
* 2.3 L'adaptation aux effets du changement climatique sur les systèmes aquifères
* 2.4 Promouvoir la protection de la qualité des eaux souterraines

* 2.5 Promouvoir la gestion des aquifères transfrontières

Thème 3 : Rareté et qualité de l'eau

* 3.1 Améliorer la gouvernance, la planification, la gestion, la distribution et l'efficacité de l'utilisation des ressources en eau
* 3.2 Traiter l'actuelle rareté de l'eau et développer la prévision pour prévenir les évolutions indésirables
* 3.3 Promouvoir des outils pour la participation et la sensibilisation des parties prenantes et pour le règlement des conflits
* 3.4 Traiter les questions de qualité et de pollution de l'eau dans le cadre de la GIRE – améliorer les capacités juridiques, politiques, institutionnelles et humaines
* 3.5 Promouvoir des outils innovants pour la sécurité de l'approvisionnement en eau et la lutte contre la pollution

Thème 4 : L'eau et les établissements humains du futur

* 4.1 Des approches et technologies radicalement différentes
* 4.2 Les changements à l'échelle du système pour des méthodes de gestion intégrée
* 4.3 Les structures institutionnelles et le leadership au service de la valorisation et de l'intégration
* 4.4 Les opportunités dans les villes émergentes des pays en développement
* 4.5 Le développement intégré dans les établissements humains ruraux

Thème 5 : L'écohydrologie, pour une harmonie au service d'un monde durable

* 5.1 La dimension hydrologique d'un bassin versant – identification des menaces potentielles et des opportunités au service d'un développement durable
* 5.2 La détermination de la structure écologique d'un bassin versant pour un éventuel renforcement de l'écosystème – productivité biologique et biodiversité
* 5.3 L'écohydrologie comme solution systémique et l'ingénierie écologique au service d'une meilleure résilience de l'eau et de l'écosystème, et pour le renforcement des services écosystémiques
* 5.4 L'écohydrologie urbaine – l'épuration et la rétention des eaux pluviales dans le paysage urbain, une possibilité d'améliorer la santé et la qualité de vie
* 5.5 La régulation écohydrologique pour conserver et rétablir les liens côtes-continents et le fonctionnement des écosystèmes

Thème 6 : L'éducation relative à l'eau, clé de la sécurité de l'eau

* 6.1 Développer l'éducation relative à l'eau dans l'enseignement supérieur et le perfectionnement professionnel dans le secteur de l'eau
* 6.2 L'enseignement et la formation professionnels des techniciens de l'eau
* 6.3 L'éducation relative à l'eau pour les enfants et les jeunes
* 6.4 Promouvoir la sensibilisation au problème de l'eau par l'éducation informelle relative à l'eau
* 6.5 L'éducation au service de la coopération et de la gouvernance dans le domaine des eaux transfrontières

Document élaboré par :

D[r] J. Fred J. Wrona, président et délégué principal du Comité national canadien du PHI (fred.wrona@ec.gc.ca)
D[r] Terry D. Prowse, conseiller scientifique (terry.prowse@ec.gc.ca)
M. Peter di Cenzo (Secrétariat du programme) (peter.dicenzo@ec.gc.ca)

Direction des sciences et de la technologie de l'eau, Environnement Canada

Au nom du Comité national canadien

REPORT OF THE CZECH NATIONAL COMMITTEE FOR HYDROLOGY (CNCH) ON UNESCO IHP RELATED ACTIVITIES (JUNE 2014)

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1. Meetings of the CNCH

1.1.1. Decisions regarding the composition of the CNCH

After the election of new members in April 2012, the Committee changed its name to the Czech National Committee for Hydrology, which is intended to be stable in future periods for different purposes (e.g. publications and conferences). Along with the name, a set of several modifications of new logo was introduced. In November 2012, a new regular member, at the same time representing the Ministry of the Environment of the Czech Republic (MECR), was elected. Also, the Statute of the CNCH was approved.

Persons who were appointed to observe activities of committees of other international programmes confirmed their commitments. At this time, the CNCH has connections to:

- Czech National Committee of Geodesy and Geophysics,
- Czech National Committee for Disaster Reduction,
- Czech Committee of the International Commission on Irrigation and Drainage,
- Czech National Committee for the UNECO Programme on Man and the Biosphere,
- Czech National Committee for IGCP,
- Czech National Committee for Cooperation with IOC UNESCO.

Through one vice-chairman and 10 national correspondents, the CNCH maintains relationships with the IAHS and its scientific commissions. Minor changes in composition of national correspondents were made during the period of report. For now, the International Commission on Remote Sensing (ICRS) and a new decade Panta Rhei are without specific representatives. This situation, however, should be improved in the near future.

1.1.2. Status of IHP-VII and IHP-VIII activities

An external coworker of the CNCH, who is in charge within the Groundwater for Emergency Situations (GWES) project, reported that the project entered its final stage. It was enabled by funding the meetings by the Japanese and, especially, German governments. In this final stage *the Global Map of Vulnerability to Water-Related Disasters and Droughts* with a scale of 1:25,000,000 has been prepared. Its publication is planned to the end of 2014. As a member of the IHP-VIII Task Force team, the same external coworker participated in the preparation of final version of *the Strategic Plan of the Eighth Phase of IHP*.

Regarding the Regional Cooperation of the Danube Countries, some members of the CNCH has cooperated with Slovak hydrologists in the development of flood forecasting at the confluence of the Dyje and Morava Rivers.

The CNCH has discussed and set up its priorities and working groups aimed at experimental basins, on history of Czech hydrology and on hydrological education. As a reaction to the survey of the UNESCO Secretariat on involvement of Czech hydrologists in activities related to IHP-VIII, the CNCH forwarded the questionnaire to its members. To date, the focal areas 1.1, 1.3–1.5, and 2.4 could be covered by Czech experts.

1.2. Activities of the CNCH at national level

1.2.1. National scientific and technical meetings

The CNCH acted as a co-organizator of a Czech-Slovak conference entitled "5th Conference with International Participation on Hydrology of a Small Basin 2014" in Prague. The conference is held in triennial cycle to bring together scientists dealing with broad range of issues connected to hydrology of small basins (measurements, water cycle research, water quality etc.). The link to website is here.

Further, members of the CNCH contributed to organization of several national conferences and workshops during the respective period, among others e.g. "Adolf Patera Workshop 2013" on extreme hydrological events in the basins or "Workshop Jizera Mts. – meeting across scientific disciplines".

1.2.2. Participation in IHP Steering Committees/Working Groups

Mr. Jaroslav Vrba, who is the external coworker of the CNCH, held the position of the international coordinator of the GWES project (IHP-VII, Theme 3, Focal area 3.4). Otherwise, the CNCH did not receive any other reports regarding this section.

1.2.3. Supported or sponsored projects

The Czech Republic did not support or sponsored projects during the period of report.

1.2.4. Collaboration with other national committees

Historically, the CNCH has closely collaborated with the Slovak Committee for Hydrology (SCH) in organizing and promoting selected hydrological events and activities. In autumn 2012 and 2013, the SCH (with the support of the CNCH) co-organized traditional "Conference of Young Experts" consisting of three sections – "the Conference of Young Hydrologist", "the Conference of Young Water Managers" and "the Conference of Young Meteorologists and Climatologists". Young experts from both countries, i.e. Slovakia and Czechia, were invited. Also, the initial consultation has been made concerning the upcoming "Hydrological Days 2015" international conference, which should take place in Slovakia as well.

1.2.5. Other initiatives

A new website of the CNCH was launched in 2013. The website provides useful information about activities of the CNCH, UNESCO-IHP, WMO-HWRP, IAHS and other with the relevance to hydrology.

The CNCH together with the Czech Hydrometeorological Institute (CHMI) established the National prize for the attribution of a significant personal contribution to a development of hydrology and hydrological service in the Czech Republic. The prize is named after Prof. Andreas Rudolf Harlacher, a scientist and a founder of the Hydrological service in Bohemia in 1875. The prize is represented by a medal. The first laureate of the Harlacher Prize was Mr. Josef Hladný, a long time chairman of the Czech National Committee for IHP (for more information in Czech see this website).

The CNCH in cooperation with the CHMI coordinated the issue of the book *Krátké úvahy o vodě [Short Essays about Water]*. The book was prepared on the occasion of the 2013 International Year of Water Cooperation (IYWC). Nine essays were written by nine personalities of Czech water management and hydrology. The book can be downloaded from this link).

The IYWC activities included the translation of selected campaign materials to Czech. Materials have been provided among others to National network of UNESCO associated schools in the Czech Republic.

The CNCH also reported events held during celebration of the IYWC via the web questionnaire by UN-Water.

The CNCH guarantees the translation of the declarations of World Water Days and its presentation in the Czech Republic.

The CHMI organized an exposition called “Water and Air around Us: Monitoring and Assessing the Atmosphere and Hydrosphere” in Prague in 2012. Its main aim was the introduction of historical and modern instruments and methods used in meteorology, climatology and hydrology. Poster from the exhibition are updated and provided for the public use on the CHMI website. The newest versions of poster presentations relating to hydrology only can be found here.

Representatives of the CNCH contributed to the preparation of “XXVI Conference of the Danubian Countries on Hydrological Forecasting and Hydrological Bases of Water Management” to be held in Deggendorf, Germany in September 2014 as members of scientific committee.

Through their comments, some members of the CNCH improved the content of updated Czech state standard on hydrological data of surface waters. The standard in itself has been valid since February 2014.

The collaboration with other national committees is realized through the Czech Committee for UNESCO and its sections (Environment, Education and Science). However, the CNCH contributed to the conference of Kroměříž gardens UNESCO site as the 2013 year topic was “the water structures in gardens”.

The CNCH cooperated with the Czech National Committee for Disaster Reduction in organization of seminars dealing with the discussion of experience from 2013 flood in the Czech Republic.

1.3. Educational and training courses

1.3.1. Contribution to IHP courses

The CNCH did not contribute to IHP courses during the reporting period.

1.3.2. Organization of specific courses

The CNCH was not involved in organization of specific courses during the reporting period.

1.3.3. Participation in IHP courses

The CNCH did not receive any reports that Czech experts participated in international IHP courses in the past two years.

1.4. Cooperation with the UNESCO-IHE and/or international/regional water centers under the auspices of UNESCO

Some Czech hydrologists and water managers maintain personal and professional contacts with members of the UNESCO-IHE staff. Czech hydrology is interested in the activities of UNESCO category 2 water-related centres; in particular in Poland as regards ecohydrology, in Japan as regards natural disasters and in the Netherlands as regards groundwater and drought.

1.5. Publications

Probably, the main contribution to UNESCO publications is the following one:

Danhelka, J., **Soukalova, E.**, Brezkova, L. & Cernik, J. (2013) Examples of cooperation in the Czech Republic flood forecasting and information service. In: *Free Flow: Reaching Water*

Security Through Cooperation (J. Griffiths & R. Lambert, eds.), First Edition., 245–247. Paris: UNESCO/Tudor Rose. Downloadable from here.

Furthermore, the IYWC was reflected in two books written in Czech:

Czech Hydrometeorological Institute. (2013) *Short Essays about Water* (in Czech). Prague: Czech Hydrometeorological Institute. (ISBN 978-80-87577-24-0)

Daňhelka, J. & Elleder, L. (Eds.). (2012) *Selected Chapters from the History of Floods and Hydrological Services in the Czech Republic* (in Czech). Prague: Czech Hydrometeorological Institute. (ISBN 978-80-87577-12-7)

The following list presents only selected scientific papers, book chaptes or contributions to conference proceedings of CNCH members or IAHS national correspondents:

Adamec, M., Trizna, M., Říhová, V., **Unucka, J.** & Gergeľová, M. (2012) On 2D and 3D parameter derivation for rainfall-runoff models. *Acta Montanistica Slovaca* **17**(3), 204–208.

Blahova, J., Leontovycova, D., **Kodes, V.** & Svobodova, Z. (2013) Study of polycyclic aromatic hydrocarbon contamination of major rivers in the Czech Republic using biliary metabolite in chub, *Leuciscus cephalus* L. *Bulletin of Environmental Contamination and Toxicology* **90**(5), 521–524. doi:10.1007/s00128-013-0972-0

Březková, L. & **Starý, M.** (2013) The stochastic discharge forecast - Creation, interpretation and other applications. In: *Floods: From Risk to Opportunity* IAHS Red Book 357 (A. Chavoshian & K. Takeuchi, eds.), 283–291. Wallingford, Oxfordshire, UK: IAHS Press.

Dohnal, M., **Vogel, T.**, **Šanda, M.** & Jelínková, V. (2012) Uncertainty analysis of a dual-continuum model used to simulate subsurface hillslope runoff involving oxygen-18 as natural tracer. *Journal of Hydrology and Hydromechanics* **60**(3), 194–205. doi:10.2478/v10098-012-0017-0

Dusek, J., **Vogel, T.**, Dohnal, M. & Gerke, H. H. (2012) Combining dual-continuum approach with diffusion wave model to include a preferential flow component in hillslope scale modeling of shallow subsurface runoff. *Advances in Water Resources* **44**, 113–125. doi:10.1016/j.advwatres.2012.05.006

Dusek, J., **Vogel, T.** & **Sanda, M.** (2012) Hillslope hydrograph analysis using synthetic and natural oxygen-18 signatures. *Journal of Hydrology* **475**, 415–427. doi:10.1016/j.jhydrol.2012.10.025

Dušek, J., Lichner, Ľ., **Vogel, T.** & Štekauerová, V. (2013) Transport of iodide in structured soil under spring barley during irrigation experiment analyzed using dual-continuum model. *Biologia* **68**(6), 1094–1098. doi:10.2478/s11756-013-0249-4

Dvořáková, Š., **Kovář, P.** & Zeman, J. (2012) Implementation of conceptual linear storage model of runoff with diurnal fluctuation in rainless periods. *Journal of Hydrology and Hydromechanics* **60**(4), 217–226. doi:0.2478/v10098-012-0019-y

Elgzeli, Y. M., Ondovčin, T., **Hrkal, Z.**, Krásný, J. & Mls, J. (2013) Impacts of heavy groundwater pumping on hydrogeological conditions in Libya: Past and present development and future prognosis on a regional scale. *Acta Geologica Polonica* **63**(2), 283–296. doi:10.2478/agp-2013-0013

Fišák, J., Stoyanova, V., Bartůňková, K., **Tesař, M.** & Shoumkova, A. (2012) Typical insoluble particles in fog water at Milešovka observatory (Czech Republic). *Pure and Applied Geophysics* **169**(5-6), 1083–1091. doi:10.1007/s00024-011-0345-8

Gerke, H. H., Dusek, J. & **Vogel, T.** (2013) Solute mass transfer effects in two-dimensional dual-permeability modeling of bromide leaching from a tile-drained field. *Vadose Zone Journal* **12**(2), 0. doi:10.2136/vzj2012.0091

Hanel, M., Mrkvičková, M., Máca, P., Vizina, A. & Pech, P. (2013) Evaluation of simple statistical downscaling methods for monthly regional climate model simulations with respect to the estimated changes in runoff in the Czech Republic. *Water Resources Management* **27**(15), 5261–5279. doi:10.1007/s11269-013-0466-1

Hanel, M., Vizina, A., Máca, P. & Pavlásek, J. (2012) A multi-model assessment of climate change impact on hydrological regime in the Czech Republic. *Journal of Hydrology and Hydromechanics* **60**(3), 152–161. doi:10.2478/v10098-012-0013-4

Havlíček, V., **Hanel, M.**, Máca, P., Kuráž, M. & Pech, P. (2013) Incorporating basic hydrological concepts into genetic programming for rainfall-runoff forecasting. *Computing* **95**(S1), 363–380. doi:10.1007/s00607-013-0298-0

Holko, L., Dóša, M., Michalko, J., Kostka, Z. & **Šanda, M.** (2012) Isotopes of oxygen-18 and deuterium in precipitation in Slovakia. *Journal of Hydrology and Hydromechanics* **60**(4), 265–276. doi:0.2478/v10098-012-0023-2

Horecký, J., Rucki, J., Krám, P., **Křeček, J.**, Bitušík, P., Špaček, J. & Stuchlík, E. (2013) Differences in benthic macroinvertebrate structure of headwater streams with extreme hydrochemistry. *Biologia* **68**(2), 303–313. doi:10.2478/s11756-013-0156-8

Janál, P. & **Starý, M.** (2012) Fuzzy model used for the prediction of a state of emergency for a river basin in the case of a flash flood - Part 2. *Journal of Hydrology and Hydromechanics* **60**(3), 162–173. doi:10.2478/v10098-012-0014-3

Klimeš, J., Benešová, M., Vilímek, V., **Bouška, P.** & Cochachin Rapre, A. (2013) The reconstruction of a glacial lake outburst flood using HEC-RAS and its significance for future hazard assessments: An example from Lake 513 in the Cordillera Blanca, Peru. *Natural Hazards* **71**(3), 1617–1638. doi:10.1007/s11069-013-0968-4

Kodešová, R., Němeček, K., **Kodeš, V.** & Žigová, A. (2012) Using dye tracer for visualization of preferential flow at macro- and microscales. *Vadose Zone Journal* **11**(1), 0. doi:10.2136/vzj2011.0088

Kovář, P., Vaššová, D. & Janeček, M. (2012) Surface runoff simulation to mitigate the impact of soil erosion, case study of Třebsín (Czech Republic). *Soil and Water Research* **7**(3), 85–96.

Kovář, P., Vrana, I. & Vaššová, D. (2012) Stakeholder group consensus based on multi-aspect hydrology decision making. *Journal of Hydrology and Hydromechanics* **60**(4), 252–264. doi:0.2478/v10098-012-0022-3

Kovar, P., Krovak, F., Rous, V., Bily, M., Salek, M., Vassova, D., Hrabalikova, M., *et al.* (2013) An appraisal of the effectiveness of nature-close torrent control methods - Jindrichovicky Brook case study. *Ecohydrology* (published online). doi:10.1002/eco.1453

Křeček, J. & Punčochář, P. (2012) Design of climate station network in mountain catchments. *Hungarian Geographical Bulletin* **61**(1), 19–29.

Kulasova, A., Smith, P. J., Beven, K. J., **Blazkova, S. D.** & Hlavacek, J. (2012) A method of computing uncertain nitrogen and phosphorus loads in a small stream from an agricultural catchment using continuous monitoring data. *Journal of Hydrology* **458-459**, 1–8. doi:10.1016/j.jhydrol.2012.05.060

Langhammer, J., Hartvich, F., Mattas, D., Rödlová, S. & Zbořil, A. (2012) The variability of surface water quality indicators in relation to watercourse typology, Czech Republic. *Environmental Monitoring and Assessment* **184**(6), 3983–3999. doi:10.1007/s10661-011-2238-9

Langhammer, J., Matoušková, M. & **Kliment, Z.** (2013) Assessment of spatial and temporal changes of ecological status of streams in Czechia: A geographical approach. *Geografie* **118**(4), 309–333.

Langhammer, J. & Rödlová, S. (2013) Changes in water quality in agricultural catchments after deployment of wastewater treatment plant. *Environmental Monitoring and Assessment* **185**(12), 10377–10393. doi:10.1007/s10661-013-3339-4

Pavelková, H., Dohnal, M. & **Vogel, T.** (2012) Hillslope runoff generation - Comparing different modeling approaches. *Journal of Hydrology and Hydromechanics* **60**(2), 73–86. doi:10.2478/v10098-012-0007-2

Podhorányi, M., Mudroň, I., Cirbus, J. & **Unucka, J.** (2012) Flood impact assessment using hydraulic modelling: A case study from Stonavka and Olse river confluence area, Czech Republic. *SGEM2012 Conference Proceedings*, Vol. 3, 671–678. Presented at the 12th International Multidisciplinary Scientific GeoConference. doi:10.5593/sgem2012/s13.v3020

Podhorányi, M., **Unucka, J.**, Bobál', P. & Říhová, V. (2013) Effects of LIDAR DEM resolution in hydrodynamic modelling: Model sensitivity for cross-sections. *International Journal of Digital Earth* **6**(1), 3–27. doi:10.1080/17538947.2011.596578

Podhoranyi, M., Kocyan, T., Mudron, I. & **Unucka, J.** (2013) The development of applications for assessment the effect of linear technical barriers on the flow in the river basin Olsa. *SGEM2013 Conference Proceedings*, 373–379. Presented at the 13th SGEM GeoConference on Water Resources. Forest, Marine And Ocean Ecosystems. doi:10.5593/SGEM2013/BC3/S12.047

Romanowicz, R. J., Kulasová, A., Ředinová, J. & **Blazková, S. D.** (2012) Influence of afforestation on water regime in Jizera Catchments, Czech Republic. *Acta Geophysica* **60**(4), 1120–1142. doi:10.2478/s11600-012-0046-4

Rihova, V., **Unucka, J.**, Podhoranyi, M. & Gergelova, M. (2013) Application of GIS and mathematical models in basin management - a case study in the upper Morava River basin. *SGEM2013 Conference Proceedings*, 19–30. Presented at the 13th SGEM GeoConference on Water Resources. Forest, Marine And Ocean Ecosystems. doi:10.5593/SGEM2013/BC3/S12.003

Soukalová, E. (2013) Transboundary cooperation in flood forecasting and warning services within the international Morava River basin. In: *Floods: From Risk to Opportunity* IAHS Red Book 357 (A. Chavoshian & K. Takeuchi, eds.), 377–382. Wallingford, Oxfordshire, UK: IAHS Press.

Steenhuis, T. S., Hrnčíř, M., Poteau, D., Romero Luna, E. J., Tilahun, S. A., Caballero, L. A., Guzman, C. D., ***et al.*** (2013) A saturated excess runoff pedotransfer function for vegetated watersheds. *Vadose Zone Journal* **12**(4), 0. doi:10.2136/vzj2013.03.0060

Šípek, V. & **Tesař, M.** (2013) Soil moisture simulations using two different modelling approaches. *Bodenkultur* **64**(3-4), 99–103.

Vlčková, M., Šrámek, V., Matoušková, V., Březina, K. B., Fadrhonsová, V. & **Kulhavý, Z.** (2012) Determination of retention curves of swelling and skeleton forest soils (in Czech). *Reports of Forestry Research* **57**(2), 133–143.

Vogel, T., Dohnal, M., Dusek, J., Votrubova, J. & **Tesar, M.** (2013) Macroscopic modeling of plant water uptake in a forest stand involving root-mediated soil water redistribution. *Vadose Zone Journal* **12**(1), 0. doi:10.2136/vzj2012.0154

Votrubová, J., Dohnal, M., **Vogel, T.** & **Tesař, M.** (2012) On parameterization of heat conduction in coupled soil water and heat flow modelling. *Soil and Water Research* **7**(4), 125–137.

Vrana, I., Vaníček, J., **Kovář, P.**, Brožek, J. & Aly, S. (2012) A group agreement-based approach for decision making in environmental issues. *Environmental Modelling & Software* **36**, 99–110. doi:10.1016/j.envsoft.2011.12.007

Vysloužilová, B. & **Kliment, Z.** (2012) Soil erosion and sediment deposition modelling at the small catchment scale (in Czech). *Geografie* **117**(2), 170–191.

Wetterhall, F., Pappenberger, F., Alfieri, L., Cloke, H. L., Thielen-del Pozo, J., Balabanova, S., **Daňhelka, J.**, *et al.* (2013) HESS Opinions 'Forecaster priorities for improving probabilistic flood forecasts'. *Hydrology and Earth System Sciences* **17**(11), 4389–4399. doi:10.5194/hess-17-4389-2013

1.6. Participation in international scientific meetings

1.6.1. Meetings hosted by the country

The "5th Conference with International Participation on Hydrology of a Small Basin 2014" was organized in Prague from 22nd to 24th April 2014. The CNCH was a co-organizer of this conference.

1.6.2. Participation in meetings abroad

Czech experts, including the members of the CNCH, participated in the "14th Biennial Conference ERB 2012" ("Studies of Hydrological Processes in Research Basins: Current Challenges and Prospects") in St. Petersburg, Russia (September 17–20), and "FLOODRisk 2012" in Rotterdam, the Netherlands (November 20–22). Regarding the first conference, the national correspondent of the ERB project (and at the same time a vice-chairman of the CNCH), was a member of scientific committee. Moreover, the same person was a member of scientific committee of the "Workshop and ERB Steering Committee Meeting", which took place in Slovenia in 2013 (October 3–6). He also actively contributed to the workshop. The second vice-chairman of the CNCH partook in four meetings of Experts for the Danube Strategy Project (preparation within HORIZON 2020) at the Joint Research Centre, Ispra, Italy.

1.7. Other activities at regional level

1.7.1. Institutional relations and cooperation

1.7.2. Completed and ongoing scientific projects

Although there are many more, only the most important projects are mentioned here:

- **P. Kovar**: DREAM-CO BOKU Vienna, Danube Strategy Project, HORIZON 2020 (period 2012–2014; submitted in April 2014).
- **P. Kovar**, J. Stibinger: GLOCAD, Danube Atlas, Danube Strategy Project, HORIZON 2020 (period 2013–2014; preparatory for submission in 2016).
- Hydrological fluxes in soil-plant-atmosphere system (Czech Science Foundation grant no. 205/08/1174; completed in 2012).
- Soluble and insoluble fraction of inorganic pollutants in various types of precipitation (Czech Science Foundation grant no. 205/09/1918; completed in 2013).
- Development and use of the new technologies of the systems of early warning for flash floods (Technology Agency of the Czech Republic grant no. TA02021451; period 2012–2015).

2. FUTURE ACTIVITIES

2.1. Activities planned until December 2014

Members of the CNCH will participate in "XXVI Conference of the Danubian Countries on Hydrological Forecasting and Hydrological Bases of Water Management" to be held in Deggendorf, Germany in September 2014 (including the work in the scientific committee).

The CNCH will support the European Geosciences Union and the Czech University of Life Sciences with organization of the "HYPER Droughts: HYdrological Precipitation - Evaporation - Runoff Droughts international conference" focused on droughts to be held in Prague in autumn 2014.

The CNCH assists the local organizing committee of the "26th IUGG General Assembly 2015" in the preparation of hydrological programme (IAHS sessions, side events, guided tours etc.).

"15th Biennial Conference ERB 2014 on Advances in Hydrologic Research on Pristine, Rural and Urban Small Basins", Coimbra, Portugal (September 9–13). The national correspondent of the ERB project, also involved in the CNCH, plays a role as a member of scientific committee of the conference.

Completion of integration of CNCH book collection into the Czech Hydrometeorological Institute library.

2.2. Activities foreseen for 2015–2016

The CNCH will further participate in coordination of activities accompanying the IAHS Assembly taking place in Prague within the IUGG General Assembly in June and July 2015 (more details can be found here).

The CNCH will cooperate with the SCH on the organization of the "Hydrological Days 2015" quinquennial international conference to be held in Slovakia in 2015.

Further development of activities of CNCH working groups.

2.3. Activities envisaged in the long term

Incorporating Czech hydrologists into IHP-VIII tasks.

Further maintenance of CNCH website and development of its English content.

National Report on IHP Related Activities (IHP)

The Government of the Democratic People's Republic of Korea (DPRK) focused on the people's livelihood and integrated water resource management because of severe meteorological disasters in recent years.

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 IHP National Committee

According to the decision of 15th meeting of National Committee held on 17~19 August 2012 Pyongyang, Mr. Ryu Bong Chol, vice administrator, State Hydro-Meteorological Administration(SHMA) was elected as chairman of National Committee of DPRK for IHP.

Composition of National Committee of DPRK for IHP:

Chairman: Ryu Bong Chol, vice administrator of SHMA.

Vice Chairman: Cho Myong Bong, professor, doctor, Earth Science faculty, Kim Il Sung University.

Secretary-General: Kim chol, director General, Hydrological Department, SHMA.

Members: representatives from following stakeholders.

1. Hydrological Institute, SHMA.
2. Geographical Institute, State academy of science.
3. Branch institute of hydraulic and ocean engineering, State academy of science.

Postal address is as follows:

National Committee of DPRK for IHP,
State Hydro-Meteorological Administration
Oesong-dong, Central District, Pyongyang
Tel: 850-2-321-4539 Fax: 8502 381-4410/4416/4427
Email: shma@star-co.net.kp

1.1.2 Status of IHP-Ⅶ activities

National committee of DPRK for IHP hosted the meetings to review and modify all activities implementing hydrological policy at national level.

Education has priority in IHP-Ⅶ activities. National committee has close relation with meteorological and hydrological agencies including Kim Il Sung University in order to strengthen education and human capacity in field of national meteorology and hydrology, and strengthened corresponding with local functions and demands.

Integrated water resource management and flood mitigation plan consist of important investment of government. National committee ensured construction of banks to control water level of River Taedong and protect environment cooperating with national agencies including cabinet.

Also, National committee organized the technical capacity for construction of multi-stage hydro power stations in Chongchon River basin and ensured technical support for this.

National committee focused on the scientific research to solve hydrological and practical problems including estimation and development of water resource and ecological problems and to strengthen scientific knowledge on hydrological cycle.

1.2 Activities at national level in the framework of the IHP

1.2.1 National / local scientific and technical meetings

Meteorological and Hydrological academic Society, DPRK convened scientific and technical meetings every quarter.

National Committee for IHP convened scientific workshops and exhibitions to control scientifically water resource on the occasion of “World Water Day”, 22 March 2014.

Scientific and technical meetings held in Pyongyang are as follows.

- National workshop for the recovery of ecosystem in Chongchon River basin of North Pyongan Province, 20 April 2013 Pyongyang.
- National workshop on the utilization of water resources and environmental protection in Taedong River Basin.14 November 2013, Pyongyang.
- National workshop for the establishment of water level controlling system to prevent flood in Taedong River, 17 March 2014, Pyongyang.

1.2.2 Research/applied projects supported or sponsored

- Developing Hydrological Information System in SHMA

- Establishing the real time flood forecasting system in the multi-stage reservoir system in Taedong River basin.
- Establishing the monthly and ten-day runoff forecasting system in the Rivers and reservoirs across the country.
- Establishing management system of under water resource in Pyongyang city using GIS.

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

- There has been proceeding Data Exchange for preventing flood damage of Amrok and Tuman River, the Rivers of Korean-Chinese boundary.

1.2.4 Other initiatives

None

1.3 Educational and training course

1.3.1 Contribution to IHP courses

None

1.3.2 Organization of specific courses

- There have been convened scientific and technical trainings including observation method, information process and flood forecast in Pyongyang every May. Directors of provincial observation stations participated in this training and it is good chance for improving their knowledge.

1.3.3 Participation in IHP courses

None

1.4 Cooperation with the UNESCO-IHE institute for water education and/or international/regional water centers under the auspices of UNESCO

None

1.5 publications

Publications have been issued in journal 《Meteorology and Hydrology》 and 《Scientific and Technical Bulletin on Meteorology and Hydrology》.

- Kim Yong Bong: Prediction of Daily flow Amount by regression model, Journal 《Meteorology and Hydrology》 2013. 2 11-12p

-Ri Ju Yong: Study on Debris Hazard Mapping by GIS, 《Scientific and Technical Bulletin on Meteorology and Hydrology》 2012. 4 10-14p

-Han Jang Baek: Flood Forecast Method by NAM Model 《Scientific and Technical Bulletin on Meteorology and Hydrology》 2012. 4

4-9p

-Kim Chol U: Basin Hydrological Model-SCS model《Scientific and Technical Bulletin on Meteorology and Hydrology》2013. 4 73-77p

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

None

1.6.2 Participation in meetings abroad

None

1.7 Other activities at regional level

National Committee of DPRK for IHP is closely cooperating with UNESCAP, WMO, UNESCO JAKARTA office and BEIJING office, and also is cooperating with Ministry of Water Resources, China bilaterally.

- National committee has accelerated basic construction project to prevent flood damage in Amrok and Tuman River basin with Chinese Meteorological Administration.
- National committee focused on the research work to improve the forecast and service of Meteo-hydrological disasters, and the result introduced into operation in 2014.
- Substructure for the real time observation, data communication and service was completed for the real time flood forecasting, and introduced into operation from June 2014.
- There had been made research work for reevaluating and standardizing the flood risk in whole parts of our country.

2. Future activities

2.1 Activities planned until December 2014

National committee of DPRK for IHP will actively participate in the meeting of IHP regional steering committee and understand the IHP-Ⅶ activities and actively cooperate.

National committee of DPRK for IHP will pay a great attention to the solution of practical hydrological problems in accordance with national strategies within IHP framework.

Also national committee will apply the real time flood forecast and control system for the Taedong and Amrok River basin to the operation and establish the decision making support system for the Taedong River basin in 2014.

In DPRK, Construction of multi-stage hydro power stations in chongchon River is very important task, and national committee contributes to the construction of hydro power stations based on the cost effectiveness and will develop flood forecast system and rational reservoir operation system in the future.

2.2 Activities foreseen for 2015-2016

SHMA will implement some national projects relating to the IHP-Ⅶ themes through national committee of DPRK for IHP.

National committee of DPRK for IHP will continue to train experts and to organize scientific and technical workshops and to disseminate knowledge and experience relating to the environmental protection, and therefore will promote the participation of mass for integrated water resource management.

National committee of DPRK for IHP will regularly organize several thematic workshops and seminars relating to the environmental protection and disaster prevention every spring and autumn.

Integrated water resource management project for ecosystem recovery will be implemented in the pilot site of north pyongan province.

Real time flood forecasting system for River and reservoir will be established using distribution model nationwide, and will be established the decision making support system for water resource management in Amrok and Chongchon River.

2.3 Activities envisaged in the long term

National committee of DPRK for IHP will actively participate in IHP activities and thus actively contribute to the achievement of UN MDGs and national development goals, extension of integrated water resource management, public awareness, environmental protection and climate change adaptation.

INFORME NACIONAL SOBRE ACTIVIDADES RELACIONADAS AL PHI

Realizadas por el INDRHI de la República Dominicana

Contenido del Informe

- Entrenamiento en software HEC- HMS/BANCO MUNDIAL
- Curso de Meteorología Clase IV/OMM_BANCO MUNDIAL
- Entrenamiento en software Map Windows/BANCO MUNDIAL
- Entrenamiento HEC-Res_Sim/BANCO MUNDIAL
- Curso para instructores en aforo/OMM_BANCO MUNDIAL
- Curso sobre curvas Intensidad Duración y Frecuencia (IDF)/UNESCO
- Curso sobre elaboración Atlas de Sequia/UNESCO
- Curso sobre Análisis Costo Beneficio en Reducción en Riesgos de Desastres/USAID

1.3.3 Participación en cursos del PHI

- Taller TWAP Programa de Acuíferos Transfronterizos/PHI-Montevideo Uruguay 2014

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

1.5 Publicaciones

1.6 Participación certámenes científicos internacionales

1.6.1 Certámenes realizados en el país

1.6.2 Participación en certámenes en el extranjero

- Primera consulta Regional sobre "Gobernanza de las Aguas Subterráneas: Un Marco Global para Acciones Locales"/Montevideo, Uruguay-Febrero 2012

1.7 Oras actividades a nivel regional

2. ACTIVIDADES FUTURAS

2.1 Actividades planificadas hasta diciembre 2014

2.2 Actividades previstas para 2015-2016

2.3 Actividades vislumbradas a largo plazo

Egyptian National Committee of the International Hydrological Program (IHP)
National Report for the period June 2012 to May 2014
To be presented at 21st Session of the IHP Intergovernmental Council

1. Activities Undertaken in the period

1.1 Meetings of the IHP National committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Formation for the Egyptian National Committee of the international hydrological programs (ENCIHP) was issued by the Ministerial Decree No. 119 dated 9/4/2012 and no 457 dated 4/10/2012. The formation consists of twenty two members. They are carefully selected from different disciplines and form a very specialized team.

Dr. Mahmoud Abu-zeid	president
Dr, Madiha Mustafa Darwish	vice president
Dr, Karima Attia	reporter

The committee was honored by the attendance of: -
Representative of UNESCO Cairo office Dr. Abdelasis Zaki

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

Activities of the committee through the mentioned period are summarized bellow: -

- The Committee established a hydrological library, which is provided with IHP publications, and other textbooks related to hydrology as well as other subjects related to freshwater.
- Establishing a web site for the groundwater protection network.
- Organizing an International Course on Environmental hydrology for arid and semiarid region, this is a yearly course, held in Egypt, about 22 participants from African country are attending the course .
- Contributing to the formulation of the eight phase of the International Hydrological Program of (IHP VIII) (2014-2021). Comments on proposed themes and suggested area of interest for the Arab region.
- Selection of focal areas will participate in IHPIIIV. Some of which the committee will prepare plans of activities; other focal areas will host activities of certain projects.
- Participation in the governmental and intergovernmental council meeting July 2012

- Participation in Arab IHP national committee meeting which held in Beirut May 2012 "improvement of cooperation between Arab committee" and the committee meeting held at Morocco October 2013"transboundary water cooperation; vision, challenges, and actions.
- The Committee discussed the flood features of the Nile River in Egypt during year 2013-2014 and made comparison with the previous flood feature to determine the lessons to be learned.
- Continues support for the regional networks, which related to Wadi Hydrology and Groundwater Protection.
- Participation on related internal or external conferences and workshops.

- Dissemination of training courses and fellowships to other partners and provide recommendations to participants.

- Study, translates and summarize reports which have been delivered to the Egyptian national committee for hydrology and contain related subject (for example World Water for Development, Urban Ground water Pollution, Groundwater Pollution.
- Discussing the proposed regional initiatives.
- Present and discuss the activity done by other Egyptian committees
- Discussing method and techniques used for flood forecasting of the River Nile
- Organize one day workshop to discuss "climatic changes and related impact on the Nile flow .
- Discussing the development of African countries and the role of Egypt
- Discussing the Nile Basin Initiatives and role of Egypt
- Discussing, contributing, and observing the sedimentation process at rivers and at storage lakes with focusing on evaporation control at Lake Nasser.
- Suggest ways to improve the cooperation between different Egyptian committee of UENSCO programe and some projects related to Echo hydrology.
- Preparation and contribute to World Water Day Celebration April 2013. The celebration was titled" Water cooperation" which organized and held in the MWRI building.
- Discuss and present the application of isotopes in hydrology (evaporation from lake Nasser , groundwater seepage , recharge to groundwater from adjacent aquifer , sedimentation at lakes)
- Participation in formulating issues related to water in Egypt" constitution 2014"
- Prepare book title "hydraulic and hydrologic studies for projects at upper Nile with emphasis on eastern Nile"

1.1.2 Status of IHP-VII (2008-2013) activities

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

The Egyptian National Committee evaluated the IHP VII by using some indicators to measure the program themes from different points: - relevance, effectiveness, efficiency, and sustainability.

1.1.3b Decisions regarding contribution to/participation in IHP-VIII

Comments on proposed themes and suggested area of interested for the Arab region

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

1.2.1 National/local scientific and technical meetings

Preparation and contribution to annual World Water Day titled Water Cooperation which held in the Ministry of water resources and irrigation on 22nd of April 2013
The minister of irrigation, environment, public works and el-Azhar, and Egyptian church are invited ,about 400 researchers and engineer from the ministry and other ministries and the NWRC have attained .

1.2.2 Participation in IHP Steering Committees/ Working Groups

One day seminar was held at the meeting room at shore protection building authority of MWRI on the 10th of July 2012 it was entitled "climatic changes and the impact on nile flow" about 50 participants where attained from the committee, other Egyptian committees and the NWRC& MWRI
The recommendation where summarize as followed: -
one day seminar is not enough to discuss this important issue, the discussion and the recommendation about the water policy of Egypt for the coming 50 year are taken into consideration

1.2.3 Research/applied projects supported or sponsored

The following list is projects and topics performed and participated by the Egyptian National Committee:

- Monitoring and evaluation of the sedimentation in Lake Nasser upstream of Aswan High Dam.
- Studying the fluvial characteristics and hydraulics of the river Nile
- Development of technologies for river bank protection and river front improvement for rural, urban and tourist centers
- Monitoring of water quality in the channel and influent drains for chemical, physical and biological characteristics
- Monitoring of groundwater quality
- Groundwater assessment and development
- Hydraulic studies on the river Nile and its structures
- Reuse of drainage water with deliberation of environmental consideration
- Integrated water management
- Pollution Control
- Wadi Hydrology

- Weed control and waterways maintenance.
- Assessment of environmental impact of the national project
- Scour around bridges piers
- Groundwater protection
- Hydrological code and formula for Wadi Feiran, Sinai, Egypt- case study
- Legend and framework to construct a hydrological map for Egypt

1.2.4 Collaboration with other national and international organization/programs

The Egyptian IHP committee being composed of several government officials, University staff, and Research Institution members have taken part in joint work with many international organizations and programs. Among those are the following:

NWRC (Egypt)- Agriculture Research Center (ARC) (Egypt)- National Academy of Science (Egypt)- CEDARS- LTNDP-WMO- TECCONILE- CIDA- DANEDA- ICID- IWRA- IAHR and many others.

1.2.5 Other initiatives

- Reviewing the UNESCO program and budget for years 2012,2013
- The training center at 6th October City of MWRI and the universities of Egypt are willing to train researchers and technicians of the third world countries.
- Egypt is supporting and contributing the joint activities done between IHP and MAB programs.
- Egypt is willing to have one of the pilot projects that can be applied at coastal zone within the frame of the Ocean Monitoring (GOOS). Proposed topics for a training program to be organized at the training center of MWRI at 6th of October city
- Training program is being executed with the cooperation between Hydraulics Research Institute and IHE of Netherlands.
- Annual training course on environmental hydrology for arid and semiarid region is being held at hydraulic research institute (NWRC)

Future activities:

* Careful plan for the activities and outputs of the focal area at themes of IHP VIII.
* Updating the Celebes of the specific courses which have been organize by the committee
* Increase the cooperation with other national committee
* Increase participation of new disciplines to the committee

1.3 Educational and Training courses

1.3.1 Contribution to IHP courses (courses supervised by the regional training center)

- Support the preparation of training material on the Hydrological And Regional Climate Modeling Tools for Climate Change Risk Management in the Nile Basin.
- Support the preparation of training need assessment in Egypt in the field of water resources management sciences.
- Support the preparation of capacity building tool for water resources management strategies formulation.
- Support the preparation of Teacher guidelines for Water education
- Support preparation of climate change vulnerability studies in the Arab region including Egypt.
- Support technical studies on practical and effective participation of all stakeholders in Groundwater governance in the Arab region including Egypt

- Within the framework of the IHP activities in the Arab region with special focus on capacity building and knowledge transfer in the field of water resources management and technologies, the committee with the UNESCO Cairo Office (UCO) supported the initiation and production of the first issues of **the International Water Technology Journal as edited by the Water Technology Association.** This journal is the first registered international peer reviewed water Journal issued from the Arab region. The first, second and third issues of the journal were published in June 2011, September 2011 and January 2012 respectively. The journal is available on the following website: http://iwtj.info/.
- Enhancement of the human capacity for national authorities in the field of Water resources management and establishment of a core group of specialists from Ministry of Water Resources and Irrigation of Egypt to assess and manage climate change risks in Egypt with special focus on the water resources of the Nile basin through training and research support.
- Building the institutional capacities of the ministry of Water resources of Egypt to run regional circulation models.
- Development of climate change digital map and building a populated database for the hydrological and meteorological modelling activities at Ministry of Water Resources and Irrigation of Egypt.
- Preparation and production of a book on Climate change risk management "Toward a climate change adaptation strategy for the water sector in Egypt".
- Preparation of climate change adaptation strategy for the Ministry of water resources and Irrigation of Egypt.
- Building awareness and capacity of key decision makers and development actors to support the systematic integration of climate change as a new variable in key policy, regulatory, institutional and operational frameworks and implement pilot projects.
- Initiation of regional collaboration in relation to climate change knowledge and information sharing and dissemination within the Nile basin in joint collaboration with UNDP-Egypt.

1.3.2 Organization of specific courses

Organizing an International post graduate training course on "Environmental hydrology

for arid and semiarid region" this is a yearly course, held in Egypt. About 22 participants from Arab and African country are attending the course. The course aimed to train the participants on the principle of environmental Hydrology and to provide sufficient competences in the collection, analysis and use of metrological and hydrological data for IWR planning, focusing on water and ecosystems. The event was held in Cairo, Egypt, during May- June every year. More than 20 participants were involved in this training course from the Arab and Nile basin countries. The course enhanced capacity building on environmental hydrology methodologies. The recommendations stated that applying more studies on environmental hydrology is needed.

The Course include the Following Subjects:-

- Surface Water Hydrology
- Groundwater Hydrology
  - Hydrometeorology
  - Watershed Management
  - Surface Water Hydrology
  - Open Channel Hydraulics
  - Fluvial Hydraulics
  - Infiltration
  - Stochastic Hydrology
  - Hydrometry
  - Groundwater Hydrology
  - Water Quality and Protection
  - Water Quality Modelling
  - Water Resources Development
  - Integrated Water Resources Management
  - Water Ethics
  - Floods and Flood Control
  - Applications of Geographic Information System (GIS) in Hydrology
  - Climate Change Impacts on Water Resources
  - Environmental Impact Assessment of Water Resources Projects

- The committee with UCO supported the preparation of climate change adaptation strategy for the Ministry of water resources and Irrigation of Egypt

1.3.3 Participation in IHP courses

- Participation of 3 Egyptian experts in the Regional Workshop on Water and education General Guides for Teachers, Beirut, Lebanon; 11-12 November 2013.
- Participation of 3 Egyptian experts in the workshop on “Water Cooperation in the Nile Basin: From Concepts to Actions”, Dar el Salaam, Tanzania; 3-6 December 2013.

1.4 cooperation with the UNESCO &IHE institute for water education and/or international/ regional water centers under the auspices of UNESCO

- Organization of the Workshop “Climate Change Impact on the Nile Basin: Exchange of Experiences within the Basin”, Cairo, Egypt; 24-25 February 2013 in joint collaboration with Ministry of Water Resources and irrigation of Egypt and UNDP-Egypt.
- Support the preparation of training material and conduction of hands-on training for the improvement of short term Nile Basin rainfall forecasting modeling capacities of the Nile Forecasting Centre of the Ministry of Water Resource and Irrigation of Egypt.
- Support the preparation of technical report on Solar Desalination as an Adaptation tool for Climate Change impacts on the Water Resources of Egypt.
- Co-support the organization of the Arab Water General Assembly, Cairo, Egypt; 26-28 February 2013 and leading a session on “The Role of Parliamentarians in Achieving Sustainable Water Resources Management in the Arab Region: Challenges, needs and future perspectives”.
- Support the preparation of a comprehensive technical paper on the Management Practice of Trans-boundary Groundwater in the Nubian Sandstone Aquifer System.
- Support the development of a 2D Facebook-hosted game including information on water issues in the Arab region. The game was developed by an Egyptian firm. The water game is an informal water educational and awareness tool within a game environment including competitions and challenges among schools students and youth (13-20 years).

- For the purpose of improving the knowledge base of water resources management for Arab legislators (parliamentarians and consultative council members), the committee with UCO supports the **preparation of a detailed template for guideline manual for Arab parliamentarian water capacity building**. The template shall include items and advices addressing the following:
  - The water scarcity problems in the Arab region.
  - Water resources policy and management techniques in the Arab region including nonconventional water resources
  - Shared water resources management cooperation and tools

- Support the organization of a workshop on “**The Role of Parliamentarians in Achieving Sustainable Water Resources Management in the Arab Region: Challenges, needs and future perspectives**” as a side event to the Arab Water General Assembly, Cairo, Egypt; 27-28 Feb. 2013. More than 200 water experts, decision makers, Ministers and politicians participated in the assembly including experts from Egypt, Sudan, Bahrain, Oman, Morocco, Yemen and Jordan. The best "strategies and modalities" to raise the parliamentarians awareness were discussed specially with the more expected water scarcity severe problems and trans-boundary water problem in the Arab region.

- **The Regional Workshop on Water Resources Management in the Arab Constitutions was successfully organized in Tunis Tunisia; 27-28 May 2013** in joint collaboration with ALECSO, ISESCO, Tunisian National Commission for UNESCO and the Ministry of Agriculture of Tunisia. More than 27 participants attended the workshop representing 8 Arab countries, namely: Egypt, Sudan, Lebanon, Morocco, Jordan, Yemen, Oman and Tunisia. The main aim of the workshop was to Promote incorporation of water resources management in the Arab constitutions for strengthening water governance. As example of outputs: some concepts related to right for water, water resources as public property, shared responsibilities of water resources protection (among others) were highly recommended to be included in the Arab constitutions.
- The Workshop on "Water Sciences for Peace and Sustainable Development in the Eastern Nile: Perspective of Future Cooperation was successfully organized in joint collaboration with IHE, as a Side Event Within "The International Conference on New Nile Perspective: Scientific Advances in the Eastern Nile Basin, Khartoum, Sudan, 6-8 May 2013. More than 100 participants from the Eastern Nile Countries (Egypt, Sudan, South Sudan and Ethiopia) in addition to international experts attended the conference and the workshop. The workshop was organized in joint collaboration with UNESCO IHE. The main aim was to formulate a vision on future cooperation perspectives for water science networking and capacity building among academicians, researchers and scientists. Also, a review of pervious and ongoing initiatives and projects promoting water management cooperation within the Eastern Nile basin was prepared with special focus on identifying achievements, gaps and challenges. List of key priority areas and immediate priorities on Research and Capacity Development was prepared as a Water Science tool for peace development in the Eastern Nile.
- Training need assessment in the field of water resources management sciences of the 4 eastern Nile countries (Ethiopia, Sudan, South Sudan and Egypt) was prepared. 4 representatives of Arba Minch University-Ethiopia, University of Khartoum-Sudan, Alexandria University-Egypt, Juba University-South Sudan prepared the training need assessment in the field of water resources management sciences in the 4 eastern Nile countries (Ethiopia, Sudan, South Sudan and Egypt)
- 3 training manuals on Hydrologic and Regional Climate Modeling Tools for Climate Risk Management in the Nile Basin, groundwater modeling and cooperation benefits sharing were prepared responding to the priority areas as defined by the network members.
- **Support during Preparation and production of the Groundwater Operational Management toolkit** with special focus on compiling, collecting and documenting field, practical and operational experiences of groundwater management of the aquifer systems in the Arab region. A number of stakeholders in Egypt, Sudan, Oman and Libya showed their interest to organize national training workshop using the toolkit.

The toolkit covered the experiences in shallow and deep aquifers besides the existing trans-boundary aquifers in the Arab region. The toolkit includes 12 technical modules covering the hydro-geological and groundwater operational management fields, namely: groundwater origin, occurrence and flow, Planning for the

management of groundwater development, investigations for managing groundwater development, groundwater potential, wells and well fields design, implementation, development of wells, monitoring and evaluation systems, groundwater and water well pollution, management of groundwater development, institutional and legal approaches for managing groundwater development and awareness for appropriate management of groundwater development. UCO developed multimedia CD/DVD and website for the toolkit on Groundwater Operational Management. The developed multimedia CD/DVD of the toolkit has full operational search tool (using key words and number of volume) and flash based auto-run navigation menu. Also, all material of the multimedia CD/DVD of the toolkit is available on http://www.gwopmn.com.

- Sea water desalination is a strategic option for facing the water scarcity problems in the Arab region, **UCO initiated the preparation of a comprehensive technical report on low-cost Nano-material application for water desalination**. The report mainly focused on a newly developed methodology for sea water desalination using the photo-thermal effect of metallic nano-material converting the sun light to heat energy. A review of the current practices/applications of the joint use of Nano-technology and solar energy outlining the best practices and disadvantages was conducted. Moreover, an extensive review on the already developed methodology of water desalination using the joint application of Nano-technology and solar energy was prepared and submitted.
- **Finalization of digital Encyclopedia for the water resources in the Arab region in joint collaboration with the Arab Water Council**. The digital encyclopedia compiled the scientific material of the available 13 volumes of the encyclopedia as prepared by the Arab water council.
- Within the framework of the International Hydrological Program (IHP) in the Arab region with special focus on water resources conflict management, **UCO supported the preparation of a concept paper on Water Diplomacy in Action for sustainable peace in the Arab region.** The paper mainly focused on suggesting mechanisms and modalities for water diplomacy in the Arab based on the recent political developments in the region. It included case studies from the Nile Basin and the Arab region on peace building Challenges and Opportunities. The study was presented in the 2nd Arab Water Forum in the plenary session on: Sustainable and fair solutions for the Trans-Boundary Rivers and groundwater aquifers. Based on the outputs of this study, a proposed on water for peace in the Eastern Nile was prepared and approved for emergency funds

- The committee with UCO supported **the preparation of a comprehensive technical study addressing climate change impacts on the groundwater resources management and sustainability in the Arab region** has been finalized. The report focused on:
  - Overview of the aquifer systems in the Arab Region and the possible impacts of climate change on the region's groundwater resources in terms of quantity and quality.
  - The possible climate change adaptive measures with respect to groundwater management and the pertinent challenges in the Arab region.

- Recommendations for the possible actions, research and studies pertaining to climate change adaptive mechanism for groundwater resources management in the Arab region.

1.5 Publications

-Proceedings of the UNESCO - NWRC - ACSAD workshops on (Wadi hydrology) and (Groundwater protection).
-Impact of the proposed Naga Hamadi Barrage on groundwater and possible remedial measures.
-Policy and strategies for the management of carbonates in Egypt
-Development of Siwa oasis
-Potentiality of aquifer in Sadat City for drinking water supply
-Hydrological condition on El Saff canal area
-Development of Groundwater protection criteria"
-IHP-Regional Network on Groundwater Protection in the Arab Region in co-operation with the Dutch Government: General Report on the Round Table Workshop on Groundwater Protection and Meeting of the Network (Cairo.6-10 September 1998). IHP-V, TDH, No4.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- **A workshop on Water Resources Management in the New Egyptian constitution** was co-organized on 12 sep. 2012 in Cairo, Egypt. The workshop was attended by more than 100 experts representing water sector, agriculture sector, regional cooperation affairs, media, parliamentarians,...etc. Representatives of the constitution preparation Committee attended the workshop to receive the recommendation. It was highly recommended to include articles on water management, conservation and rights in the constitutions. Some draft articles were prepared
- The Regional workshop on Promoting NGOs and Civil Society Role in the Eastern Nile water Resources Management, was organized in Cairo, Egypt; 1-2 December 2013. More than 30 NGO representatives and media professional attended the workshop. The workshop was a good platform to initiate dialogue and mutual understanding and to strengthen the partnership and cooperation on water issues among civil society/NGOs and Media professionals in the eastern Nile (and at the country level) for the promotion of culture of peace through water cooperation and to raise awareness and knowledge exchange, both on the potential for increased cooperation.
- UCO in joint collaboration with UNDP-Egypt organized a regional workshop of Climate Change Impact on the Nile Basin "Exchange of Experiences within the Basin", Caro, Egypt; 24-25 Feb.2013. More than 100 water experts and researchers from 10 Nile countries (namely: Egypt, Sudan, Ethiopia, South Sudan, Burundi, Rwanda, D.R. Congo, Tanzania, Uganda and Kenya) attended the workshop. The main objective of the workshop was strengthening regional

collaboration in relation to climate change and also strengthening knowledge and information sharing.

1.6.2 Participation in meetings abroad

- Participation of 3 Egyptian experts in the Workshop on "Water Sciences for Peace and Sustainable Development in the Eastern Nile: Perspective of Future Cooperation", Khartoum, Sudan; 6-8 May 2013.
- Two Egyptian experts are participate in the Regional Workshop on Water Management in the Arab constitutions, Tunis, Tunisia; 27-28 May 2013.

- **One of the egyptian commette attained the Regional Arab IHP National Commissions Meeting, Beirut, Lebanon; 30 April-1 May 2012** in joint collaboration with UNESCO Beirut and ISESCO. More than 12 regional high level experts and representative of the IHP National Commissions of 7 Arab countries, namely: Egypt, Sudan, Jordan, Morocco, Yemen, Syria and UAE participated in the meeting. The formulation of an effective and sustained mechanism for IHP planning, implementation and capacity building in hydrological sciences and water resources management in the Arab Region was highly recommended.
- Within the International UN Year 2013 on Water Cooperation, UNESCO Cairo Office in joint collaboration with ISESCO organized the **Regional Meeting for the Arab IHP National Committees on Arab Trans boundary Water cooperation: Vision, Challenges and Actions, Rabat, Morocco; 9-10 October 2013**. The meeting mainly aimed to document the Arab Countries water cooperation experience, challenges and their visions on tools for better water cooperation, not only among countries but also among different sectors such as agriculture, municipalities, industry,...etc. The IHP Nat Com of Egypt, Sudan, Jordan, Mauritania, Morocco, Lebanon, Algeria, Libya and Oman participated in the meeting. Country presentation (from Egypt, Sudan, Libya, Mauritania, Algeria, Morocco, Oman, Jordan and Lebanon) documenting water cooperation experience, challenges and visions on tools for better water cooperation, not only among countries but also among different sectors such as agriculture, municipalities, industry,...etc. It was noted that the level of cooperation experience changes from one country to another two Egyptian experts are participate in the Regional meeting.

- In joint collaboration with UNESCO IHP-HQ and UNESCO Dar Es Salaam Office, a workshop on "Water Cooperation in the Nile Basin: From Concepts to Actions" was successfully organized in Dar Es Salaam, Tanzania; 3-6 December 2013. More than 40 participants attended the meeting representing 10 Nile countries (Tanzania, Kenya, DR Congo, Rwanda, Burundi, Uganda, South Sudan, Sudan, Ethiopia and Egypt) in addition to representatives of FRIEND/Nile network, the Nile Basin initiative, Nile Basin Capacity Building

Network, UNESCO-Water Cat 2 center on Water Harvesting of Sudan, IWICARM, and TIGER-Network.

- The First Steering Committee meeting of Arab G-Wadi Network, Muscat, Oman; 28-29 Jan. 2013 in joint collaboration with the Ministry of Regional Municipalities and Water Resources of Oman and ISESCO. More than 18 participants attended the meeting representing 8 Arab countries namely: Egypt, Sudan, Bahrain, Lebanon, Morocco, Jordan, Yemen and Oman. Priority areas of the Arab G-WADI and work plan for the period 2013-2014 were through discussed and approved. Possible Coordination and experience exchange with other networks such as Asian G-Wadi was explored. A website for the Arab G-Wadi network is under preparation by the Ministry of Regional Municipalities and Water Resources of Oman (Network coordinator).
- Regional workshop on "**Water and education General Guides for Teachers**" was successfully organized in Beirut, Lebanon during the period 11-12 November 2013 in joint collaboration with UNESCO Beirut Office. More than 20 participants attended the workshop representing 7 Arab countries, namely: Lebanon, Tunisia, Sudan, Yemen, UAE, Jordan and Egypt. The objective of the workshop was to formulate an executive work plan for designing educational tool comprising general guides and teaching material for teachers.
- Attained the third regional consultaion in Arab region 8-10 October 2012 Amman , Jordan "groundwater governance"
- Attended the meeting held in Turkey 21-23 February "water cooperation"
- Attend the workshop on "rainwater harvesting as a tool for coping with climatic changes at Arab region "20-22 May 2013 Beirut Lebanon

1.7 Other activities at a regional level

1.7.1 Institutional relation/co-operation

• A network of representatives of universities, water resources ministries and national commissions from Egypt, Sudan, South Sudan and Ethiopia was initiated with a list of identified activities to enhance research cooperation between various institutions in the Nile basin countries

1.7.2 Completed and ongoing scientific projects

Completion of friend program
Completion of groundwater protection project

2)Future activities

2.1 Activities foreseen until December 2014: -

a) Organizing the annul conference for the National Water Research Center of the Ministry of Water Resources and Irrigation.

b) Dissemination of publications, posters, and all water awareness prepared by Water

Awareness Unit of the Ministry of Water Resources and Irrigation of Egypt.
c) Establishing a web site for Groundwater Protection Network in the Arab Region.
d) Participation in the different themes of IHP-VI and publishing all technical reports among the other regional committees of IHP.
e) Organizing yearly competitions among all water scientists on the following subjects:
- Best research on river hydraulic engineering and hydraulic structure.
- Best design of an irrigation project.
- Water resources planning.
- Water quality management.
- Water conservation projects.
- Best PhD theses from Egyptian Universities.
- Water control structures.
- Environment protection.
- Improve efficiency of water conveyance and distribution.
- Best engineer in water management
- Best MSC or PhD theses on water economics
- Best engineer in the field of irrigation improvement.
- Development of conventional and unconventional water resources.
- Best project of Horizontal Extension.
- Best research on integrated management of water resources.
- Best research on the field of survey engineering.
-Best student's project, final year, Hydraulic and Irrigation Departments at Faculty of Engineering, Egyptian Universities.
f- Completion of Wadi hydrology activity and protection of groundwater.
g- Execution of regular meeting of the Egyptian committee
h- Preparation of one day seminar or workshop to present the committee activity and technical issue to other committees

2.2 Activities foreseen for 2014-2015-------

Water resources assessment in arid and semi arid region
Groundwater development
Control of groundwater pollution
Reservoir sediment
Technology transfer

2.3 Activities envisaged in the long term

Optimum use of the limited water resources which is available in Egypt.
Updating the policy of water resources utilization.
Groundwater protection
Water saving
Desalination technology
Integrated water resource management

INSIVUMEH
INSTITUTO NACIONAL DE SISMOLOGIA,
VULCANOLOGIA, METEOROLOGIA E HIDROLOGIA
MINISTERIO DE COMUNICACIONES, INFRAESTRUCTURA Y VIVIENDA
7 Av. 14-57 zona 13 Guatemala, Guatemala
Tel. 2310-5000, Fax :2261-3239
www.insivumeh.gob.gt E-Mail: indireccion@insivumeh.gob.gt

INFORME NACIONAL DE GUATEMALA PARA LA 21ª REUNIÓN DEL CONSEJO INTERGUBERNAMENTAL DEL PHI (París, 18 – 20 de junio de 2014)

ACTIVIDADES DEL INSIVUMEH Y DEL PHI-LAC EN 2012:

1. *El problema de la erosión y sedimentación: Una aproximación desde la investigación, la gestión técnica pública y las políticas públicas. San José, CR, ISI-LAC.*
2. *Vigilancia en el desarrollo de las variables hidrológicas aplicadas a las aguas superficiales, aguas subterráneas y a la hidroquímica.*
3. *Creación del Centro de Monitoreo y Alerta Hidrometeorológica Aplicada del INSIVUMEH, con el objeto de realizar discusiones técnicas diarias para el análisis y predicciones hidrometeorológicas.*
4. *Caracterización de los recursos hídricos en la Cuenca Alta del Río Lempa, en el marco del Proyecto OIEA-RLA-08045 y la Comisión Tri-nacional del Plan Trifinio.*
5. *Reunión del Grupo sobre continuación de la Estrategia del Programa UNESCO/OEA ISARM Américas (Acuíferos Transfronterizos de las Américas), Río de Janeiro, Brasil.*
6. *Colaboración con el Programa HELP en el Subprograma UTN (University Twinning and Network Programa), referido a la Cátedra del Agua Guatemala en el tema: "Water Resources Sustainability, Guatemala, Universidad de San Carlos.*

ACTIVIDADES DEL INSIVUMEH Y DEL PHI-LAC EN 2013:

1. *Vigilancia hidrometeorológica por presencia de hundimientos, deslizamientos, derrumbes, deslaves, inundaciones súbitas, inundaciones en planicies de valles y de zonas costeras y lahares en las pendientes de volcanes activos.*
2. *Caracterización de los recursos hidroquímicos en la Cuenca Alta del Río Lempa, en el marco del Proyecto OIEA-RLA-08045 y la Comisión Tri-nacional del Plan Trifinio (Continuación).*
3. *Taller de Planificación del Programa Agua y Clima de Centro América. GWP. Antigua-Guatemala.*
4. *Reunión de Centros Nacionales y Puntos Focales del PHI-LAC y Cierre del Año Internacional de Cooperación en la Esfera del Agua. México, dic 2013.*
5. *Celebración del "Día Internacional del Agua 2013", con presentación de conferencias y entrevistas para los medios de comunicación en general.*
6. *Creación del TWAP (Transboundary waters Assessment Program), asociado a IGRAC (International Groundwater Resources Assessment Centre), PHI (Programa Hidrológico Internacional) sobre: Componente Aguas Subterráneas de Acuíferos Transfronterizos y Sistemas de Aguas Subterráneas de Pequeños Estados Insulares en Desarrollo (SIDS), Montevideo, Uruguay.*
7. *Colaboración con el Programa HELP en el Subprograma UTN (University Twinning and Network Programa), referido a la Cátedra del Agua Guatemala en el tema: "Water Resources Sustainability, Guatemala, Universidad de San Carlos.*

ACTIVIDADES DEL INSIVUMEH Y DEL PHI-LAC EN 2014:

INSIVUMEH
INSTITUTO NACIONAL DE SISMOLOGIA,
VULCANOLOGIA, METEOROLOGIA E HIDROLOGIA
MINISTERIO DE COMUNICACIONES, INFRAESTRUCTURA Y VIVIENDA
7 Av. 14-57 zona 13 Guatemala, Guatemala
Tel. 2310-5000, Fax :2261-3239
www.insivumeh.gob.gt E-Mail: indireccion@insivumeh.gob.gt

1. *Celebración del "Día Internacional del Agua 2014", con presentación de conferencias, entrevistas para los medios de comunicación en general y demostración de equipos de medición hidrometeorológico a escolares.*
2. *Proyecto de Caudales y de Máximos Hidrológicos del Programa Programa de Regímenes de Corriente en Cuencas Experimentales y Red de Datos Internacionales (FRIEND) e Iniciativa Internacional sobre Inundaciones (IFI), Panamá.*
3. *Regionalización de Precipitaciones Pluviales y Caudales Máximos de Latinoamérica y el Caribe, Costa Rica.*
4. *Preparación de información de los acuíferos transfronterizos: Mopán(Gua) – Belize(Bel) y Esquipulas(Gua) – Ocotepeque(Hon) – Citalá(Sal), para el programa TWAS-IGRAC-PHI-UNESCO.*
5. *Continuar colaborando con el Programa: "Water in the Knowledge Society", (El Agua en la Sociedad del Conocimiento), del Instituto Mexicano de Tecnología del Agua, Morelos, México.*
6. *Colaboración con el Programa HELP en el Subprograma UTN (University Twinning and Network Programa), referido a la Cátedra del Agua Guatemala en el tema: "Water Resources Sustainability, Guatemala, Universidad de San Carlos.*

Guatemala, junio 11de 2014

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

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

The organizational structure of the Indonesian National Committee for IHP consist of a Chairman, a Vice Chairman, two Secretaries, and 23 members from vrious research institutes, universities and sectoral-Ministries.

The composition of the National Committee is:

Chairman	: Prof. Dr. Iskandar Zulkarnain
Vice Chairman	: Ir. Bambang Hargono, M. Eng
Secretary I	: Dr. Tri Widiyanto
Secretary II	: Nur Tri Aires, MA
Members:	
1. Prof.Dr. H. Arief Rachman	: Executive Chair of National Commision for Unesco – Ministry of Education and Culture
2. Prof. Drs. Agus Subekti MSc, PhD	: Ministry of Education and Culture
3. Prof.Dr. Hery Harjono	: Indonesian Institute of Sciences (LIPI)
4. Prof. Dr. Hidayat Pawitan	: Bogor Agriculture Institute (IPB)
5. Ir. Dodid Murdohardono, MSc	: Ministry of Energy and Mineral Resources
6. Dr. Ir.William M. Putuhena M.Eng	: Ministry of Public Works
7. Prof. Dr. Sudarto Notosiswoyo	: Technology Institute of Bandung (ITB)
8. Drs. Endro Santoso, MSi	: BMKG
9. Drs. Arko Hananto Budiadi	: Ministry of Foreign Affairs
10. Dr. Titi Anggono	: Indonesian Institute of Sciences (LIPI)
11. Dr. Ir. M. Rahman Djuwansah	: Indonesian Institute of Sciences (LIPI)
12. Ir. Sudaryati Cahyaningsih	: Indonesian Institute of Sciences (LIPI)
13.Dr. Indreswari Guritno	: University of Indonesia (UI)
14.Dr. Istiqlal Amien	: Ministry of Agriculture
15. Dr. Budi Kartiwa	: Ministry of Agriculture
16. Ir. Imam Anshori, MT	: National Water Resources Council
17. Dr. Arie Setiadi Moerwanto, MSc	: Ministry of Public Works
18. Dr. Sutopo Purwo Nugroho	: National Bureau of Disaster Management (BNPB)
19. Dr. Gadis Sri Haryani	: Indonesian Institute of Sciences (LIPI)
20. Drs. Budi Suhardi, DEA	: BMKG
21. Dr. Armi Susandi	: National Climate Change Council (DNPI)
22. Dr. Saiful Anwar	: Ministry of Forestry
23. Dr. Ignasius D.A. Sutapa	: Indonesian Institute of Sciences (LIPI)

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

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

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

Theme 1. **Adapting to impacts of global changes on river basins and aquifer systems**

1. Climate change impacts on hydrological cycle and consequence impact on water resources
    - Impacts of landuse and climate change on hydrologic regime on a watershed
    - Studies on water resources carrying capacity (WRCC)

Theme 2. **Strengthening water governance for sustainibility**

Theme 3. **Ecohydrology for sustainibility**

1. Improving ecosystem quality and services by combining structural solutions with ecological biotech. : Research Center for Limnology-Indonesian Institute of Sciences (LIPI) conduct research on Ecohydrology application in Lake Limboto, Gorontalo Province
2. Groundwater-dependent identification, inventory and assessment ecosystems : Research Center for Physic - Indonesian Institute of Sciences (LIPI) conduct research on Groundwater identification for community and economy in Serang, Province of Banten

Theme 4.**Water and life support system**

Theme 5. **Water education for sustainable development**

1. Tertiery water education and professional development
    - Basic hydrological training for the water resources managers of the river area
    - Dissemination Unit for Water resources Management and Technology (DUWRMT) formation in the Ministry of Public Works as a unit of knowledge dissemination and knowledge management on water resources including hydrology
    - Centre River Basin Organization Management (CRBOM) establishment as a center that will facilitate the implementation of experience in water resources management based on river basin carried out by the RBO (River Basin Organization)
    - Commemorating the world water day (Ministry of Public Works), Exhibition, National seminar (opened by the Minister of Public Works), discussions with awardees good water management (Mayor of Surabaya)., 22 Ministries participated
    - Ministry of Environment: Management of rivers and lakes, giving awards to the Group Management of Maninjau lake and Lake Batur.
    - International Seminar on delta region held by the Coordinating Ministry for People's Welfare at the JCC, (The event attended by researchers from about 12 countries, opened by the Minister.

2. Water education in school
    - Water education for communities, stakeholders and mass-media professional

1.2 Activities at national level in the framework of the IHP

Several activities at national level are :

- National Seminar of Limnology : Management of 15 Priority Lakes in Indonesia
- FGD evaluation and implementation of management programs 15 Priority Lakes in Indonesia June 2013
- Workshop on Ecohydrology and Lake Ecosystem at APCE building on June 2014
- Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VII/VIII and WWAP
  Please include here those activities which led to accreditation of degrees, or those held in formal school settings.
- Research activities that directly contributed to the IHP-VII and/or IHP-VIII activities
  Please include research/applied projects outputs such as publications that directly contributed to the IHP-VII/VIII and WWAP objectives
- In collaboration with Ministry of Forestry, APCE (M. Fakhrudin) gives recommendation of scientific authority to construct dam in NTT Province
- Research Centre for Limnology in collaboration with Ministry of Marine and Fisheries prepares Inland Fisheries Management Plan of Rawa Pening Lake, Maninjau Lake, Towuti Lake and Toba Lake
- Research Centre for Limnology in collaboration with Ministry of Environment prepares Inland Water System Data Base in Indonesia
- Prof. Dr. Gadis Sri Haryani attended to World Water Day Event as keynote speaker in Indonesia National Committee to Unesco in March 2014
- Indonesia National Committee to Unesco (KNIU) in collaboration with Uneaco Jakarta, LIPI, and Ministry of Public Works organized one day Seminar of "Green City balancing people and planet", 24 April 2014 in Jakarta
-

In collaboration with RC for Limnology – Indonesian Institute of Sciences :

- Development of Saguling Reservoir Demo-site
- Biovillage development in Giam Siak Kecil – Bukit Batu Biosphere Reserve in collaborate with MAB – Unesco : Promoting Alternative Technology To Provide Clean Water In Peat land Area
- Development of Peat Water Treatment Technology To Provide Clean Water In Peat land Area in colaboration with Katingan Prefecture – in Central Kalimantan and Kuburaya Distric – West Kalimantan
- Participated in the STRP NFP regional workshop conducted in South Korea.
- Providing training on coral reef management to local manager
- Disemination of academic manuscript of Lake Toba, lake Towuti and Lake Maninjau to local government.
- Providing scientific & technical advice to local government in development of management plan relation to implementation of convention of wetland trough meeting, consultation , focus group discussion (Case study management of Maninjau Lake, Toba lake and Towuti Lake).
- Capacity building for relevant stakeholder trough a training related with implementation of scientific and technical guidance and other material related with use of wetland resources case study in (Central Kalimantan and Riau Province)

1.2.1 National/local scientific and technical meetings

- Hearing switch the House of Representatives Commission VII, on the research of 15 priority Lakes in Indonesia
- Technical Meeting to construct Government Regulation of water resources management in Indonesia
- Technical Meeting to construct Government Regulation on mangrove and wetland areas zonation
- Technical Meeting with the Ministry of Marine Affairs and Fisheries to identify the potential resources of 15 priority lakes in Indonesia
- Meeting with the Ministry of Education and Culture, and Indonesia National Committee for Unesco

1.2.2 Participation in IHP Steering Committees/Working Groups

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

1.2.3 Research/applied projects supported or sponsored

RC for Limnology – Indonesian Institute of Sciences :

- Development of Saguling Reservoir Demo-site

RDC for Water Resources – Ministry of Public Works

- Flood forcasting and warning system
- Area reduction factor in West Jawa
- Rain fall run off relationship for flood analysis
- Hydrological characteristic sand the erosion rate as a function of land use change
- Balance and utilization of water resources strategy
- Balance and allocation of water in Indonesia
- Forecast sand drought control in the River watershed of Pemali Comal
- Development off lood and drought risk map of the Java island
- Raw water supply technology development in East Java

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

- Biovillage development in Giam Siak Kecil – Bukit Batu Biosphere Reserve in collaborate with MAB – Unesco : Promoting Alternative Technology To Provide Clean Water In Peat land Area
- Development of Peat Water Treatment Technology To Provide Clean Water In Peatland Area in colaboration with Katingan Regency – in Central Kalimantan
- Committe member of the National Congress of Sciences especially in water field

1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses
1.3.2 Organization of specific courses

1.3.3 Participation in IHP courses

- 21st IHP Nagoya Training Course in Asia and Pacific Region on Introduction to River Basin Environment Assessment under Climate Change. @8 November – 9 December 2013, Kyoto University, Japan.
- APCE organized IFAS (Integrated Flood Analysis System) Training Course in collaboration with ICHARM and Unesco Jakarta,January 2013 in Jakarta
- APCE organized workshop on water resouces management in Islamic Boarding School Ciamis, February 2013 in Ciamis
- APCE organized workshop on Lakes Management in collaboration with ILEC Japan, July 2013 in Jakarta for preparing WLC 2016 in Indonesia
- Workplan for each division in APCE organization
- Discussion and perparation for WLC 2016
- Discussion on book publication with topic Ecohydrology.
- Discussion and preparation for ICE (International Conference for Ecohydrology) on November 2014 at Yogyakarta
- Dr. Ignasius D.A. Sutaoa gives lecture in IHP Training Course in Kyoto University in December 2013

  This course focuses on three main objectives: (1) to acquire the latest knowledge on hydrology and environmental assessment under the influence of climate change on the scale of the catchment are in the Asia-Pacific, (2) use of simulation exercises catchment environmental assessment, (3)to discuss the possibility of implementing the environmental assessment of the catchment into several hydrologic and environmental management

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

- Nomination of Governing Board members of Asia Pacific Centre for Ecohydrology (APCE) in progress :
  - Prof. Dr. Soon Tak Lee from IHP Korea
  - Prof. Dr. Kaoru Takara from IHP Japan
  - Prof. Dr. Quentin Grafton from IHP Australia

- Initiation of Collaboration between APCE and ICHARM(Japan), HTC (Malaysia), ERCE

- exchange of information on activities such as training/educational materials, and funding opportunities : ERCE, HTC, ICHARM, IHP japan,

- promoting Master and PhD students in collaboration with ERCE, UQ Australia, ICCE (Portugal)

- joint project for IFIT with Unesco jakarta

- Indonesian National Committee for Unesco, Indonesia IHP, Japan IHP, Korean IHP, Australian IHP, Malaysian IHP,

1.5 Publications

- UNESCO Free Flow : "Managing water : from local wisdom to modern sciences." 2013
- Ignasius Sutapa, IPAG60 : Alternative technology to provide clean water in peatland area." October 2013, Daegu, Korea
- Reliana Lumban Toruan, 2012, Zooplankton emerging from fresh and saline wetlands, Journal of Ecohydrology and hydrobiology, Vol.12 no 1. 2012
- **Subehi L** (2014) Hydrological regime of several rivers in Indonesia. Proceeding of the 8th International Symposium on "The Recent Technologies for Flood Disasters Mitigation Measures", November 6, 2013, Daejeon – South Korea).
- **Subehi L** & Setiawan F (2014) Limnological studies on river forested watersheds. Proceeding of the 2nd International Symposium on "Advanced Technology for River Management", November 7 - 9, 2013, Seoul – South Korea.
- **Subehi L** (2013) Characteristics of fluctuation in water temperatures as an indicator for sustainable water management at River Cianten, West Java. Proceeding of International Conference of Indonesian Inland Waters III (ISBN 978-602-8380-07-2), Palembang – Indonesia, November 2012, pp 209.
- **Subehi L,** Triyanto, Wibowo H, Ridwansyah I (2013) Analysis of hydrological dynamic of lake Limboto that related to fisheries production. Proceeding of International Conference of Indonesian Inland Waters III (ISBN 978-602-8380-07-2), Palembang – Indonesia November 2012, pp 37
- **Subehi L**, Setiawan F, Hidayat (2012) Analysis of water temperature changes as an indicator for sustainable water management on the river forested watershed. Water Supply Management System and Social Capital Vol. 3, Chapter 30 : 385 – 389.
- Wibowo H, Setiawan F, **Subehi L** (2012) Study of clean water services investment at Jabodetabek based on physical characteristics. Water Supply Management System and Social Capital Vol. 3, Chapter 14 : 215 - 222

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- Asia Pacific Centre for Ecohydrology, Indonesian National Committee for IHP-UNESCO, ICHARM, Indonesian Institute of Sciences, Indonesian National Committee of Indonesia conducted International Training on Integrated Flood Analysis System (IFAS), in Jakarta, Indonesia, 15 – 17 January 2013
- One Day Workshop on Ecohydrology and Lake Management in collaboration wirh ILEC (Japan), Shiga University (Japan) and LIPI, Cibinong 02 June 2014

1.6.2 Participation in meetings abroad

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

- APCE participate in IFIT Project in collaboration with UNESCO Jakarta Office and Indonesian National Committee for Unesco
- APCE organized IFAS Training course in collaboration with ICHARM and UNESCO Jakarta
- Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)
- Annual meetings of the Regional Steering Committee for IHP in the Asia Pacific region are held in rotational base locations. APCE has always participated in these yearly meetings
- Dr. Iskandar Zulkarnain, Dr. Tri Widiyanto, Dr. Ignasius D.A. Sutapa Attend to 20th Session of IC of IHP in UNESCO Paris 4 – 7 June 2012
- Dr. Ignasius D.A. Sutapa attends to the International Workshop "The Asia Pacific Water Museum : Concept and Development" NWM, Pathum Thani 24 – 25 June 2012
- Dr. Gadis Sri Haryani attends to the International Seminar on Ecohydrology and Global Water Issues, University Algarve, Faro, Protugal, 4 – 5 September 2012
- Attending on General Conference UNESCO 3, Natural Science Commision, Paris – November 12-15, 2013
  Delegation:
  Prof. Dr. Iskandar Zulkarnain (Deputy Chairman for Earth Sciences-LIPI)
  Prof. Dr. Hery Harjono (Executive Directur of APCE)
  Dr.Ir. Fatimah Zulfa Padma (Deputy Chairman for Scientific Services))
  Dr. Siti Nuramaliati Prijono (Deputy Chairman for Life Sciences)
- Dr. Ignasius D.A. Sutapa attended on Strategic and High Level Meeting on Water Security and Cooperation, di Nairobi, Kenya – September 11 -13, 2013,
- Prof. Harjono attended the Strategic Meeting of Asia-Pacific IHP HELP and Ecohydrology in Jakarta (2-3 December 2013)
- Attending the 21th IHP Regional Steering Committee Meeting (RSC-Meeting) in Gyengju – South Korea, October 1 – 4, 2013
  Delegation :
  - Prof. Dr. Iskandar Zulkarnain
  - Prof. Dr. Hery Harjono
  - Dr. Ignasius D.A. Sutapa, MSc
- Consultative meeting with ILEC delegation, Japan, March 2013, Attending *International Symposium on Integrated Lake Basin Management (ILBM) which coordinator by* ILEC, Kyoto – Japan. In addition, also to discuss for preparing WLC (World Lake Conference) 2016 in Indonesia
  Delegation : Dr. Ignasius D.A. Sutapa, MSc
- Coordination in order to propose the *Governing Boards* APCE
  Governing Boards of APCE :
  Prof. Dr. Soon Tak Lee : South Korea
  Prof. Dr. Takara : Japan
  Prof. Dr. Quentin Grafton : Australia
  Personal from Indonesia :
  Prof. Dr. Iskandar Zulkarnain, Chairman of IHP Indonesia
  Prof. Dr. Hidayat Pawitan, IPB
- 21st IHP Nagoya Training Course in Asia and Pacific Region on Introduction to River Basin Environment Assessment under Climate Change. @8 November – 9 December 2013, Kyoto University, Japan.
- Attending at International Workshop on Freshwater Biodiversity Conservation in Asia (November 26 – 27, 2012 – Kyushu University, Japan). Sponsorship from AP-BON (Asia Pacific – Biodiversity

Observation Network). Presenting paper : ***Biodiversity of various tropical lakes at the main islands in Indonesia.***

- Attending at the 37th Southeast Asia Seminar on "***Human-Nature Interactions in Southeast Asia: Trans-disciplinary Approaches***" (October 29 – 31, 2013 – Penang, Malaysia). Coorganized by CSEAS (Japan) and Universiti Sains Malaysia (Malaysia)***.***
- Keynote speaker at the 8th International Symposium on "The Recent Technologies for Flood Disasters Mitigation Measures" (November 6, 2013, Daejeon – South Korea). Coorganized by IWRRI (International Water Resources Research Institute) Chungnam National University and ARCROM (Advanced Research Centre for River Operation and Management)
- Keynote speaker at the 2nd International Symposium on "Advanced Technology for River Management" (November 7 - 9, 2013, Seoul – South Korea). Coorganized by ARCROM (Advanced Research Centre for River Operation and Management) and Seoul National University, Korea.
- Attending "**The First International Workshop on Climate and Societal Change in Coastal Areas in Indonesia And South East Asia**", February 19 - 22, 2014 at Sahid Hotel – Jakarta.
- Attending at the **Integrated Lake Basin Management Expert Group Meeting and Workshop** with the theme "Heartware Cases in Asia: Learning from the Philippines Experience", March 3 – 5, 2014 at San Pablo City, Laguna, Philippines.
- Attending at Transboundary Water Assesment Program (TWAP) – Lake Group Consultative Meeting with South Asia and Southeast Asia - Large Marine Ecosystems (LME) Group, March 6 – 7, 2014 at Manila, Philippines.
- Ignasius D.A. Sutapa attended to International Workshop on Integrated Lakes Basin Management in ILEC – Kyoto – Japan, March 2013
- Hidayat Pawitan attended to International Symposium on Integrated Lakes Basin Management in Kuala Lumpur – Malaysia, July 2013
- Ignasius D.A. Sutapa attended to the International UNESCO IHP VIII Ecogydrology Steering Committee Meeting in Paris France, May 2014
-

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

- Nomination of Governing Board members of APCE in progress :
    - Prof. Dr. Soon Tak Lee from IHP Korea
    - Prof. Dr. Kaoru Takara from IHP Japan
    - Prof. Dr. Quentin Grafton from IHP Australia

- Initiation of Collaboration between APCE and ICHARM(Japan), HTC (Malaysia), ERCE , Universiti Sains Malaysia (USM), University of British Columbia (Canada), Chungnam National University (Korea)

- exchange of information on activities such as training/educational materials, and funding opportunities : ERCE, HTC, ICHARM, IHP japan,

- promoting Master and PhD students in collaboration with ERCE, UQ Australia, ICCE (Portugal)

- joint project for IFIT with Unesco jakarta

- Indonesian National Committee for Unesco, Indonesia IHP, Japan IHP, Korean IHP, Australian IHP, Malaysian IHP,

1.7.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

- Participation in IHP-Training course
- Development of Saguling Demo-site
- Asia Pacific Centre for Ecohydrology, Indonesian National Committee for IHP-UNESCO, Indonesian Institute of Sciences, Indonesian National Committee of Indonesia, will continue to conduct on goingresearch on Ecohydrology Demosite "Sediment Deposition System on Saguling Reservoir"
- Participation in IHP-RSC meeting Asian Pacific FRIEND
- Conducting International seminar on Ecohydrology, in cooperation with the Ministry of Education and Culture of Indonesia
- Conducting regional training on Ecohydrology, in cooperation with UNESCO Jakarta Office and KNIU
- In collaboration with Unesco Jakarta, APCE and LIPI, Conduct International Conference on Ecohydrology 2014 (ICE 2014) in conjunction with RSC Meeting of IHP in Yogyakarta 10 – 14 November 2014

2.2 Activities foreseen for 2015-2016

- Monitoring activities of Saguling Demo-site
- Participation in IHP-RSC meeting
- Conducting International seminar on Ecohydrology
- Conducting regional training on Ecohydrology, in cooperation with UNESCO Jakarta Office and KNIU and other instittution

2.3 Activities envisaged in the long term

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

National Report on IHP Related Activities
June 2012 – May 2014

1. Activities undertaken in the period June 2012 – May 2014

1.1.Meetings of the IHP national committee

- Iranian national committee for IHP held monthly during this period.
- Close communication with the Iranian National commission for UNESCO (NATCOM) in concern with knowledge dissemination activities undertaken in the framework of IHP
- Due to global changes, a considerable number of aquifers over the world are subjected to over exploitation. Qanat is one of the rational groundwater exploitation methods. In this regard ICQHS planned the construction of new qanats in Azerbaijan and Iraq in cooperation with these countries, which is in line with focal area 2.1, theme 2, Eighth Phase of the IHP.
- Global warming could have given rise to climate changes in many parts of the world to a large extent over the past decades. Some regions are struck by destructive floods and unprecedented torrential downpour, whereas some other regions are in the grip of severe droughts. In some areas, the snow coverage is shrinking, resulting in a dramatic decrease in snow melt and the amount of surface streams. Permanent streams are turning into seasonal runoffs, and seasonal runoffs are drying out over time. In such areas the demand for water is still on the rise, though their surface streams are diminishing. Therefore the residents of these areas resort to extracting groundwater which is more reliable to supply water to domestic and agricultural sectors. What may immediately flash trough our mind is that pumped well is the best way to abstract groundwater, but our past experiences in arid and semi arid regions tell that such regions are subject to over-exploitation of groundwater and depletion of aquifer accordingly. In some arid zones, groundwater used to be extracted by the system of qanat over the past centuries without causing any drawdown in water table. Therefore ICQHS is trying to introduce the traditional know how of qanat to the regions which turning arid and becoming short of surface streams. Qanat never threatens groundwater resources and ensures sustainable utilization of groundwater, so it deserves to be introduced to the areas in need of groundwater. This goal is being achieved by holding scientific gatherings, publishing books and articles,

etc, which lie within Focal area 2.3 - Adapting to the impacts of climate change on aquifer systems.

Most of the ICQHS plans and activities lie within THEME 2: GROUNDWATER IN A CHANGING ENVIRONMENT with a focus on the focal areas 2.1, 2.3 and 2.4. ICQHS plans and activities would meet these focal areas through the following measures:

- Research
- Training
- Technology Transfer
- Scientific Gathering
- Publication
- Cooperation with other countries and organizations

- Cooperation with Ministry of Regional Municipalities and Water Resources - Sultanate of Oman:

❖ Holing the International Seminar on Use of Unconventional Water in Urban Water Management, Muscat – Oman, 24-26 February 2014

- Cooperation with Ministry of Water Economy and Land Reclamation – Tajikistan:

❖ Holding the special focused event on International Drought Initiative (IDI) during the High-level International Conference on Water Cooperation, Dushanbe, Tajikistan, August 2013

❖ Holding the 9th RCUWM-Tehran Governing Board Meeting, August 2013

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

1.2.1. National/local scientific and technical meetings

❖ Training workshop on preservation and maintenance of Qanats, 3-4 July 2012, Zahedan, Iran

❖ Question-answer session for the students of civil engineering, 21 May 2012, Yazd

❖ One day advanced training course for Qanat nomination, 28 February 2012, ICQHS, Yazd

❖ Advanced training course on Qanat for the experts of agriculture organization of Sistan-Balouchestan provinc, 1 December 2012, ICQHS, Yazd

❖ Preliminary Qanat training course for tour guides, 15 August 2013 , ICQHS

- Training course on "mutual interactions between city and Qanat", 8-24 September 2013 , ICQHS
- Holding IDI Advisory Committee Meetings, RCUWM-Tehran Secretariat, During 2012-2014

1.2.2. Participation in IHP steering committees/working groups

- Participation in 20th Session of intergovernmental council of UNESCO-IHP and giving a report on ICQHS and RCUWM activities, and taking membership of the committee of declarations, 4-7 June 2012, UNESCO, Paris
- Holding a training course for the managers of GEF MENARID projects upon the recommendation of IHP
- Participation in UNESCO Strategic and High-Level Meeting on Water Security and Cooperation, 11- 13 September 2013, Nairobi, Kenya

1.2.3. Research/applied projects supported or sponsored

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

- Comprehensive studies on Dehno Qanat in Hassan abad (Yazd) in order to submit a report through cultural heritage organization to UNESCO for its nomination on UNESCO World Heritage.
- Publishing the book entitled: "Veins of Desert" in English
- Comprehensive studies on Joopar Qanat (Kerman) to submit a report through cultural heritage organization to UNESCO considering it as a nominee for UNESCO World Heritage.
- Comprehensive studies on the Qasabeh Qanat in Gonabad (in Razavi Khorasan) in order to report through cultural heritage organization to UNESCO to nominate it for UNESCO world heritage list.
- Comprehensive studies on Baladeh Qanats (Southern Khorasan) in order to submit a report through cultural heritage organization to consider it as UNESCO world heritage.
- Submitting the final report of the research project entitled: "The Possibility Of Electric Energy Generation By Qanats And Potential Survey On The Qanats Of Yazd".
- Studies on the modern techniques and methods in Qanat construction and restoration.
- Publishing the Second Edition of the Book entitled:"Qanat from Practitioners' Point of View" with 3000 circulations.

- Research project of mapping the Qanat of Dehno – Hassan abad.
- Comprehensive studies on Ebrahim-Abad Qanat (in Arak) in order to submit a report through cultural heritage organization to nominate it for UNESCO world heritage list.
- Submitting a detailed technical report on the Qanats of Qasem- Abad and Emamiyeh in order to nominate them as the national properties through the Iranian Cultural Heritage Organization.
- Publishing the book "Qanat in its Cradle"
- Publishing the book "Qanat Practitioners of Kerman Province"
- Publishing the Proceedings of TKWRM Conference
- Study on negative impacts of developmental projects on qanats and possible solutions
- Study on methodology of qanat atlas with the use of GIS
- A comprehensive study on qanats of Kish island

1.2.4. Collaboration with other national and international organizations and/or programs

- Ministry of Energy - I.R. Iran:

a. Holding International Seminar on Drought Management, Tehran – Iran, 14 May 2013

b. Holding the Second International Drought Meeting, Tehran – Iran, 15 May 2013

- ICQHS is an official member of the International Water History Association, and has a close cooperation with them. Also ICQHS is in close contact with UNESCO Regional Centre on Urban Water Management (RCUWM – Tehran) and the director of this center is one of the members of ICQHS governing board. Also, ICQHS has close cooperation with UNESCO-IHE, so that it teamed up with UNESCO-IHE to organize a short course on world history of water management. Moreover ICQHS has participated in several international events such as:

- Attending Water History Conference in technical university of Delft and presenting an article about Modern techniques and methods in Qanat construction and restoration.
- Participation of ICQHS at in the International Conference of Foggara in Algeria, and giving a lecture entitled: "Application of new methods and technologies in Qanat Preservation and Restoration".

- Participating in Tehran G-Wadi meeting as well as introducing the ICQHS activities.
- Attending the "International Conference on business opportunities in Kenya" to give the report on readiness for research and education collaborations in the field of water resources and historic hydraulic structures.
- Giving a lecture on Qanats, historic hydraulic structures and the activities of ICQHS at the "International Congress on Irrigation and Drainage".
- Giving a lecture at the International workshop on Water & History entitled: Water relics, their significance in modern world, case study: Qanat system in Iran.
- Participation of ICQHS in the conference of "water and wastewater technology in ancient civilizations" and delivering a presentation on historic hydraulic structures in Iran, 2012, Istanbul, Turkey
- Participation of ICQHS representative in the scientific conference on "socio-cultural aspects of water in arid and semi-arid regions" held at Lisbon University Portugal, by giving a presentation on Qanat civilization, 2012, Lisbon, Portugal
- Participation of ICQHS representative in Asia Pacific Water Museum Workshop in Thailand, 2012, Thailand
- Holding periodic sessions of "Joint technical Qanat steering committee"
- Participation of ICQHS representative in International Conference on Preservation of Landscape, 2012, Florence, Italy
- Participation in "Groundwater Governance: A Global Framework for Action" held in Shijiazhuang, China to present the experiences of the International Center on Qanats and Historic Hydraulic Structures, 2012, Shijiazhuang, China
- Cooperation in holding a Qanat session during the 8th conference of International Water History Association in Montpellier, June 2013, Montpellier, France.
- Contribution to the conference on Landscapes of water, source of life, 12-13 July 2013 , Vitoria- Gasteiz, Spain.

1.2.5. Other initiatives

Holding the International Initiatives Expert Group Meeting in Close cooperation with the following Category II Centres:

- ICHARM – Japan (International Flood Initiative)

❖ IRTCES-Beijing (International Sediment Initiative)

❖ International Centre on Qanats and Historic Hydraulic Structures - ICQHS

Establishment of the qanat training center was one of the activities of ICQHS which is still playing an important role in training many students there. This training center which educates the technicians is situated in Taft a town near Yazd. The students of this collage can gain the skill of construction and rehabilitation of qanat during a two year period. This center is utilizing the experiences and knowledge of the traditional practitioners. So this center bridges the gap between the modern sciences and indigenous know how.

1.3. Educational and training courses

1.3.1. Contribution to IHP courses

- Holding the short course on World History of Water Management with Collaboration of UNESCO- IHE, UNESCO IHP & IWHA with the presence of 53 national and international experts.
- short course on World History of Water Management with Collaboration of UNESCO- IHE, UNESCO IHP & IWHA, Yazd, 2012

1.3.2. Organization of specific courses

- Holding International Seminar on Drought Management, 14 May 2013, Tehran – Iran
- Holding the Second International Drought Meeting, 15 May 2013, Tehran – Iran
- Holding the International Workshop on Use of Unconventional Water in Urban Water Management, 2425 February 2014, Muscat- Oman
- Holding the special focused event on International Drought Initiative (IDI) during the High-level International Conference on Water Cooperation, Dushanbe, Tajikistan, August 2013
- Holding the International Conference on Traditional Knowledge for Water Resources Management (TKWRM-2012) with the participation of 440 scholars and experts from 31 countries.
- Holding the International workshop on "Trans-boundary Waters, Opportunities for cooperation" with the presence of 44 national and International experts.
- Training session for MENARID Project staff, 12 June 2012, ICQHS, Yazd

- One day training course for Chinese, German, French and Italian tourists to acquaint them with Qanats and historic hydraulic structures, 2 October 2013 , ICQHS
- Training Course on "Restoration and Maintenance of Karez: Advanced Techniques in Planning, Methodology and Applications" for Iraqi Experts
- Training the new generation of Qanat workers in Nakhchivan by ICQHS experts.
- Training workshop on Qanats in Bam with the collaboration of the UNESCO regional office officials in Tehran.
- International Training Course on Qanats for the experts of Islamic countries and the experts of other countries such as: Oman, India, Sri Lanka, Afghanistan, Pakistan, Tajikistan, United Arab Emirate, Iraq, Azerbaijan, Algeria, and Morocco.
- Training Course on Qanat technology and Historic Hydraulic Structures in Kerman for the experts of the regional water authority, ministry of agriculture, and cultural heritage organization.
- Training course on Qanats for Master and PhD students of Tarbiat Modares University.
- Training Course on Qanat Technology (Level 1) for the experts of Agriculture Organization of Qom.
- First Qanat club meeting with the presence of representatives from Qanat holding countries: Turkey, Algeria, Pakistan, China, Oman, Azerbaijan, Morocco and Japan.
- Training course on "mutual interactions between city and Qanat", 8- 24 September 2013 , ICQHS

1.3.3. Participation in IHP courses

- FRIEND-Water Conference on Hydrology in a Changing World: Environmental and Human Dimensions, Hanoi, Italy, February 2014
- 1st IWA Workshop on Traditional Qanats Technologies, Morocco, Marrakesh, October 2013
- 8th Water History Conference, UNESCO-IHP, Montpellier, France, 24-29 June 2013
- Asia-Pacific Water Museum: Concept and Development, IHP & National Science Museum of Thailand, Pathum Thani, Thailand, 25-26 June 2012

1.4. Cooperation with the UNESCO-IHE institute for water education and/or international/regional water centers under the auspices of UNESCO

- Cooperation with International Flood Initiative and International Sedimentation Initiative in compiling IDI Road Map
- The training course on world history of water management was held at ICQHS in February 2012 in cooperation with UNESCO-IHE.
- The Director of the Regional Center on Urban water Management (RCUWM) is a member of the Governing Board of ICQHS.
- ICQHS held a training course on transboundary waters in cooperation with IGRAG which is a category II UNESCO center, based in Delft, the Netherlands
- As a lecturer, ICQHS Senior Advisor participates in the training course on world history of water management which takes place at UNESCO-IHE every year.

1.5. Publications

- Translating and publishing a UNESCO book on Integrated Urban Water Management: Arid and Semi-Arid Regions" into Farsi and distributing it among relevant entities
- The book Qanat from Practitioners' Point of View
- The book A Survey on the Qanats of Bam from Engineering Point of View
- English version of the book A Survey on the Qanats of Bam from Engineering Point of View
- Country report of Qanats of Afghanistan, Iran and Pakistan
- The book Qanat of Zarch
- Proceedings of the workshop on Groundwater Artificial Recharge and Rainwater Harvesting in Arid and Semi – Arid Regions of Asia
- Proceedings of the first international training course on Qanat; A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development
- Veins of Desert
- Qanat in its Cradle
- Qanat Practitioners of Kerman Province
- Proceedings of TKWRM Conference

1.6. Participation in international scientific meetings

- Participating in the 20th UNESCO IHP Intergovernmental Council, 4-7 June 2012, Paris – France

- Participating in the 20th UNESCO-IHP Regional Steering Committee Meeting for South East Asia and the Pacific, 8-9 November 2012, Langkawi - Malaysia
- Participation in the World Water Council (WWC) General Assembly, 17-19 November 2012, Marseille – France
- Participating in the IHP-VIII Working Group, 10-12 December 2012, Koblenz – Germany
- Active participation in the High-level International Conference on Water Cooperation, Dushanbe, Tajikistan, August 2013
- Intending to participate in GWADI-IDI meeting, California, USA, April 2014

1.7. Other activities at regional level

ICQHS has also taken some measures as follows:

- Conducting a research project on some materials on qanat which are to be added to the primary schools textbooks
- Getting on Iranian TV programs to describe the importance of Qanats and historic hydraulic structures in order to enhance the public awareness about the role of traditional water harvesting systems in sustainable development.
- Teaming up with some directors in making some documentary movies and animations about Qanats and historic hydraulic structures
- Starting some negotiations at governmental level which eventually led to an official agreement between the Iranian Ministry of Energy and Ministry of Agriculture. This agreement emphasizes the necessity of training on Qanat technology that the experts of both ministries should receive from ICQHS. Also this agreement stipulates that both ministries should allocate a fund to research projects on different aspects of Qanats, which would be done by ICQHS. Also ICQHS took the lead to organize a qanat committee including representatives of the ministries of agriculture and energy and the cultural heritage organization in order to achieve a convergence between those involved in qanats. Also, ICQHS has put forward a proposal to the Iranian ministry of energy on modifying the existing water fair distribution law in favor of qanats and having it ratified in the parliament in terms of qanat and protection of this ancient legacy against groundwater over-exploitation and structural damages.

- Documenting indigenous know how: ICQHS has sent out expeditions to gather traditional knowledge on Qanat through interviewing the elderly Qanat masters the last generation who are vanishing.

2. Future activities

- Holding IDI Advisory Committee Meetings
- Translating one of the new UESCO publication in the related fields to Farsi
- Holding the International Training Course on Groundwater Modeling in close cooperation with the Ministry of Water Resources, Iraq, Mid 2014
- Participating in UNESCO related events,
- Extension of RCUWM activities for the 3rd 5-year period, evaluation by UNESCO Experts, mid 2014
- Organising training course on urban water management, Iran, mid 2014
- Attending the international conference on urban drainage, Malaysia, September 2014
- Holding an international drought event, in the framework of IDI activities

ICQHS's future activities mostly pertain to research and training as follows:

- Disseminate world experiences on various aspects of Qanats and historic hydraulic structures;
- Incorporate the indigenous knowledge into the new methods of construction, preservation, rehabilitation and operation of Qanat systems as well as historic hydraulic structures;
- Turn Qanats into an interdisciplinary tool where the traditional know - how and the modern techniques work together;
- Acquaint experts with the importance of cultural and technical aspects of historic hydraulic systems as well as the community life linked to these systems.

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 June 2012 to May 2014.

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

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

Members of the IHP National Committee as of June 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.	jishizak@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	mktsuji@geoenv.tsukuba.ac.jp
	NAKAYAMA Mikiyasu	Prof., Univ. of Tokyo	nakayama@k.u-tokyo.ac.jp
	HARUYAMA Shigeko	Prof., Mie Univ.	haruyama@bio.mie-u.ac.jp
	HORI Tomoharu	Prof., WRRC, DPRI, Kyoto Univ.	hori.tomoharu.3w@kyoto-u.ac.jp
	WATANABE Tsugihiro	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;
ICHARM: 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
WRRC: 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)
    - 2nd GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 16-17, April 2008
    - 3rd GEOSS/AWCI/ICG Meeting, Beijing, China, 6 November 2008
    - 4th GEOSS/AWCI/ICG Meeting, Kyoto, Japan, 6-7, February 2009
    - 5th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 15-18, December 2009
    - 6th GEOSS/AWCI/ICG Meeting, Bali, Indonesia, 13 March 2010
    - 7th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 5-6, October 2010
    - 8th GEOSS/AWCI/ICG Meeting, Seoul, South Korea, 6-8 October 2011
    - 9th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 29-30 September 2012
    - 10th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 26-30 May 2014
    -

  in Africa
  - 1st African Water Cycle Symposium, Tunis, Tunisia, 6-8 January, 2009.
  - 1st Task Team meeting in preparation of the Second GEOSS African Water Cycle Symposium, Geneva, Switzerland, 23-24 September 2009
  - 2nd African Water Cycle Symposium, Addis Ababa, Ethiopia, 6-8 January, 2011.
  - GEO-UNESCO Joint Workshop on Earth Observation and Capacity Development for IWRM at River Basins in Africa, Nairobi, Kenya, 12 - 14 January 2012.
  - 3rd African Water Cycle Symposium, Libreville, Gabon, 27-29 February, 2012.
  - 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.]

- IHP-IOC sessions are organized at the meetings of Japan Geoscience Union (JpGU) at Makuhari Messe in May 2011 and in May 2012.

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

- Innovative Program of Climate Change Projection for the 21st Century: MEXT Kakushin Program (2007-2012). http://www.jamstec.go.jp/kakushin21/eng/index.html
- Program for Risk Information on Climate Change: MEXT Sosei Program (2012-2016). http://www.jamstec.go.jp/sousei/eng/index.html

- 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.

- Climate change research under the MEXT KAKUSHIN program “Innovative Program of Climate Change Projection for the 21st Century" was intensively conducted from 2008 to 2012.

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

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.

- The predictability of the large flood at the Yodo River basin in 2013 was examined to verify the performance of a hydrologic model for predictions of extreme events [Kyoto University].

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

- Space Application for Environment (SAFE), Asia-Pacific Regional Space Agency Forum (APRSA) [Koike]
  Demonstration projects:
  - Hong River, Viet Nam, 2008-2010
  - Sangker River, Cambodia, 2009-2012
  - Indus River, Pakistan, 2010-2012

- Case studies on human security and water-related disasters.

- Japan has experienced very severe water-related disasters in 2010-2012. Especially, the Great East Japan Earthquake and Tsunami (GEJET) damaged Japan very much, causing the tsunami disasters in wider coastal zones and its aftermath including radioactive contamination issues from nuclear power plants in Fukushima.

- Best practices on water risk management
  * ICHARM has 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).
  * ICHARM had announced a flood inundation forecast of Chao-Phraya river basin to help local people in emergent operation(2011-).
  * Flood forecasting and management [ICHARM, PWRI, IFNet, JMA and universities] under the MEXT Kakushin Program from 2007 to 2012 and MEXT SOSEI Program from 2012 to 2017, changes of water-related disasters and water resources under global warming were investigated.

- Committee on Hydorscience 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.

- Publishing "Model estimates of sea-level change due to anthropogenic impacts on terrestrial water storage" in *Nature Geoscience*, **5**, 389-392 in 2012. [The Univ. of Tokyo, etc.]

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, WRRC, 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]

- Collaboration with IHP-LAC for Rio de La Plata Basin Workshops
  Preparatory Meeting for 6th International Workshop of Regional Approach of Development and Management of Reservoirs in La Plata River Basin [Dr. Yosuke Yamashiki, Kyoto Univ.]

- 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 governace.

- 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 “Ecogydrology 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.
- ICHARM has been jointly conducting a three-year doctoral course, “Disaster Management”, with GRIPS since October 2010.
- Six short-term training courses have been conducted about Early Warning System, June 2012-May 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 on March 2012. 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) Prediction in Ungauged Basins (PUB) by IAHS:
PUB-Japan members attended IAHS 90th anniversary PUB Symposium, Delft, the Netherlands, on 23-25 October 2012 [Takeuchi, Tani, Takara, Sayama, Hishinuma].
ICHARM Director Kuniyoshi Takeuchi was awarded “2012 IAHS International Hydrology Award” at this meeting.

(5) 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.

- 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).

(6) 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 Geo-ecology, Mongolian Academy of Sciences and the University of Tsukuba.

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).

(3) The Japanese National Committee for IHP, UNESCO and the Japanese National Committee for IAHS, the Science Council of Japan organized an Open Discussion Conference "Japan Water 2012: International Research and Education Activities on Water in Japan -Career Paths for Young Scientists and Japan Initiative-" at MEXT on 15th Oct 2012.

(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 20th RSC was held in Langkawi, Malaysia in conjunction with UNESCO-IHP and the 2nd International Conference on Water Resources (ICWR2012) "Sharing Knowledge of Issues in Water Resources Management to Face the Future" *Langkawi, Malaysia, 5-9 November 2012*. The RSC Secretariat Assoc. Prof. Tachikawa was re-elected for 2012-2014. [Takara, Kawamura, Tachikawa, Kobayashi]

(2) 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]

(3) The 1st Meeting of the Implementation Working Group UNESCO International Hydrological Programme (IHP), 10-12 December 2012, Koblenz [Tachikawa]

(4) 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 Kakushin Program “Innovative Program of Climate Projection for the 21st Century” 2007-2012 [ICHARM, PWRI, IFNet, Kyoto Univ., Univ. Tokyo and others]

- 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). [Oki]

1.2.5 Other initiatives

ICHARM: **I**nternational **C**entre for Water **Ha**zard and **R**isk **M**anagement under the auspices of UNESCO was established in Tsukuba, Japan in March 2006, after getting accreditation by the

member states of UNESCO at the 33rd General Conference of UNESCO. Dr. Kuniyoshi Takeuchi, the former chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the founding 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 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, dbris flows, tsunamis, storm surges, water contamination, and snow and ice disasters. The Centre envision 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) The Forum on Science, Technology Innovation for Sustainable Development as a Rio+20 side event organized ICSU, UNESCO and others, on 11 June 2012, Rio de Janeiro, Brazil
(2) Signing Memorandum of Understanding to promote institutional cooperation with HidroEX, on 19 June 2012, Frutal, Minas Gerais State, Brazil
(3) International Workshop on Accuracy and Reliability of Flood Forecasting Models by Use of Remote Sensing Techniques, organized by UNESCO, Pakistan Meteorological Department, Government of Japan and JICA, on 17-18 June 2012, Lahore, Pakistan
(4) UNESCO-ICHARM Training Course on the Integrated Flood Analysis System (IFAS), on 20-22 June 2012, Hanoi, Vietnam
(5) The 4th Davos International Disaster and Risk Conference, on 27-31 August 2012, Davos, Switzerland
(6) ADB-TA 7276-Reg. Capacity development training program for flood risk management, organized by ICHARM, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and Asian Development Bank (ADB) on 26-28 September in Metro Manila and on 2-4 October in Tuguegarao City, Philippines
(7) ICHARM Director, Dr. Kuniyoshi Takeuchi was awarded "International Hydrology Prize" on 23 October 2012 at the conference on International Association of Hydrological Sciences (IAHS) 90th Anniversary –Prediction in Ungaged Basins (PUB) Symposium 2012
(8) ADB –TA-7276-Reg. Training on Development and Utilization of Flood Vulnerability Indices in Cambodian Floodplain, organized by ICHARM, the Mekong River Commission Secretariat (MRCS), the Cambodia National Mekong Committee and ADB on 11-13 December 2012 in Phnom Penh, Cambodia
(9) 45th Session of the UNESCAP/WMO Typhoon Committee session on 29 January- 1 February 2013 in Hong Kong, China
(10) Seminar on Sediment Hydraulics and River Management on 13-14 February 2013 in Dhaka, Bangladesh, with cooperation from the Bangladesh Water Development Board
(11) 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)
(12) 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
(13) ADB –TA-7276-Reg. Final project report submitted to ADB on 12 March 2013, which completed the entire implementation of the project
(14) 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.
(15) Signing Memorandum of Understanding to promote research exchange and technical cooperation with the Iran Water and Power Company (IWPC), on 12 April 2013
(16) 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
(17) 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
(18) 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
(19) 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
(20) 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
(21) 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
(22) 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

(23) ICHARM Research Specialist, Dr. Hideyuki Kamimera was awarded from the Ministry of Natural Resources and Environment (MONRE) of Vietnam on 16 August 2013
(24) IFAS Training Workshop at the Flood Forecasting Division (FFD) of Pakistan Meteorological Department (PMD) on 22-26 August 2013 in Islamabad, Pakistan
(25) 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
(26) 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
(27) UNESCO Strategic and High-Level Meeting on Water Security and Cooperation on 11-13 September 2013 in Nairobi, Kenya
(28) 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
(29) The Budapest Water Summit "the Role of Water and Sanitation in the Global Sustainable Development Agenda" on 8-11 October 2013 in Budapest, Hungary
(30) IFAS Training organized by the Asian Development Bank and the Japan Aerospace Exploration Agency (JAXA) on 8-11 October 2013 in Manila, the Philippines
(31) The Second United Nations Office for Disaster Risk Reduction (UNISDR) Asia Partnership Meeting on 5-7 November 2013 in Bangkok, Thailand
(32) The 29th meeting of ISO/TC 113 (Hydrometry) on 11-15 November 2013 at Comision Nacional del Aqua (CONAGUA) in Mexico City, Mexico
(33) 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
(34) 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
(35) The 8th UNESCAP/WMO Typhoon Committee Integrated Workshop on 2-7 December 2013 in Macau, China
(36) 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
(37) 46th Session of the UNESCAP/WMO Typhoon Committee session on 10-13 February 2014 in Bangkok, Thailand
(38) The 9th USGS-Japan Workshop on Hydrology and Water Resources on 18-20 February 2014 in Lakewood, USA
(39) 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
(40) 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
(41) Field Survey for research project on pre-recovery planning in the Pampanga River Basin of the Philippines on 13-15 March 2014
(42) 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
(43) The UN-Water "Water for Life" during World Water Day celebrations 2014 water and energy on 20-21 March 2014 in Tokyo, Japan
(44) The First United Nations Office for Disaster Risk Reduction (UNISDR) Asia Partnership Meeting on 22-24 April 2014 in Bangkok, Thailand
(45) 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

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 Measurment 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 Foest, 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, and 12 students in the class of 2012 graduate on 17 September 2013 with a master's degree in disaster management. The class of 2013 started the program on 4 October 2013 with 12 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 with a doctoral degree. One student in the class of 2011, two students in the class of 2012 and three students in the class of 2013 participated from three countries.

ICHARM has been providing a short-term training course with JICA as Capacity Development for Flood Risk Management (from 2012) as well as Master's Course Program "Water-related Disaster Management Course of Disaster Management Policy Program", and Doctor Course Program, "Disaster 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 22nd IHP Training Course in 2012, "Precipitation Measurement from Space and its Applications", Nagoya University, Kyoto University and UNESCO.
(2) The textbook for the 23rd IHP Training Course in 2013, "Ecohydrology for River Basin Management under Climate Change", Nagoya University, Kyoto University and UNESCO.
(3) IAHS Red Book on "Floods: From Risk to Opportunity", Ali Chavoshian, Kuniyoshi Takeuchi, , Xialtao Cheng (Eds.), IAHS, 357, March, 2013, 470 p .
(4) Proceedings of the International Symposium on Answers to Asian Aquatic Problems (AAA+2013), Tokyo Metropolitan University, Tokyo, November 2013.
(5) The 23rd IHP Training course textbook, Ecohydrology under Climate Change, Water Resources Research Center, DPRI, Kyoto Univ., December 2013.
(6) Morphometoric Property and Flood Equation, Shigeko Haruyama and KayThwe Hlaing, Terrapub publisher, Tokyo, 2013,196 p
(7) Coastal geomorphology and Vulnerability of disaster –towards disaster risk reduction-, Shigeko Haruyama (Eds), Terrapub publisher, Tokyo, 2013,180 p
(8) 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.
(9) 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) JAPAN WATER 2012, an IAHS-IHP Joint National Workshop for Water Issues, MEXT, Tokyo, 15 October 2012 [Takara, Taniguchi, Tsujimura, Oki, Tachikawa].
(2) ISRS2013 (The 12th International Symposium on River Sedimentation, Kyoto Japan, Sept. 2-5, 2013)
(3) IGU 2013 Kyoto Regional Conference, organized by IGU Commission Biogeography and Biodiversity, Kyoto International Conference Center, Kyoto, Japan, 4-9 August 2013.
(4) World Water Day main celebrations, organized by UNU and UNIDO on behalf of UN-Water, supported by MLIT, MOE, MOFA and others, Tokyo, Japan, 20-21March 2014
(5) 1st Joint Seminar of Integrated Water Resources Management for Chao Phraya River Basin, organized by Thai government and JICA, Siam Niramit Theatre, Bangkok, Jan. 14th, 2012. [Oki]
(6) Japan-China-Korea Green Technology Forum, Water Management March 2012, JST Tokyo Headquarters, Tokyo, Japan. [Oki]
(7) Planet Under Pressure Water: integrated assessment, governance and management in changing conditions at global, regional and transboundary levels, London, 27 March, 2012. [Oki]
(8) IPCC SREX Regional Outreach Meeting, Chinese Meteorological Agency, Beijing, China, April 26, 2012. [Oki]
(9) DOE Workshop on Community Modeling and Long-Term Predictions of the Integrated Water Cycle Renaissance Washington DC Downtown Hotel, September 24 - 26, 2012. [Oki]
(10) NSF "Climate Change" Symposium Cosmos Club, Washington, DC, USA, February 22, 2013. [Oki]
(11) Science Council in Asia, Bangkok, Thailand, May 7, 2013. [Oki]
(12) Asia Pacific Water Summit, Chiang Mai, Thailand, May 18, 2013. [Oki]
(13) Integrated water resources management for the 21st century Science Forum, Budapest Water Summit, 9 October 2013, Budapest, Hungary. [Oki]
(14) Integrated water resources management for the 21st century Science Forum, Budapest Water Summit, 9 October 2013, Budapest, Hungary. [Oki]
(15) JST-NSERC Workshop on Sustainable Water Use, 21 October 2013 Fujisoft Akiba Plaza, Tokyo, Japan. [Oki]
(16) In commemoration of the 2014 UN World Water Day: Asia Pacific Regional Symposium "Water - Energy Nexus in Asia", 20 March 2014, UNU, Japan. [Oki]
(17) In commemoration of the 2014 UN World Water Day: Asia Pacific Regional Symposium "Water - Energy Nexus in Asia", 20 March 2014, UNU, Japan. [Oki]
(18) 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.
(19) IAEA (International Atomic Energy Agency) Scientific Forum "Water Matters -Making a Difference with Nuclear Techniques-", Vienna, Austria, 20th - 21st September 2011 [Tsujimura]
(20) 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.]

(21) IGU 2013 Kyoto Regional Conference, organized by IGU Commission Hazard and Risk, Kyoto International Conference Center, Kyoto, Japan, 4-9 August 2013. [Haruyama, Takara].

(22) GLP committee meeting was held in Makuhari,Chiba Japan on 24 May 2012 at the occasion of JpGU (Japan Geoscience Union) meetings on 20-25 May 2012 [Haruyama].

(23) IHDP committee meeting was held in Makuhari,Chiba Japan on 24 May 2012 at the occasion of JpGU (Japan Geoscience Union) meetings on 20-25 May 2012 [Haruyama].

(24) GLP 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].

(25) 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].

(26) 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 20th Session of the IHP Intergovernmental Council at UNESCO Headquarters, 4-7 June 2012. [Takara, Tachikawa and others]

(2) ASLO summer meeting: Lake Biwa, 8-13 July 2012

(3) The International Workshop of the UNESCO Chair in Mongolia was held at Ulaanbaatar in July/August 2012.

(4) The 90th Anniversary meeting of IAHS and PUB final symposium was organized at TU Delft, the Netherlands, on 23-25 October 2012 [Takeuchi, Sayama (ICHARM), Takara, Tani (Kyoto Univ.)].

(5) First meeting of the IHP Phase-VIII implementation working group in Koblenz, Dec. 10th - 12th, 2012 [Tachikawa]

(6) The 6th International Conference on Water Resources and Environment Research (ICWRER), Koblenz, Germany, 3-7 June 2013.

(7) IAHS/IASPEI/IAPSO joint Assembly – Knowledge for the Future: Gothenburg, Sweden on 22-20 July, 2013

(8) 2nd Asia Pacific Water Summit (Focus Area Session: IWRM Process Water Secured World organized by UNESCO)[NARBO supported and attended]

(9) The 81st ICOLD Annual meeting at Seattle, USA, on 12-16 August 2013 [Sumi (Kyoto Univ.)]

(10) ISO TC207/SC5/WG8 meeting, Shangri-La Hotel, Bangkok, Thailand, 24 June 2012. [Oki]

(11) ISO TC207/SC5/WG8 "Water Footprint" 7th working group meeting, Padova, Italy, 10 Dec. 2012. [Oki]

(12) The 6th installment of the International Perspectives on Water Resources & the Environment conference, Swissotel, Izmir, Turkey, January 8th, 2013. [Oki]

(13) Soil Systems and Critical Zone Processes – Integrating Life Support Functions across Disciplines Monte Verita (Ascona- Switzerland) 14-18, April 2013. [Oki]

(14) Integrated hydrological-water resources modeling in the Anthropocene PhD Defense Symposium for Yoshi Wada, Utrecht, November 8th, 2013. [Oki]

(15) World Environmental & Water Resources Congress 2012, Albuquerque, New Mexico, USA on 20-24 May, 2012.

(16) IGU 2012 organized by IGU Commission Hazard and Risk, Bonn University, Bonn, German, 26-30 August 2012. [Haruyama].

(17) The International Seminar on Infrastructure Development in Cluster Island in Eastern Part of Indonesia, Baubau, Indonesia on 19 January, 2013.

(18) 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].

(19) The 3rd International MAHASRI/HyARC Workshop on Asian Monsoon and Water Cycle, Danang, Vietnam on 28-30 August 2013.

(20) IAHS Statistical Hydrology Workshop (STAHY 2013), Kos Island, Greece on 17-19 October 2013.

(21) The 2nd International Symposium on Vietnam Water Cooperation Initiative for Liable Cities (VACI 2013), Hanoi, Vietnam on 16 December 2013.

(22) The 35th Hydrology and Water Resources Symposium, Perth, Australia on 24-27 February 2014.

(23) General Assembly of EGU (European Geosciences Union), Vienna, Austria, 27 April - 2 May 2014. [Sayama, Tsujimura]

(24) The 3rd Istanbul Water Forum was held in Istanbul, Turkey, 27-29 May 2014 [Takara].

(25) IGU 2014 organized by IGU Commission Hazard and Risk, Jagiellonian University, Krakow, Poland, 18-23 August 2014. [Haruyama].
(26) 11th Annual Meeting of Asia Oceania Geosciences Society (AOGS2014) will be held in Sapporo, Japan, 28 July – 2 August 2014.
(27) 12th Annual Meeting of Asia Oceania Geosciences Society (AOGS2015) will be held in Singapore, 3-7 August 2015.

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, 2-13 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

JORDAN NATIONAL REPORT ON IHP RELATED ACTIVITIES
Jordan National IHP Committee
Representing the Period

(June/2012 - May/2014)

Correspondance:

Basem_Telfah@mwi.gov.jo
Secretary General of the Ministry of Water and Irrigation(MWI), Jordan
OR
Mohammad_Al-Atrash@mwi.gov.jo
OR
Mohammad_Almomani@mwi.gov.jo

Tel: 00962 6 5652265
Fax: 00962 6 5652287

Adress:

Ministry of Water and Irrigation (MWI)
Schmeisani
Amman, Jordan
P.O.Box: 2412-5012

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

There are several meetings existed each year.

1.1.1 Decisions regarding the composition of the IHP National Committee

* The committee is headed by the Minister of Water and Irrigation, Jordan.
The Vice Chair Person is the Secretary General of the Ministry of Water and Irrigation, Eng. Basem Telfah.

The IHP National Committee composed with the following Institutions and Universities:

- Ministry of Water and Irrigation (MWI) and both Water Authorities
* Water Authority of Jordan (WAJ)
* Jordan Valley Authority (JVA)
- Ministry of Education-National Commission for Education, Science and Culture
- University of Jordan, Amman
- University of Science and Technology, Irbid
- Yarmouk University, Irbid
- Muta University, Karak
- Hashemite University, Zarqa
- Al Albayt University, Mafraq
- Balqa Applied University, Salt
- Meterological Department
- Natural Resources Authority (NRA)
- The Higher Council for Science and Technology (HCST)

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

Concentration on the National Priorities as follows:

* Surface water and Groundwater Resources Protection
* Artificial Groundwater Recharge and Surface Water Harvesting.
* Adaptation to Climate Change.
* Sanitation and Wastewater Resources Management.
* Shared Water Resources and Trans-boundary Water.
* Watershed and Aquifers / Climatic Change Impacts.
* Hydrology / Eco-hydrology.
*Public engagement in water management.
*Water education for children and youth.
* Others

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Jordan National IHP Committee organized a one day scientific workshop in 16th April 2014 on a topic " Optimization Water Resources Management in a Water Scarce Areas " at the Jordan Ministry of Water and Irrigation head quarter.

Several Training workshops conducted in Jordan within 2012 and 2014 in cooperation between a number of technical cooperation projects and the Ministry of Water and Irrigation (MWI), Jordan.

Celebration in the World Water Day and Arab Water Day in March 2013 and March 2014.

1.2.2 Participation in IHP Steering Committees/Working Groups

1.2.3 Research/applied projects supported or sponsored

Jordan National IHP Committee applied to UNESCO-IHP for financing a research project proposal for 2012-2013, unfortunately not financed due to budget reduction.

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

- UNESCO Chair in Wadi Hydrology at the University of Jordan, Amman.

- UNESCO Regional Office in Cairo.

- UNESCO Chair in Desertification Studies at the Yarmouk University, Irbid

-Steering Committee of the project entitled, " Adaptation To Climate Change To Sustain Jordan,s MDG Achievement, United Nation Country Team Joint Program.

-UNESCO, Amman Office.

-ALECSO, ISESCO and ACSAD.

-NATCOM for Education, Science and Culture in Jordan.

-Water, Environment and Energy Center at the university of Jordan.

- NGO,s and Civil Associations in Jordan as for public engagement in water management.

1.2.5 Other initiatives

Contribution in celebration of the World Water Day and Arab Water Day, in march 2014 at the Ministry of Water and Irrigation headquarter.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

1.3.2 Organization of specific courses

*Several Training courses conducted at the Ministry of Water and Irrigation (MWI), Jordan and a regional technical cooperation projects.

1.3.3 Participation in IHP courses

*Possible participation of a limited trainees in IHP courses.

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

1.5 Publications

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

*Participation in the Third Regional Consultation Meeting held in Amman within 8-10, October 2012, entitled, « Groundwater Resources Governance in the Arab World: A Global Framework for Country Action «. The meeting organized under, UNESCO Amman Office, IHP head quarter, GEF, the Ministry of Water and Irrigation (MWI), Jordan.
This scientific and technical consultation is a fundemental component of the project on Groundwater Governance that the UNESCO International Hydrological Programme IHP,

the Global Environment Facility (GEF), the Food and Agricultural Organization (FAO), the International Association of Hydrogeologists (IAH) and the World Bank jointly.

*Participation in the Second Learning Workshop For GEF MENA ARID Project Managers, entitled :

« Opportonities for Managed Aouifer Recharge », 11-13 December 2012, Amman, Jordan. (GEF, UNESCO-IHP, ICARDA, UNDP, IFAD, IGRAC, MWI-Jordan)

1.6.2 Participation in meetings abroad

* Participation to the meeting entitled, «UNESCO Strategic and High-Level Meeting on Water Security and Cooperation, in Nairobi, Kenya, 11-13 September, 2013.

* Participation in the 15th Arab National IHP Committee Meeting that held in Morocco within 9-10, October, 2013. A main topic entitled: Trans-boundary Water Cooperation in the Arab Region. The meeting organized by UNESCO Cairo Office, ALECSO , UNESCO-IHP NATCOM of Morocco.

* Participation in a meeting held in Tunisia, within 27-28 May, 2013, under a topic entitled: "Water Resources Management in the Arab Constitutions. The meeting organized by UNESCO Cairo Office, ISESCO ,UNESCO-IHP NATCOM of Tunisia.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

* Cooperation with several Governmental and Non-Governmental Organizations and Associations at the regional level.

* Cooperation with Wadi Hydrology Network, UNESCO Regional Office in Cairo, UNESCO Amman Office, UNESCO Chair in Wadi Hydrology.

* Cooperation with G.Wadi Network, UNESCO Cairo Office, Groundwater Protection, ACSAD

* Cooperation with the Arab National IHP Committees.

1.7.2 Completed and ongoing scientific projects

Jordan National IHP Committee applied to UNESCO-IHP for a scientific research project proposal for 2012-2013, that not financed due to limitation and reduction of the UNESCO-IHP budget.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

Participation on, « Assessment of transboundary aquifers within the framework of UNESCO-IHP. That is through UNESCO,s Internationally Shared Aquifer Resources Management (ISARM) initiative.

2.2 Activities foreseen for 2015-2016

A number of activities as follows:

* A training program for WEAP.

* Management of transboundary aquifers and shared water..

* Water harvesting and artificial recharge.

*Public engagement in water management, Highland Water Forum.

*Water education for children and youth.

2.3 Activities envisaged in the long term

Some projects and activities that mentioned in the detailed consultation survey, Jordan case, on the implementation of the IHP-VIII.

REPOBLIKAN'I MADAGASIKARA
Fitiavana - Tanindrazana – Fandrosoana

RAPPORT PAYS MADAGASCAR SUR LE THEME SECURITE DE L'EAU

- Mai 2014 -

INTRODUCTION

Depuis toujours, le secteur eau, assainissement et hygiène revêt un caractère prioritaire au niveau des engagements nationaux pris dans le cadre du développement du pays.

Le présent rapport « Programme Hydrologique International » permettra de faire un aperçu de la situation actuelle à Madagascar en matière hydrologique, ainsi que les défis auxquels le pays devrait faire face.

Ainsi, le thème de ce rapport, « La sécurité de l'Eau », est motivé par le fait que la phase actuelle du PHI traite la sécurité de l'eau ainsi que les défis au niveau local, régional, national et globaux y afférant. L'objectif principal du rapport est donc d'identifier les défis majeurs pour sécuriser l'eau au niveau national et mettre en évidence les interventions existantes et envisagées.

PARTIE I :
DISPONIBILITE DES RESSOURCES EN EAU EN QUANTITE ET EN QUALITE

Quantitativement/Qualitativement, la disponibilité des ressources en eau (de surface ou souterraine), dans les diverses régions de Madagascar, destinées à l'alimentation en eau potable varient selon les régions du Nord au Sud et de l'Est à l'Ouest.

Dans les régions sèches, les ressources exploitées sont en majorité les nappes assez profondes. Par contre dans les régions humides, on exploite soit les nappes phréatiques peu profondes, soit les sources d'émergences, soit les eaux de surface telles que les lacs et les rivières.

Dans le cas général, même si les ressources sembleraient abondantes, on peut constater une régression flagrante de leur quantité, qui ne fera que s'empirer dans les années à venir si des mesures draconiennes ne sont pas prises à savoir l'implantation d'une politique adaptée aux réalités suivie d'une application rigoureuse, pour protéger ces ressources avec l'environnement qui sont interdépendants.

Mais il est à souligner, qu'outre la quantité, la qualité des ressources est un des problèmes majeurs dans certaine région. En effet, cette qualité se dégrade d'année en année suite aux pratiques humaines (les usines pollueuses, les déboisements massives et défrichements par feux de brousses augmentant les envasements des lacs ou chargeant les cours d'eau de sédiments très importants ou la prolifération des algues dans les lacs).

Par ailleurs, le secteur agriculture, de son côté est aussi victime de ce problème de manque d'eau, notamment la riziculture irriguée qui occupe une assez importante place dans l'agriculture malgache. Presque 90% des périmètres irrigués souffrent de cette insuffisance d'eau et rencontrent des difficultés pour satisfaire les besoins en eau des cultures.

PARTIE II :
ACCES ET USAGES DE L'EAU

2.1 Accès et usages de l'eau dans le domaine de l'approvisionnement en eau potable

Selon l'annuaire 2013 du secteur, seulement 47% et 48% de la population totale sont respectivement desservies en Eau Potable et en infrastructures d'Assainissement.

Toutefois, la répartition varie suivant les régions considérées.

Ce taux peut s'expliquer par la faible qualité des services publics, à la non pérennisation des infrastructures, à la vulnérabilité des ressources en eau et à l'incapacité financière de la population à se brancher aux réseaux d'eau potable payants.

Il est aussi à souligner que même pour la population ayant accès à l'eau potable, la qualité de service demeure insatisfaisante et est à améliorer. Les pertes techniques sur les réseaux sont considérables à cause de la vétusté des infrastructures de distribution.

De plus, les faibles pressions voir même les coupures fréquentes à certaines heures sont considérables.

Ce qui implique le nombre important de défis, à savoir :

- L'augmentation des taux de desserte de la population ;
- L'amélioration de la qualité de service (pression, qualité de l'eau).

Aussi, d'autres actions sont envisagées pour remédier à la vétusté des installations (usines de traitement et réseau de distribution), mais moyennant d'importants investissements, donc de recherche de fond de financement auprès des bailleurs.

2.2 Accès et usages de l'eau dans le domaine de l'agriculture

La place de **l'agriculture** dans l'économie nationale Malgache est prépondérante. La population active est très majoritairement agricole (82 % en 2004). Le **PIB agricole** est estimé à 27% du PIB global, et la filière riz qui constitue la première activité économique en milieu rural de Madagascar en termes de volume, y occupe une première place.

En ce sens, les performances du secteur rizicole déterminent très largement celles du secteur agricole et de manière significative celles de l'économie nationale. Principale culture vivrière de Madagascar, le riz occupe une place importante dans le secteur agricole.

Le riz représente l'aliment de base pour la grande majorité des malgaches. Sa consommation est élevée et est évaluée en moyenne à 138 kg/hbt/an en milieu rural et 118 kg/hbt/an en milieu urbain. (UPDR/FAO 1999-2000). Cette forte consommation agit sur les importations de riz qui étaient en 2008 de 180.000 tonnes. Madagascar est le deuxième pays d'Afrique sub-saharienne en termes de superficie irriguée : un million d'hectares, soit 30 % des terres agricoles. L'agriculture irriguée représente 15 % du PIB, 70 % de la production agricole et 88 % de la production de riz. Dans certaines zones comme sur les Hautes Terres, 85 à 93% des agriculteurs ont recours à l'irrigation. Le riz est de loin la principale culture irriguée : près de 1 640 000 exploitants, culture principale dans ¾ des communes totales et principales sources de revenus agricoles dans 45% des communes. L'agriculture concerne 26% du PIB malgache et 12% de ce PIB provient de la riziculture.

Dans plusieurs pays en voie de développement, l'irrigation représente jusqu'à 95% de toutes les utilisations d'eau, et joue un rôle important dans la production de nourriture et la sécurité alimentaire. Les futures stratégies de développement agricole de la plupart de ces pays dépendent de la possibilité de maintenir, d'améliorer et d'étendre l'agriculture irriguée.

A Madagascar, le périmètre irrigué s'évalue à 1,2 million d'hectares. Actuellement, 10% seulement des infrastructures hydroagrioles sont en bon état de fonctionnement. La majorité des ouvrages sont vétustes ou sont endommagés par les crues engendrées par le passage des cyclones.

Actuellement, la gestion de l'eau dans ces périmètres hydroagrioles rencontre des problèmes cruciaux à cause du tarissement des ressources du à la dégradation de l'environnement.

- Le programme Bassins Versants Périmètres Irrigués s'inscrit dans de cadre de la mise en œuvre de la **Politique du Secteur Irrigué**. Cette politique permet de baliser les interventions des projets qui œuvrent dans le domaine de l'aménagement hydroagricole : pérenniser les infrastructures hydroagricoles tout en préservant l'environnement dans les bassins versants en amont des périmètres, mettre en place une organisation paysanne bien structurée. Dorénavant, tout projet intervenant dans le secteur irrigué doit impérativement respecter cette politique.

- **La loi 90-016** du 20 juillet 1990 régissant la Gestion, l'Entretien et Police des eaux dans les périmètres hydroagrioles, n'étant plus partiellement d'actualité, doit être révisée et se conformer à la politique du secteur irrigué.

La gestion de l'eau d'irrigation est basée sur l'état de fonctionnement des infrastructures hydroagricoles et sur l'organisation des usagers de l'eau, bénéficiaires de ces infrastructures:

- l'insuffisance en eau est mieux gérée si le périmètre est équipé d'ouvrage en bon état de fonctionnement et la pratique de tour d'eau y est efficace ;
- L'inondation peut aussi être maîtrisée avec des ouvrages adéquats ;
- Un bon système de drainage aide à éviter l'excès d'eau nuisible aux cultures ;
- Le gaspillage d'eau en irrigation reste minime dans un réseau en bon état de fonctionnement ;
- La réussite dépend aussi de la structure mise en place au niveau des bénéfiiaires.

PARTIE III : CATASTROPHES LIEES A L'EAU

3.1 Les différentes catastrophes naturelles et humaines liées à l'eau et leur importance et conséquences sur le développement socio-économique du pays

Catastrophes du aux changements climatiques

Madagascar est parmi les pays les plus exposés aux chocs climatiques en Afrique. Le pays est régulièrement affecté par les cyclones, inondations et sècheresses qui sont d'origine météorologique :

- *les cyclones génèrent de grandes précipitations et entraînent des inondations :*
  - Etat sanitaire dégradant de la population du fait de la détérioration de l'accès à l'eau potable, des conditions de vie plus difficile et de l'apparition des maladies (diarrhée, paludisme, IRS,…) et en conséquence des pertes financières pour les familles (récoles, perte du bétail, frais de santé, pertes matérielles,…) ;
  - Dégâts importants au niveau des infrastructures de base (ouvrages routières, digues, écoles, CSB,…) d'où enclavement et état sanitaire précaire de la population, déperdition scolaire ;
- *les sècheresses sont les conséquences de la déforestation et des feux de brousse :*
  - tarissement des sources d'où réduction des surfaces irrigables et faible production agricole ;
  - dénudement des bassins versants et accroissement des crues causant des inondations qui entraînent également avec elles la couche arable du sol d'où aridité sinon désertification de zones ;
  - la déforestation met en péril sinon entraîne la disparition des écosystèmes vitaux.

- *Conséquences des catastrophes sur l'exploitation agricole*

Plus de 75% de la population vit en milieu rural. L'activité agricole et l'agriculture produisent 27% du PIB, soit 40% des recettes d'exportation. Mais à chaque catastrophe

[1] Evaluation des pertes et des dommages selon la méthodologie DALA, Banque Mondiale, 2008.

naturelle, les infrastructures sont détruites et les activités agricoles sont interrompues.

En cette période des changements climatiques, les ouvrages hydro agricoles subissent des dégâts énormes pour ne citer qu'en 2008, ces dégâts dus aux cataclysmes naturels sur les ouvrages hydro agricoles ont été estimés à 9.314,5 millions d'Ariary.

3.2 Quelle est l'ampleur de ces phénomènes et leur recrudescence ?

La dernière saison cyclonique la plus intense remonte à 2007-2008, avec le passage d'un cyclone tropical de catégorie 4, ayant affecté directement environ 525.000 personnes et dont les dommages et pertes ont été estimés à 333 millions de $US[1].

Des études menées en 2008 par la Direction de la Météorologie Malagasy sur les changements climatiques prévoient, pour les 50 prochaines années, une plus grande intensification des cyclones dans le bassin Sud-Ouest de l'Océan Indien, dans lequel se trouve Madagascar, ainsi qu'une abondance des précipitations.

Une situation de sécheresse prolongée était présente dans le Grand Sud depuis 2009 jusqu'en 2011

A cause de leur accessibilité plus facile, les forêts naturelles de basse altitude (0-400m) ont subi un taux de déforestation plus élevé à raison de 0,5% par an, entre 2005 et 2010.

Une nette tendance à la baisse des surfaces brulées a été enregistrée entre 2010 et 2012.

Dans le secteur agriculture, sept milliards ariary sont nécessaires à la réhabilitation des infrastructures détruites à chaque passage d'un cyclone. A l'instar des tempêtes tropicales Giovanna et Irina, survenues il y a plusieurs années, dix millions de dollars étaient consacrées aux infrastructures hydroagricoles (soure CPGU)

« Les catastrophes naturelles n'ont jamais cessé de s'accroître, ces derniers temps. A cela s'ajoute la dégradation de l'environnement. En l'absence de normes aux constructions, les infrastructures ne tiennent pas longtemps ».

3.3 Est-ce que le pays a pu cartographier toutes les zones à risque ?

Seules quelques zones à risque objet d'études localisées ont été cartographiées.

3.4 Quelles sont les mesures prises et envisagées pour adresser les différents défis liés aux catastrophes liées à l'eau ?

A part les actions et mesures mises en œuvre par les différents acteurs essentiellement dans le domaine de l'environnement, la mise en œuvre de la GIRE est en cours de développement.

L'adoption et l'introduction du processus de Réduction des Risques et Catastrophes sont actuellement considérées par les différents acteurs.

En ce qui concerne le domaine de l'agriculture, en 2013, le Ministère de l'agriculture, avec la concurrence financière de la Banque Mondiale à travers le CPGU a adopté des normes de construction qui permettra de réduire substantiellement les dégâts sur les infrastructures, causés par les crues et les inondations et les pertes économiques engendrées comme la destruction des récoltes, l'indisponibilité des terres agricoles ou les dépenses occasionnées par les reconstructions.

Il s'agit du décret 2013-070 du premier mars 2013 concernant le « NIHYCRI » ou Normes de construction des Infrastructures Hydro-agricoles contre les Crues et les Inondations. Cette normalisation des infrastructures hydroagricoles vise à accroître la résistance et la durabilité des ouvrages face aux cataclysmes naturels et surtout en aux inondations. Et celle-ci sera instaurée d'une part afin de réduire les coûts de réparation des dégâts cycloniques, et d'autre part afin de permettre à la population de produire davantage continuellement.

Il fixe les règles de construction destinées aux travaux de construction d'infrastructures hydro-agricoles dans le cadre d'aménagement nouveau, de travaux d'extension sur des périmètres déjà aménagés ou des travaux de réhabilitation pour les rendre résistants aux effets des crues et des inondations.

Le NIHYCRI vient d'être mis en vigueur. Sa mise en application demande encore plusieurs étapes à parcourir avant qu'il devienne un habituel outil de travail au niveau des responsables concernés qui œuvrent dans le domaine de l'aménagement hydroagricole. Un grand pas a été lancé mais il reste encore beaucoup à faire.

Notons qu'avec la mise en application du NIHYCRI, le pays pourra économiser sur les dépenses destinées aux travaux de réhabilitation post-crues ou post-inondation. Il faut seulement noter que la mise en œuvre de ces normes a un surcoût de 10 à 15% par rapport

aux constructions et travaux habituels. Les économies dégagées des impacts de la mise en œuvre des nouvelles normes pourraient aider le pays à étendre les superficies irriguées.

La prévention via la mise en œuvre de normes comme celles pour les infrastructures hydro agricoles est indispensable dans le cadre du changement climatique. Si auparavant, un barrage devrait durer 100 ans, il n'en est plus ainsi à l'heure actuelle à cause de la dégradation de l'environnement et du changement climatique incluant l'intensification des cyclones, les inondations et crues fréquentes, etc. La mise en application des nouvelles normes devrait aussi permettre de dégager des économies pour l'entretien des infrastructures. A Madagascar, le manque de maintenance des infrastructures publiques (barrages agricoles, écoles, centres de santé, etc.) coûte 2% du PIB (ou 198 millions US$ par an) d'après les données de la Banque mondiale.

3.5 Comment les catastrophes transfrontalières sont elles gérées ?

Madagascar étant une île, ce problème ne le concerne pas.

PARTIE IV :
ECOSYSTEMES LIES A L'EAU

Les principaux écosystèmes liés à l'eau sont constitués par les zones humides d'eau douce (eaux continentales) et les eaux souterraines.

4.1 Les eaux continentales

Les eaux continentales sont subdivisées en deux grandes catégories de milieux :

- Milieux d'eau courante ou lotiques constitués par les rivières, ruisseaux et fleuves d'une longueur totale d'environ 3000 km dont le réseau hydrographique est subdivisé en cinq grands bassins fluviaux.
- Milieux d'eau stagnante ou lentiques constitués par les lacs, étangs, marais et marécages.

  - Les lacs continentaux et littoraux, naturels et artificiels, couvrent une superficie totale d'environ 2000 km2. 1300 lacs, y compris les lagunes sont recensés jusqu'à maintenant.

  Les lacs continentaux sont constitués par les lacs tectoniques (Lac Alaotra,…) ; les lacs volcaniques (petit lac et grand lac dans les Montagnes d'Ambre,…) ; les lacs de plaines caractérisés par leur faible profondeur et se rencontrent dans les zones où le drainage est mal assuré (Bemamba, Bemarivo,…) ; les lacs de barrages artificiels (Tsiazompaniry, Mantasoa,…)

  Les lacs littoraux dont principalement le Canal des Pangalanes dans la partie orientale sur une longueur de 600 km environ.

  - Les marais d'eau douce et marécages, peu profonds, souvent associés aux inondations fréquentes ou à l'accumulation plus ou moins permanente de masses d'eau provenant de nappes phréatiques, de sources, de ruisseaux et d'eau de ruissellement.

4.2 Les eaux souterraines

Madagascar dispose une potentielle importante de ressources en eau souterraine.

Selon la classification des zones hydrogéologiques de la BDEA (Basse de Données du secteur Eau et Assainissement), Madagascar contient huit zones hydrogéologiques, qui ont été délimitées en fonction de leurs pluviométries et leurs géologies. Chaque zone

comprend aux moins cinq types d'unité hydrogéologique jusqu'à onces pour le cas du bassin sédimentaire de Morondava.

Concernant leur situation, certaines zones humides (lacs, marais) sont menacées par les activités économiques : aménagement agricole engendrant une diminution de leur superficie et altération de la qualité de l'eau (pollutions chimiques et biologiques) (site Torotorofotsy,…) ; la déforestation et la culture sur brulis sur les versants favorisant l'érosion sont les causes de l'ensablement des lacs et la pollution tellurique des eaux (lac Alaotra,…) et le changement de lit des rivières ; le changement climatique dû entre autres à la déforestation est l'une des causes du tarissement de certains rivières et fleuves.

Parmi les mesures prises :

- Mise en œuvre de la convention RAMSAR (7 zones humides sont classés sites RAMSAR)
- Restauration forestière (cas du corridor FandrianaMarolambo : rivière Nosivolo,…)
- Sensibilisation et éducation pour la protection de l'environnement,
- Création des projets AGR dans les sites protégés,
- Mise en place des COBA (Communautés de Base) au niveau de la population aux alentours des sites protégés,
- Projets d'adaptation aux effets du changement climatique
- Conception des comptes de stocks et d'utilisation des ressources en eau dans le cadre de « waves » en vu de la mise en œuvre de la GIRE

Amélioration des basses de données du secteur eau afin d'enrichir les outils de décisions.

Elaboration du document stratégique et planification du secteur eau, assainissement et hygiène pour la période 2013-2018.

Sources : REEM 2012, site ASITY Madagascar,

PARTIE V :
ENVIRONNEMENT FAVORABLE A LA GESTION DURABLE ET PAISIBLE DES RESSOURCES EN EAU

En référence aux objectifs de l'OMD 2015, « assurer un environnement durable », la securité de l'eau est devenue un caractère prioritaire au niveau des engagements nationaux.

Et aussi à partir du Titre II du « Code de l'Eau », la protection de l'Eau, que ce soit au niveau quantitative ou qualitative, est définit comme une loi nationale Malagasy à respecter.

De ce fait, des textes relatifs à la protection et à la mise en valeur des ressources en eau ainsi qu'à la lutte contre la pollution de l'Eau sont harmonisés et rentrent dans les grandes préoccupations actuelles du pays.

Telle est donc la prélude avant d'entrer dans la partie 6 du présent rapport, pour montrer que la sécurité de l'Eau tient une grande place dans les engagements faits par les décideurs du secteur ainsi que pour toute la population Malagasy.

5.1 Généralité

- Parce qu'élément vital de la Nation, l'eau est qualifiée de patrimoine commun national.
- Parce que denrée de plus en plus rare dans presque toutes les régions de Madagascar et particulièrement dans les régions du sud et de l'Ouest malgache qui souffrent cruellement de cette rareté, la ressource en eau est classée dans la catégorie juridique des « choses communes ». L'eau est prioritairement considérée comme bien du domaine public.

Se présentant sous formes d'eaux de surface et d'eaux souterraines, l'eau est indispensable à toutes activités humaines, et si elle est mal gérée, elle réduit de façon vitale le potentiel utilisable et indispensable à la survie de l'espèce non seulement humaine mais aussi animale et végétale. L'eau nécessite ainsi une politique de conservation, d'amélioration, d'utilisation durable, de protection et de gestion rationnelle, liée à la nature de ses ressources.

Parmi les principes qui sous-tendent ces actions pour la mise en valeur, la protection et la gestion de la ressource en eau, on peut relever :

- le renforcement des mesures de protection des eaux, spécialement en matière d'alimentation en eau potable ;
- la libéralisation du secteur Eau ;
- le principe de non gratuité de l'eau ;
- la nécéssité du transfert de gérance des infrastructures aux collectivités concernées ;
- la responsabilisation des communautés tant rurales qu'urbaines et périurbaines ;
- la régulation du service de l'Approvisionnement en Eau et de l'Assainissement;
- le renforcement de la lutte contre la pollution des eaux ;
- l'articulation des règles de protection et de mise en valeur de la ressource en eau avec les normes environnementales ;
- le principe de pollueur payeur.

5.2 Politique et loi sur l'eau

Madagascar est doté de ressources en eaux satisfaisantes et suffisantes mais jusqu'à présent le système de gestion n'est pas rationnelle ni planifiée.

D'une part, le Développement Rapide et Durable est inscrit dans la Politique Générale de l'Etat (P.G.E) et Madagascar adhère aux Objectifs du Millénaire pour le Développement (O.M.D.), d'autre part, les besoins en eau sont toujours croissants pour toutes les secteurs d'activités économiques et sociales et ceci face à la non-maîtrise de la pollution, le changement climatique incontournable et la diminution de la quantité disponible en eau douce. Peu d'actions ont été menées pour atténuer la dégradation alarmante des bassins versants et de l'environnement. Face à tout cela, le développement de la Gestion Intégrée des Ressources en Eau est plus que nécessaire.

Pour faire face à la demande en croissance exponentielle et de la dégradation des bassins versants, l'utilisation rationnelle des ressources en eau devrait également garantir une répartition équitable tout en assurant la préservation de ces ressources pour les générations futures.

5.3 Application du Concept de la Gestion Intégrée des Ressources en Eau à Madagascar

L'Etat malagasy, en application des dispositions de la Loi n° 98-029 du 20 janvier 1999 portant Code de l'Eau, a créé l'Autorité Nationale de l'Eau et de l'Assainissement

(ANDEA), un organisme indépendant non lié aux utilisateurs et favorisant l'approche participative pour mettre en œuvre le processus de Gestion Intégrée des Ressources en Eaux.

L'ANDEA est un organisme rattaché à la Primature mais délégué par décret au Ministère de l'Eau et ayant le statut d'un « Etablissement Public à caractère Administratif (EPA) » et dont les structures déconcentrées sont les Agences de Bassins et les Comités de Bassins.

Elle est le premier responsable de l'application du concept GIRE à Madagascar et rattachée au Ministère de l'Eau, en collaboration avec la Direction de la Gestion des Ressources en Eau de ce dernier. Elle a donc pour principales missions:

- La mise en œuvre de la Gestion Intégrée des Ressources en Eau (GIRE);
- Le recouvrement et la gestion du Fonds National pour les Ressources en Eau (FNRE).

La GIRE a été ainsi considérée comme un mode de gestion de l'eau accompli par l'ensemble des acteurs concernés, tendant à assurer un usage « optimal » de la ressource au sens social, économique et environnemental.

Les principales actions entreprises sont :

- L'élaboration du Schéma Directeur d'Aménagement et de Gestion Intégrée des Ressources en Eau (SDAGIRE) des 6 Grands Bassins de l'île ainsi que le Plan Hydraulique National;
- Le développement du Système Intégrée d'Information des ressources en eau;
- La mise en œuvre des SDAGIREs par le biais du Fond National pour les Ressources en Eau.

Le FNRE est alimenté, en grande partie par les redevances de prélèvements et de rejets d'eau.

Dans la mise en œuvre de la Gestion intégrée des Ressources en Eau, l'ANDEA a comme structure décentralisée :

- 6 Agences de Bassin;
- Des comités de Bassin.

Cadre de coopération :

L'ANDEA travaille en étroite collaboration avec les Départements ministériels concernés par les ressources en eau.

5.4 Système d'Information Intégrée (SII)

La mise en place du Système d'Information Intégrée du secteur de l'eau pour le Bassin de la Betsiboka, un des sous-bassins formant l'Agence de Bassin du Nord-Ouest a été réalisée. Le système sert à regrouper et à améliorer la connaissance dans le domaine afin de faciliter la gestion des ressources naturelles du bassin et aussi de constituer une base de données fiables qui servira d'outils de décision pour les hauts responsables du secteur de l'eau. Etant le premier système de ce type développé à Madagascar, on peut considérer qu'il servira de système pilote, pour être, par la suite étendu aux autres bassins versants du pays.

PARTIE VI :
RESUME DU PROGRAMME HYDROLOGIQUE INTERNATIONAL

Dans le cadre de la mise en œuvre du Programme Hydrologique International à Madagascar, un Comité National est créé suivant l'Arrêté interministériel N°36797/2013 du 30 Décembre 2013.

Il est rattaché conjointement aux Ministère de l'Education Nationale et du Ministère de l'Eau et composé des représentants des huit Ministères concernés dans le domaine de l'Eau ainsi que ceux des secteurs privés et sociétés civiles y œuvrant.

6.1 Activités réalisés au niveau du PHI

- *Avant la création du Comité National* : avant décembre 2013, le point focal ainsi que la Représentante de Madagascar au sein du Conseil Intergouvernemental ont assurés la mise en oeuvre des activités du PHI dont :
  - La création du Comité National PHI, en collaboration avec les futurs membres: préparation de l'Arrêté Interministériel ;
  - Les transferts des informations à tous les concernés telles que rapports de réunion, participation de Madagascar à la mise en œuvre du PHI, appels à des réunions et conférences ;
  - La préparation des documents participatifs de Madagascar à présenter par les délégations de Madagascar à des conférences et réunions y afférentes ;
  - La communication avec le secrétariat du PHI, le repermad au siège de l'UNESCO et la Commission Nationale Malagasy pour l'UNESCO ;
  - La préparation de la participation à la 20ème session du Conseil Intergouvernemental.

- *Après la création du Comité National* : à partir de la signature de l'Arrêté portant création du Comité, toujours dirigé par le Point Focal, les activités réalisées sont :
  - La réunion des membres pour la préparation du 5ème rapport national du PHI sous le thème « Sécurité de l'Eau » avec la participation de tous les membres du Comité ;

- La préparation du Programme de travail biannuel 2014-2015 ;
- La préparation à la participation au 5ème Réunion des comités Nationaux PHI en Afrique ;
- La préparation de la participation à la 21ème session du Conseil Intergouvernemental du PHI.

6.2 Axes prioritaires d'intervention du PHI au niveau national et régional pour les deux prochaines années

Il a été convenu lors de la dernière Assemblée Générale des membres du Comité National que les axes prioritaires seront issus du programme de la huitième phase du PHI (2014-2021). Après collectes des priorités de tous les concernés, les axes prioritaires ainsi que les activités nationales à entreprendre sont annexées au présent rapport.

CONCLUSION

Malgré l'inexistence de budget alloué à la mise en œuvre du Programme Hydrologique International par Ministère des Finances et du Budget de Madagascar, les membres du Comité National s'efforcent toujours de réaliser toutes les activités relatives à ce programme au moyen de plaidoiries auprès des partenaires techniques et financiers oeuvrant dans le domaine de l'hydrologie.

Il est à noter que la population Malagasy est consciente de la vitalité des ressources en eau et en particulier, l'Etat reconnait la valeur de la Sécurité de l'Eau.

Le Comité fait donc appel aux bailleurs nationaux, régionaux et internationaux afin que ce programme tienne une valeur importante dans leur domaine d'activité.

United Nations
Educational, Scientific and
Cultural Organization

MALAYSIA
COUNTRY REPORT

of the

NATIONAL COMMITTEE FOR
MALAYSIA INTERNATIONAL HYDROLOGICAL PROGRAMME

21st SESSION OF IHP INTERGOVERNMENTAL COUNCIL MEETING
UNESCO, PARIS

[ACTIVITIES UNDERTAKEN FOR THE PERIOD OF JUNE 2012 – MAY 2014]

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

Name of the Centre		UNESCO - International Hydrological Programmes Malaysia
Name of Chairman		Datuk Ir. Hj. Ahmad Husaini Sulaiman
Name and title of contact person (for cooperation)		Mr. Muhammad Al-Muzammil Chu Ahmad
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 : Kuala Lumpur country : Malaysia
Geographic orientation *		global regional
Year of establishment		1975
Themes	**Focal Areas ♦**	☒ groundwater ☒ urban water ☒ arid / semi-arid zones ☒ humid tropics ☒ droughts and floods ☒ sediment transport and management ☒ water and environment ☒ ecohydrology ☒ water law and policy ☒ transboundary river basins/ aquifers ☒ IWRM ☒ global and climate change ☒ mathematical modelling ☒ social and cultural dimensions of water ☒ water education ☒ other: stormwater management, ☒ water hazard.
	Scope of Activities ♦	☐ vocational training ☐ postgraduate education ☐ continuing education ☒ research ☒ institutional capacity-building ☐ advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies 1		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	☒ director and governing board ☐ other: Frequency of meetings: twice every year(s) ☐ 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 JUNE 2010 – MAY 2012

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, Secretaries, Vice Secretary, 8 Executive Committees and 3 Working Committees from various research institutes, universities and sectorial-departments. These programme EXCO consist of 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), of Mineral and Geoscience Department Malaysia (MGD), Malaysian Nuclear Agency (Nuclear Malaysia).

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

i. Retuning the programme within the new path of IHP Programme Phase VII
ii. Obtaining better participation from key stakeholders.

The present composition of the National Committee:

Chairman : H.E Datuk Ir Hj Ahmad Husaini Sulaiman
Secretary : Dato Ir. Hj Hanapi Mohamad Noor
Vice Secretary: Mr. Muhammad Al-Muzammil Chu Ahmad

EXCO Members:

1. Dato' Nordin Hamdan
   - Department of Irrigation and Drainage Malaysia
2. Mr. Asmawar Samad
   - 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

The committee holds bi-monthly coordination meetings and in additional several technical meetings as needed for the planning and implementation of seminars and workshops organized under coordination of the committee. The committee routine meetings is attended by the Chairman of the 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 2012 -2014

- 28 Aug 2012 in Kuala Lumpur
- 4 July 2013 in Kuala Lumpur
- 25 April 2014 in Kuala Lumpur

ANNUAL GENERAL MEETING

The 39th AGM was held on 23 Jun 2010. Since then the AGM has been replaced with the bi-annual meeting (namely EXCO 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 Technology Malaysia (UTM)
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 Office
UNESCO-IHP Malaysia
Water Resources Management and Hydrology
Department of Irrigation and Drainage Malaysia
KM 7 Jalan Ampang
68000 Ampang
Kuala Lumpur, MALAYSIA

E-mail : ihp@water.gov.my
Tel : +603 4289 5545
Fax : +603 4256 2645

1.1.2 Status of IHP-VII activities

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

each group were delivered for the knowledge and use by other members and for related IHP-VII activities.

1. A series of workshops on Review of the National Water Resources Study (2000-2050) and Formulation of National Water Resources Policy was held starting February 2010: This is a contribution for IHP VII Theme 2: Integrated Watershed and Aquifer Dynamics.

2. A program of Public Discourse has been successfully carried out in conjunction with the World Water Day 2014 theme: Water and Energy. This program discusses the relationship and the importance of water resources in generating energy for daily life.

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 have 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.

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 Traning for Government Officials :
  - Training Course On Developing The Capacity Of Government Officers For The Practical Implementation Of Integrated Water Resources Management In Malaysia | 2-3 Nov 2010, National University Malaysia
  - Training Course On Developing The Capacity Of Government Officers For The Practical Implementation Of Integrated Water Resources Management In Malaysia | 1-2 Dec 2010, Labuan, Sabah
- Malaysia IHP Strategic Planning Meetings (yearly)

1.2.2 Participation in IHP Steering Committees/Working Groups

- 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).

1.2.3 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

2011-2012

- Malaysia UNESCO Cooperative Programme (MUCP)
- Monitoring Of MSMA Eco-Hydrology At HTCKL
- Upscaling Of MSMA Eco-Hydrology At Catchment Level (Sg. Langat)
- Impact on Reservoir Sediment & Water Quality at Sembrong Dam & Study on Agricultural Non
- Erosion Risk Categorization Potential at Sg. Langat
- Monitoring Rainwater Harvesting Effectiveness in Pulau Perhentian
- Remediation of Pollution From Large Point Sources for Sg. Hiliran – MUWAREC

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 Institut Teknologi Malaysia
- National Oceanography Directives
- Putrajaya Corporation
- University of Technology Malaysia

1.2.5 Other initiatives

None

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

- Malaysia IHP Technical Talks (3 sessions in 2010, 12 sessions in 2011, 12 sessions in 2012). The talks will cover topics on

hydrology, water resources, meteorology, agriculture, civil & structures etc.

- International Conference on Water Resource (ICWR) | 5-9 Nov 2012 , Langkawi Kedah, Malaysia
- 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.

1.3.2 Organization of specific courses

- National Water Watch Programme for Young Leaders (4 sessions yearly for each zone - north, south, east and Borneo)
- Short Course on Water Resources Management from 20-22 May 2014 in Kota Bharu, Malaysia.

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

2013

Mrs. Vasukey Palani
Short course on Ecohydrology In River Basin Management from 2-14 Dec 2013 at Kyoto University, Japan.

2012
Mr. Mohamad Radzi Abdul Talib
Training on Disaster Risk Management Technology on Volcanic Eruption, Debris Flow and Landslide
3 Jun - 23 Nov 2012
Japan
JICA

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.

1.5 Publications

- Monthly Updates of IHP activities

- 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

1.6.1 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.

1.6.2 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

1.7.1 Institutional relations/cooperation

- 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

1.7.2 Completed and ongoing scientific projects

Please refer 1.2.3

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

- National Water Watch Programme For Young Leaders
- IHP Technical Talks (yearly)
- 13th IAHR/IWA International Conference on Urban Drainage (ICUD) 2014
- Workshop for ASEAN IWRM Country Strategy Guideline
- Position Paper by IHP Malaysia on Water-Energy Nexus in conjunction with World Water Day 2014.
- Legislation for Malaysia National Standard for National Guidelines of Quality Assurance for Hydrological Management
- Preparing Guidelines of Quality Inspection for Hydrology Management
- Preparing Guidelines of hydrology data validation
- Preparing Guidelines of Water Balance Condition.
- Participation in IHP-RSC Meeting, Asian Pacific FRIEND and Catalogue of Rivers
- Participation in Training course in 2012 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)
- International Water Resource Conference | 5-9 Nov 2012, Langkawi Kedah

2.2 Activities foreseen for 2015-2016

- 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
- The On Job Training (OJT) IHP Training Course: "The Tank Model"
- Implementation of projects related to IHP-VIII.
- Implementation of Malaysia-UNESCO Cooperative Programme funding by Government of Malaysia for South-South Country and Small Island.
- Collaboration with UNESCO-IOC activities.
- The 3rd International Conference on Water Resource in 2014

2.3 Activities envisaged in the long term

- 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
- Malaysia National committee for IHP will promote activities to public coordinate participations at national level to augment people's

awareness through, educations and trainings on hazards caused by global warming, as well as hazards caused by geological events, These include sea level rise, flood and drought hazard, debris control, tsunamis, water and food security, and access to save water. Area of priorities is mega cities, and coastal areas.

- Participation in IHP-VIII projects and RSC activities.
- Nagoya University IHP Training Courses.
- Information dissemination through a web page of the National Committee.
- Participation in IHP-RSC activities and IHP InterGovernmental 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.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

SUBMITTED BY

THE NIGERIA NATIONAL COMMITTEE FOR UNESCO-IHP (JUNE 2012 – MAY 2014)

NATIONAL REPORT ON IHP RELATED ACTIVITIES SUBMITTED BY THE NIGERIA NATIONAL COMMITTEE FOR UNESCO-IHP (JUNE 2012 – MAY 2014)

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

The Nigeria National Committee for UNESCO – IHP, was inaugurated since 1988 and was constituted as a body representing the Hydrological Community in Nigeria, which actively participates in the implementation of IHP programmes and projects in Nigeria. The Nigeria National Committee for UNESCO – IHP is a multidisciplinary body, comprising of different relevant professionals nominated by their Water related Ministries, Departments and Agencies (MDAs) involved in UNESCO hydrological programs/ activities, along with other renowned experts from the academia and the private sector of the water industry in the country.

In the period under review June 2012 – May 2014, the Nigeria National Committee for UNESCO-IHP (NNC-UNESCO-IHP) has been able to undertake a number of activities within and outside the country in order to move the Committee and the Nation forward and in line with the UNESCO hydrological Programs. The Nigeria National Committee and focal point for the UNESCO - IHP resolved at one of its annual meetings in 2012 to meet twice a year. However, paucity of fund has adversely affected regular meetings reducing it to once yearly instead. This development has affected the functionality of the Committee. It is hoped that the situation will improve for more regular meetings.

1.1.1 Decision regarding the composition of the IHP National Committee

The National Committee consists of the Executive Members and sub-committees, constituted to address specific issues of the hydrological programs.

The Executive Members include (i) President (ii) Two (2) Vice Presidents (iii) Secretary (iv) Assistant Secretary (v) Ex – official member.

The Sub – Committees consist of the following:

(i) Ad – hoc Technical Sub – Committee.
(ii) Standing technical Sub – Committee
(iii) Communication and Information Sub – Committee
(iv) Working Group on joint annual conference of the Nigeria Association of Hydrological Sciences (NAHS)
(v) Ad – hoc Sub – Committee on United Nations Decade on Education for Sustainable Development (2005 – 2014) as relevant to Water Resources
(vi) Working Group on Data Collection/ Water Resources Assessment

Some other pertinent matters regarding the composition of the National Committee and sundry issues include ;

-The resolution that Chairmen of the standing sub-committees would be considered as members of a larger Executive Committee.
- Two years tenure of the EXCO with individuals (except Secretary and Assistant Secretary) the National Committee who are with the Nigeria Hydrological Services Agency (NIHSA) which is the Secretariat of the NCC.
- The Director General of NIHSA will serve as the Secretary and will appoint an Assistant Secretary.
- Funding Budget for administrative, Secretarial and relevant projects to be provided by NIHSA /UNESCO .
-NNC-IHP could package programmes based on areas of interest and aligning with any of the six themes of the Eighth phase of the UNESCO-IHP. To encourage a wider membership of the NNC-IHP, relevant MDA_s/$Organisation_s$ should be invited to nominate institutional representatives, if not already represented.

1.2.2 Status of IHP – VII Activities (including IHP – VIII activities)

The IHP – VII activities attracted many technical proposals which were submitted for critical appraisal and short listing to attract UNESCO's support for possible implementation. However, because of the infrequent meetings during the period, the committee could not meet early to conclude on shortlisted proposals, leading to late submission.

The IHP – VIII has been studied by the sub-committee constituted by the larger National Committee with the recommendation that the specific areas of interest identified in the activities of the eighth phase, be also apportioned institutional drivers for effective implementation. Actually, the six major thematic areas bear much relevance to the national interest and the transformation agenda of the Federal Government of Nigeria. Drivers for each of the selected areas of interest were appointed and are presently strategizing especially on some relevant programmes/projects at both the national and regional levels e.g. Global Inventory on Trans-boundary Aquifer Systems in the country, Diagnostic Study of the Iullemeden-Taoudeni/Tanazrouft Aquifer System and river Niger etc.

1.2 Activities at national level in the framework of the IHP

The National Committee has been involved in some activities at the national level in the framework of the IHP.

- Meetings of the National Committee Members in the years 2012 and 2013 were held where salient issues were deliberated upon and resolutions made to ensure the progress of its activities. At the meetings relevant technical reports were presented and effectively discussed.
- Meeting was held between the Executive Members of the National Committee and the Honourable Minister of Water Resources for the purpose of intimating the Hon. Minister on the scientific and technical relevance of the Committee's activities to

the nation and the need for better collaboration and support to promote effective implementation of its hydrological programmes.

- Meeting of the Executive Member of the National Committee was held to consider urgent and pressing technical issues for the enhancement of the technical performance and delivery of/by the larger National Committee through its activities.
- Involvement/Participation in the activities of the newly established Category 2 Regional Centre (on Integrated River Basin Management) such as in the formulation of training modules for the centre, inauguration of the Governing Board etc.

1.2.1 National/local scientific and technical meetings

a). 3rd and 4th National Water Conference

This is a forum of water sector stakeholders that is organised annually in Nigeria by the National water Resources Institute (NWRI), Kaduna. The aim of the conference is to share knowledge and experiences on water resources issues in Nigeria. The 3rd Water Conference, with the theme "Water and Food Security: Call for Solution" was held in 2012 at Ilorin, Nigeria. The 4th conference was held in Calabar, Nigeria from 22nd to 24th October, 2013 and had as its theme "Water Cooperation: Building Partnerships for Sustainable Development"

b). Strengthening of IHP and MAB Committees in Nigeria

UNESCO Office, Abuja in collaboration with the Regional Centre for Integrated River Basin Management (RC-IRBM) held a Workshop in Kaduna, Nigeria on "Strengthening the UNESCO-IHP and MAB National Committees for effective water governance, biosphere reservation management and biodiversity conservation on 25th -26th of March, 2013.

c). Global Micro-science Experimental KITS Demonstration Workshop

RC-IRBM provided a Resource Person at the UNESCO Micro-Science Demonstration & Global Water Experiments hosted by University of Nigeria, Nsukka, Nigeria on 17th – 21st June, 2013

1.2.2 Participation in IHP Steering Committees/Working Groups

Members of constituted and existing Steering Committees/Working Groups on specific areas of concern to the National Committee and the nation have been meeting

(though not as frequently as expected because of some constraints) to strategize and map out ways of achieving desired results.

1.2.3 Research/applied projects supported or sponsored

a). Skills and Training Needs Assessment of Water Sector in Nigeria:

The National Water Resources Institute (NWRI) as one of NEPAD's Water Centres of Excellence in West Africa was assigned to carry out a study aimed at identifying skills and training needs in the Nigerian water sector. The project was part of NEPAD West African Water Centres of Excellence collaboration with European Union (Task JLP1.1 and JLP1.2). Report on the findings was submitted to EU (January 2013).

b). Design of Irrigation Schemes in Ekiti State

The Ekiti State Government in collaboration with the United Nations Development Programme (UNDP) and Food and Agricultural Organisation of the United Nations (FAO) requested the services of the National Water Resources Institute to provide technical expertise and advice to undertake feasibility studies and detailed design of irrigation schemes using two existing dams in the State, Ero and Itapaji dams in order to enhance agricultural production, income and food security. The activities had been completed and reports submitted to the State Government, UNDP and FAO for implementation (August, 2013).

c). Water Quality Assessments

In pursuance of its mandate, the NWRI has carried out assessments of drinking water quality in some states in Nigeria between 2012 and 2013. These include Federal Capital Territory (FCT) Abuja and Nasarawa state in 2012 while Osun, Anambra and Kebbi states in 2013. The aim of the assessments was to determine the quality of drinking water sources (Hand dug wells, boreholes and pipe borne supplies) due to public concern over the safety of the sources. The parameters considered for the assessments include faecal coliform, pH, hardness, turbidity, chloride, total solids, nitrate, arsenic, chromium, lead, cadmium, mercury, iron, manganese, and fluoride.

d). Design and Construction of Manual and Mini-powered Drilling Rigs

Manual and min-powered rigs were designed, fabricated and tested by the NWRI. The rigs are capable of drilling up to a depth of 40 and 60m respectively and were commissioned by the Honourable Minister of Water Resources in 2013.

e).Trans-boundary Aquifer Systems in Nigeria

The National Committee through the Nigeria Hydrological Services Agency (NIHSA), a Parastatal of the Federal Ministry of Water Resources (which also serves as the Secretariat of the National Committee), has embarked on a systematic study of the trans-boundary aquifers (i.e Iullumeden aquifer system, Chad Basin Aquifer System, keta Basin Aquifer System, Benue Trough Aquifer System, Rio Del Ray Aquifer System). This programme is supported by UNESCO under the ISARM project.

The National Committee has already forwarded the name of its national expert to UNESCO for the project on the Global Inventory on Trans-boundary/Regional Aquifers.

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

a). African Water Resources Capacity Building (AWaCab) Programme

The Regional Centre for Integrated River Basin Management (RC-IRBM) was commissioned by UNESCO Office in Nairobi, Kenya to execute the AWaCaB programme on its behalf. A total of 10 countries in Africa (2 from each sub-region) were selected for the programme. The programme has a regional component and a national component. The countries include Nigeria and Guinea Conakry (West Africa), Kenya and Tanzania (East Africa), Namibia and Zimbabwe (South Africa), Sudan and Tunisia (North Africa) and Democratic Republic of Congo and Chad (Central Africa). The first phase of the programme has been completed in 2013 and the RC-IRBM is looking forward to the second phase to begin in 2014.

b). Enhancing the Function of Rural Water Supply and Sanitation Centre for Capacity Development in National Water Resources Institute

The NWRI, Kaduna has established the Rural Water Supply and Sanitation Centre (RWSSC). The RWSSC is collaborating with JICA under the project "Enhancing the Function of Rural Water Supply and Sanitation Centre for Capacity Development in National Water Resources Institute". The project is supported by Japan International Cooperation Agency (JICA) in collaboration

with the National Water Resources Institute (NWRI), Kaduna. The project lasted for 45 months beginning 2010 and ending in 2014. Several training courses were developed under the project aimed at enhancing the capacity of stakeholders in the rural water supply and sanitation sub-sector in Nigeria.

c). Other Collaboration with National Organizations

It is interesting to note that all the water related organizations in the country are collaborating better than before, the devastating flood of 2012 which ravaged the nation and causing the death of over 400 people, displacing over 2 million people, and destroying many infrastructures, farmlands, etc. (all amounting to a total loss of N2.29 trillion according to the National Emergency Management Authority). These organizations include the Nigeria Meteorological Agency (NIMET); Nigeria Hydrological Services Agency (NIHSA), Nigeria Emergency Management Authority (NEMA), National Inland Waterways Authority (NIWA),National Water Resources Institute (NWRI), River Basin Development Authorities (RBDAs), etc.

During the maiden edition of National Annual Flood Outlook for the nation in 2013, NIHSA collaborated with NIMET by obtaining rainfall data which were used along with its hydrological data from its stations for rainfall/runoff modelling to arrive at the forecast for the year. The other relevant national establishments were also involved in the sensitization of the populace on potential flood risk disasters in the country to enhance preparedness and mitigation. These sister agencies are NIHSA, NIMET, NEMA, etc.

d). Other Collaboration with International Organizations

The National Committee, through the technical activities of the secretariat (Nigeria Hydrological Services Agency) collaborate with other international organizations on the implementation of hydrological programmes/projects. These include World Bank, JICA, WMO, UNICEF, EU, UNESCO, AU, AFDB, etc.

1.2.5 Other Initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

a). Junior Water Prize Competition in Nigeria

Junior Water Price organized to impact early water education in young scientists in high schools 2012 -2 013.

1.3.2 Organization of specific courses

a). Training of Trainers: The Niger Basin Authority (NBA) with support from the Canadian Development Agency (GDA) and the international Water Association (IWA) and the Secretariat/Focal Point for the UNESCO-IHP (Nigeria Hydrological Services Agency) organised a training programme to develop alternative network to regularly monitor water quality driven by users of the Niger Basin. The training course dealt on the use of the water kit including regents to ascertain/analyze the different water parameters. These include PH, Turbidity, Temperature, etc (This took place in December, 2013).

b). Organization of Specific Courses by Rural Water Supply and Sanitation Centre (RWSSC) in collaboration with JICA for capacity building

The RWSSC of NWRI under the JICA Project has developed specific courses and conducted a series of trainings nationwide aimed at enhancing the capacity of stakeholders in the rural water supply and sanitation sub-sector in Nigeria. The courses include Groundwater Investigation, Borehole Construction and Management, Drilling Technology, Drilling Machinery Maintenance Technique, Hand Pump Installation and Maintenance, Borehole Rehabilitation and Maintenance, Alternative Water Supply Sources (Hand Dug well Construction, Spring Development and Rain Water Harvesting), Sanitation and Hygiene and Community Mobilization and Sensitization. The courses were conducted between 2011 and 2014.

c). Capacity Building Training Workshop

In February, 2014 the training workshop was organised for staff of the Agency and staff of other establishments that have their activities on hydro-meteorological and on water resources management/development in the Country. The training involved the use of four different types of software namely;

- WEPP (Water Erosion Prediction Project) model;
- SWAT (Soil and Water Assessment Tool) interfaced with GIS;
- HEC-HMS (Hydrologic Engineering Centre-Hydrologic Modelling System and
- AnnGNPS (Annualised Agricultural Non-Point Source Pollution) for hydrologic catchments modelling.

1.3.3 Participation in IHP courses

a). IFAT Trade Fair on Water and Wastewater Workshop

NWRI was represented at IFAT Trade Fair on Water and Wastewater Workshop held in Munich, Germany in May, 2014 to showcase its manual and mini-powered rigs design and developed in the Institute.

b). Ecohydrology and Economic Sociology Training Programmes in Poland

Two (2) staff of NWRI have undergone a 6-month study fellowships under the auspices of UNESCO/Polish co-sponsored Fellowship Programme in Eco-hydrology and Economic Sociology in 2012 and 2013 respectively.

The fellowships were domiciled in Category 2 European Regional Centre for Ecohydrology in Lodz, Poland and the AGH University of Science and Technology, Krakow, Poland respectively. More of such Fellowships are still being explored not only in Poland but also the rest part of the UNESCO Water Family.

c). Geo-UNESCO Joint Workshop on Earth Observations and Capacity Development for Integrated Water Resources Management (IWRM)

Two (2) of NWRI staff attended the workshop on Earth Observations and Capacity Development for IWRM at River Basins in Africa held in Nairobi, Kenya between 12th and 16th January, 2012.

d). Training of Trainers Course on Integrated Urban Flood Management

As a follow up to the workshop on Earth Observations and Capacity Development for IWRM at River Basins in Africa, NWRI was represented at the Training of Trainers on Integrated Urban Flood Management jointly organised by UNESCAP and CAP-NET on 5th – 9th March, 2012 at UN Headquarters in Bangkok, Thailand.

e). Regional Consultative Workshop on Groundwater Governance and Global Groundwater Monitoring Network Workshop

RC-IRBM was represented at the Regional Consultative Workshop on Groundwater Governance and Global Groundwater Monitoring Network Workshop held in Nairobi, Kenya on 29th -31st May and 1st-2nd June, 2012 respectively.

f). Steering Committee Meeting of Integrated Water Resources Management (IWRM) Guidelines at River Basin Level

The NWRI Executive Director on behalf of RC-IRBM attended the Steering Committee Meeting of Integrated Water Resources Management (IWRM) Guidelines at River Basin Level in Jakarta, Indonesia on 19th-20th March 2013.

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

a). Memorandum of Understanding (MoU) with Jaroslav Cerni Institute (JCI)

The RC-IRBM signed Memorandum of Understanding (MoU) with Jaroslav Cerni Institute (JCI), Belgrade, Serbia on the study of a typical river basin management plan in Nigeria designating the Gurara River Basin in North-central Nigeria as a HELP Basin. Another MoU was signed with the UNESCO Chair on Remote Sensing and Geographic Information Systems in Capital Normal University, China. The National Council on Water Resources (NCWR) in November, 2012 endorsed the classification of Gurara River Basin as UNESCO HELP Basin. This has been endorsed by the National Council on Water Resources (NCWR).

Conference on "Contemporary Issues of Adaptive Water Management" which aims to introduce the new UNESCO Category 2 Centre: "Water for Sustainable Development and Adaptation to Climate Change" at the invitation of Jaroslav Cerni Institute (JCI) on 31st of October, 2012.

b). International Symposium on Ecohydrology, Biotechnology and Engineering

RC-IRBM was represented at the UNESCO-organized International Symposium on Ecohydrology, Biotechnology and Engineering: Towards the harmony between Biogeosphere and Society on the basis of long, term Ecosystem Research hosted by Category 2 European Regional Centre for Ecohydrology in Lodz, Poland.

1.5 Publications

a). Water Education and Cooperation Initiatives at the National Water Resources Institute, Nigeria

Two (2) of NWRI officers presented an article with the title "Water Education and Cooperation Initiatives at the National Water Resources Institute, Nigeria" which was published under Water Education and Institutional Development (pages 144 – 147) in a UNESCO publication "Free Flow : Reaching Water Security through Cooperation" in 2013.

b). World Largest Rivers' Initiative

One of the staff of NWRI and a representative of the RC-IRBM actively participated and contributed to the development of the concept note for World´s Large Rivers Initiative WLRI Version 11.03.2014.

c). Publication of Hydrological Year Book

In 2012, the Nigeria Hydrological Services Agency (Secretariat of NNC-UNESCO-IHP) published the Hydrological Yearbook, Newsletters, Journals and Bulletins which provide scientific information that are also of relevance to the national implementation of the UNESCO water programmes under the IHP in Nigeria.

d). Publication of the 2013 Annual Flood Outlook for Nigeria

The Nigeria Hydrological Services Agency (Secretariat of NNC-UNESCO-IHP) produced the maiden edition of the Annual Flood Outlook in 2013. This is a tool designed to sensitize the Nigeria populace of likely flood scenarios in the country to enhance preparedness towards the use of preventive and mitigation measures thereby promoting socio-economic activities.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

i Hosting of the Director General of UNESCO during her working visit to Nigeria (10^{th} – 12^{th} September, 2013). It was also during this visit that there was the official opening of the Abuja UNESCO Regional Office on 12^{th} September 2013.

1.6.2 Participation in meetings abroad

a). 4^{th} Regional Meeting of the Sub-Sahara African National Committees

Active participation of the Nigeria's National Committee at the 4^{th} Regional Meeting of the National Committees of the Sub-Saharan Africa held in Dar Es Salaam Tanzania (June 2012).

b). UNESCO Strategic and High Level Meeting on Water Security and Cooperation

The RC-IRBM and NIHSA (Secretariat of NNC-UNSCO-IHP) were represented at the UNESCO Strategic and High Level Meeting on Water Security and Cooperation. The meeting took place in Nairobi, Kenya on 11-13 September, 2013. It was held within the framework of the International Year of Water Cooperation 2013. The meeting was organized by UNESCO's International Hydrological Programme, with kind support of the Government of Kenya and other sponsors.

c). Budapest Water Summit

RC-IRBM was represented at the Budapest Water Summit meeting from 8^{th} – 11^{th} October, 2013. The Budapest Water Summit was initiated at the United Nations Conference for sustainable Development by the Hungarian Government

with the principal objective to take stock of the various developments in preparing the water-related goal for the post 2015 development agenda.

d). 37th UNESCO General Conference

Participation of National Committee/Nigeria's delegation at the 37th UNESCO General Conference held in Paris, France (5th – 20th November, 2013)

e). Closing Ceremony of the 2013 International Year of Water Cooperation.

Participation of the Nigeria Delegation at the Closing Ceremony of the 2013 International Year of Water Cooperation held in Mexico City, United Mexican States (5th – 6th December 2013).

f). African Water Week

The RC-IRBM and NIHSA (Secretariat of NNC-UNESCO-IHP) were represented at the African Water Week held in Dakar, Senegal between 25th and 29th May, 2014. The theme of the Water Week was "Placing Water at the Heart of Post-2015 Agenda".

g). Launching of the International Year for Water Cooperation

The RC-IRBM represented at the official launching of the International Year of Water cooperation 2013 under the auspices of UNESCO, held in Paris, France on Monday 11, February 2013.

h). Hydro free Open-source software Platform of Experts (HOPE) Meeting

RC-IRBM was represented at the Launching and First Steering Committee Meeting of UNESCO's Hydro free and/or Open-source software Platform of Experts (HOPE) in Paris, France. RC-IRBM is a member of the Steering Committee.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

a). **Promotion of International Cooperation on freshwater, with Regional bodies** including planning joint activities within the scope of the Eight phase of the International Hydrological Programme (IHP VIII) e.g. **Niger Basin Authority Lake Chad Basin Commission, Iullemeden-Taoudeni/Tanazrouft Aquifer System, Nigeria Cameroon Commission, Nigeria Niger Commission, etc.**

b). New Partnership for African Development (NEPAD)

Coordinating Centre for NEPAD West Africa Network of Water Centres of Excellence in Nigeria

c). Global Water Partnership (GWP)

Steering Committee Member of Global Water Partnership (GWP) – Nigeria

d). Hydro free Open-source software Platform of Experts (HOPE)

Membership of the Steering Committee of Hydro Open-Source Platform for Experts

e). Coastal Aquifer Resources Management

Regional UNESCO-IHP project for the joint management of shared West African Coastal Aquifer Resources

f). Application of Isotope in Water Resources Assessment

Application of Isotope Hydrology Techniques in contemporary Water Resources Assessment, Development and Management in Nigeria, under the auspices of the International Atomic Enger Agency (IAEA) and the UNESCO-IHP as part of the establishment of the Joint International Isotopes in Hydrology Programme (JIIHP) between UNESCO and IAEA.

2.0 FUTURE ACTIVITIES

2.1 Activities planned until December, 2014

2.2 Activities foreseen for 2015 – 2016

a). Participation in the 9th Session of UNESCO-IHP National Committee Meeting; and

b). NATCOM-UNESCO Experts Consultation on the UNESCO Draft Medium-Term Strategy 37C/4 for 2012-2014 and Draft Programme & Budget 37C/5 for 2014-2017 on National Sciences Sector MP II

c). Signing of Memorandum of Understanding on the 2nd phase of the project, “Managing Hydrological Risk in the Iullemeden, Taoudeni/Tanezrouft Aquifer System”.

d). More national contribution toward the Global Inventory on the Trans-boundary Aquifer Systems in the country.

e). Further work on the Assessment of the Coastal Aquifers in the Country.

2.3 Activities envisaged in the long term

Progress Report on Oman National Committee for IHP Related Activities
June 2012 to May 2014

1. Decision regarding the reformulation of Oman IHP National Committee:

Oman National Committee for IHP has initiated in 1997 by a Ministerial decision No. (257/97) from the Ministry of Water Resources and has been reissued in 2005 by a Ministerial decision No. (224/2005) from the Ministry of Regional Municipalities, Environment and Water Resources after merging of the two Ministries. The Committee, on 2011 re-issued by a Ministerial decision (331/2010) from the Ministry of Regional Municipalities and Water Resources. Oman National Committee has representatives from the Ministry of Health (MOH), Ministry of Housing (MOH), Ministry of Agriculture and Fishers (MOAF), Ministry of Environment and Climatological Affairs (MECA), Scientific Research Council, Office of Dhofar Governorate, Muscat Municipalities, Oman Commerce and Industrial Chamber, Sultan Qaboos University (SQU) and Petroleum Development Oman (PDO).

2. Meetings of Oman IHP National Committee:

The Oman National Committee for IHP had several meeting during this period to discuss the following issues:

- Meeting on 13 May 2012:
  - Reviewing and assessment of all activities and participation of the committee during the last year 2011.
  - All members stressed and agreed on the necessity of their participations in order to accomplish the goals of the current IHP phase 2008-2013.
  - Members agreed on reporting the Committee activities every three months to be done by the Committee's coordinator.
  - Attendance agreed on the need to get support and backup from their high authorities to attend the events, programs and meetings organized by the International Hydrological Programme (IHP) outside the Sultanate.
- Meeting on 3 July 2013:
  - Reviewing and assessment of all activities and participation of the committee during the last year 2012.
  - Proposed implementation of a workshop on raising capacity buildings of Omani technicians in the field of water related issues.
  - Attendees agreed on the need to support and strengthen the Commission's current budget and begin to take administrative action in this regard.
- Launch of the Omani IHP National Committee's website www:\\omanihp.org.om.

3. Activities and Framework in the Period June 2012 to May 2014:

3.1 Activities at National Level

- Presenting a paper on the International Conference on "Environmental Problems in Arab Countries" which organize and held on Sultan Qaboos University during 26-28 February 2012. The paper discussed the "Urbanization Effects on Water Table Rise in Muscat-Sultanate of Oman" presented by Eng. Tariq Helmi.
- The Omani National Committee for Education, Culture and Science, organized a Student Forum at Muscat City celebrating the World Water Day 2012. The Forum attended by 50 school students as 3 lectures were presented titled; 1) Relation between water and food security, 2) Water resources in Oman-present and challenges, 3) Threaten to echo-system on seas and oceans and 4) Interaction of rainfall and topography and its role on human activities. On the second session participants divide into working groups to present their ideas, opinions and solutions to sustain water resources either by expressions or drawings.
- Celebrating the Arabic Water Day 3 March 2012.

- Celebrating the World Water Day 2012 at Nizwa city, were an open discussion held at Nizwa University participated by the Governor of Ad Dakhliyah, Al Shura Council Members, Decision Makers and citizens to discuss all related water issues and problems in Ad Dakhliyah. The activity organized by Oman Water Society, Ministry of Regional Municipalities, Public Authority of Electricity and Water and Nizwa University.
- The Committee organized a meeting with Dr. Abdel Aziz Zaki the Head of IHP Regional Office – UNESCO Cairo. The meeting aims to discuss several topics, activities and subjects executed by the Oman IHP Committee during the last two years. Also, spot the light on the proposed activities during 2013 as an "International Year on Water Cooperation".
- Participating on celebrating the Arabic Water Day 3 March 2013 activities at Shinas – North Al Batinah.
- Oman National Committee organized a seminar on conjunction with Oman Water Society and Ministry of Regional Municipalities and Water Resources on Water Resources in Musandam (Challenges and Solutions) during 2nd - 3rd March 2013, Khassab, Governorate of Musandam, Sultanate of Oman. The seminar attended by several water resources local and regional experts from government and non government entities.
- The Oman National Committee celebrates the World Water Day 2013 in conjunction with the Ministry of Regional Municipalities and Water Resources and "Friends of Peace Volunteers Team". The event organized under the patronage of H.E. Eng. Ali bin Mohammed Al Abri, Undersecretary of Ministry of Regional Municipalities and Water Resources for Water Resources Affairs. The celebration programme sited at Wadi Dayqah Dam location in Wilayat Quriyat-Muscat Governorate and attended by several local water concerns.
- Oman National Committee for IHP have participated in the "3rd TROPICAL CYCLONES SYMPOSIUM" 5 June 2013 MUSCAT–SULTANATE OF OMAN", organized by the Oman Water Society. Two lectures had been presented by Faisal bin Nasser Al Hajri (Assistant Director of the executive Office for the National Oman Self Defense Committee) and Eng. Tariq Helmi (Hydrogeologist Expert, Ministry of Regional Municipalities and Water Resources).
- The Oman National Committee celebrates the World Water Day 2013 in conjunction with the Department of Soils and Water Agriculture Engineering, Sultan Qaboos University and Ministry of Regional Municipalities and Water Resources. The event organized under the patronage of H.E. Eng. Ali bin Mohammed Al Abri, Undersecretary of Ministry of Regional Municipalities and Water Resources for Water Resources Affairs. The celebration programme include scientific workshop entitled "Water Cooperation Towards Resources Sustainability" that held on the 23rd of March 2013 at Al Fahm Hall, Cultural Center (SQU). The workshop covered multiple aspects including cultural, educational, scientific, religious, ethical, social, political, legal, institutional and economic. The workshop covered most of the topics related to the water cooperation by bringing international, national and regional experts together. Key note speakers tackled the following topics; the Water legislatives and regulatives, Socio-economics of water, conflict resolution and Resources transboundary. In addition to the workshop, the Sultan Qaboos University students organized an open day in to raise the public awareness with regard to water resources and the role of society in preserving such resource. The events held from 4:00 pm to 9:00 pm in March 21, 2013 at Al Sahwa Park and at City Center Carrefour in March 23, 2013.
- The Committee members contributed with collaboration with the Oman Water Society and Under the patronage of His Excellency Dr. lshaq bin Ahmed bin Mohammed Al-Ruqaishi, The Under Secretary of Ministry of Agriculture and Fisheries for Agriculture, on the Seminar on "Role of produced water in sustainable

Development Plans in Al Wusta Governorate", in Duqm, during the period from December 09th to 10th December 2013. The seminar was attended by national and international researchers, specialists and representatives of some government agencies, private sector, universities, colleges and scientific research centers. Total of (18) scientific papers were presented covering different aspects of produced water. These aspects include produced water treatment technologies, practical applications of produced water management, utilization of investment opportunities, and water demand.

- The Oman National Committee contributed in organizing the "International Seminar on "Use of Unconventional Water in Urban Water Management" in Muscat, on 24th to 26th February 2014 organised with collaboration with Ministry of Water Regional Municipalities and Water Resources and Regional Centre on Urban Water Management-Tehran.
- Celebrating the Arabic Water Day 3rd March 2014. The National Committee participated in organizing several events to celebrate this day. This included lectures in schools and public areas, TV and radio interviews, marathon and distribution of posters and pamphlets to the public.
- The Oman National Committee celebrates the World Water on 23rd March 2014 by organizing a workshop in collaboration with the Sultan Qaboos University and Ministry of Regional Municipalities and Water Resources. The event organized under the patronage of H.E Ahmed bin Nasr Al Bakri, the Under Secretary of Ministry of Agriculture and Fisheries. The workshop entitled "Workshop on Water & Energy". The workshop brought scientists and engineers working in water science and applications to discuss the major issues related to energy & water production, water sanitation and desalination. The workshop was intended particularly to address water-energy nexus. The participants have international and national experience and they address the water-energy nexus including: solar energy and its use on water production, the bio-fuel production from waste water, renewable energy among other important issues. The Ministry and the SQU had other activities such as an open day at the Sahwa Park to bring together the public and children together and brochures on importance of conserving the water resources was emphasized.
- Dr. Ghazi Al Rawas, member of the Oman National Committee invited as a guest speaker to give a lecture title "Applications of Remote Sensing: Assessment of Vegetation damage using Remote Sensed Data" for the Oman Water Society, May 2014.

3.2 Activities at Regional Level

- The Oman National Committee (ONC) for IHP delegate attended and have its contribution in the "6th World Water Forum held during 12-17 March 2012 Marseille, France", "The Time for Solutions". The delegate; Head of Committee Eng. Salim Al Shibli, Dr. Ghazi Al Rawas and Mr. Sulaiman Al Mabsali (committee members) attended all the meetings and activities along the events representing the Oman National Committee.
- Dr. Ghazi Al Rawas attended the "Environment Impact Assessment (EIA), Centre for Environmental Studies and Research (CESAR)", Sultan Qaboos University, 27-30 May 2012.
- Three members of the Oman National Committee for IHP participated on the "20th session of the Intergovernmental Council" held during 4-7 June 2012, Paris, France" as an observer member. The Omani delegates include Eng. Salim Al Shibli, Dr. Ghazi Al Rawas and Mr. Sulaiman Al Mabsali. The 20th session discussed many issues includes; institutional developments at UNESSCO, revision and implementation of 19th session, strategic plan of the 8th phase of IHP Programme IHP-VIII, 2014-2021 and IHP activities related of UNESSCO.

- Dr. Ghazi Al Rawas attended the "Second workshop in the initial national communication to the United Nations Framework Convention on Climate Change (UNFCCC)", United Nations Environment Programme (UNEP) Project, Sultan Qaboos University, 2-3 June 2012.
- Oman National Committee for IHP has contributed in the "Regional Consultation for Arab States–Amman – Jordan, 8-10 October 2012". The Head and Coordinator of the Committee participate at the meetings to discuss Groundwater Governance in Arab States region in accordance with the global Framework for Country Action (FA). The scientific contribution presented by a paper and a PowerPoint presentation on the "Status of the Groundwater Governance in Oman", considering challenges, priorities, gaps and recommendations. Also a Questionnaire on Groundwater Governance in Oman had prepared and submitted to the meeting organizers.
- A periodic executive report prepared and sent to the IHP Secretariat exploring all the Oman National Committee for IHP activities and participation during the period of June 2010 to May 2012.
- The Oman National Committee (ONC) for IHP attended and have its contribution in the "UNESCO Strategic and High Level Meeting on National Drought Policy held during 11-15 March 2013 Geneva, Switzerland" organized by the World Metrological Organization (WMO). Eng. Salim Al Shibli (previous Head of Committee) attended the meeting and activities along the events representing the Oman National Committee and the Ministry of Regional Municipalities and Water Resources.
- Oman National Committee for IHP has contributed in the "ihp survey for viii implementation plan 2014-2021". The committee proposed a list of several activities, events or projects which could be executed during the eighth plan.
- Presenting a paper at the Third International Conference on Water Resources and Environmental Management: Role of Governance in the Management of Water Resources and Environment (ICWRE-2014) which was held on 13-15 May 2014 in Antalya, Turkey on Water Resources Management Practices in the Sultanate Oman. The paper was presented by Eng. Ahmed Al Barwani, Water Resources Expert, Ministry of regional Municipalities and Water Resources and coordinator of IHP National committee.

REPÚBLICA DEL PERÚ

PROGRAMA HIDROLÓGICO INTERNACIONAL
de la UNESCO para América Latina y el Caribe

COMITÉ PERUANO PARA EL PROGRAMA
HIDROLÓGICO INTERNACIONAL
(C O N A P H I - PERÚ)

SERVICIO NACIONAL DE METEOROLOGÍA
E HIDROLOGÍA

S E N A M H I

Informe Nacional sobre Actividades Relacionadas al PHI 2012 - 2014

Lima - Perú

2014

SERVICIO NACIONAL DE METEOROLOGÍA E HIDROLOGÍA

COMITE NACIONAL PARA EL PROGRAMA HIDROLÓGICO INTERNACIONAL DEL PERÚ

PRESIDENTE DEL CONAPHI - PERÚ

Ing. AMELIA DIAZ PABLO

PRESIDENTE EJECUTIVO DEL SENAMHI

VICEPRESIDENTE DEL CONAPHI – PERÚ

AUTORIDAD NACIONAL DEL AGUA - ANA

SECRETARIO TÉCNICO DEL CONAPHI – PERÚ

Ing. OSCAR FELIPE OBANDO

DIRECTOR GENERAL DE HIDROLOGÍA Y RECURSOS HÍDRICOS DEL SENAMHI

Lima - Perú

2014

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura

Programa Hidrológico Internacional

Contenido del Informe

INFORME NACIONAL SOBRE ACTIVIDADES RELACIONADAS AL PROGRAMA HIDROLOGICO INTERNACIONAL

1. Actividades realizadas en el periodo junio 2012 - mayo 2014

1.1 Reuniones del Comité Nacional del PHI

1.1.1 Decisiones concernientes a la composición del Comité Nacional del PHI

El CONAPHI-PERÚ, es un organismo consultivo y coordinador cuyo objetivo es reunir iniciativas a nivel nacional referente al tema del recurso hídrico; en ese sentido el CONAPHI-Perú agrupa un conjunto de instituciones académicas científicas y gubernamentales que buscan fomentar un espacio neutral, multisectorial de participación, capaz de promover la gestión integrada del recurso hídrico, y orientando sus esfuerzos primordialmente a consolidar una cultura del agua basada en principios de equidad, solidaridad, sustentabilidad ecológica, social y económica y gestión democrática.

A continuación mostramos los miembros del CONAPHI-Perú:

- Instituto del Mar del Perú - IMARPE
  Ministerio de la Producción
- Autoridad Nacional del Agua - ANA
  Ministerio de Agricultura
- Dirección General de Electricidad – DEG/MINEM
  Ministerio de Energía y Minas
- Ministerio de Relaciones Exteriores - RREE
- Centro Nacional de Salud Ocupacional y Protección del Ambiente para la Salud - CENSOPAS
  Instituto Nacional de Salud - Ministerio de Salud
- Asamblea Nacional de Rectores - ANR
  Ministerio de Educación
- Comisión Nacional Peruana de Cooperación con la UNESCO - COMIUNESCO
  Ministerio de Educación
- Superintendencia Nacional de Servicios de Saneamiento - SUNASS
- Dirección General de Programación Multianual del Sector Público - MEF
  Ministerio de Economía y Finanzas
- Servicio Nacional de Meteorología e Hidrología – SENAMHI
  Ministerio del Ambiente
- Dirección General de Salud - DIGESA
- Dirección del Laboratorio de Hidráulica - LHN
- Dirección Nacional de Saneamiento - VIVIENDA
  Ministerio de Vivienda, construcción y Saneamiento
- Consejo Nacional de Ciencia y Tecnología - CONCYTEC
- Ministerio del Ambiente – MINAM

1.1.2 Estado de las actividades del PHI-VII

Dentro del programa de actividades que desarrollamos, está la búsqueda del fortalecimiento del comité, a través de la participación activa y dinámica de cada uno de los miembros, el cual se ve reflejado en las 03 reuniones comprendidas entre junio de 2012 hasta la fecha mayo 2014. A la fecha estamos actualizando el directorio del comité, para dar continuidad a la gestión del comité nacional.

Respecto a las actividades del PHI –VII (2008-2013), el Perú ha tenido representación en las iniciativas de CAZALAC en la formulación del Atlas de Frecuencias de Sequías; en una primera etapa con la inclusión de 9 cuencas piloto por parte del SENAMHI (2009) y posteriormente ANA, San Marcos y SENAMHI (2012) lo complementan a nivel nacional. Por otro lado también se ha participado de la iniciativa de Máximos Hidrológicos auspiciado por el IFI (Iniciativa Internacional sobre Inundaciones) y FRIEND (Proyecto sobre los Regímenes de Flujos Determinados a Partir de Series de Datos Experimentales Internacionales y de Red, Lima fue sede en el 2010 sobre la presentación de las metodologías y los compromisos para trabajar cuencas experimentales. Perú trabajó las cuencas del Rímac y Chillón y la vertiente del Lago Titicaca.

1.2 Actividades a nivel nacional dentro del marco del PHI

1.2.1 Certámenes científicos y técnicos nacionales/locales:

Todos los años, se realizan eventos técnicos y sociales, que están orientados a resaltar los valores culturales y fortalecer los conocimientos técnicos.

El CONAPHI apoya el desarrollo este tipo de eventos mediante la participación de sus miembros; y además divulga y aplaude la iniciativa como una ventana a la necesidad de articular esfuerzos hacia la búsqueda de un desarrollo sostenible del recurso agua, fomentando una cultura del Agua.

- **Actividades por la celebración del Día Mundial del Agua (Marzo - 2013).**

Ese año las celebraciones por el Día Mundial del Agua, han buscado la participación social de la sociedad Peruana y enfocados en el lema "Año Internacional de la cooperación en la Esfera del Agua", en coordinación en conjunto con la Autoridad Nacional del Agua –ANA, y el apoyo de instituciones públicas y privadas nacionales. El objetivo fue que las celebraciones no se queden en tan solo un día sino que se extiendan a todo el mes de marzo siendo este denominado "El mes del agua", desarrollándose muchas eventos culturales, talleres, puestas en escena pasacalles, muestra fotográficas y un evento deportivo que busco integrar a la sociedad y población peruana en las celebraciones.

Cabe mencionar que el 1ro de marzo se dio inicio con el Primer Diálogo Nacional y Seguridad hídrica frente a la Adaptación del Cambio Climático, en la sede de la Autoridad Nacional del Agua, este evento tuvo como objetivo convertirse en un espacio propicio para encontrar mecanismos para balancear el agua requerida en los diferentes sectores y ecosistemas buscando la equidad social, la eficiencia económica y la sostenibilidad ambiental.

La conferencia magistral "Desarrollo sostenible y seguridad hídrica frente al cambio climático" estuvo a cargo de Victor Pochat, además se desarrollaron diferentes paneles con la participación de funcionarios y expertos de la ANA, COSUDE, BID, GWP, SENAMHI, MINAM etc. Esta jornada reunió a cientos de personas del ámbito público y privado, así como de la academia y fuentes cooperantes.

- **Actividades por la celebración del Día Mundial del Agua (Marzo - 2014).**

La Autoridad Nacional del Agua –ANA, realizó una serie de actividades con motivo a las celebraciones por el Día Mundial del Agua, en marzo de 2014 denominando a la celebración "La semana del agua 2014 – agua & energía", que englobó actividades técnicas y sociales como conferencias, charlas, exposiciones de maquetas informativas, caminata y bicicleteada, concursos de fotografía hasta un I Festiagua (festival de música) con el fin de integrar al público en general a esta celebración.

Los otros miembros del Comité realizaron actividades científicas internas en el marco de las celebraciones por el Día Mundial del Agua.

1.2.2 Participación en programas y grupos de trabajo del PHI

- **Grupo de Trabajo de Nieves y Hielos (Quito, Ecuador – Noviembre 2013)**

Durante este periodo se ha tenido dos reuniones de trabajo, donde se eligió al coordinador del grupo, designando a Chile en este cargo y a Perú como vicecoordinador, asimismo Perú el año 2015 asumirá la tarea de coordinador del grupo.

Este grupo de trabajo tiene como meta convertirse en un Programa de UNESCO y, para ello es necesario que cada país tenga tres integrantes como mínimo. En el caso del Perú, el SENAMHI y la Autoridad Nacional del Agua – ANA, serían dos de las integrantes quedando por designar o elegir otra.

- **Taller Programa IFI-FRIEND sobre máximos hidrológicos (Panamá, 28 al 30 de abril de 2014)**

Con el apoyo de la Autoridad del Canal de Panamá y de la oficina Regional del PHI-LAC se llevó a cabo del 28 al 30 de abril 2014, en la ciudad de Panamá una reunión de expertos de 13 países de Latinoamérica y el Caribe en el tema de análisis de hidrológicos extremos, en marco del Programa IFI-FRIEND, con el objetivo de mostrar el comportamiento regional de los fenómenos hidrológicos extremos, a través de series de tiempo de valores máximos de precipitaciones y caudales; que sean representativos del comportamiento de estos fenómenos en la región ALC.

Durante la reunión los participantes se realizaron presentaciones de las actividades relacionadas al análisis de frecuencia de eventos extremos. También se contó con ponencias de los coordinadores de IFI y FRIEND. En representación de Perú se presentó el "Análisis regional de frecuencia de precipitaciones máximas empleando l-momentos en la cuenca hidrográfica del lago Titicaca", en la que se tiene como importante aporte los mapas de precipitación máximas en 24 horas para un periodo de retorno de 50 y 100 años en la región del Titicaca parte Peruana; además se destacó los trabajos

que se viene realizando en torno a la documentación de eventos máximos de inundación en las "Fichas Técnicas", donde el Perú ha contribuido con la documentación de 03 eventos:

a) En la zona norte los eventos ocurridos durante noviembre de 1997 a abril 1998.
b) En Cusco, evento ocurrido el 3 de Febrero 2002;
c) y en Puno y Madre Dios el evento ocurrido el 9 de marzo de 2013.

1.2.3 Proyectos de investigación o de aplicación apoyados o patrocinados

En el marco de las actividades desarrolladas por el Centro del Agua para Zonas Áridas y Semiáridas de América Latina y el Caribe – CAZALAC, se ha elaborado el Mapa de frecuencia de sequías, labor que se viene ejecutando con la Autoridad Nacional del Agua, SENAMHI y MINAM.

La ANA informa además que se viene trabajando con la UNESCO la creación del "observatorio de sequías"; mediante una plataforma informática que implica la participación de varias instituciones del CONAPHI. UNESCO participaría con la asistencia técnica del Dr Koen Verbist para consolidar el Observatorio de Sequías en Perú.

1.2.4 Colaboración con otras organizaciones o programas nacionales e internacionales

Global Water Partneship-Perú (Foro Peruano para el Agua)

El CONAPHI-PERÚ ha venido colaborando y recibiendo apoyo de la Global Water Parnetship-Perú (Foro Peruano del Agua) con el fin de promover y facilitar la adopción de los principios de la gestión Integrada de los recursos hídricos (GIRH), entendiéndose como "un proceso que propone el manejo desarrollo coordinado del agua y los recurso relacionados, con el fin de maximizar el bienestar social y económico resultante de manera equitativa, sin comprometer la sostenibilidad de los ecosistemas"

En el marco de la tercera Asamblea General de miembros de la Asociación Sudamericana para el Agua que se realizó en la ciudad de Lima del 13 al 15 de abril, la Global Water Partnership organizó el Taller sobre "Gestión integrada de los recursos hídricos y cambio climático"

En el 2013, se desarrolló un taller de "Aguas subterráneas, pasos hacía una gestión adaptativa y sostenible" a cargo del Dr. Stephen Foster, Asesor Senior de la GWP, en agosto del 2013 en las instalaciones de la Autoridad Nacional del Agua, bajo la Organización de la Global Water Partnership, y la participación de instituciones de cooperación e integrantes del CONAPHI.

GWP-Perú, en noviembre del 2013 presenta el programa piloto "**Agua, Clima y Desarrollo en la subcuenca del río Santa Eulalia"** donde se pondrá en práctica la cooperación transectorial para generar mayor resiliencia climática y seguridad hídrica en la sub-cuenca Santa Eulalia. Ésta es parte de un proceso hacia la firma de un acuerdo transectorial entre todos los ministerios peruanos que les comprometería a trabajar de manera coordinada para garantizar la gestión integrada de os recursos hídricos en el contexto del cambio climático.

Comisión Nacional Peruana de Cooperación con la Unesco

Continuamente se viene participando en las actividades que la Comisión Nacional Peruana de Cooperación con la Unesco desarrolla con el fin de propiciar y fortalecer el diálogo de sus investigadores.

Anualmente se realiza la reunión anual de comités especializados de ciencias, donde el CONAPHI-Perú participa.

1.2.5 Otras iniciativas

- A través del Ministerio de Relaciones Exteriores y bajo un trabajo coordinado se realizó la Contribución al Plan Estratégico para la VIII Fase del PHI (2014-2021).
- "Seguridad hídrica: respuestas a desafíos locales y mundiales". En marzo del 2013 con el auspicio del Foro peruano para el Agua, la Pontificia Universidad Católica del Perú y la Cooperación Suiza – COSUDE, se desarrolló en Lima el primer **Diálogo sobre Desarrollo Nacional y Seguridad Hídrica frente a la Adaptación al Cambio Climático,** evento donde se expuso el nexo entre agua, desarrollo y cambio climático: experiencias exitosas de desarrollo con equidad social y sostenibilidad ambiental**,** GIRH**:** gobernabilidad y gestión efectiva.
- Con el Ministerio del Ambiente MINAM, se está difundiendo los resultados de la ejecución del Proyecto Regional Andino de Adaptación-PRAA para Monitoreo de Glaciares.
- Los miembros del CONAPHI-PERÚ viene colaborando de manera conjunta con el Ministerio del Ambiente incluyendo información al Geo-Servidor. Este Geo-Servidor es un mecanismo de difusión e intercambio de información geoespacial que se pone a disposición de profesionales, sectores de gobierno, gobiernos regionales, gobiernos locales y sociedad civil en general; para que a través del internet puedan acceder a información relevante sobre la situación territorial y ambiental del país de manera transparente y actualizada.
- Asimismo, en busca de mejorar nuestras capacidades, los miembros del CONAPHI-PERÚ, se encuentran trabajando en el Proyecto de Modernización de Gestión del Recurso Hídrico y otro convenio específico con el Ministerio de Energía Minas-MINEM, con el cual se busca mejorar, implementar y ampliar nuestra red observacional para una óptima gestión del recurso hídrico.
- Otras iniciativas que se debe tomar en cuenta son las realizadas por nuestros miembros del Ministerio de Vivienda y MINAM. Esto es formando parte de los comités de descolmatación del lago Titicaca y de la bahía Ferrol (Chimbote), elaborando el protocolo para el tratamiento de aguas residuales y que este año realizará el diagnostico nacional de tratamiento de aguas residuales.
- Por otro lado se realizan algunos estudios como contribución aislada de nuestros miembros del CONAPHI-Perú en forma general del agua para la población que se ve afectada por la actividad minera, donde se desarrolla la investigación y la interacción del ambiente con la actividad minera, complementando con análisis de agua, aire y suelo.

1.3 Cursos académicos o de adiestramiento

1.3.1 Contribución a cursos del PHI

El CONAPHI-PERÚ no ha contribuido, durante este periodo en cursos que haya programado el PHI.

1.3.2 Organización de cursos específicos

Con el fin de mejorar las capacidades de nuestro colaboradores se dictó un curso sobre "Equipos de Medición de Caudales de ríos con Tecnología Doppler, ADCP", es así que también aprovechando la coyuntura de algunos lazos de cooperación como instituciones como la Autoridad Nacional del Agua y el Ministerio de Energía y Minas-MINEM en lo que va del periodo de 2012 – 2013 se han desarrollado tres cursos de capacitación en equipos de medición con tecnología Doppler y mantenimiento de estaciones automáticas.

De igual forma la ANA, en el marco del Proyecto de modernización y gestión del Recurso Hídrico –PMGRH, ha desarrollado entre el 2013-2014 cursos sobre perfiladores acústicos (ADCP) en 3 módulos, donde de manera práctica y teórica los profesionales se han capacitado en el uso y manejo de dicho instrumental para realizar labores de operación y mantenimiento de equipos para mediciones hidrológicas.

Cabe destacar la participación de algunos miembros del comité en el "Seminario de formación en Modelización Hidrológica e Hidráulica con RS Minerve" organizado por el Centro de Investigación en Medio Alpino-CREALP, con apoyo de École polytechnique fédérale de Lausanne –LCH, Oficina de Cooperación Suiza en Perú –COSUDE, MeteoDat, Care Perú y SENAMHI. Este seminario de formación en modelización hidrológica e hidráulica con RS MINERVE se impartió los conocimientos necesarios para poder afrontar con éxito la realización de modelizaciones hidrológicas e hidráulicas en cálculo unidimensional. Para ello se recordaron los conocimientos básicos de hidrología e hidráulica que hacen posible la correcta interpretación de las modelizaciones y se instruye al profesional en el manejo práctico del programa RS MINERVE.

1.3.3 Participación en cursos del PHI

El CONAPHI-PERÚ no participó, durante este periodo en cursos que haya programado el PHI; sin embargo, se articularon actividades de capacitación puntuales en función a las necesidades que tiene cada una de las instituciones miembros del comité.

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

No se ha participado en cursos bajo auspicios de la UNESCO en lo que va del periodo 2012-2013.

1.5 Publicaciones

Las instituciones miembros del CONAPHI-PERÚ participaron activamente en la realización, edición y publicación del Informe país – VI Foro mundial del Agua Marsella, Francia 2012, tendiendo puentes hacia el trabajo conjunto en torno al agua: experiencia peruana.

1.6 Participación en eventos científicos internacionales

1.6.1 Certámenes realizados en el país

Se articularon actividades de capacitación puntuales en función a las necesidades que tiene cada una de las instituciones miembros del comité.

- En temas de agua cabe resaltar la realización de: **Foro Internacional de Glaciares** (Huaraz, julio-2013) que reunió a la comunidad científica, teniendo entre sus invitados aún representante del PHI de Paris;
- **Foro Internacional " Retos para mejorar la Calidad del Agua en el Perú: experiencias, tecnología y gobernabilidad"** organizado por la SUNASS con el apoyo de la Organización Panamericana de la Salud y la Organización Mundial de la salud (LIMA, setiembre 2013);
- Y el **IV Congreso del Agua** (LA MOLINA -UNALM, Junio- 2013); donde el objetivo es reunir a los investigadores, profesionales y gestores de los sectores públicos y privados con la finalidad de compartir sus experiencias a través de artículos para permitir a los asistentes ampliar sus conocimientos sobre temas del agua, dentro de una visión integral.

1.6.2 Participación en certámenes en el extranjero

En el 2013, se participó de la X Reunión de Comités y Puntos Focales del Programa Hidrológico Internacional de la Unesco para América Latina y el Caribe (PHI-LAC), que se llevó a cabo en Jiutepec, Morelos, México del 2-4 de diciembre de 2013, donde los participantes manifestaron sus avances y logros obtenidos durante la gestión 2012-2013 y se tomó acuerdos como el desarrollo de capacidades técnicas para la gestión sostenible de las aguas superficiales y subterráneas en la región. Cabe destacar que en la reunión los presentes acogen con beneplácito la iniciativa de Perú, de ser la sede de la próxima Reunión de Comités Nacionales y Puntos Focales de la región en el año 2015.

Por otro lado la representante del comité participó además en la ceremonia de clausura del Año Internacional de la Cooperación en la Esfera del Agua 2013 que se realizó el 5 – 6 de diciembre del año 2013, participando de las diferentes actividades y grupos de trabajo.

1.7 Otras actividades a nivel regional

1.7.1 Relaciones/cooperación institucionales

- **Global Water Parnetship-Perú (Foro Peruano para el Agua)**

Los miembros del Comité vienen colaborando con la Global Water Parnetship (Foro Peruano del Agua) con el fin de promover y facilitar la adopción de los principios de la gestión Integrada de los recursos hídricos (GIRH), entendiéndose esta "como un proceso que propone el manejo desarrollo coordinado del agua y los recurso relacionados, con el fin de maximizar el bienestar social y económico resultante de manera equitativa, sin comprometer la sostenibilidad de los ecosistemas".

- **CAZALAC** . Se consolidó el Atlas de frecuencias de Sequías en el Perú con el apoyo del IRI y UNESCO y la participación de la Universidad

Nacional Mayor de San Marcos, Autoridad Nacional del Agua (ANA) y SENAMHI.

1.7.2 Proyectos científicos concluidos y en marcha

- **Proyecto de Adaptación al Impacto de Retroceso Acelerado de Glaciares en los Andes Tropicales -PRAA**

Dentro de este contexto científico mundial, la preocupación por entender el presente y el futuro sobre los efectos de la desglaciación andina, nos llevan a desarrollar investigaciones para comprender, entender y generar procesos de adaptación al retroceso de los glaciares. Es así, que las instituciones miembros del comité, con el apoyo del GEF a través del BANCO MUNDIAL y la Secretaría General de la Comunidad Andina, aúnan esfuerzos buscando generar procesos conceptuales, metodológicos y culturales, ante los impactos del retroceso glaciar en los Andes Tropicales.

2. Actividades futuras

2.1Actividades planificadas hasta diciembre 2014

- Realizar acciones enmarcadas dentro de la política ambiental en temas de agua y conservación como país respetuoso del medio ambiente, que considera al agua el derecho fundamental del ser humano.
- Consolidar el trabajo coordinado con los programas FRIEND e IFI para replicar la metodología a nivel nacional e integrar una base de datos que ayude al conocimiento y comprensión de los procesos hidrometeorológicos.
- Realización de cursos específicos que ayuden a mejorar las capacidades de cada uno de los profesionales que buscan el desarrollo sostenido del Recurso Hídrico a nivel nacional.
- Participación en los eventos técnicos que organiza el PHI.
- Institucionalizar el Observatorio Nacional de Sequías

2.2 Actividades previstas para 2014-2015 -2016

- Coordinar y desarrollar la celebración por el día Mundial del Agua, con la realización de eventos por el Día Mundial el Agua; involucrando masivamente a la sociedad peruana.
- Contribuir a la celebración del Día Interamericano del Agua.
- Desarrollo de eventos técnicos sobre la problemática del recurso hídrico asociado a los cambios climáticos.
- Desarrollo de capacidades, con el apoyo y colaboración del PHI.
- Difusión de las Fases y actividades y del PHI,
- Participación en los eventos técnicos que organiza el PHI

2.3. Actividades vislumbradas a largo plazo

- Insertar dentro del PHI un Programa regional de la cuenca amazónica, sobre la base de la experiencia del proyecto HYBAM (IRD de Francia), aglutinando intereses de los países de la región andina.
- Insertar en Perú un Programa Presupuestal de Adaptación al Cambio Climático en la cuenca amazónica.
- Contribuir y participar en los procesos de gestión de los recursos hídrico en el Perú

- Contribuir, apoyar y difundir sobre la problemática del agua y los cambios climáticos.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

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
Maciej Zalewski
Iwona Wagner
Iwona Jasser

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)
UNESCO IHP
- Maciej Zalewski – member of the Special Task Force for IHP-VIII
Other International Programmes:
- UNEP GEMS Water Programme
- European Commission Joint Programming Initiative "Water Challenges for a Changing World" – Maciej Zalewski polish representative
- InterAcademy Water Programme (IAP) – coordination IAP in Europe, Maciej Zalewski

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

- 1st Meeting of the Implementation Working Group UNESCO International Hydrological Programme (IHP), Koblenz, December 10th - 12th 2012
- UNESCO Strategic and High-Level Meeting on Water Security and Cooperation Nairobi, Kenya September 11th - -13th 2013
- UNESCO International Year of Water Cooperation – Closing Event
- Working Group – Preparing Recipes for Water Cooperation
- Mexico City, Mexico, December 5th – 6th 2013
- The Twenty-third IHP Training Course: Ecohydrology for River Basin Management under Climate Change, Keynote Speaker "Ecohydrology: process oriented thinking towards sustainable enhancement, water resources, biodiversity, ecosystem services and resilience to climate changr; Kyoto, Japan,
- December 2nd – 13th 2013
- UNESCO IHP VIII Ecohydrology Steering Committee and Workshop – 20-21.05.2014

1.2.3 Research/applied projects supported or sponsored

- "Towards Engineering Harmony Between Water, Ecosystem and Society. Strengthening the Collaboration between European Academies of Sciences in the IAP Water Programme". IAP 3240226102/010/013.

- EU Life+ ENVEUROPE: Environmental quality and pressures assessment across Europe: the LTER network as an integrated and shared system for ecosystem monitoring. LIFE08 ENV/IT/000399.
- Ecohydrology - a transdysciplinary science for integrated water resources and sustainable development in Ethiopia. Co-operation with Ministry of Water Resources of Ethiopia. Project financed by the Ministry for Foreign Affairs.
- EU FP7 EXPEER: Distributed Infrastructure for EXPErimentation in Ecosystem Research. FP7-INFRASTRUCTURES-2010-1.
- ALTER-Net: A Long-Term Biodiversity, Ecosystem and Awareness Research Network. (Network of Excellence, 6th FP EU)
- EU Life+ EKOROB: Ecotones for reducing diffusion pollution. LIFE08 ENV/PL/000519.
- EU Life+ EH-REK: Ecohydrologic rehabilitation of Arturowek recreational reservoirs (in Lodz) as a model approach to rehabilitation of urban reservoirs. LIFE08 ENV/PL/000517.
- "Analysis of point sources pollution of nutrients, dioxins and dioxinlike compounds in the Pilica River catchment and draw up of reclamation methods". N305 365738. Project financed by the Ministry of Sciences.
- PBS1/A8/2012 MIKRAZO - Microbial activators in denitrifying deposits used for the treatment of nitrate pollution for the implementation of the Water Framework Directive and the Nitrates Directive.
- N305 3657 58 „Analysis of point sources pollution of nutrients, dioxins and dioxin-like compounds in the Pilica River catchment and draw up of reclamation methods”
- UMO-2012/07/B/NZ8/03991 Application of reporter cell biosensors in ecotoxicology of cyanobacteria: new targets for bioactivity,
- UMO-2012/07/N/NZ8/00599. Assessment of the interaction between hepatotoxic cyanobacterium Microcystis aeruginosa and pathogenic bacteria of the genus Aeromonas,
- UMO-2012/05/B/NZ9/00980 Do fish adapt to cyanobacterial blooms?,
- PBS1/A8/0/2012 Microbial activators in denitrification deposits used for the treatment of nitrate pollution for the implementation of the Water N N305 096439 Framework Directive and the Nitrates Directive Explanation of cause-effect relationships between the occurrence of toxinogenic cyanobacterial blooms, and abiotic and biotic factors with particular emphasis on the role of viruses and bacteria

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

- ALTER Net (A Long Term Biodiversity, Ecosystem and Awareness Research Network) Network of Excellence, 6th FP EU
- AlterNet2 Consortium on Biodiversity and Ecosystem Services
- LTER Europe (A Long Term Ecological Research Network)
- ILTER (International Long Term Ecological Research)
- Water, Ecosystem Services and Society - establishing the Collaboration between European Academies of Science under the IAP Water Programme and European Long-Term Ecosystem Research Network. IAP Water Programme.

- Hydroacoustic estimation of fish abundance in shallow lakes using horizontal beaming. Within Agreement between Polish Academy of Sciences and Hungarian Academy of Sciences.
- ENVEUROPE: Environmental quality and pressures assessment across Europe: the LTER network as an integrated and shared system for ecosystem monitoring.
- EKOROB: Ecotones for reducing diffusion pollution.
- EXPEER: Distributed Infrastructure for EXPErimentation in Ecosystem Research.
- Towards Engineering Harmony Between Water, Ecosystem and Society. Strengthening the Collaboration between European Academies of Sciences in the IAP Water Programme".
- Mechanisms and Early Warning Techniques of Algal Blooms including Cyanobacteria in the Tributaries of the Three Gorges Reservoir in China.
- EH-REK: Ecohydrologic rehabilitation of Arturowek recreational reservoirs (in Lodz) as a model approach to rehabilitation of urban reservoirs.
- Standardization of hydroacoustic methods for assessment of ecological quality of aquatic ecosystems. Within Agreement between Polish Academy of Sciences and Czech Academy of Sciences.
- Ecohydrology - a transdysciplinary science for integrated water resources and sustainable development in Ethiopia. Project financed by the Ministry for Foreign Affairs Republic of Poland.
- FORMAN - Forest Management and the Water Cycle.
- SIL - International Society of Limnology
- ESFRI – European Strategy Forum on Research Infrastructures - Maciej Zalewski

1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

- The Twenty-third IHP Training Course: Ecohydrology for River Basin Management under Climate Change, Keynote Speaker "Ecohydrology: process oriented thinking towards sustainable enhancement, water resources, biodiversity, ecosystem services and resilience to climate changr; Kyoto, Japan, December 2nd – 13th 2013
- International Seminar on Ecohydrology, Biotehnology and Engineering: Towards the Harmony between Biogeosphere and Society on basis of Long Term Ecosystem Research, Invited lecture; Brno, Olomuniec; Czechy; kwiecień 2013

1.3.2 Organization of specific courses

Researchers from European Regional Center for Ecohydrology run lectures for the University of Lodz students on the basis of Cooperation Agreement between ERCE and University of Lodz in a field of Ecohydrology. Lectures on:

- Ecohydrology
- Urban Ecohydrology
- Applied Ecology
- Ecology Basis

- Environmental Monitoring
- Ecotoxicology
- Integrated Water Resources Management
- Ecological Biotechnologies
- Environmental Modelling & Statistics
- Environmental/Landscape Planning
- Phytotechnologies & Phytoremediation
- Wetlands & Land – Water Ecotones

1.3.3 Participation in IHP courses

ERCE run also classes and provides supervisors and facilities for master theses within the international Master Course on Ecohydrology:

ECOHYD

ERASMUS MUNDUS Master Course on Ecohydrology (ECOHYD) with ICCE UNESCO/Algarve University, UNESCO-IHE Delft, Lodz University & Kiel University.

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

Members of the Governing Board: Iwona Wagner

1.5 Publications

2012

- Urbaniak, M., Skowron, A., Zieliński, M., Zalewski, M. 2012. Hydrological and environmental conditions as key drivers for spatial and seasonal changes in PCDD/PCDF concentrations, transport and deposition along urban cascade reservoirs. *Chemosphere* 88 (11): 1358-1367.
- McClain, M.E., Chícharo, L., Fohrer, N., Gaviño Novillo, M., Windhorst, W., Zalewski, M. 2012. Training hydrologists to be ecohydrologists and play a leading role in environmental problem solving . *Hydrology and Earth System Sciences* 16 (6): 1685-1696.
- Holsten, B., Bednarek, A., Fier, A., Fohrer, N., Heckrath, G., Höper, H., Hugenschmidt, C., (...), Zalewski, M. 2012. Potentiale für den einsatz von nährstoff-filtersystemen in Deutschland zur verringerung der nährstoffeinträge in oberflächengewässer | [Potential for reducing nutrient input in surface waters by using nutrient filters]. *Hydrologie und Wasserbewirtschaftung* 56 (1): 4-15.
- Godlewska, M., Frouzova, J., Kubecka, J., Wiśniewolski, W., Szlakowski, J. 2012. Comparison of hydroacoustic estimates with fish census in shallow Malta Reservoir – Which TS/L regression to use in horizontal applications? Fish. Res. 123-124: 90-97.
- Gagala I., Izydorczyk K., Jurczak T., Mankiewicz-Boczek J. 2012. The key parameters and early warning methods to identify presence of toxigenic blooms dominated by Microcystis aeruginosa in the Jeziorsko Reservoir (Central Poland). Fresenius Environ. Bull. 2012, 21(2): 295-303.
- Gagala I., Mankiewicz-Boczek J. 2012. The Natural Degradation of Microcystins (Cyanobacterial Hepatotoxins) in Freshwaters - Future for the Modern Treatment Systems and Water Quality Improvement. Pol. J. Environ. Stud. 21(5): 1125-1139.

- Mankiewicz-Boczek, J., Kokociński, M., Gagala, I., Pawelczyk, J., Jurczak, T., Dziadek, J. 2012. Preliminary molecular identification of cylindrospermopsin-producing Cyanobacteria in two Polish lakes (Central Europe). *FEMS Microbiology Letters* 326 (2): 173-179.
- Mankiewicz-Boczek J. 2012. Application of molecular tools in Ecohydrology. Ecohydrol. Hydrol. 12(2): 165-170.
- Zalewski M. 2012. Ecohydrology – process oriented thinking for sustainability of river basins. Ecohydrol. Hydrol. 12(2): 89-92.
- Kiedrzyńska E., Urbaniak M., Kiedrzyński M., Skłodowski M., Zalewski M. Punktowe źródła zanieczyszczeń jako zagrożenie dla jakości wód Pilicy. Gaz, Woda i Technika Sanitarna. 2012 (6): 254-256.
- Zalewski M., Urbaniak M. (eds). 2012. Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź. ISBN: 978-83-928245-0-3, pp. 117.
- Zalewski M., Urbaniak M., Negussie Y.Z. 2012. Polish-Ethiopian cooperation in ecohydrology – toward sustainable water resources and ecosystem services for societies in Ethiopia. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp. 7-20.
- Kiedrzyńska E., Zalewski M. River floodplain as a purification system. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp. 23-38.
- Izydorczyk K., Krauze K., Sodol A. Regulation of matter circulation in watersheds by the application of buffer zones. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp. 39-48.
- Wojtal-Frankiewicz A., Frankiewicz P. Eutrophication and methods of reversing its symptoms. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp. 61-74.
- Mankiewicz-Boczek J. Diagnosing and possibilities of limiting toxic cyanobacterial blooms. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp.75-90.
- Urbaniak M. Persistent Organic Pollutants in water ecosystems – problems, causes and recommendations. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp.91-100.
- Zalewski M., Urbaniak M. Persistent Organic Pollutants in water ecosystems – a case study of Asella, Ethiopia. In: Zalewski M., Urbaniak M. (eds). Adaptation of ecohydrological system solutions and biotechnologies for Africa. II PAN ERCE, Łódź, pp.101-104.
- Mankiewicz-Boczek J., Kobos J., Gągała J., Izydorczyk K., Toruńska A. POLAND: Management and Regulation of Toxic Cyanobacteria. In: Chorus I. [ed.] Current approaches to Cyanotoxin risk assessment, risk management and regulations in different countries. Federal Environmental Agency, Germany. 2012, TEXTE 63, pp. 109-114.
- Kiedrzyńska E, Zalewski M. Water Quality Improvement Through an Integrated Approach to Point and Non-Point Sources Pollution and Management of River Floodplain Wetlands. In: Voudouris K, Voutsa D. (eds). Ecological Water Quality – Water Treatment and Reuse. INTECH Open Access 2012, 325-342.

- K. Izydorczyk, W. Frątczak, J.Mankiewicz-Boczek, I. Gągała, E. Cichowicz, L.Courseau, T. Jurczak, M. Zalewski. 2012. Biotechnologie ekohydrologiczne – narzędziem do poprawy jakości wód zlewni Pilicy i potencjału ekologicznego Zbiornika Sulejowskiego. W: Raport o stanie środowiska w województwie łódzkim w 2011 roku. Biblioteka Monitoringu Środowiska Łódź: 72-77.
- Frątczak, W, Izydorczyk, K., Zalewski M. 2012. Ekotony dla redukcji zanieczyszczeń obszarowych. Gospodarka Wodna, kwartalnik WODA 3: 1-4.
- Zalewski M., Wagner I., Fratczak W., Mankiewicz-Boczek J., Parniewski P. 2012. Blue-Green City for compensating Globar Climate Change. The Parliament Magazine – Politics, Policy and People, 350: 2-3. http://www.theparliament.com/digimag/issue350
- Zalewski M., Chcharo L. 2012.The recent progress in Ecohydrology evelopment and implementation in UNESCO Ecohydrology Centers. SIL News 60: 8-9

2013

- Gągała I., Izydorczyk K., Jurczak T., Pawełczyk J., Dziadek J., Wojtal-Frankiewicz A., Jóźwik A., Jaskulska A., Mankiewicz-Boczek J. Role of Environmental Factors and Toxic Genotypes in The Regulation of Microcystins-Producing Cyanobacterial Blooms. Microbial Ecology 2013. DOI: 10.1007/s00248-013-0303-3,
- Kokociński M., Mankiewicz-Boczek J., Jurczak T., Spoof L., Meriluoto J., Rejmonczyk E., Hautala H., Vehniäinen M., Pawełczyk J. Aphanizomenon gracile (Nostocales), a cylindrospermopsin-producing cyanobacterium in Polish lakes. Environ. Sci. Pollut. Res. 2013. 20: 5243-5264.
- Mankiewicz-Boczek J., Imsiridou A., Kaczkowski K., Tsiora A., Karaiskova N., Łapińska M., Minos G., Zalewski M. Genetic diversity of perch populations in three lowland reservoirs (Central Poland): perspective for fish sustainable management. Polish Journal of Ecology 2013. 61 (2): 385-390.
- Urbaniak M, Kiedrzyńska E., Kiedrzyński M., Mendra M., Grochowalski A. The impact of point sources of pollution on the transport of micropollutants along the river continuum. Hydrology Research. 2013. DOI:10.2166/nh.2013.242

- Urbaniak M., Kiedrzyńska E., Zieliński M., Rydzyński K., Zalewski M. Spatial distribution of PCDDs/PCDFs and reduction of TEQ concentrations along three large Polish reservoirs. Environmental Science and Pollution Research. 2013. DOI: 10.1007/s11356-013-2401-7.
- Ye S., Lian Y., Godlewska M., Liu J. and Li Z., Day-night differences in hydroacoustic estimates of fish abundance and distribution in Lake Laojianghe, China. J. Appl. Ichthyol. 2013. 29: 1423–1429
- Izydorczyk K., Frątczak W., Drobniewska A., Cichowicz E., Michalska-Hejduk D., Gross R., Zalewski M
- A biogeochemical barrier to enhance a buffer zone for reducing diffuse phosphorus pollution – preliminary results. Ecohydrology & Hydrobiology 2013. 13: 104-112.

- McClain, M.E. , DuBowy, P.J., Zalewski, M Ecohydrology for harmonization of societal needs with the biosphere potential. Ecohydrology & Hydrobiology
- 2013. 13 (1): 3-5.
- Wagner, I., Breil, P. The role of ecohydrology in creating more resilient cities. Ecohydrology & Hydrobiology
- 2013 13 (2): 113–134.
- Zalewski M. Ecohydrology: Process oriented thinking towards sustainable river basins. Ecohydrology & Hydrobiology
- 2013. 13 (2): 97-103.
- Frątczak W., Izydorczyk K., Zalewski M. Wysokoefektywne strefy buforowe dla zwiększenia potencjału ekologicznego i turystycznego zbiornika sulejowskiego. Gospodarka Wodna. 2013. 12: 479-483
- Izydorczyk K., Frątczak W., Zalewski M. Strategia zastosowania ekohydrologicznych metod i rozwiązań systemowych dla redukcji toksycznych zakwitów sinicowych w Zbiorniku Sulejowskim. Gospodarka Wodna 2013. 12: 474-478Urbaniak M. 2013.
- Biodegradation of PCDD/PCDF and dl- PCB. Chamy R., Rosenkran F. (Eds) Biodegradation - Engineering and Technology. INTECH Publisher, ISBN 978-953-51-1153-5, pp. 73-100. 2013
- Wagner, I., Krauze K., Zalewski, M. Blue aspects of green infrastructure Bergier, T., Kronnenberg, J., Lisicki, P. nature in the city - solutions. Sustainable development – applications (nr 4/2013). Sendzimir Foundation.
- Zalewski M., Izydorczyk K., Wagner I., Mankiewicz-Boczek J., Urbaniak M., Frątczak W. 2013.. Ecohydrology – transdisciplinary sustainability science for multicultural cooperation Griffiths J. and Lambert R. [Eds.] Free Flow Reaching Water Security Through Cooperation. UNESCO, Paris, France, pp 299-303. 2013
- Wagner, I., Krauze K., Zalewski, M. Błękitne aspekty zielonej infrastruktury. Bergier, T., Kronnenberg, J., Lisicki, P. Przyroda w mieście - Rozwiązania. Zrównoważony Rozwój - Zastosowania 4: 145-155. 2013
- Izydorczyk K., Frątczak W., Zalewski M. 2013. Poprawa jakości wody w obszarach użytkowanych rolniczo w wyniku zastosowania biotechnologii ekohydrologicznych. Panorama PAN 3: 2-4.

- Wagner I., Zalewski M. 2013. Błękitno-Zielona Sieć – poprawa jakości życia w miastach w obliczu zmian klimatu. Panorama PAN4 (4): 9-12.

- Wagner I., Zalewski M. 2013. SIL Working Group on Ecohydrology, Symposium Report International Symposium: Ecohydrology, Biotechnology & Engineering: Towards Harmony between the biogeosphere and Society on the basis of Long-Term Ecosystem Research. 17-19 September 2013, Łódź, Poland. SIL News 63.

- Wagner, I., Zalewski. M. 2013. Błękitno-zielona Sieć. Zieleń Miejska. Zeszyt specjalny 1/2013.

- Zalewski M. 2013. Ekohydrologia – regulacja procesów ekologicznych dla osiągnięcia trwałego rozwoju. Panorama PAN 2 (2): 2-3.

2014

- Guillard J., Lebourges-Daussy A., Balk H., Colon M., Jóźwik A. Godlewska M. Comparing hydroacoustic fish stock estimates in the pelagic zone of temperate deep lakes using three frequencies (70, 120, 200 kHz). Inland Waters (in press)
- Kiedrzyńska E., Kiedrzyński M., Urbaniak M., Magnuszewski A., Skłodowski M., Wyrwicka A., Zalewski M. Point sources of nutrient pollution in the lowland river catchment in the context of the Baltic Sea eutrophication. Ecological Engineering
- Kiedrzyński M., Kiedrzyńska E., Witosławski P., Urbaniak M., Kurowski J.K. 2014. Historical land use, actual vegetation and the hemeroby levels in ecological evaluation of an urban river valley in perspective of its rehabilitation plan. Polish Journal of Environmental Studies 23: 1, 109-117
- Kiedrzyński M., Zielińska K.M. Kiedrzyńska E., Jakubowska-Gabara J. 2014. Regional climate and geology affecting habitat availability for a relict plant in a flat landscape: the case of Festuca amethystina L. in Poland. Plant Ecology & Diversity,
- Skłodowski M., Kiedrzyńska E., Kiedrzyński M., Urbaniak M., Zielińska K.M., Kurowski, J.K., Zalewski M., The role of riparian willow communities in phosphorus accumulation and dioxin control for water quality improvement in a lowland river. Ecological Engineering
- Godlewska M., Doroszczyk L., Długoszewski B., Kanigowska E. Long-term decrease of the vendace population in Lake Pluszne (Poland) – result of global warming, eutrophication or both? Ecohydrology&Hydrobiology
- Bednarek A., Szklarek S., Zalewski M. A comparison of the effectiveness of various biotechnological methods to enhancing denitrification for N removal from areas of intensive farming. Ecohydrology & Hydrobiology.
- Wyrwicka A., Steffani S., Urbaniak M., The effect of PCB-contaminated sewage sludge and sediment on metabolism of cucumber plants (Cucumis sativus L.). Ecohydrology & Hydrobiology 14,75–82,
- Bednarek A., Zalewski M., Mankiewicz-Boczek J. Denitrification ditches as a bioremediation tool for the removal of the nitrogen pollution and protection of groundwater in rural area. In: Skowronek J. [ed.] Innovative solutions for revitalisation of degraded areas (pol. Innowacyjne rozwiązania rewitalizacji terenów zdegradowanych) - accepted for print

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- International Symposum: Ecohydrology, Biotechnology and Engineering: Towards Harmony between the Biogeosphere and Society on the basis of Long Term Ecological Research, Lodz, September 2013,
- Co-organisation of III Krajowe Warsztaty Ekotoksykologiczne "Praktyczne wykorzystanie systemów bioindykacyjnych do oceny toksyczności środowiska i substancji chemicznych" (11-12 kwietnia 2013, Łodź)
- Innovative and system solutions for reducing diffuse pollution in Europe: demonstration catchments. 2-4 June 2014, Bronisławów

- 4th International Congress, June 4-5 2014 in Turek – co-organised with ProBiotics Polska

1.6.2 Participation in meetings abroad

- UNESCO International Year of Water Cooperation – Closing Event Working Group – Preparing Recipes for Water Cooperation, *Mexico City, Mexico, December 5th – 6th 2013*
- The Twenty-third IHP Training Course: Ecohydrology for River Basin Management under Climate Change, "Ecohydrology: process oriented thinking towards sustainable enhancement, water resources, biodiversity, ecosystem services and resilience to climate change; *Kyoto, Japan, December 2nd – 13th 2013*
- World Water Summit; Water and Sanitation in the Global Sustainable Development, *Budapest, Hungary October 8th – 11th 2013*
- UNESCO Strategic and High-Level Meeting on Water Security and Cooperation *Nairobi, Kenya September 11th - -13th 2013*
- 6th International Conference on Water Resources and Environment Research; *Koblenz, Germany June 3rd – 7th 2013* International Seminar on Ecohydrology, Biotechnology and Engineering: Towards the Harmony between Biogeosphere and Society on basis of Long Term Ecosystem Research, *Brno, Olomuniec; Czech Republic; April 8-10th 2013*
- UN International Year of Water Cooperation 2013, *Paris, February 11th 2013*
- 1st Meeting of the Implementation Working Group UNESCO International Hydrological Programme (IHP), *Koblenz, December 10th - 12th 2012*
- EcoSummit 2012, Columbus, Ohio, USA, 30 September – 5 October 2012
- International Seminar on Ecohydrology and Global Water Issues, Faro, Portugal, September 2012
- CIWEM Riwers & Coastal Group Conference on Flood Plain Management: Implementing International Experience in the UK, Birmingham, UK, May 2012
- Planet under Pressure International Conference, London, UK, March 2012
- Euroscience Open Forum 2012, Dublin, Ireland, June 2012
- ALTER-Net Conference: Science underpinning the EU 2020 Biodiversity Strategy. Ghent, Belgium, April 2013

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation
Ministry for Foreign Affairs Republic of Poland
Polish Academy of Sciences
Ministry of Science and Higher Education

1.7.2 Completed and ongoing scientific projects

- "Towards Engineering Harmony Between Water, Ecosystem and Society. Strengthening the Collaboration between European Academies of Sciences in the IAP Water Programme". IAP 3240226102/010/013.
- EU Life+ ENVEUROPE: Environmental quality and pressures assessment across Europe: the LTER network as an integrated and shared system for ecosystem monitoring. LIFE08 ENV/IT/000399.

- Ecohydrology - a transdysciplinary science for integrated water resources and sustainable development in Ethiopia. Co-operation with Ministry of Water Resources of Ethiopia. Project financed by the Ministry for Foreign Affairs.
- EU FP7 EXPEER: Distributed Infrastructure for EXPErimentation in Ecosystem Research. FP7-INFRASTRUCTURES-2010-1.
- ALTER-Net: A Long-Term Biodiversity, Ecosystem and Awareness Research Network. (Network of Excellence, 6th FP EU)
- EU Life+ EKOROB: Ecotones for reducing diffusion pollution. LIFE08 ENV/PL/000519.
- EU Life+ EH-REK: Ecohydrologic rehabilitation of Arturowek recreational reservoirs (in Lodz) as a model approach to rehabilitation of urban reservoirs. LIFE08 ENV/PL/000517.
- "Analysis of point sources pollution of nutrients, dioxins and dioxinlike compounds in the Pilica River catchment and draw up of reclamation methods". N305 365738. Project financed by the Ministry of Sciences.
- PBS1/A8/2012 MIKRAZO - Microbial activators in denitrifying deposits used for the treatment of nitrate pollution for the implementation of the Water Framework Directive and the Nitrates Directive.
- N305 3657 58 „Analysis of point sources pollution of nutrients, dioxins and dioxin-like compounds in the Pilica River catchment and draw up of reclamation methods”
- UMO-2012/07/B/NZ8/03991 Application of reporter cell biosensors in ecotoxicology of cyanobacteria: new targets for bioactivity,
- UMO-2012/07/N/NZ8/00599. Assessment of the interaction between hepatotoxic cyanobacterium Microcystis aeruginosa and pathogenic bacteria of the genus Aeromonas,
- UMO-2012/05/B/NZ9/00980 Do fish adapt to cyanobacterial blooms?,
- PBS1/A8/0/2012 Microbial activators in denitrification deposits used for the treatment of nitrate pollution for the implementation of the Water N N305 096439 Framework Directive and the Nitrates Directive Explanation of cause-effect relationships between the occurrence of toxinogenic cyanobacterial blooms, and abiotic and biotic factors with particular emphasis on the role of viruses and bacteria

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

- Conference: ALL Scientist Meeting of Global LTER Network 2014.Interface with IHP: Coupling long term information about ecological processes with socio-economic dynamics, forecasting trends with respect to global change and ecosystem performance
- The Pilica River Global Reference Site for UNESCO IHP Ecohydrology "Development and implementation of the Ecohydrology concept for reduction cyanobacterial blooms in a man-made reservoir (Pilica River Catchment, Poland)"
-

2.2 Activities foreseen for 2015-2016

- PROJECT: 2013 – 2016 Application of reporter cell biosensors in ecotoxicology of cyanobacteria: new targets for bioactivity,

submitted as a national project to NCN - National Science Centre of the Republic of Poland

- NATIONAL RESEARCH PROJECT: 2013 – 2016 Do fish adapt to cyanobacterial blooms?, UMO-2012/05/B/NZ9/00980, national project funded by the NCN - National Science Centre of the Republic of Poalnd
- NATIONAL RESEARCH PROJECT: 2012 – 2015 Microbial activators in denitrification deposits used for the treatment of nitrate pollution for the implementation of the Water Framework Directive and the Nitrates Directive PBS1/A8/0/2012, national project funded by the National Research and Development Centre (the Republic of Poland)

2.3 Activities envisaged in the long term

- Cooperation with Africa: "Elaboration of the basis for the establishment of the Ethiopian Centre for Ecohydrology", Partner of the Project: Ministry of Water and Energy of Ethiopia

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 REPUBLIC OF KOREA IHP-NC	Country Priorities 2008-2009	Country Participation in Theme and Focal area 2008-2013	Events organized in the Country	Activity lead/Coordinated by the Country
IHP VII Themes and Focal areas				
Theme 1:				MLTM/KWRA*
Focal area 1.1	●	2008-2009		MLTM/KWRA
Focal area 1.2	●	2009-2010		MLTM/KWRA
Focal area 1.3		●2011-2013		MLTM/KWRA
Focal area 1.4	●	2008-2009		MLTM/KWRA
Focal area 1.5				
Theme 2:				MLTM/KWRA
Focal area 2.1		●2010		MLTM/KWRA
Focal area 2.2	●	2008-2009		MLTM/KWRA
Focal area 2.3		●2010-2011		MLTM/KWRA
Focal area 2.4		●2011-2013		MLTM/KWRA
Focal area 2.5				
Theme 3:				
Focal area 3.1	●	2008-2009		MLTM/KWRA/IHES*
Focal area 3.2	●	2008-2009		MLTM/KWRA/IHES
Focal area 3.3		●2010-2011		MLTM/KWRA/IHES
Focal area 3.4		●2011-2012		MLTM/KWRA/IHES
Theme 4:				
Focal area 4.1	●	2008-2009		MLTM/KWRA
Focal area 4.2				MLTM/KWRA
Focal area 4.3		●2010-2011		MLTM/KWRA
Focal area 4.4		●2011-2013		MLTM/KWRA
Theme 5:				
Cross-cutting programmes				
HELP	●	2008-2013		MLTM/IHES
FRIEND	●	2008-2013		MLTM/IHES
Associated programmes :				MLTM/IHES
International Flood Initiative(IFI)	●	2008-2013		
International Sediment Initiative(ISI)				
Water for Peace(PCCP)				
UNESCO-IAEA Isotope(JIIHP)				
Shared Aquifer(ISARM)				
Global Network Arid Lands(G-WADI)				
Unban Water Management(UWMP)	●	2008-2013		MLTM/KWRA
World Hydrogeological Map(WHYMAP)				

* MLTM : Ministry of Land, Transport and Maritime Affairs
KWRA : Korea Water Resources Association
IHES : International Hydrologic Environmental Society

* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

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 casse studies in HELP experimental river basins
FRIEND	Regional comparative case studies in Asia-Pacific river basins
Associated programmes :	
International Flood Initiative(IFI)	Regional case studies on flood and water-related disasters
International Sediment Initiative(ISI)	
Water for Peace(PCCP)	
UNESCO-IAEA Isotope(JIIHP)	
Shared Aquifer(ISARM)	
Global Network Arid Lands(G-WADI)	
Unban Water Management(UWMP)	Development of urban water management strategies and technologies
World Hydrogeological Map(WHYMAP)	

* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

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(KFWSES); Korea Institute of Construction Technology(KICT); Korean Universities Hydrology and Water Resources Programmes.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

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

1.3.2 Organization of specific courses

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

1.3.3 Participation in IHP courses

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

1.4 Cooperation with the 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 Committee of Russia for the International Hydrological Programme of UNESCO

Report of the Russian National Committee for the IHP to the XXI Session of the Intergovernmental Council for the IHP of UNESCO (June 2014)

Moscow – St Petersburg
2014

Contents

Introduction

The present report is prepared at the State Hydrological Institute based on materials received from the following agencies and organizations:

- State Hydrological Institute of Roshydromet (SHI)
- State Oceanographic Institute of Roshydromet (SOI)
- State Hydrochemical Institute of Roshydromet
- All-Russian Research Institute of Hydrometeorological Information of Roshydromet
- Caspian Marine Scientific and Research Center of Roshydromet
- Federal Agency for water resources (RosVodResursy)
- Moscow State University
- Institute of Geography RAS
- Russian State Hydrometeorological University (RSHU)
- Institute of Water Problems RAS
- Institute of Water and Ecological Problems SB RAS
- Institute "Hydroproject"

The Report is prepared according to the structure, format and volume developed at the UNESCO IHP Secretariat.

1. Activities undertaken in the period June 2012 – May 2014

1.1 Meetings of the IHP National Committee

Decisions regarding the composition of the IHP NC of Russia

The NC of Russia (hereinafter the NC) exists since International Hydrological Programmes of IHD/IHP were launched by UNESCO. The personal composition of the NC, however, has been renewed periodically. The present NC composition was nominated by the Russian Government in 2003. The Chairperson of the NC is the Head of Roshydromet Dr Alexander V. Frolov, the deputy Chairpersons are Academician Victor M. Kotlyakov, Director of the Institute of Geography RAS, and Dr Vladimir Yu. Georgievskiy, Director of the State Hydrological Institute of Roshydromet (in accordance with the decision of the NC of 19.10.2011 and the appointment order № 635 of 29.11.2011 issued by the Head of Roshydromet). At present the Committee consists of 21 members – scientists and specialists known both in Russia and all over the world, representatives of different ministries, departments, organizations and institutions working actively in the fields of hydrometeorology, water resources, water management, education and training.

Major topics addressed

In 2012-2014 the NC performed activities in accordance with the following plan:

1. In 2012 two meetings were held aimed at reviewing accomplishments of important events related to hydrology and water sector organized in the country, as well as building common position of the NC on key issues of international cooperation in the above areas. In last meeting it was decision to organize the VII All-Russian Hydrological Congress in 2013.

2. In 2013 two meetings were held which focused on preparation and conduct of the VII All-Russian Hydrological Congress held in St. Petersburg from 19 to 21 November 2013. This important event was organized in accordance with the order of the Government of the Russian Federation. State Hydrological Institute was assigned responsibility for preparation and conduct of the event.

Members of the NC proactively participated in the conduct and discussing the outcomes of the VII All-Russian Hydrological Congress. A special meeting of the NC was held in St. Petersburg during the Congress. The meeting noted the extensive work of the Organizing Committee on organization of the Congress. Members of the NC made their contributions to preparation of the draft Decision of the VII All-Russian Hydrological Congress.

1.2 Activities at international level in the framework of IHP

1.2.1 Status of IHP activities and contribution to IHP-VII

During the reporting period, the NC implemented activities at national and international levels on the following IHP-VII Themes:

Theme 1: Adapting to the impacts of global changes on river basins and aquifer systems
Focal Area 1.1 – Global changes and feedback mechanisms of hydrological processes in stressed systems
Focal Area 1.2 – Climate change impacts on the hydrological cycle and consequent impact on water resources
Focal Area 1.3 – Hydro-hazards, hydrological extremes and water-related disasters
Focal Area 1.4 – Managing groundwater systems' response to global changes
Focal Area 1.5 – Global change and climate variability in arid and semi-arid regions
Theme 2: Strengthening water governance for sustainability
Focal Area 2.2 – Capacity development for improved governance; enhanced legislation for wise stewardship of water resources
Focal Area 2.4 - Managing water as a shared responsibility across geographical and social boundaries
Theme 3: Ecohydrology for sustainability
Focal Area 3.3 - Risk-based environmental management and accounting
Focal Area 3.4 - Groundwater-dependent ecosystems identification, inventory and assessment
Theme 5: Water education for sustainable development
Focal Area 5.1 - Tertiary water education and professional development
Focal Area 5.2 - Vocational education and training of water technicians
Focal Area 5.3 - Water education in schools

In the reporting period the NC ensured timely preparation of documents on liaison with National Committees for the IHP of the Group II members.

In April 2014 materials were provided for publication in the Bulletin of Commission of the Russian Federation for UNESCO on results of 60 years of cooperation between USSR/Russia and UNESCO. It was noted that international cooperation in the framework of IHP is especially vital for Russia during the period of intensive development of globalization, enhancement of international cooperation and also for promoting the global visibility of Russia and especially the Russian science. Proactive participation of Russian scientists in IHP is especially important in the period when anthropogenic climate change and its impact on nature, and particularly water resources, are observed, when it is widely recognized that water aspects will be playing even greater role in development of economy and well being of the country than energy aspects. If this occurs, Russia on the one hand will require up-to-date hydrological and climatological data from many regions to handle its water issues, but on the other hand the wealth of experience of Russian scientists in handling global water issues will be much required all over the world with all benefits for Russia arising form this.

In September 2013 Zh. Balonishnikova, a member of the NC, participated in the meeting of the working group for the VIII IHP phase Strategic Implementation Plan "Water Security: Responses to Local, Regional and Global Challenges" 2014-2021 (12-13 September 2013, Nairobi, Kenya). The meeting was aimed at shaping the final version of the VIII IHP phase and its implementation plan for each of the six Themes.

The official website of NC for the IHP of UNESCO was launched in 2009 at: www.ihp-russia.ru and it is maintained and updated regularly. The site contains information on the IHP objectives and tasks, as well as documents describing the structure and governing bodies. The site is regularly updated with the IHP Secretariat newsletters and information on forthcoming IHP events.

Main contributions of the NC to the IHP-VII (2008 – 2013) in the reporting period were numerous publications, including monographs, VII All-Russian Hydrological Congress successfully held in 2013, as well as scientific conferences and meetings (see paragraphs 1.2.2, 1.2.6, 1.6.1).

1.2.2 National scientific and technical meetings

The most important event organized under the auspices of the Russian NC in the reporting period was the VII All-Russian Hydrological Congress held from 19 to 21 November 2013 in St. Petersburg.

Traditionally, hydrological congresses in Russia (USSR) are of critical importance for development of national hydrological science and water sector.

In accordance with the order of the Government of the Russian Federation, the Head of Roshydromet A. Frolov was appointed the Chairperson of the Organizing Committee and the Director of SHI V. Georgievskiy a Chairperson of the Programme Committee.

The Congress was attended by 702 participants, including 47 specialists from the CIS and some other countries. 386 reports were provided for Plenary meeting, five section meetings (both oral and poster presentations) and the round table on hydrological education.

An international exhibition of hydrometeorological instruments "Hydrology Expo – 2013" was organized as a side event during the Congress. The Congress was jointly organized by Roshydromet, Rosvodresursy, Russian Academy of Sciences, Ministry of Education and Science of the Russian Federation and other agencies.

The following were noted among major achievements made in the last decade after the VI Hydrological Congress:

- up-to-date assessments of water resources and hydrological regime of the Russian rivers, taking into account the impact of human activities and climate change;
- further development of hydrological simulation models and their practical application;
- development and improvement of existing hydrological forecasting methods, also taking into account ice phenomena in rivers; progress to automated techniques of forecasting hydrological characteristics;
- development of methods to calculate and forecast hydrological hazards;

– development of new methods and techniques to characterize hydrological regime of rivers and water bodies (remote sensing techniques, use of lasers, isotope analysis and others);

– development and modernization of hydrological observation system in the Kuban, Ob and Ussuri basins;

– development and implementation of automated information system of State Water Register;

– development and implementation of automated information system of state water monitoring.

Considering strategic goals defined in the Water Strategy of the Russian Federation for the period until 2020 (i.e. secured provision of water resources for population and economy, protection and restoration of water bodies, protection against the negative effects of water), the Congress defined the following priorities for hydrology and water sector in the coming years:

- ✓ ensure achievement of objectives of the Federal target program «Development of Water Sector of the Russian Federation in 2012-2020»;
- ✓ undertake current and prospective assessment of surface and groundwater resources, hydrological regimes of water bodies, water resources usage and availability in different regions of the country under the impact of changing climate and human activities;
- ✓ further development of hydrological forecasting systems, including hydrological hazards, based on the use of automated methods and means of observations;
- ✓ further improvement of hydrological simulation and physical models, more active application of models for handling of applied problems in hydrology and water sector and provision of a hydrological rationale for mitigation measures;
- ✓ hydrological monitoring data generalized in the form of reference books and updated maps of design hydrological characteristics of water bodies, as well as annual issues of Water Cadastre;
- ✓ monitoring of flow formation processes and other water balance components as well as their drivers under changing climate conditions;
- ✓ development of scientific basis and practical recommendations for river bed evolution process control and regulation, especially for its hazardous manifestations, in the developed areas;
- ✓ further development of studies of hydrological regime and hydromorphological processes at river mouths; development of morphogenetic classification of river mouths as a fundamental basis for predicting the dynamics of different types of river mouths under changing climate conditions and active anthropogenic impact;
- ✓ implementation of water bodies restoration programmes (including minor rivers) in regions where unfavourable conditions in terms of water management and environment occur;
- ✓ elaboration of methodology and technological basis for ecosystem water use;
- ✓ further improvement and modernization of hydrological observation network, including modernization of specialized observation network; carrying out coordinate and elevation referencing of observation sites across Russia; improvement of regulatory and procedural framework for maintaining the State Water Register and Cadastre;
- ✓ extensive implementation of satellite-based techniques and information in hydrological sciences and practices;
- ✓ establishment of updated interagency databases of long-term hydrological data available for a wide range of users, including those basin-centered and based on advanced information technologies; enhanced hydrological measurements and products; ensuring unrestricted access of users to information resources in hydrology and water sector; improved online information products;
- ✓ restoration and development of specialized hydrological observation sites (bog and water balance stations, soil, snow cover and water surface evaporation observation sites);
- ✓ ensure coordination of research in hydrology and water management between organizations of Roshydromet, Federal Water Resources Agency (Rosvodresursy), Federal Agency for Subsoil Use (Rosnedra), Russian Academy of Sciences and organizations of other ministries and agencies carrying out hydrological research;
- ✓ strengthening the engagement of Russian hydrologists in international cooperation within the framework of the WMO and UNESCO Programmes, programmes of other international organizations pertinent to hydrology and climate, and the activities of the Intergovernmental Panel on Climate Change;
- ✓ improvement of regulatory policies in water sector and in the field of government administration;

- ✓ further strengthening of technical, technological and computer facilities of hydrological production units of Roshydromet and other agencies, as well as scientific and educational hydrological organizations;
- ✓ training of hydrologists of different qualifications, especially hydrological technicians, provision of support to young scientists and specialists in the field of hydrology and water management, substantial raising of payment for labour of staff of the state hydrological observation network.

Participants were of the opinion that the VII All-Russian Hydrological Congress was a substantial contribution of the Russian Federation to implementation of the events aimed at strengthening cooperation in the field of water resources and tackling water resources management problems within the framework of the UN International Year of Water Cooperation 2013.

NC of Russia also participated in the following scientific and technical activities with relevance to hydrology, water resources and water sector:

- ➢ 14th Biennial Conference ERB 2012 "Studies of Hydrological Processes in Research Basins: Current Challenges and Prospects" (St. Petersburg, 17-20 September 2012)

The conference was convened by the ERB Steering Committee in cooperation with:

- IHP UNESCO North European FRIEND Project 5
- State Hydrological Institute, St.Petersburg
- Russian IHP Committee and Roshydromet
- Germany IHP-HWRP

The conference mainly focused on the following topics:

- Uncertainties in surface and ground water interactions;
- Changes in hydrological regimes resulting from climate variations and human impacts;
- Current state, problems and perspectives of hydrological modelling;
- Study of runoff formation in research basins and the transfer of results to ungauged basins;
- New methods for water balance components measurements;
- Open session on hydrological and ecologically related research in small basins.

- ➢ Annual International Forum "Great Rivers", Nizhny Novgorod (2012, 2013. 2014);
- ➢ All Russian Scientific Conference "Current problems of stochastic hydrology and flow regulation", 10-12 April 2012, Moscow;
- ➢ Workshop "Monitoring of coastal and bottom conditions of reservoirs", Novosibirsk, 30 July - 1 August 2012;
- ➢ All-Russian Scientific Conference attended by international participants "Water and ecological problems of Siberia and Central Asia", Barnaul, 20-24 August 2012;
- ➢ International Scientific Conference on regional problems of hydrometeorology and environmental monitoring (Kazan, 2-4 October 2012). The conference was held in conjunction with the celebration of the 200th anniversary of the start of meteorological observations in Kazan and the 20th anniversary of the Intergovernmental Council for hydrometeorology of CIS;
- ➢ Scientific Conference "From International Polar Year towards International Polar Initiative", 8-10 October 2012, Sochi;
- ➢ III International Forum "Clean Water", 6-7 November 2012, Moscow.
- ➢ International Conference "Arctic Zone of the Russian Federation: North-Eastern Vector of Development", 28-30 November 2012, St. Petersburg;
- ➢ IV All-Russian Conference "Ice and thermal processes in water bodies of Russia" 24-29 June 2013, Rybinsk;
- ➢ Joint meeting of the Scientific Council of Roshydromet, Scientific Council of RAS "Research on the Earth climate theory" and the Scientific Council of Rosvodresursy "Extreme Flooding of 2013 in the Amur Basin: Origin, Forecast, Recommendations" February 2014, Moscow.

1.2.3 Participation in IHP Steering Committees/Working Groups

In the period 4-7 June 2012 Russian delegation participated in the 20th session of the Intergovernmental Council for the IHP of UNESCO. The delegation consisted of NC members from various agencies, including Federal Agency for Water Resources, State Hydrological Institute, State

Oceanographic Institute and Russian State Hydrometeorological University. The delegation submitted to the IHP Secretariat a comprehensive report on the activities in the period 2010-mid 2012 prepared by the NC of Russia on the basis of materials provided by all members of the NC.
The delegation included:
1. V. Georgievskiy, Director of SHI, Deputy Chairman of the NC of Russia for the IHP of UNESCO, Head of the delegation;
2. O. Gorelits, Senior Scientist, State Oceanographic Institute, Executive Secretary of the NC of Russia for the IHP of UNESCO;
3. Zh. Balonishnikova, Scientific Secretary of SHI;
4. V. Sakovitch, Candidate of Sc. in Geography, Vice-rector, Russian State Hydrometeorological University.

Russian delegation participated actively in all plenary meetings of the 19th Session of the IHP Intergovernmental Council, its representatives reporting on all key issues of the Agenda. Consultations were held during working meetings with the Secretariat and meetings of RA II countries (East and Central European countries). Representative of NC Zh. Balonishnikova was elected to the IHP publications and communications committee. O. Gorelits and Zh. Balonishnikova participated in daily sessions of the IHP finance committee and publications and communications committee.

Russian delegation initiated a meeting with Prof. S. Demuth, Chief of the Section of Hydrological Processes and Climate, UNESCO Division of Water Sciences, representatives of the IHP Panel and the UNESCO IHP Secretariat which discussed the issue of assigning the WMO International Data Centre on Hydrology of Lakes sand Reservoirs (HYDROLARE, St. Petersburg) the status of the UNESCO Category II Centre. Russian delegation was provided all appropriate documentation and ensured the support of the Panel and the Secretariat. Future activities were outlined to further implement this initiative.

1.2.4 Research/applied projects supported or sponsored by the NC

In view of implementation of the «Water strategy of the Russian Federation for the period 2020», the government of the Russian Federation approved in April 2012 a Federal Target Programme «Development of the water management complex of the Russian Federation until 2020». The main objectives of the programme are to ensure secured provision of water resources for sustainable socio-economic development of the Russian Federation, preserve and restore water bodies to a condition ensuring ecologically favorable environment for population, protection of population and economic objects from floods and other negative impacts of waters, as well as to develop and improve hydrological monitoring systems. The programme is coordinated by the Ministry of Natural Resources. **In the framework of activities under Theme 1** during the last two years, the organizations of Roshydromet, Rosvodresursy and RAS obtained important scientific and applied outcomes on the above Federal Target Programme:

- Development of techniques for automated monitoring and forecasting of hazardous fast-breaking events on rivers, methods of forecasting elements of hydrological regime for rivers and reservoirs of the Russian Federation (contribution to Focal Area 1.3)
- Development of administrative, methodological and technological solutions for development and improvement of the hydrological forecasting system in the Ob and Yenisei basins (contribution to Focal Area 1.2)
- Improvement of methods and techniques for forming hydrological forecasts for lower reaches and mouths of large rivers of the Arctic Russia (contribution to Focal Area 1.2)
- Modern and prospective assessment of the water resources and water availability of Russia with account of climate change (contribution to Focal Area 1.3)
- Study of transformations in water, ice and thermal regimes of rivers in the Volga basin (contribution to Focal Area 1.2)
- Development of related sections for reference books and updated maps of best estimates of specific discharges in the Upper Volga, Kama and Lower Volga basins (contribution to Focal Area 1.2)
- Provision of information and methodological support for the work of representatives of Russia in joint commissions of neighbouring countries for the issues of water use and protection in transboundary basins of the Selenga, Irtysh and Ural rivers (contribution to Focal Area 3.3)

- Integrated research of channel processes and ice jams formation in the confluence of the Sukhona-Yug-Small Northern Dvina rivers for ice jam regulation and development of flood protection measures at the city of Velikiy Ustyug (contribution to Focal Area 1.3)
- Main physical processes and regularities of formation of hydrological regime of water bodies under climate warming explored and the forecast of possible changes for the perspective reflecting state-of-the-art of the climate scenarios developed (contribution to Focal Area 1.2)
- Studies of spatial and temporal regularities of ice and thermal processes (contribution to Focal Area 1.3)
- Assessment of the state, trends and the dynamics of contamination of surface waters in rivers of the Russian Federation, development and publication of routine and reference papers (contribution to Focal Area 1.2)
- Development of a technique and a GIS-technology for the use of ground and aircraft snow surveys in mountainous areas for improvement of forecasting hazardous floods, floodings and landslides on mountain rivers (contribution to Focal Area 1.3)

In the framework of activities under Theme 2 substantial progress has been achieved in development and enhancement of transboundary water cooperation . Intergovernmental agreements have been concluded on protection and use of transboundary water bodies with Ukraine, Estonia, Finland, Belarus, Kazakhstan, Mongolia, Abkhazia, China and Azerbaijan. Implementation of the agreements and plans resulted in positive dynamics of intergovernmental cooperation and representation of interests of the Russian Federation in protection and use of transboundary waters.

In the framework of activities under Theme 5, Focal Area 5.1 "Tertiary water education and professional development", 56 students were trained in 2012, 79 in 2013 and 56 in 2014 at the RSHU. The RSHU also organized the following events:

- All-Russian student academic competition on hydrometeorology and applied hydrometeorology (April 2012, 2013, 2014; 50-60 participants);
- International Russian-Polish student workshop "Modern problems of hydrology" (April 2013, 35 participants);
- Field trip to lake Sveltoyar for the students of RSHU Hydrology Department jointly with the staff of the Institute of Limnology RAS (June 2013, 5 participants).

Under the agreements signed between RSHU and:

- the Nicolaus Copernicus University, (Toruń, Poland) - training for students of RSHU under hydrological education development programme (May 2012, 2013) and training for Polish students and one trainer at RSHU training facilities (July 2012, 2013) – 6 students at each training courses;
- the Yerevan State University (Armenia) – summer training courses under hydroecological programme for students from RSHU at lake Sevan (Armenia) and for students from Yerevan at the training and observation station on Valaam Island, Ladoga Lake (July 2012, 2013) – 6 students and a trainer at each courses.

In the framework of activities under Focal Area 5.2 the following training courses were organized:

- «Engineering hydrological calculations. Current problems and solutions» (annually), State Hydrological Institute, St. Petersburg;
- «Automatic hydrological station AGK. Acoustic Doppler current profilers. Methodological provision of hydrological means of measuring level and flow velocity» (19- 30 May 2014), State Hydrological Institute, St. Petersburg;
- International workshop and school-seminar for young scientists and post-graduates «First Vinogradov's Readings. The Future of Hydrology» (16 -18 November 2013), St. Petersburg;
- Round Table «Hydrological Education. Problems and Perspectives» (November 2013 in the framework of the VII All Russian hydrological Congress);
- «Monitoring of surface water pollution. Principles of monitoring system organization, methods and technical tools» (24 September - 6 October 2012), State Hydrochemistry University, Rostov-on-Don.

In the framework of activities under Focal Area 5.3 the following events for schools were organized:

- Preparatory courses at RSHU (October 2012 – April 2014; 145 attendees);
- RSHU Open Days – outreach and educational guidance meetings with high school students and their parents (10 meetings from September 2012 to April 2013) – 500 attendees;
- Job Fairs – monthly meetings with high school students (21 events);
- Career-guiding competition on geography, environmental protection and ecology for high school students – 3 rounds, (2012 – 537 participants; 2013 – 580 participants from Russian schools) 650 participants;
- TV conferences on water resources and hazardous hydrological events with schools of the regions of Russia (4 TV conferences, around 130 participants at schools – Yamalo-Nenets Autonomous Okrug, Volgograd, Tula, Ufa, Bui, Tolyatti, Lyvni Orlov obl.)
- All-Russian National Youth Water Competition-2014 (20-25 April, Moscow).

1.2.5 Participation in other national and international organizations and programmes

4th meeting of the Steering Committee for the WMO International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE) was held from 24 to 26 September 2013 at the State Hydrological Institute.

The meeting was attended by 14 participants including representatives of CNES/LEGOS, WMO, GCOS and ILEC.

The meeting discussed the following:

- report on the status of activities and achievements made;
- re-designed website of the centre with demonstration of its new capabilities;
- preliminary results of data collection from WMO members;
- liaison with national and international partners and data providers;
- reports of partner centres on their activities;
- GCOS programme and its connection with HYDROLARE;
- organization of international workshop on monitoring of large lakes of the world under the umbrella of the 15th World Lake Conference (ILEC);
- integration of in-situ and remote sensing data;
- work plan and milestones until 2015.

During the meeting a series of reports were presented on activities of HYDROLARE, other data centres and their cooperation: GCOS programme and its connection with HYDROLARE, activities of CNES/LEGOS and others. A presentation was made on changes of large lakes' levels under climate change. A range of issues was discussed of relevance to HYDROLARE. It was emphasized that successful operation of the centre contributes to more efficient cooperation with international hydrological organizations and promotes enhanced international hydrological data exchange.

The fifth meeting of the HYDROLARE Steering Committee is planned to be held in July 2015.

Joint Russian-Chinese commission for protection and rational transboundary water use held its fifth and sixth meetings 11-13 December 2012 in Moscow and 23-25 January 2014 in Sanya, China.

The meetings focused on development of joint programmes for protection and rational transboundary water use, establishment of hydrological monitoring on transboundary rivers, ensuring interoperability of methods and analysis of transboundary impacts resulting from extreme events (floods, contamination), sharing of information, procedures of mutual informing on any either implemented or planned water-resources projects on transboundary rivers.

The sixth meeting was also focused on the hazardous flood in the Amur basin in 2013, performing and coordination of joint Russian-Chinese monitoring at cross-sections of the Amur river and evaluation of possible impact of bank protection and reconstruction of the Amur embankment in the city of Blagoveshchensk.

Most members of the NC of Russia participate in the activities of international organizations:

Frolov Alexander V., the Chairman of Russian National Committee for the IHP of UNESCO (since 2004), the President for oceanography of the Joint WMO/IOC Technical Commission for Oceanography

and Marine Meteorology (since 2009), the Representative of the Russian Federation in the Intergovernmental Council on hydrometeorology of CIS countries (since 2010)

Alekseevsky Nikolay I., member of the World association on sedimentation and erosion researches WASER

Asarin Alexander E., member of the National Committee of the International Commission on Large Dams (ICOLD)

Balonishnikova Zhanna A., member of the International Association of Hydrological Sciences (IAHS)

Bolgov Mikhail V., member of the National Committee of the International Commission on Large Dams (ICOLD)

Vasilyev Oleg F., member of the Committee of the Russian Academy of Sciences for system analysis, member of National Committee on theoretical and applied mechanics, member of the International Association on Hydraulic Researches (IAHR) (since 1961, Honorary Member since 2001), member of the International Association of Hydrological Sciences (IAHS), Honorary Member of the Hungarian hydraulic society (1980), Honorary Doctor of engineering sciences of Karlsruhe University (Germany) (1988)

Gorelits Olga V., member of the International Association of Water Resources (IWRA)

Zektser Igor S., Vice-president of the International Association of Hydrogeologists (IAH), member of GEM-IUGS, Academician of the Bulgarian Academy of Sciences

Kopaliani Zurab D., member of Council of the International research and training center of UNESCO on erosion and sedimentation (IRTCES), Beijing, China, member of Council of the International center of UNESCO on natural water disasters and risk management, Tsukuba, Japan

Kotlyakov Vladimir M., Chairman of the Russian National Committees for the International geosphere and biosphere programme for Antarctic research.

Nikanorov Anatoly M., Acting member of the International Engineering Academy, International academy of computer sciences and systems, Ecological Academy of Russia, corresponding member of the Russian Academy of Sciences (since 1997г.), Chairman of the International commission on protection of waters from pollution, the International association of geochemistry, first vice-president of the International commission for quality of waters of the International association of hydrogeological sciences, Honorary professor of Wisconsin University, USA.

Seliverstova Marina V., chairperson on the Russian side of the joint Russian-Finnish commission for transboundary water use, co-chairperson of the joint Russian-Estonian commission for protection and rational transboundary water use, co-chairperson on the Russian side of the joint Russian-Chinese commission for protection and rational transboundary water use.

1.2.6 Other initiatives

In August 2013 a second meeting of Russian and Japanese specialists from Civil Engineering Research Institute for Cold Region, CERI, Hokkaido, Japan, a branch of the International Centre for Water Hazard and Risk Management, Tsukuba, Japan, operating under the auspices of UNESCO, was held at SHI. The meeting discussed the results of the applied research for cold regions made by the participants and outlined main areas of joint research efforts to be made in the fields of ice jams on ice covered rivers, river restoration and flash floods.

A final agreement was signed between CERI, ICHARM and SHI on exchange of data and cooperation in the field of water engineering.

Dr I. Zektser, a member of permanent international commission for environmental protection and management of the International Union of Geological Sciences (GEM-IUGS), a chair of the working group on ground waters, organized and held in 2013 (Poland) a workshop on ground water resources. The workshop was attended by hydrologists from Russia, Azerbaijan, Lithuania, Poland and Estonia. The meeting developed recommendations on the use and studies of groundwater resources which were submitted to the International Union of Geological Sciences.

On the initiative of Dr Zektser national committees of the International Association of Hydrogeologists have been established in Russia and Azerbaijan (president of the Russian committee of IAH Dr of Sc. in geogr. and math. L. Abukova, Institute of Oil and Gas RAS; president of the Azerbaijan

committee Academician Ali-Zade, the president of the Azerbaijan Academy of Sciences). The committees already started active implementation of the goals of IAH.

The Caspian Marine Research Institute (CaspMRI) as an organization of Roshydromet participates in the activities of the Coordination Committee for Hydrometeorology and Pollution Monitoring of the Caspian Sea (CaspCom). The Director of CaspMRI S. Monakhov coordinates the activities of CASPAS. In the framework of this project a regional programme of environmental monitoring in the Caspian Region has been developed. In the reporting period a 4th conference of the Framework convention on protection of the Caspian environment (10-12 December 2012, Moscow, Russia) and 18th session of CaspCom (27-28 November 2013, Ashgabat, Turkmenistan) were held. Materials were also prepared for concluding and agreement on hydrometeorology between Russia and Turkmenistan.

1.3 Educational and training courses

1.3.1 Participation in IHP courses (at IHP Centres)

N/A

1.3.2 Organization of specific courses

- «Engineering hydrological calculations. Current problems and solutions» (annual), State Hydrological Institute, St. Petersburg;
- «Automatic hydrological station AGK. Acoustic Doppler current profilers. Methodological provision of hydrological means of measuring level and flow velocity» (19- 30 May 2014), State Hydrological Institute, St. Petersburg;
- «Monitoring of surface water pollution. Principles of monitoring system organization, methods and technical tools» (24 September - 6 October 2012), State Hydrochemistry University, Rostov-on-Don.

1.3.3 Organization of Category II UNESCO IHP Centre

Negotiations are under way between RSHU and the Secretariat for assigning RSHU the status the UNESCO IHP Category II Centre.

1.4 Cooperation with UNESCO-IHE Institute for Water Education

N/A

1.5 Publications – monographs, collected works, manuals and study guides

Monographs

Zektser I.S. Fresh groundwater resources. Current state and prospects of groundwater use in Russia. Moscow, Scientific world, 2012. 374 p.

The results of long-term researches of regional assessment and mapping of fresh groundwater resources as a reliable source of drinking water supply are considered. Particular attention is paid to the methodology of quantity assessment of natural, sustained groundwater yield and forecast groundwater resources and prospects of their practical use in different regions of the country. Preliminary prediction of changes of groundwater recharge in the XXI century in case of different scenarios of climate changes is given. Special attention is paid to the features of formation and assessment of groundwater flow in areas of permafrost rocks, which cover about 2/3 of all territories of Russia at present time. It is shown that climate warming in Arctic is greatly occurred due to emissions of methane and carbon dioxide from thawing permafrost, that creates an additional greenhouse effect. The analysis of formation of fresh water quality in condition of the intensive influence of engineering and economic activity and climate change is carried out. The impact of the Chernobyl accident on groundwater contamination is shown. Maps of exceeding of the maximum permissible concentration (MPC) for the individual components in the main groundwater aquifers are made and analyzed for the regions of the South and North Caucasus Federal District which are mostly poor in water resources. The modern data concerning pathogenic influence of anthropogenic pollution and natural groundwater composition is considered. The basis of medical and environmental approaches in management of groundwater resources is represented. An impact of intensive groundwater withdrawal on the environment is analyzed in the monograph. Authors give numerous examples of long-term impact of groundwater withdrawal on river flow in Russia and foreign

countries which causes reducing water levels in lakes, surface subsidence, and seawater intrusion into the shores.

Vasilenko N.G. Hydrology of the BAM Zone Rivers (Expeditionary Learning's Research). Nestor History, Saint-Petersburg,2013, 670p.

The monograph presents the results of a long-term research project on hydrological regime of the southern mountainous taiga rivers in Eastern Siberia. The research was conducted by the State Hydrological Institute (SHI) expedition in the BAM track economic development area. The study focuses on the research carried out by the SHI expedition during the decade of 1976-1985 at the Mogot experimental watershed, located in the Central BAM region, 65 km north of the town of Tynda. The book features the optimal exploratory design research technology and generalization of observations, adjusted for the specific features of the study basin. Based on the expedition and stationary meteorological observation materials, the study reviews the regularities of changes in the main characteristics of the flow. The book presents calculation methods for determining the main hydrological features, developed as a result of the research expeditions for the rivers located in the permafrost regions, as well as problems of rivers' changing water balance in the process of economic development of the territory.

The publication is intended for hydrology specialists, i.e. scientists, design engineers, environmentalists,

River mouths of the Caspian region: history of formation, modern hydro-morphological processes and hydrological hazards / Edited by V. Mikhailov /. M.: GEOS, 2013. 703 p.

The paper considers mouths of the main rivers flowing to the Caspian and the regularities of their response to large-scale level, flow and sediment variations. Changes in morphological structure and hydrological regime of the mouths of the Volga, Terek, Sulak and Kura rivers are analysed both in geological past and for the three modern periods: significant decrease in the Caspian level until 1978, abrupt increase in 1978-1995 and a slow decrease in the following years. The obtained results can be considered as case-studies and examples for evaluation of processes occurring in other river mouths both in Russia and the world and those that can occur in the future under expected natural and anthropogenic changes in sea level and river flow.

The monograph was prepared by a team of authors from Faculty of Geography of Moscow State University (MSU), Institute for Water Problems (IWP RAS) and State Oceanographic Institute of Roshydromet.

Kaluyzhnyi I.L., Lavrov C.A. Hydrophysical processes in watershed. Experimental investigations and modeling. Nestor History, Saint-Petersburg,2012, 616p.

The monograph is focused on the results of field and laboratory studies of hydrophysical processes occurring over the water drainage area. The book describes methods and experimental equipment developed by the authors for physical modeling of moisture mitigation towards the freezing boundary, of frost heaving and water infiltration into thawed and frozen soil under conditions close to nature ones.

Experimental data on the main water- and thermo-physical characteristics of thawed and frozen soils are summarized and methods for their determination are given in the monograph. Physical-mathematical models are described for vertical heat and mass transfer within the freezing and thawing soils, for the total evaporation and greenhouse gasses fluxes within the system soil-atmosphere-plant, and for snow cover forming and melting.

Hydro-physical methods for runoff characteristics forecasting and calculating are given. The relations between different factors of runoff forming are studied under the condition of climate changes.

Zavolgenskiy M, Nikanorov A. Water and air flow turbulence, Rostov-on-Don, published by the South Federal University, 2013, 484 p.

The monograph describes and studies a range of developed turbulent flows not described by rigorous analytical methods. Approximation of the Reinolds stress tensor proportional to the relative flow velocity is used for simulation. Such approximation enables one to address isotropic, anisotropic and non-

linear turbulence. Using of this method enables one to solve a wide range of tasks from turbulent flows in channels and tubes to hurricanes and tropical cyclones.

Losev K, Romanov A. New Russian-English Hydrological Dictionary. M., Nauchniy Mir, 2013. 530 p.

The dictionary contains around 35,000 articles and acronyms on all main fields of land hydrology: hydrography, hydrological computations, forecasting, hydrophysics, hydrochemistry, as well as a range of allied disciplines.

The edition includes many new terms related to the mathematical modeling of the processes determining the hydrological cycle. These are the terms of the various areas of applied mathematics and programming.

The dictionary is designed for a wide range of professionals, undergraduate and graduate students in hydrology and other fields.

Other Monographs

- Issues of geography. Vol. 133: Geographical and hydrological studies / Ed. by N. Koronkevich, E. Barabanova, M., «Kodeks», 2012. 492 p.
- V. Kravtsova, N. Mitkinykh, Mouths of the Russian Rivers. Atlas of satellite images. M.: Nauchniy Mir, 2013. 120 p.
- Monograph of Roshydromet "Methods of assessing climate change impacts for physical and biological systems" (team of authors) / Sc. ed. by S. Semenov; Federal Service for Hydrometeorology and Environmental Monitoring. – M., 2012
- A. Nikanorov, V. Bryzgalo, O. Reshetnyak, Rivers of Russia under conditions of extreme ecological events. – Rostov-on-Don: «NOK», 2012. – 329 p.
- A. Nikanorov, M. Trofimchuk, B. Sukhorukov, Methods of experimental hydroecology– Rostov-on-Don: «NOK», 2012– 310 p.
- Novosibirskoye reservoir: scientific and information publication / ex.ed.: A. Atavin, P. Popov, L. Kipriyanova; Institute of water and ecological problems SB RAS. Novosibirsk, SB RAS publishing, 2012. – 47 p.
- Rivers and Lakes of the World. Encyclopedia. Moscow: «Encyclopedia», 2012. 927 p.
- V. Shirokova, N. Frolova, Water: seas and oceans, rivers and lakes. OLMA Media Group. 2012. 304 p. (factual book).
- Rivers and lakes of the world. Encyclopedia. Moscow: « Encyclopedia», 2012. 927 p.
- Current state of water resources and operation of water management system in the Ob and Irtysh basins / ex.ed. Yu. Vinokurov, A. Puzanov, D. Bezmaternykh. – Novosibirsk, SB RAS publishing, 2012. – 242 p.
- Teletskoe lake: scientific and information publication / ex.ed. E. Mitrofanova, V. Kirillov; Institute of water and ecological problems SB RAS. – Novosibirsk, SB RAS publishing, 2012. – 28 p. ISBN 978–5–7692–1266–6.
- A. Khabidov, I. Leontyev, K. Marusin, V. Shlychkov, E. Fedorova, An. Lygin, A. Lygin, Khomchanovskiy. Monitoring of the coastal zone of inland water bodies of Russia / A. Khabidov et.al.; ex.ed. L. Zhindarev. Federal Agency for Water Resources, Siberian branch of RAS, Institute of water and ecological problems SB RAS. Novosibirsk, SB RAS publishing 2012. – 139 p.

Textbooks and handbooks

- N. Baryshnikov. Problems of flood plain morphology, hydrology and hydraulics, RSHU,St. Petersburg, 2013, 426 p.
- V. Kovalenko. New events and regularities of flow formation.: St. Petersburg, RSHU, 2013, 172 p.
- S. Vinnikov. Studies of kinematics of nonsteady flow. RSHU, 2013, 104 p.
- A. Doganovskiy. Land hydrology, Textbook. RSHU, 2012.
- G. Ugreninov. Water use economy, Handbook, RSHU, St. Pb., 2013, 176 p.
- A. Asarin, K. Bestuzheva, A. Khristoforov, S. Chalov. Water management calculations. Handbook. M.: Faculty of Geography, 2012. 140 p.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

• XXIV International coastal conference "Sea shore - evolution, ecology, economics" (Tuapse, 1-6 October 2012)
• International Conference "Regional response to global environmental change in the North-East and Central Asia" (Irkutsk, 17-21 September 2012)
• Russian-German workshop "Live Show - the main directions of Russian-German cooperation in the field of Polar and Marine Research" (Moscow, March 7, 2012).
• IV IWA Eastern European Young and Senior Water Professionals Conference, St.-Peterburg, sentyabr 2012,
• Conference on the project «ULTRALIGHT», September 19, 2012, IFC Metropol, Moscow. • VII Scientific and Practical Conference "Drinking Water of Siberia-2012", Barnaul, April 26, 2012;
• International conference on "Regional effects of global climate change (causes, consequences, forecasts)", 26-27 June 2012, Voronezh
• Scientific Conference with international participation "Water and environmental problems of Siberia and Central Asia", 20-24 August 2012, Barnaul
• V All-Russian symposium with international participation "Organicheskon matter and nutrients in inland waters and marine waters", 10-14 September 2012., Petrozavodsk
• Scientific Conference "Water and Water Resources: backbone function in nature and economy", July 23-29, 2012, Tsimlyansk
• Scientific Conference "Modern problems of stochastic hydrology and flow regulation," April 10-12, 2012, Moscow
• Scientific - practical conference "Monitoring of the coasts and seabed reservoirs", Novosibirsk, Russia, July 30 - August 1, 2012
• International Seminar on "Mechanisms of adaptation to climate change, biodiversity in the Altai-Sayan Ecoregion" Gorno-Altaisk, 5 - 7 March 2012
• XV Glaciological Symposium "Modern variability of the Earth's cryosphere" Arkhangelsk, June 2012
• Scientific Conference "From the International Polar Year International Polar initiative to" 8-10 October 2012, Sochi.
• III International Forum "Clean Water" Moscow 6-7 November 2012
• International Scientific and Practical Conference "Arctic zone of the Russian Federation: eastern vector of development", 28-30 November 2012, Saint-Petersburg
• Conference "Hydrometeorological support work on the continental shelf", Moscow, 25-26 October 2012
• 2nd International scientific-practical conference "Water Resources of the Volga: the history, present and future management issues", Astrakhan, 25-27 October 2012
• International conference on regional issues Hydrometeorology and Environmental Monitoring, Kazan, 2-5 October 2012
• V International Scientific and Practical Conference "Problems of the Caspian ecosystem conservation under oil and gas development", Astrakhan, 26-27 September 2013
• VII All-Russian Congress of Hydrology, St. Petersburg, 19-21 November 2013
• III All-Russian Congress of Environmental Protection, Moscow, 2-4 December 2013
• IV Russian Conference "Ice and thermal processes on water bodies of Russia" 24-29 June 2013 Rybinsk
• International Forum "Ecology", St. Petersburg, 27-28.02.2013, the
• XV International Scientific and Industrial Forum "Great Rivers 2013", May 15-18, 2013, Nizhny Novgorod.
• International Congress "Clean Water. Kazan 2013 ", Kazan, 27-29 March 2013.
• XVI International Scientific and Industrial Forum "Great Rivers 2014", May 13-16, 2014, Nizhny Novgorod.

1.6.2 Participation in meetings abroad

• 32nd International Geographical Congress (26th - 30th August 2012 in Cologne, Germany) «Ice and water regime of the rivers of European Russia under climate change has been accepted for presentation at the conference»
• VI International (Polish-Russian-Ukrainian) conference "Actual problems of erosion studies and channel processes and their role in the functioning of the basin geosystems" (September 2012, Ukraine, Kiev)

• Conference on the project «PAN-Eurasian experiment», Helsinki, Finland. 1-4 October 2012.
• 6 th World Water Forum, 12 -17 March, 2012, Marseille, France
• Symposium on Climate Impacts on Low Flows and Droughts, 29 Febr - 4 March, 2012, Vienna, Austria
• International Conference HYDRO-2012 "Innovative approaches to global challenges", Bilbao, Spain, in 2012.
• 80th Annual Meeting and the 24th Congress of the International Commission on Large Dams, Kyoto, Japan, in 2012.
• IPY 2012 Conference «From Knowledge to Action» April 22-27, 2012 Montreal, Canada
• International Conference on the cryosphere. Sanya, China, 10-12 November 2012.
• World Water Congress 2012,16-21 September, Busan, Korea
• 5 meeting of the Joint Russian-Chinese Commission on rational use and protection of transboundary waters, 11013 December 2012., Moscow.
• The 12th International Symposium on River Sedimentation. Kyoto Japan. September 2-5. 2013.
• 20th International Conference on Environmental Indicators, Germany, Trier, 16-19 September 2013
• International Conference MEDCOAST-2013, Marmaris, Turkey, 30 October-3 November 2013
• Technical conference (seminar) on methodological and laboratory support Sino-Russian transboundary water quality monitoring, Harbin, China, 26-28 September 2013.
• IV meeting of the Working Group on Monitoring the quality and protection of transboundary waters of the Joint Russian-Chinese Committee for the rational use and protection of transboundary waters, Harbin, China, 29 - 30 September 2013.
• Russian-Chinese meeting of experts on research and analysis on the Amur River flood of 2013, April 10-14, 2014 in Harbin (China)

1.7. Other activities at regional level

1.7.1. Liaison and cooperation with organizations and institutes

Since 2013 following the order of the President of the Russian Federation of 31 August 2013 №693 large-scale scientific research of the extreme flooding in the Amur, Zeya, Bureya and Ussuri basins has been initiated to evaluate climate impact on the hydrological regime and develop new requirements for ensuring area and hydraulic constructions safety. The work is implemented and coordinated by RAS, Roshydromet and Rosvodresursy.

In January 2014 a joint meeting of the Scientific Council of Roshydromet, Scientific Council of RAS “Studies of the Earth climate theory” and Scientific and technical Council of the Federal Agency for Water Resources was held. The meeting was attended by leading Russian specialists in hydrometeorology and water management. It was aimed at extensive discussion of the origin and reasons of this large-scale extreme event and defining future research priorities.

In April 2014 a scientific report was prepared giving the results of activities undertaken by Roshydromet for monitoring of the extreme flood of 2013, analysis of its formation conditions, defining the main factors of large-scale floodings in Primorskiy and Khabarovskiy krai, Amur region, Evreiskaya Autonomous Oblast, analysis of data from the state observing network of Roshydromet and development of design hydrometeorological information needed for planning and implementation of activities to ensure protection of the area and hydraulic constructions under current and future climate change conditions.

Cooperation at regional level in different fields of hydrology is also implemented in the framework of federal programs, RFBR grants and the RAS Presidium programs.

At the level of the CIS member states to ensure environmental safety issues of transboundary waters are solved under the Agreement on basic principles of cooperation in the field of rational use and protection of transboundary sites of CIS countries (1998).

Key provisions of the Agreements of CIS countries, as well as experience in international cross-border activities have created legal and methodological basis of bilateral agreements of the Russian Federation in the field of protection and rational use of transboundary water bodies with Kazakhstan, Belarus, Ukraine,

Azerbaijan. In order to implement the provisions of these agreements created intergovernmental commission.

1.7.2. Completed and ongoing scientific projects (Russia and other countries)

In 2012-2014 were carried out numerous research projects in the federal program, sectoral and regional programs, programs of the Presidium of Russian Academy of Sciences and Department of Earth Sciences RAS.

In addition, proactive research conducted by Russian and international grant funds.

2. Future activities

2.1 Activities planned until December 2014

Completion of scientific research of extreme floods in the Amur, Zeya, Bureya and Ussuri basins to evaluate climate impact on the hydrological regime and develop new requirements for ensuring area and hydraulic constructions safety.

Participation of members of the NC RF in the VII All-Russian Meteorological Congress 7-9 July 2014, St. Petersbug.

2.2 Activities foreseen for 2015-2016

Further implementation of number of the national scientific and technical projects in hydrology and water resources are being developed in Russia, which are supported by the NC of Russia and fully agree with purposes and objectives of the IHP-VIII. These projects are implementing by different agencies and organizations and covering the whole territory of the country or its vast physiographic and economic regions:

- «Water strategy of the Russian Federation for the period 2020г.». «The plan of measures on realization of Water Strategy of the Russian Federation for the period 2020г» and the Federal target program «Development of the water management complex of the Russian Federation to 2020г.»
- Implementation of the Union State programme “Improvement of the System of Providing Information to the Population and Industries of Russia and Belarus on Existing and Projected Climatic Conditions, the State and Pollution of the Environment”;
- Multipurpose projects implemented by the organizations within RosVodResursy on development of outlook, principles and practice for more effective management of water resources and water ecosystems in transboundary river basins.

2.3 Activities envisaged in the long term

These activities will be considered at the meetings of NC RF in 2015 in the course of preparation of research programmes in hydrology and water resources in different agencies and organizations of Russia for 2016-2018, taking account of the main tasks of the IHP-YIII.

SERBIAN NATIONAL COMMITTEE FOR UNESCO IHP

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

The Serbian National Committee for UNESCO IHP was adopted at the meeting held at the Commission for cooperation with UNESCO, Ministry of Foreign Affairs, Republic of Serbia, on May 6th, 2010.

The decision was adopted as a need for closer cooperation with UNESCO IHP Programme and more intensive engagement of water sector professionals from Serbia in topics IHP is focused on. The Serbian National Committee consists of nine members that represent Ministries of the Republic of Serbia and national and public institutions responsible for water management in Serbia: Prof. Marko Ivetic, Dr. Milan Dimkic, Mr. Dejan Lekic, Mr. Tioslav Petkovic, Mr, Slavimir Stevanovic, Prof. Jovan Despotovic, Ms. Nada Lazic, Dr. Nikola Marjanovic, Mr. Mihajlo Gavric

Scientific Committee of the Serbian National Committee for UNESCO IHP was established with the following members: Jasna Plavsic (University of Belgrade – Faculty of Civil Engineering), Slobodanka Blagojevic (Faculty of Civil Engineering and Architecture - University of Niš), Marina Babic Mladenovic (Jaroslav Cerni Institute for the Development of Water Resources), Stanimir Kostandinov (University of Belgrade – Faculty of Forestry) and Ivana Ivancev Tumbas (Faculty of Sciences, University of Novi Sad).

1.1.2 Status of IHP-VIII activities

Serbian Committee was strongly involved in preparation of IHP VIII programme.The emphasis in this period will be on the activities related to the **Theme 6: WATER EDUCATION, KEY FOR WATER SECURITY** of the IHPVIII.

In particular on the four focal areas as follows:

- Focal area 1.5 - Improve scientific basis for hydrology and water sciences for preparation and response to extreme hydrological events
- Focal area 3.1 - Improving governance, planning, management, allocation, and efficient use of water resources
- Focal area 6.1 - Enhancing tertiary water education and professional capabilities in the water sector and
- Focal area 6.2 - Addressing vocational education and training of water technicians

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

On the occasion of the celebration of the World Water Day 2013, Serbian National Committee organized gathering at the Faculty of Civil Engineering, University of Belgrade. Main themes of the gathering were:

- Cooperation in the field of water
- Legislation related to water area
- Declaration on water resources in the Republic of Serbia
- Initiative for project "Evaluation of water resources in Serbia"
- Report on Serbian Committee for UNESCO IHP
- Lecture given by Dr. Nesa Ilic: "Capabilities and limitations of optimization models for operating the reservoirs - Examples of studies from Canada"

Celebration of the World Water Day 2014 was organized by the Serbian national Committee at the Faculty of Civil Engineering, University of Belgrade. Main themes of the gathering were:

- Water and Energy
- Water Act, the strategy and tactics of implementing the concept of integrated water management, as a basis for the development of Serbia, based on contemporary and realistic assessment of water resources and potentials
- Declaration on water resources in the Republic of Serbia

Numerous informal meeting were held with the members of the National Committe in Novi Sad, Belgrade, Nis, Kragujevac and other cities.

1.2.2 Participation in IHP Steering Committees/Working Groups

Prof. Jovan Despotovic participated at the 50th session of the IHP Bureau, held in March/April 2014 in Paris.

Prof. Jovan Despotovic participated at the 49th session of the IHP Bureau, held in June 2013 in Paris.

Prof. Jovan Despotovic participated at the Meeting of the IHP UNESCO National Committees from the Danubian Countries, 14th December 2012, Bucharest, Hungary

Professors Jovan Despotovic and Marko Ivetic participated at the conference in Mexico City: "UNESCO Strategic and High - Level Meeting on Water Security and Cooperation". The meeting was held in December 2013. Active participation was taken in the session "Regional Spotlight Session Introductions and Presentations of Regional views and expectations for IHP VIII".

Professors Jovan Despotovic and Marko Ivetic participated at the meeting "UNESCO Strategic and High-Level Meeting on Water Security and Cooperation", held in September 2013 in Nairobi, Kenya

Prof. Despotovic participated at the Regional Cooperation, Meeting „Capacity Building of National Commissions for UNESCO of South East Europe – Enhancing Regional Cooperation", 18-19 March, 2014, Belgrade

Prof. Despotovic participated at the Conference and exhibition – Budapest Summit, held in October 2013, Budapest, Hungary. During the event UNESCO

publication “Free Flow – Reaching Water Security through cooperation” was presented. One paper “ Application of water directives in small settlements” was prepared by IRTCUD members.

1.2.3 Research/applied projects supported or sponsored

Several research projects related to water sector have been implemented of which five projects financed by the Ministry of Education and Science, Republic of Serbia are listed:

- Measurement and modeling of physical, chemical, biological and morpho-dynamic parameters in rivers and reservoirs
- Systems for drainage of storm waters as a part of urban and transport infrastructure
- Management and protection of reservoirs

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

IRTCUD, International Research and Training Center under auspices of UNESCO, from its establishment have intensive coopearation with UNESCO and other UN organizations (UNEP, UNDP, and UNIDO), professional institutions (IAHR, IAWPRC, IAHS), World Meteorological Organization (WMO), universities and research institutions all over the World.

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

IRTCUD members were the initiators and were either direct organisers or sponsors / book editors of all of the the UDM (Urban Drainage Modelling) series of 8 international conferences which are held every three years under ausopices of the Joint Committee for Urban Drainage of IAHR (International Association for Hydraulic Research and IWA (international Water Association). Previous two conferences in the seried were held at in Melbourne, Australia (2006) and in Tokyo, Japan (2009). The last conference was held in September 2012 in Belgrade and was directly organised by IRTCUD.

The 9th International Conference on “Urban Drainage Modelling” (UDM) was held in Belgrade, Serbia, in 2012 from 4 to 7 September. This is a Specialized Conference, an IWA event organized by Joint IAHR/IWA Committee on Urban Drainage (JCUD). The conference was a tribute to Prof. Maksimovic who has been the spiritus movens of the whole UDM conference series that started back in 1986 in Dubrovnik, former Yugoslavia, UDM conference topics are traditionally related to modelling urban drainage systems and interactions with other urban water systems and urban/suburban environment. The conference is designed to bring together specialists, researchers and practitioners, to exchange experience, demonstrate present potentials, improve the reliability of urban drainage modeling and to set-up the stage for its future developments. The topics are:

- Data issues (data avalibility, reliability and uncertainity; climate change and urban drainage systems, hydroinformatic support to urban drainage modeling, etc.)
- Modelling (urban stormwater and flood analysis; model and parameter identification and propagation of uncertainty; urban runoff quality, etc.)
- Applications (urban floods forecasting; interaction of pluvial and fluvial floods in urban areas; rainfall forecast; etc.)

- Management (stormwater and urban drainage management; risk analysis in urban drainage management; outlook for the urban drainage future; etc.)
- Special topics (UDM under extreme conditions; urban hydro-ecology and urban amenities; performance tends, indicators and life span assessment; etc.)

More than 200 participants took part at the conference.

Conference web site could be found at http://hikom.grf.bg.ac.rs/9UDM/

Proceedings "Urban Drainage Modelling – Extended Abstracts of the Ninth International Conference on Urban Drainage Modelling, Belgrade, Serbia, 4-6 September 2012", edited by D.Prodanovic and J.Plavsic, ISBN 978-86-7518-155-2.

Prof. Despotovic participated in the VII Hydrological Congress, St. Petersburg, 19 - 21 November 2013 representing two papers:

- Management of rainfall runoff process including quality aspects, in 7 steps- From cloudy, stochastic sky to safety of traffic and people, and rainfall harvesting
- Networking for sustainable education as the basis for integrated water resources management implementation from state level to small settlements

Professors Jovan Despotovic and Marko Ivetic participated at the CATEF 2014 – Caspian International Aqua Technologies Exibition and Forum, April 2014, Baku, Azerbaijan.

Prof. Despotovic participated in the VII Hydrological Congress, St. Petersburg, 19 - 21 November 2013 in the following ways:

1. Representing two papers:
   - Management of rainfall runoff process including quality aspects, in 7 steps- From cloudy, stochastic sky to safety of traffic and people, and rainfall harvesting, by Prof. Jovan Despotovic, Dr. J. Plavsic, Dr. N. Jacimovic, Mr. D. Pavlovic, A. Todorovic and Lj. Jankovic
   - Networking for sustainable education as the basis for integrated water resources management implementation from state level to small settlements, by Prof. Jovan Despotovic, Marko Ivetic and Lj. Jankovic
2. NSG IHP UNESCO National representatives discussing the IHP Phases VIII contents. Lots of interests have been shown, including the information given from J. Culmann, on plans and visions for the next steps for implementation of it.

Professors Jovan Despotovic and Marko Ivetic participated at the CATEF 2013 – Caspian International Aqua Technologies Exibition and Forum, April 2013, Baku, Azerbaijan, in the following ways:

1. Representing two papers:
   - Sustainable education on the integrated water resources management, by Prof. Jovan Despotovic, Prof. Marko Ivetic and Lj. Jankovic
   - Networking and education in the field of water, by Marko Ivetic and Lj. Jankovic
2. Exhibition, together with Baku State University, Azerbaijan University of Architecture and Construction, JSC AZERSU.

Prof. Despotovic participated at the Regional Cooperation, Meeting „Capacity Building of National Commissions for UNESCO of South East Europe – Enhancing Regional Cooperation", 18-19 March, 2014, Belgrade

Prof. Despotovic participated at the Conference and exhibition – Budapest Water Summit "Building Peace and development through water security", held in October 2013, Budapest, Hungary. Prof. Despotovic had a lecture as a

Chair of the Serbian National Committee for UNESCO IHP. During the event UNESCO publication “Free Flow – Reaching Water Security through cooperation” was presented. One paper “ Application of water directives in small settlements” was prepared by IRTCUD members.

Prof. Despotovic participated the meeting organized by German IHP/HWRP Secretariat – The first meeting of the working group supporting the implementation of IHP-VIII, Koblenz, 10-12 December 2012.

Prof. Despotovic is a member of the World’s Large Rivers Initiative WLRS Task Force.

1.2.5 Other initiatives

Participation of Prof. Jovan Despotovic at the Meeting on Connecting Policy and Science through Innovative Knowledge Brokering in the field of Water Management and Climate Change.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

Serbian National Committe for IHP UNESCO was not involved in implementation of IHP courses.

1.3.2 Organization of specific courses

Among educational activities the Faculty of Civil Engineering focused also on a postgraduate studies and specialized courses prepared for professionals in water sector. Programmes of studies are focused on up to date knowledge and water problems societies deal with nowadays.

IRTCUD, together with four leading Universities in the South-Eastern European region: National Technical University of Athens, the University of Belgrade, the Technical University of Civil Engineering of Bucharest and the University of Ljubljana organizes an international postgraduate programme in Water Resources and Environmental Management - EDUCATE!. The postgraduate programme is a two-year, full-time course that consists of four taught semesters and the preparation of a thesis. The entire programme is values at 120 ECTS.

Course in Software 3DNet is organized by the Faculty of Civil Engineering. 3DNet is an integrated hydroinformatic tool designed for modeling of water supply and sewerage networks. Simulation procedures for water supply and sewerage are embedded into GIS model that include information on terrain elevations, facilities in the water supply and sewerage networks, catchment surface covers, and others.

1.3.3 Participation in IHP courses

Serbian National Committe for IHP UNESCO was not involved in implementation of IHP courses.

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

1.5 Publications

Despotović,J., Janković,Lj. (2013). Application of water directives in small settlements, UNESCO publication "Free Flow – Reaching Water Security through cooperation", pages 123-125

Proceedings from 2nd Regional Rainfall Conference of the Balkans – Regional Rainfall and Climate Change.

Proceedings "Urban Drainage Modelling – Extended Abstracts of the Ninth International Conference on Urban Drainage Modelling, Belgrade, Serbia, 4-6 September 2012", edited by D.Prodanovic and J.Plavsic, ISBN 978-86-7518-155-2.

Nine books (four more to follow) published in the Urban Water Series initiated within the IHPVI, Series editors Č. Maksimović and J.A. Tejada-Guibert, staring with the book:

Data Requirements for Integrated Urban Water Management". T.D. Fletcher and A. Deletić, ed. Book Series, Series ed. C. Maksimovic, Tejada-Guibert, Sarantuyaa Zandaryaa, J.A., Taylor and Francis, ISSN 1749 0790

- Urban Water Cycle Processes and interactions
  Jiri Marsalek, Pascal Breil, Blanca Jiménez-Cisneros, Mohammad Karamouz,Per-Arne Malmquist, Joel Goldenfum and Bernard Chocat. 2007
- Data requirements for integrated Urban Water Management
  Edited by Tim D. Fletcher and Ana Deletić. 2007
- Aquatic Habitats in Sustainable Urban Water Management Science, Policy and Practice
  Edited by Iwona Wagner, Jiri Marsalek and Pascal Breil. 2007
- Urban Water Security: Managing risks
  Edited by Blanca Jiménez and Joan Rose. 2009
- Integrated Urban Water Management: arid and Semi-arid regions
  Edited by Larry W. Mays. 2009
- Integrated Urban Water Management: Humid tropics
  Edited by Jonathan N. Parkinson, Joel A. Goldenfum and Carlos E.M. Tucci. 2010
- Advanced Simulation and Modeling for Urban Groundwater management – UGrOW, Edited by Dubravka Pokrajac and Ken Howard. 2010

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

The 9th International Conference on "Urban Drainage Modelling" (UDM) was held in Belgrade, Serbia, in 2012 from 4 to 7 September. This is a Specialized Conference, an IWA event organized by Joint IAHR/IWA Committee on Urban Drainage (JCUD). The conference was a tribute to Prof. Maksimovic who has been the spiritus movens of the whole UDM conference series that started back in 1986 in Dubrovnik, former Yugoslavia, UDM conference topics are traditionally related to modelling urban drainage systems and interactions

with other urban water systems and urban/suburban environment. The conference is designed to bring together specialists, researchers and practitioners, to exchange experience, demonstrate present potentials, improve the reliability of urban drainage modeling and to set-up the stage for its future developments. The topics are:

- Data issues (data avalibility, reliability and uncertainity; climate change and urban drainage systems, hydroinformatic support to urban drainage modeling, etc.)
- Modelling (urban stormwater and flood analysis; model and parameter identification and propagation of uncertainty; urban runoff quality, etc.)
- Applications (urban floods forecasting; interaction of pluvial and fluvial floods in urban areas; rainfall forecast; etc.)
- Management (stormwater and urban drainage management; risk analysis in urban drainage management; outlook for the urban drainage future; etc.)
- Special topics (UDM under extreme conditions; urban hydro-ecology and urban amenities; performance tends, indicators and life span assessment; etc.)

More than 200 participants took part at the conference.

Conference web site could be found at http://hikom.grf.bg.ac.rs/9UDM/

Proceedings “Urban Drainage Modelling – Extended Abstracts of the Ninth International Conference on Urban Drainage Modelling, Belgrade, Serbia, 4-6 September 2012”, edited by D.Prodanovic and J.Plavsic, ISBN 978-86-7518-155-2.

1.6.2 Participation in meetings abroad

IRTCUD members participated in the 12th conference “Water supply and sewerage system” held on Jahorina mountaints, Republika Srpska, in May 2012.

IRTCUD members participated in the 13th conference “Water supply and sewerage system” held on Jahorina mountaints, Republika Srpska, in May 2013.

Prof. Despotovic participated in the VII Hydrological Congress, St. Petersburg, 19 - 21 November 2013 in the following ways:

1. Representing two papers:
   - Management of rainfall runoff process including quality aspects, in 7 steps- From cloudy, stochastic sky to safety of traffic and people, and rainfall harvesting, by Prof. Jovan Despotovic, Dr. J. Plavsic, Dr. N. Jacimovic, Mr. D. Pavlovic, A. Todorovic and Lj. Jankovic
   - Networking for sustainable education as the basis for integrated water resources management implementation from state level to small settlements, by Prof. Jovan Despotovic, Marko Ivetic and Lj. Jankovic
2. NSG IHP UNESCO National representatives discussing the IHP Phases VIII contents. Lots of interests have been shown, including the information given from J. Culmann, on plans and visions for the next steps for implementation of it.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

IRTCUD applied for the project in a frame of the Programme Participation 2012-2013: “The treasures of water resources and historical heritage”, that

will be implemented in Natural and Historical Sites in the following countries: Serbia, Croatia, Bosnia and Herzegovina, FYRO Macedonia, Bulgaria - in connection with Roman times

1.7.2 Completed and ongoing scientific projects

Already commented activities with numerous IHP National Committees concerning joint research and other activities.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

Hosting of the meeting with the Black See University Network at the University of Belgrade, from 10 to 13 September 2014.

2.2 Activities foreseen for 2015-2016

Participation at the 10th International Conference on Urban Drainage Modelling that will be held in September 2015, in Quebec City, Canada.

Organization of the 3rd Regional Rainfall Conference that will be held at the University of Belgrade-Faculty of Civil Engineering. Besides the Faculty, IRTCUD, Chair in Water for Ecologically Sustainable Developments and Serbian National Committee for IHP UNESCO will be the organizers.

Participation at the The Caspian International Aqua Technologies Exhibition and Forum - CATEC that will be held in Baku, Azerbaijan, in April 2015.

2.3 Activities envisaged in the long term

Establishment of the subcenters of experimental catchments in countries from the UNESCO II Group.

Jovan Despotovic, Ph.D., P.C.E.
Professor in Hydrology and Hydraulic Engineering
University of Belgrade, Faculty of Civil Engineering in Belgrade
Member of the Serbian Commission for UNESCO
Chair of the National Committee for IHP UNESCO
Vice Chair of the Intergovernmental Bureau of the IHP UNESCO

Boulevard of the King Alexander 73/I
11000 Belgrade, Serbia

+381 11 3218 530
+381 11 337 00 99
+381 63 32 82 63

ihp.unesco.rs@grf.bg.ac.rs
jdespotovic@grf.bg.ac.rs
edespoto@hikom.grf.bg.ac.rs

NATIONAL REPORT ON IHP RELATED ACTIVITIES

THE SLOVAK REPUBLIC

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

The Slovak Committee for Hydrology represents the Slovak NC IHP UNESCO. It was established in 1993 with the support of the Slovak Commission for UNESCO. The committee consists of the Executive Committee and the Plenum. The current business is handled by the secretariat associated with the Institute of Hydrology of the Slovak Academy of Sciences in Bratislava. The Plenum meets once a year, usually in the first half of the year. The Executive Committee meets at need.

1.1.1 Decisions regarding the composition of the IHP National Committee

There were only several changes in the composition of the IHP National Committee during the period due to retirements. The Plenum consists of 19 members, and 6 of them form the Executive Committee. All the main research institutes, universities and ministries related to hydrology in Slovakia are represented in the committee.
The present membership of the IHP NC of Slovakia is as follows:

Executive Committee:

Chairman:
MIKLÁNEK Pavol, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
Vice-chairman
SZOLGAY Ján, Slovak University of Technology, Bratislava
Scientific secretary
HALMOVÁ Dana, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
Members
FENDEKOVÁ Miriam, Comenius University, Bratislava
HOLUBOVÁ Katarína, Water Research Institute, Bratislava
POÓROVÁ Jana, Slovak Hydrometeorological Institute, Bratislava

Plenum:
BAČÍK Martin, Ministry of the environment of the Slovak republic, Bratislava
ELIÁŠ Pavol, Slovak Agricultural University, Nitra
HLAVČOVÁ Kamila, Slovak University of Technology, Bratislava
HOLKO Ladislav, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
LAPIN Milan, Comenius University, Bratislava
LEŠKOVÁ Danica, Slovak Hydrometeorological Institute, Bratislava
LICHNER Ľubomír, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
MAJERČÁKOVÁ Oľga, Slovak Hydrometeorological Institute, Bratislava
NOVÁK Viliam, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
PASTIRČÁK Vladimír, Slovak Hydrometeorological Institute, Bratislava
PEKÁROVÁ Pavla, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
RONČÁK Peter, Slovak Hydrometeorological Institute, Bratislava
ŠOLTÉSZ Andrej, Slovak University of Technology, Bratislava

1.1.2 Status of IHP-VII activities

The activities of the Slovak institutions were concentrated on the following IHP-VII projects:

CCPC Flow Regimes from International Experimental and Network Data (FRIEND)
1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources
1.3 - Hydro-hazards, hydrological extremes and water-related disasters
2.4 - Managing water as a shared responsibility across geographical & social boundaries
2.5 - Addressing the water-energy nexus in basin-wide water resources

The Slovak representative Dr. Holko served as the international coordinator of Euro-mediterranean Network of Experimental and Reference Basins (ERB) till September 2012 (CCCP FRIEND).

The Slovak representative Dr. Fendeková was member of EUROFRIEND Working group 2 *Low flows and droughts* (CCCP FRIEND).

The Slovak representative Dr. Pekárová is the international coordinator of the *Flood Regimes of the Rivers in the Danube Basin* project of the Regional co-operation of the Danube countries in framework of IHP UNESCO (Focal Area 1.3 Hydro-hazards, hydrological extremes and water-related disasters, and Focal Area 2.4 Managing water as a shared responsibility across geographical & social boundaries).

The Slovak NC participated in organisation of the following international conferences:

ERB conference 2012, Studies of Hydrological Processes in Research Basins: Current Challenges and Prospects, St.Petersburg, Russia, September 17-20, 2012.

26th Conference of Danubian countries on the Hydrological Forecasting and Hydrological Bases of Water Management. (Focal Area 2.4 Managing water as a shared responsibility across geographical & social boundaries.) Deggendorf, Germany, September 22-24, 2014.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The 24th Conference of Young Slovak and Czech Hydrologists was organised in on 14 November 2012 in Bratislava and the conference proceedings were published. Following three papers were awarded:

- Ducháček Libor, Czech Hydrometeorological Institute, Jablonec nad Nisou - Vertical variability of the zero izochion position in geomorphological regions of the Czech republic
- Macurová Zuzana, Slovak University of Technology, Bratislava - Impact of the climate change on extreme flows in the Váh basin
- Rodný Marek, Lukowski Mateusz, Institute of Hydrology SAS, Bratislava - Application of drought index in modeling of the soil water storage dynamics

The 25th Conference of Young Slovak and Czech Hydrologists was organised on 7 November 2013 in Bratislava and the conference proceedings were published. Following three papers were awarded:

- Katarína Jeneiová and Miroslav Sabo, Slovak University of Technology, Bratislava – Trend analysis of the maximum annual flows in the Bodrog basin
- Pavel Ježík, Technical university, Brno – Example data matrix for calculation of the runoff response of small basins on stormrain and example of the results
- Veronika Říhová, Czech hydrometeorological institute, Ostrava – Application of the hydrological modeling to landscape risk analysis

1.2.2 Participation in IHP Steering Committees/Working Groups

Representatives of the NC took part at the 20th Intergovernmental Council of IHP UNESCO in Paris in 2012.

The Slovak NC is member of the Steering Committee of EUROFRIEND and Slovak experts participate in its Working Groups.
Representatives of the NC took part at following FRIEND meetings:
EURO FRIEND WG 2 meetings in Payerbach, Austria in 2012
EURO FRIEND WG 5 meetings in Sankt Petersburg, Russia in 2012 and in Matavun, Slovenia in 2013.

FRIEND NWE WG 5 closely collaborates with the European Network of Experimental and Reference Basins (ERB) project including parallel meetings and common conferences. The Slovak NC participated in the ERB Steering Committee meeting and 14th ERB conference in Sankt Petersburg, Russia in 2012 and took part at the ERB Steering Committee meeting in Matavun, Slovenia in 2013.

The delegates of the committee participate regularly at the meetings of the NC representatives of the Danube countries and Slovak experts co-ordinate or actively participate in different projects within this regional co-operation. There was 1 meeting of the representatives and experts of the Danube countries during the period (2012 Bucharest, Romania).

1.2.3 Research/applied projects supported or sponsored

The Slovak IHP NC has no possibility to support or sponsor any research/applied projects, but it is supporting co-operation and participation in IHP UNESCO projects.

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

The Slovak Committee for Hydrology is a joint IHP/IAHS national committee, in fact. The national representative of IAHS prof. Szolgay is the vice-chairman of the committee and the IAHS national correspondents are members of the committee. The WMO OHP is also represented in the committee. Most of the activities within these three programmes are organised jointly.
The NC is collaborating also with other programmes like IGBP/BAHC, IAH, etc.

1.2.5 Other initiatives

Except the IHP projects, the IHP National Committee is traditionally organizing three national activities. The NC has its own library of UNESCO and other international

publications that is used by the hydrological community; it is organizing the Conferences of Young Hydrologists and publishing series of SVH Publications (Publications of the Slovak Committee for Hydrology).

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

There was no contribution to IHP courses during the period of interest.

1.3.2 Organization of specific courses

The NC did not organize any training seminar during the period of interest.

1.3.3 Participation in IHP courses

There was no participant from Slovakia in IHP courses in 2012-2014.

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

There is no specific cooperation between Slovak NC and UNESCO/IHE.

1.5 Publications

The Slovak NC is supporting publications in three main groups:
– SVH Publications (Publications of the Slovak Committee for Hydrology).
These are monographs summarizing results of the IHP projects. The series started in 1997 and eleven volumes were published till now. Two of them were published within the period of this report.

- Kohnová, S., Hlavčová, K., Szolgay, J., Horvát, O.: Scenario Based Modeling of Hydrological Change: Case Studies in Slovak Basins. Slovak Committee for Hydrology and Key Publishing, Ostrava 2012, ISBN 978-80-7418-169-6, 89 pp.

- Szolgay, J., Danáčová, M., Šúrek, P.: Multilinear Flow Routing Using Travel-Time Discharge Relationships. Slovak Committee for Hydrology and Key Publishing, Ostrava 2012, ISBN 978-80-7418-172-6, 94 pp.

– UNESCO and IHP publications, mainly proceedings of international conferences.

Unfortunately, none of them was published within the period of this report.

– Proceedings of the conferences organised in Slovakia related to IHP:

Transport of water, chemicals and energy in the system soil-plant-atmosphere. Proceedings of the XXth poster day. (IHP-VII FA 1.2) CD ROM, UH SAV-GfU SAV, Bratislava, Slovakia, 2012. ISBN 978-80-89139-28-6

24th Conference of the Young Hydrologists – Proceedings. CD ROM, SHMI, Bratislava, Slovakia, 2012. ISBN 978-80-88907-81-7

25th Conference of the Young Hydrologists – Proceedings. CD ROM of Hydrological Days conference, SHMI, Bratislava, Slovakia, 2013. ISBN 978-80-88907-85-5

Results of the Slovak institutions in the framework of the Regional co-operation of the Danube countries were published in the chapter of a monograph :

- Miklánek, P.: Rivers. Recent Landform Evolution in Slovakia: the Carpatho-Balkan-Dinaric Region, Dordrecht : Springer, 2012, p. 31-38.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

Transport of water, chemicals and energy in the system soil-plant-atmosphere. XXth poster day. (National contribution to IHP-VI Focal Area project 1.2 Climate change impacts on the hydrological cycle and consequent impact on water resources.) Bratislava, Slovakia, 2012.

Transport of water, chemicals and energy in the system soil-plant-atmosphere. XXIst poster day. (National contribution to IHP-VI Focal Area project 1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources.) Bratislava, Slovakia, 2013.

24th Conference of the Young Hydrologists. Bratislava, Slovakia, 2012.

25th Conference of the Young Hydrologists. Bratislava, Slovakia, 2013.

1.6.2 Participation in meetings abroad

20th Session of the Intergovernmental Council of the IHP UNESCO, Paris, 2012: Miklánek, P., Halmova, D.

EUROFRIEND WG 2 meeting, Payerbach, 2012: Fendekova. M.

EUROFRIEND WG 5 meeting, Sankt Petersburg, 2012: Miklánek, P., Holko, L.

EUROFRIEND WG 5 meeting, Matavun, 2011: Holko, L.

ERB (*European Network of Experimental and Representative Basins*) Steering Committee meeting, Sankt Petersburg, 2012: Miklánek, P., Holko, L.

XIVth ERB Conference and General Assembly, (*Studies of Hydrological Processes in Research Basins: Current Challenges and Prospects)*, Sankt Petersburg, 2012: 4 papers and 6 participants.

ERB (*European Network of Experimental and Representative Basins*) Steering Committee meeting, Matavun, 2013: Holko, L.

26th Working Session of the Danube countries representatives, Bucharest, 2012: Miklánek, P., Pramuk, B.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

The Slovak IHP NC does not have institutional relations/co/operation at a regional level except the IHP UNESCO projects.

1.7.2 Completed and ongoing scientific projects

The Slovak IHP NC did not organise or participate in any projects out of IHP UNESCO.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

The NC will continue in all the main ongoing activities mentioned in the report. Activities within the IHP projects and participation at the meetings depend on their working plans, but most of the activities will be oriented on projects of IHP-VIII:

- Participation at the Intergovernmental council of IHP UNESCO in Paris on June;
- Participation at the Steering Committee of EUROFRIEND project in Montpellier on October;
- International coordination of the project Flood regime of the rivers in the Danube basin in the framework of the Regional cooperation of the Danube countries *(Dr. Pekárová)*;
- Organization of the working group meeting on Flood regime of the rivers in the Danube basin;
- Participation at the 27th meeting of the Danube countries representatives in Deggendorf in Germany on September;
- Collaboration on organization of the XXVIth conference of the Danube countries in Deggendorf in Germany on September;
- Participation at the working group meeting EUROFRIEND2 in Montpellier on October;
- Participation at the working group meeting Hydrological processes EURO FRIEND5 in Coimbra in Portugal on September;
- Participation at the ERB Steering Committee meeting in Coimbra in Portugal on September;
- Collaboration on organization of the 15th biannual international conference ERB2014 in Coimbra in Portugal on September;
- Organization of the 26th Conference of the young hydrologists in Bratislava on November;
- Organization of the XXIInd Poster Day on Transport of water, chemicals and energy in the system soil-plant-atmosphere in Bratislava on November.

2.2 Activities foreseen for 2015-2016

The continuation in all the main ongoing activities in framework of IHP-VIII is foreseen. The Slovak NC IHP will contribute to following activities.

- Continuation in Regional co-operation of the Danube countries in hydrology.
- Participation at the regular bi-annual hydrological Conferences of the Danube countries.

- Continuation in organisation of the Poster days Transport of water, chemicals and energy in the system soil-plant-atmosphere.
- Publication of SVH Publications

- Participation in European Reference Basins project.

CCPC FRIEND (Flow Regimes from International Experimental and Network Data)

- Participation in EURO FRIEND working groups 2 and 5
- Collaboration and co-ordination of activities with other international programs and projects as European Network of Experimental and Reference Basins (ERB), and others.

CCPC HELP (Hydrology for the Environment, Life and Policy)

- Maintenance and promotion of research in experimental and representative basins.

2.3 Activities envisaged in the long term

Continuation in active participation in the IHP UNESCO. No specific activities planned at the moment.

Slovak Committee for Hydrology
National Committee for IHP UNESCO
Institute of Hydrology SAS
tel. & fax +421 2 44259311
831 02 Bratislava 3 ncihp@uh.savba.sk
Slovak Republic
Slovak NC IHP - Homepage http://www.ih.savba.sk/ihp/

THE SWEDISH NATIONAL REPORT ON IHP RELATED ACTIVITIES

Anna Johnell
Katarina Veem
Jafet Andersson

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

The composition of the Swedish National Committee changed 2012. The chairperson was changed from Karin Lexén to Katarina Veem from SIWI. During 2012 the other members where Lotta Andersson (secretary), Berit Arheimer (Swedish representing IHP Council), and David Gustafsson (from the Swedish Hydrological Council).

In 2013 the members of the Swedish IHP committee were changed with Jafet Andersson, SMHI and Anna Johnell, SMHI joined as secretary and Jafet Andersson from SMHI replaced Berit Arheimer. This year, 2014, a member from the Swedish Hydrological Council, Andrew Frampton, also joined the Swedish IHP.

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

The IHP Committee is involved in a cross-border project in Vietnam and China. This project will involve several IHP-VII activities. Theme 1 (Adapting to the impacts of global changes on river basins and aquifer systems) will be covered by including climate change impact in the region. This project will support cooperation between China and Vietnam linked to sustainable development and effective governance of land and water resources in the Red River basin. Thus theme 2 activities (Strengthening water governance for sustainability) will be performed. Theme 4 activities (Water and life support systems) will be covered in the project by mapping land use, sanitation, logging, use of pesticides and nutrients etc. Activities related to theme 5 (Water education for sustainable development) will be taken care of by organization of workshops.

So far a stakeholder analysis has been done identifying important stakeholders in the Red River basin. These stakeholders will have important roles in fact finding as well as dissemination and discussions. Main governmental partners have been identified to act as focal points within respective country.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The Swedish IHP committee supports activities during World Water Day. The theme for the world water day 2013 was “Water Cooperation” and 2014 “Water and Energy”. IHP commissioned the national coordination of Swedish activities in connection with the World Water Day. The output has been a webpage www.vattendag.org where organizers can register their activities and find campaign material and news before World Water Day takes place. The Swedish Hydrological Council have also initiated new activities and engaged new organizations before the World Water Day. Swedish Hydrological Council has updated information material “water packages” according to the annual theme.

The Swedish IHP attends the Swedish Research Council’s UNESCO meetings in Stockholm. The purpose of these meetings is to strengthen the cooperation between the UNESCO committees and Swedish research.

1.2.2 Participation in IHP Steering Committees/Working Groups

The Swedish IHP participated in the Intergovernmental IHP Council Meeting in Paris. Another meeting was the ”UNESCO Strategic and High-Level Meeting on Water Security and Cooperation” which was held in Nairobi in Kenya 11-13 September 2013. This purpose of the meeting was to find cooperation possibilities between UNESCO’s IHP committees in different countries. Swedish IHP especially hoped to find cooperation partners in Africa. Unfortunately, the limited funds which the Swedish IHP committee has compared to other projects in Africa, rendered such cooperation as less suitable

Swedish IHP participated in a Region I (Europe and North America) meeting, which was held in Oslo 21-22 October 2013. The purpose of this meeting was also networking and to find common projects. Participants at the meeting agreed to work together in the following concrete fields:
1. Design criteria
2. Water watch project for the region
3. Management practice handbook update – this item is to be initially prepared by Canady and the UK.

As funding possibilities are limited for the Swedish IHP, useful collaboration has to make use of related national activities and attempt to pool resources creatively.

1.2.3 Research/applied projects supported or sponsored

After consultations, the IHP Committee has identified a cross-border project in Vietnam and China as the focus for the committee’s activities. IHP can play a continuous and constructive role in this project as it is a new collaboration that will culminate in a joint major application. In collaboration with other partners (SIWI and ICRAF) IHP will work to create a platform for dialogue regarding common water management between China and Vietnam. The dialogue is based on the common statement as President Truong (Vietnam) and President Xi Jinping (China) presented at a joint high-level meeting in June 2013.

The overall objective of the project is to contribute to increased knowledge of the land and water resource management in the basin to the Red River and thus contribute to a sound basis for decision-making aimed at sustainable development focused on "water and food security and resilient urban growth”. Through a historical survey of the development of the river delta, forecasts for the future can be made and challenges estimated. Moreover, three scenarios will be developed - the climate, urban planning / development and socio - economic growth - to ensure robust planning and decision making in the river delta.

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

IHP will give support to a cross-border project in Vietnam and China in the Red river. The Stockholm International Water Institute (SIWI) generates knowledge and informs decision-making towards water wise policy. SIWI performs research, builds institutional capacity and provides advisory services. SIWI is one of the partners in the Red River Project

Support for this project has led to synergies between Swedish institutions working for sustainable climate adaptation and water quality work. In addition to SMHI, the international department at the Swedish Agency for Marine and Water Management will also join the project.

Another partner in this project is the World Agroforestry Organisation, ICRAF. This organisation works with transboundary dimensions in the Red River basin. They work with farmers in a local context. ICRAF has two offices in the region one in Kunming and one in Hanoi and is well placed to facilitate upstream-downstream dialogues.

1.2.5 Other initiatives

IHP sponsors a hydrological terminology group, which was initiated by Swedish Hydrological Council during 2010. The long term purpose of this group is to create an electronic glossary with Swedish and English words relevant for hydrological discourse, which will be continuously updated. This work has been ongoing during 2011-2014. A first version of this glossary was created by digitalization of the existing "Nordic Glossary of Hydrology"from 1973-1984.

1.3 Educational and training courses

1.3.1 Organization of specific courses.

During 20-21 November 2012 the Swedish IHP committee meet for a workshop in scientific writing. This took place to finish the work with publications from the two workshops around uncertainties, possibilities and hinders related to use of hydrological models in water management. The purpose was to create two scientific papers and a paper for the people working with water management.

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

UNESCO has opened a research centre at SIWI in Stockholm to increase the knowledge about how we can cooperate with our common water resources to avoid future conflicts. SIWI is one partner in the Red River project which the Swedish IHP committee supports.

1.5 Publications

After two workshops on the use of numerical models in water management in 2011, the publication "Potentials for Numerical Models in Water Management" was published in the Journal of Water Management and Research in 2013. Researchers and modellers from various parts of Europe were invited. The results were recommendations of good practices in the use of models with a focus on local water management and stakeholder involment.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

The Swedish IHP participated in a seminar arranges by Swedish Research Council science network in Stockholm 2012. Focus for this seminar was how scientists and

different stakeholders together form their view of reality. This was given with examples from transnational to local scale, with a gender perspective.

1.6.2 Participation in meetings abroad

Swedish IHP participated in an Artic HYCOS meeting in Canada in 2012. Other conferences were the Rio+20 in June 2012 where a presentation was given at an event arranged by UNESCO-IHP ”Water Security – growing multiple need and scarcity”. Another presentation 2012 was given at the workshop Catchment Change Network International Conference: Stakeholders, next generation models, and risk in managing catchment change” in Lancaster, England. During 2013 Swedish IHP did not participate in meetings abroad, but two posters are planned at meetings in France and Malawi later 2014 (see below).

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation
1.7.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

Between the 7th and 10th October IHP will visit the 7 IHP FRIEND conference in Montpellier in France. The FRIEND-Water2014 Conference aims at sharing knowledge about change in hydrological processes, and how this knowledge can be streamlined to let water management and policy to adapt to it. This will be an excellent opportunity for networking.

Swedish IHP wants to network with organizations in Africa, and between 29th and 31th October Swedish IHP will have a poster at the WaterNet/WARFSA/GWP-SA Symposia in Malawi. The theme is: 'IWRM: An effective response to water-energy-food security challenges under changing climate'. This Symposium promotes interaction among policymakers, academics and practitioners. Great emphasis will be placed on integration of knowledge, by involving scholars from the natural, medical and social sciences.

The first step towards development of a proposal will be to organize a scoping workshop in the Red River basin, inviting stakeholders in China and Vietnam as well as international experts and financial partners. The purpose of the workshop will be to improve the participants’ understanding of existing land and water resources in the basin; the current use of the same; and the challenges and opportunities today and in the future. A mobile workshop is planned for the Red River project, travelling overland from Kunming to Hanoi. A series of presentations will start the workshop with inputs from various experts during the first day in Kungming. Next the workshop will travel during three days and visit relevant places. The workshop will finish in Hanoi with a day of discussions to outline the main activities in the project.

2.2 Activities foreseen for 2015-2016

The Swedish IHP will continue to give support to the World Water Day in Sweden. Next year, 2015 the theme will be “Water and Sustainable Development”, and provides an important opportunity to consolidate and build upon the previous World Water Day.

The Red River project will hopefully continue. This project proposes to undertake a comprehensive analysis of the land use development over time in the entire river basin and its affect for water resources. The project intends to assess the land use and water linkages in the past, present and future. The outcome objectives are:

a) Document historic development of the land and water use in the basin.
b) Assess the current land and water challenges in the basin and the local, national and regional preparedness.
c) Outline three development scenarios based on climate change, urban development and socio-economic growth for planning and decision-making.
d) To support cooperation between China and Vietnam linked to sustainable development and effective governance of land and water resources.

The Swedish IHP committee will continue to attend IHP meetings and relevant conferences.

2.3 Activities envisaged in the long term

The Red River project will hopefully continue and support will be given from the Swedish IHP. After the Red River project finishes Swedish IHP will fund other projects in developing countries.
The Swedish IHP will continue to give support to the World Water Day in Sweden.
The Swedish IHP committee will continue to attend IHP meetings and relevant conferences.

RAPPORT NATIONAL SUR LES ACTIVITES DU PHI

Contribution de la Suisse

1. ACTIVITES ENTREPRISES PENDANT LA PERIODE JUIN 2012 – MAI 2014

1.1 Réunions du Comité national du PHI

1.1.1 Décisions sur la composition du Comité national du PHI

Le Comité national suisse du PHI a été renouvelé afin d'intégrer au mieux les différents aspects des sciences de l'eau sur le plan national. Le nouveau comité est composé de membres issus de l'administration nationale (Office fédéral de l'environnement, Département fédéral des Affaires étrangères) et de la recherche scientifique. Une extension à des membres de la société civile pourrait être décidée ultérieurement.

1.1.2 Bilan des activités du PHI-VII

La Suisse poursuit ses activités pour l'Initiative internationale relative à la sédimentation (ISI), dont la présidence est assurée par Manfred Spreafico de l'université de Berne.

Au niveau international, la Suisse, à travers la DDC et son programme global Initiatives eau, soutient un projet de l'UNESCO-PHI sur la gouvernance des eaux souterraines pour les aquifères transfrontaliers. Ce projet se développe en Amérique centrale, Asie centrale et Afrique australe. Ce projet, démarré en 2013, a d'ores et déjà été présenté lors de plusieurs événements internationaux et nationaux.

1.2 Activités nationales dans le cadre du PHI

1.2.1 Réunions scientifiques et techniques au niveau national ou local

Les activités essentielles ont consisté à réorganiser le comité national qui s'est réuni sous sa nouvelle forme en mai 2014.

1.2.2 Participation à des Comités directeurs ou des groupes de travail du PHI

Néant

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

Néant

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

Dans le cadre de la commission internationale pour l'hydrologie du bassin du Rhin, émanant de l'UNESCO, plusieurs projets ont été élaborés, notamment dans le domaine du climat et de la modélisation de la fonte de neige.

1.3 Cours d'éducation et de formation

Néant

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

Néant

1.5 Publications

1.6 Participation aux réunions scientifiques internationales

1.6.1 Réunions tenues dans le pays

Néant

1.6.2 Participation à des réunions à l'étranger

Néant

1.7 Autres activités au niveau régional

Néant

2 ACTIVITES FUTURES

2.1 Activités planifiées jusqu'à décembre 2014

Redéfinition des tâches et activités du comité national.

2.2 Activités prévues pour la période 2013-2014

Les activités précises seront définies en fonction des résultats de la session du PHI, tenant compte des projets déjà en cours et avec lesquels des synergies pourront être identifiées.

2.3 Activités envisagées à long terme

De manière générale, la Suisse entend appuyer les activités de l'UNESCO dans les différentes activités pour les quelles elle dispose de connaissances particulières. De par ses compétences larges et l'étendue des problématiques hydrologiques identifiées en Suisse, elle dispose de l'expertise nécessaire pour participer activement au PHI et contribuer à ses développements et visions futures.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

THAILAND
June 2012 - May 2014

for
21st Session of the IHP Intergovernmental Council: IHP-IC-XXI)
(UNESCO, Paris, 18-20 June 2014)

Paris, France

Contents

1. Activities undertaken in the period of June 2012 – May 2014

1.1 Meeting of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

The present composition of Thailand National Committee – IHP: TNC-IHP consists of 18 members as follows:

Chairman: Director General of Department of Water Resources
Vice Chairmen: Deputy Director General of Department of Water Resources
Deputy Director General of Royal Irrigation Department
Secretary: Director, Bureau of Research, Development and Hydrology, Department of Water Resources
Members: Representatives from concerned agencies and expert 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 Association
13. Mr. Veeraphol Taesombat
14. Director of Research and Hydrology Development Division, Department of Water Resources

The mailing address is as follows:
Thailand National Committee for the IHP
Department of Water Resources
180/3 Rama 6 Road, Soi 34, Samsennai,
Phayathai, Bangkok, 10400, Thailand
Tel : +66-22986604 Fax: +66-22986604
Email : sukontha.a@dwr.mail.go.th
kanokwan.yw@gmail.com

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)
Please see attached sheet.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

During June 2012 – May 2014, there was a discussion with Thailand National Committee –IHP meeting to review some activities and organize the meeting in future. 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 Regional Steering Committee Meeting for Southeast Asia and the Pacific, RSC for UNESCO-IHP and the International Conference on Sharing Knowledge of Issues in Water Resources Management to Face the Future, 5-9 November 2012 in Langkawi, Malaysia.
- The 21st Regional Steering Committee Meeting for Southeast Asia and the Pacific, RSC for UNESCO-IHP and the Conference, 30 September - 5 October 2013, Gyeongju, Republic of Korea.

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 of 2013 (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 its impact on water resources management of community. (Multiple case study : tributaries of Mun river basin)
- Water resources management in the Chi river basin community.
- Water resources management in the 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: Case study in the Mun River sub watershed area, 1 October 2012-30 September 2014.
- The conservation planning on small canal and the way of life for Ampawa district's people, 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 and 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, Vangveieng 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.
- Collaborate with Network of Asian River Basin Organizations (NARBO) on NARBO RBO Benchmarking program, 2013-2014 (RBOB 2013) in cooperation with Japan Water Agency (JWA).

1.2.5 Other initiatives

- The Department of Water Resources initiates the guidelines on Conjunctive Water Management with the Department of Groundwater Resources and Royal Irrigation Department, Thailand under the consultations of Natural Heritage Institute (NHI), the United States of America.
- The Department of Water Resources initiates the guidelines on the SOURCE Model for decision support on water resources management with eWater Cooperative Research Center, Australia.

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 on 9-10 May 2013, with the total of 1,052 stations, cover 3,207 villages. Its objectives are to increase understanding and skills for public relations and public hearing on the early warning system for flood risk areas - landslide prone areas in the foothills and plains for 2013.
- National Workshop for Trainers in Using Integrated Water Resources Management Model "Pilot Study No.1: Application for Flood Study and Water Quality Management in Lamtakhong Basin" and "Pilot Study No.2: MRC Toolbox Application for Integrated Water Resources Management in Nam Pong Basin" on 31 July – 2 August 2013, Bangkok, Thailand.
- National Training on Operation and Maintenance of Grain Size Analysis, on 5 – 6 August 2013, Chiang Rai, Thailand.
- National Training on Operation and maintenance of Echo Sounder on 27 – 28 November 2013, Ubon Ratchathani, Thailand.
- Regional Training on Quality Assurance and Quality Control (QA/QC) for Spatial GIS and Hydro-Meteorology Data, 25 – 27 February 2014, Ho Chi Minh City, Viet Nam.
- Regional Technical Workshop on Discharge and Sediment Data Quality Assurance (QA) and Quality Control (QC), 11-14 March 2014, Siem Reap, Cambodia.
- National Workshop for Trainers in Using Integrated Water Resources Management Model "Pilot Study No.1: Application for Flood Study and Water Quality Management in Lamtakhong Basin" and "Pilot Study No.2: MRC Toolbox Application for Integrated Water Resources Management in Nam Pong Basin" on 19-23 May 2014, Khonkaen, Thailand.

1.3.3 Participation in IHP courses

- Thai representative attended the training course on Precipitation Measurement from Space and its Applications on 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 (AsianG-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 Cooperation with UNECSCO-IHE Institute for Water Education and/or international/ regional water center under the auspices of UNESCO

1.5 Publications

There are numerous Publications from various conferences.

1.6 Participation in international scientific meeting

1.6.1 Meetings hosted by the country

- Ministry of Natural Resources and Environment, Thailand 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.

- Department of Water Resources, Thailand hosted the ASEAN Water Dialogue Conference 2013: AWDC 2013, 25-27 September 2013, Bangkok, Thailand.

1.6.2 Participation in meetings abroad

Representatives from Thailand participated in

- World Water Week 2013, 1-6 September 2013, SIWI, Stockholm, Sweden.
- The 13th ASEAN Working Group on Water Resources Management, 24-26 June 2013, Darussalam, Brunei.
- The 2nd Mekong River Commission Summit and related Meeting, 2-5 April 2014, Ho Chi Minh City, Vietnam.
- Globe 2014 Conference: Building Business Resilience through Sustainability Strategies and Innovation, March 2014, Canada.

1.7 Other activities at regional level

1.7.1 Institutional relations /co-operation

- TNC-IHP has remained coordination closely and contacts with UNESCO Jakarta Office and UNESCO Bangkok.

1.7.2 Completed and ongoing scientific projects

- Completed project

The Mekong-HYCOS is the MRC project funded by Agence Française de Développement (AFD) and Fonds Français pour l'Environnement Mondial (FFEM). The Mekong-HYCOS 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 PR 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 stations on the mainstream, 30 stations on the tributaries and 2 tidal stations in the Mekong Delta. These stations are able to 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 model 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 in Thailand.
- Nam Pong project: Series of training for national modeler under IWRM principles.
- Lam Ta Kong project: Series on the job training/workshop for capacity building for the application of ArcSWAT
- Flow model calibration and data preparation for sedimentation model held on 10-12 July, 2013.
- The Lam Ta Kong sedimentation model calibration to be held on 21-23, August 2013.

2 FUTURE ACTIVITIES

2.1 Activities planned until December 2014

- Thai representatives will participate in the IHP Training Course in Kyoto, Japan.
- The Department of Water Resources, Thailand in cooperation with UNEP will organize the 1st International Environment Forum for Basin Organizations in November 2014, Bangkok, Thailand.

2.2 Activities foreseen for 2015-2016

- Continuation of Collaboration with RSC for Southeast Asia and the Pacific
- Continuation of involvement in *Asian-Pacific FRIEND*
- Enhancing activities contributed to IHP-VIII
- Enhancing activities on flood and drought management

- Continuation on promotion of integrated water resources management
- Expansion on implementation of integrated water resources management 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 or environmental aspects
- Thai Hydrologist Association, Faculty of Engineering, Chulalongkorn University and Kasetsart University, Royal Irrigation Department, Department of Water Resources, Thailand Research Fund and Asian Institute of Technology will co-organize THA 2015 International Conference on *Climate Change and Water & Environment Management in Monsoon Asia*, 28-30 January 2015 in Bangkok Thailand.

2.3 Activities envisaged in the long term

- Enhancing activities contributed to IHP-VIII
- Enhancing activities in Flood and Drought Management
- Highlight on Integrated Water Resources Management in 25 river basins
- Continuation of raising public awareness and education on 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

Report Format

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

Turkish IHP National Committee will be close contact with Turkish National Commission for UNESCO.

Turkish IHP National Committee will be reorganized in a way to collaborate all of the related water institutions and Universities and Research centers. such as General Directorate of Water Management, Water Institute, General Directorate of Meteorological Services, Hacettepe University, International Karst Water Sources Research and Application Center.

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

Studies on adaptation of the Strategic Plan to Turkey is ongoing.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Meetings held in the June 2012-May2014 period are as follows;

-2nd İstanbul Somali Conference on Preperation for Future of Somali: Targets for 2015, 31 May-1 June 2012,İstanbul.

-National Hydrology Commission Workshop, 10-11 February 2013, Ankara.

-National Hydrology Commission Meeting, 20 February 2013, Ankara.

-D8 Water Cooperation Meeting With a Special Focus to Egypt and Nigeria, 21-22 February 2013.

-Water Law and Policies Workshop, 17-19 April 2013, Ankara.

-3rd National Flood Symposium, 29-30 April 2013, İstanbul.

-Sharing Experiences for Karst Water Resources in the Middle East Workshop, 26-30 May 2013, Hacettepe Universty, International Karst Water Sources Research and Application Center, Ankara.

-7th Hydrology Congress, 26-27 September 2013, Süleyman Demirel University. Isparta.

-First World Irrigation Forum, 29 September-5 Ekim 2013, Mardin.

-Water Safety and Turkey in the 21st Century Workshop, 12-13 December 2013, Middle East Technical University, Ankara.

-Turkish International Hydrology Commission Workshop, 10-11 February 2014, State hydraulic Works, Ankara.

-Dams Congress, 13-15 February 2014, İstanbul.

-International Integrated Basin Management Workshop, 25-26 February 2014, İstanbul.

-Water Safety and Water Law: Facing Challenges and Catching Opportunities, 27-29 May 2014, İstanbul.

-Irrigation and Drainage in the Changing World: Global Food Safety Challenges and Opportunities Meeting, 29 September-5 October 2014, Mardin.

-3rd International Istanbul Water Forum, 27-29 May 2014, Istanbul.

-1st World Young Water Ambassadors Assembly Meeting, within the context of the 3rd International Istanbul Water Forum, 28 May 2014, Istanbul.

1.2.2 Participation in IHP Steering Committees/Working Groups

1.2.3 Research/applied projects supported or sponsored

"Assessment of Risk and Uncertainty related to Coastal Aquifers Management in the Mediterranean: Country Report-Turkey" is under preparation within the context of the MedPartnership sub-component of the UNESCO IHP.

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

There is close collaboration with WMO, IAHS, and Medpartnership.

1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

1.3.2 Organization of specific courses

Following courses were hosted;

-Course on Cooperation Opportunities for participants from Gabon, 11 September 2012, Ankara.
-Course on Cooperation Opportunities for participants from Burkina Faso, 20 May 2013, Ankara.

-More than 300 engineers have received training at The Turkish Water Institute (SUEN) from various countries such as Azerbaijan, Saudi Arabia, Afghanistan and Ghana.
-The Turkish Water Institute (SUEN) gave trainings to the personnel of the Azerbaijan State Water Company AZERSU in the years 2012 and 2013 mainly in the fields of water and wastewater treatment and management. Total personnel trained were 240.
-The Turkish Water Institute (SUEN) organized a training programme in water and wastewater management and technologies to a group of 9 senior officials from the Republic of Ghana Water Resources, Works and Housing Ministry between 28 April – 3 May 2014. The delegation also undertook site visits to the treatment facilities operated by the Istanbul Water and Sewerage Administration (ISKI) to observe the successful implementations and practices in place. Certificates were handed out to each participant at the end of the programme. The programme was carried out in cooperation with the Turkish Cooperation and Coordination Agency (TIKA) and it is the target to deliver similar training programmes to other countries in Africa.
-SUEN hosted a delegation of 6 senior officials from the Afghan Energy and Water Resources Ministry between 17 and 22 March 2014. The programme topic was Integrated Water Resources Management and was financed by the USA donor agency USAID.
-SUEN gave trainings to the engineers from several water and sewerage companies from Saudi Arabia in 2013 and 2014.

1.3.3 Participation in IHP courses

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

1.5 Publications

There are number of papers and books published in the field of water resources field.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

European Group of Basin Organizations EUROPE-INBO, 17-19 October 2012, Istanbul, Turkey.

1.6.2 Participation in meetings abroad

Hydrology Forum , 8-10 May 2012, WMO, Germany.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

There is close cooperation with Ministry of Food, Agriculture and Livestock, Ministry of Environment, Ministry of Energy, Ministry of Development, Scientific and Technological Research Center of Turkey, Universities, and other water related institutions.

1.7.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

Completion of the reorganization and preperation of regulation are the main short term targets.

2.2 Activities foreseen for 2015-2016

12th Session of The United Nations Convention to Combat Desertification Meeting will be held in Turkey in 2015.

8th National Hydrology Congress will be held in Şanlıurfa in 2015.

It is planned to organize an education program related to UNESCO-IHP and IHE activities.

2.3 Activities envisaged in the long term

4th International İstanbul Water Forum will be held in İstanbul in 2017.

UGANDA
NATIONAL REPORT ON IHP RELATED ACTIVITIES

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

The National IHP Committee for Uganda was first re-constituted in 2010, but because some members were less active, it had to be again re-constituted in 2012 with new membership based on re-defined criteria and is now fully operational.

1.1.1 Decisions regarding the composition of the IHP National Committee

The composition was based on consideration of the following criteria:

i. Representative from the line Ministry responsible for Water Resource Management
ii. Representative from Agencies dealing with water issues
iii. Representative from Academic Institutions researching and training manpower in water resources management
iv. Representative(s) from Private Sector/Civil Society Organizations in Water sector
v. Representation that engenders the composition of the Committee
vi. The Secretariat to be at the National Commission while the Chairperson should be from the line Ministry dealing with Water Resources.

On the basis of the above, the composition of the National Committee was drawn up consisting of 9 full members from water and environment, government agencies, NGOs, academic institutions, professional associations and the National Commission. The Chair of IHP Committee is Ministry of Water while the Secretariat is Uganda National Commission for UNESCO. The list of the IHP National Committee is as shown in the table below.

LIST OF NATIONAL IHP COMMITTEE MEMBERS

	Name of Official/Member	**Work Place**	**Constituency**	**Remarks**
1	Dr. Callist Tindimugaya	Ministry of Water and Environment, Directorate of Water Resources Management	Gov't Hydrologist& Water Resource Dept	Chairman
2	Dr. Max Kigobe	Makerere University,	Academic/Research Institution	Member
3	Dr.Isaac Mutenyo	Kyambogo University/Institution of Professional Engineers	Academic/Research Institution/Professional body	Member

4	Eng. Johnson Amayo	National Water &Sewage Corporation	Gov't Hydrologist& Water Resource Parastatal	Member
5	Eng. Ian Arebahona	Ministry of Water and Environment, Directorate of Water Development	Gov't Hydrologist & Water Resource Dept	Member
6	Mr.Richard Kyambadde	Ministry of Water and Environment, Directorate of Environment Affairs	Gov't Environmentalist related to Water Sector	Member
7	Ms. Doreen Kabasindi Wandera	Uganda Water & Sanitation Network(UWASNET)	Civil Society Organization/NGO in Water Sector/Female	Member
8	Ms.Cate Nimanya	NETWAS	Professional Network of Water Professionals	Member
9	Dr.Dominic V.L. Mundrugo-Ogo	UNATCOM	Programme Officer, Natural Science	Secretary to IHP National Committee

The Secretary General of the National Commission plays an advisory role to the IHP National Committee.

During the period under review, the IHP National Committee has held three meetings.

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

Some work has been on-going on IWRM approaches in schools based on river basins under Education for Sustainable Development (ESD) programme, in Kyoga, Victoria and Albertine basins

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- Participation in UNESCO GRAPHIC program. Study site has been maintained in Uganda since 2009 and results of the groundwater monitoring are regularly used in assessment of impacts of climate change on groundwater resources.
- Coordinated and guided the project for Assessment of vulnerability of groundwater resources to pollution in urban areas with specific focus on Kampala, 2012.
- Co-organised a meeting with GWP and Ministry of Water and Environment in 2013 and 2014 national consultations on water in the post 2015 development agenda.

1.2.2 Participation in IHP Steering Committees/Working Groups: Participated in meetings of National IHP Committees in Africa in 2012 and 2014

1.2.3 Research/applied projects supported or sponsored: Project for Assessment of vulnerability of groundwater resources to pollution in urban areas with specific focus on Kampala, 2012

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

- Participation in a workshop on Water for peace in Africa programme held in Dar es Salaam, Tanzania in December 2013.
- Compilation of information on transboundary aquifers in Uganda under TWAP and participation in a regional meeting on TWAP held in Nairobi, Kenya in March 2014
- Participation in UNESCO/GEF regional Groundwater Governance workshop held in Nairobi, Kenya in 2012
- Participation in UNESCO/IGRAC workshop on Global Groundwater Monitoring held in Nairobi, Kenya in 2012.

1.2.5 Other initiatives

- Facilitating linkages and collaboration between academic institutions and water management and development agencies to improve CB in water related issues .

1.3 Educational and training courses

1.3.1 Contribution to IHP courses : None

1.3.2 Organisation of specific courses : None

1.3.3 Participation in IHP courses : None

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

Not undertaken

1.5 **Publications :** None specific to IHP, but a publication on a concluded Participation Programme of 2012/13 Biennium entitled : *« Geohazards*

Vulnerability and Risk Profiles in Uganda » Chapters 2-4 documented a wide coverage of hydrological causes of disasters in Uganda.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

A meeting co-organised with GWP and Ministry of Water and Environment in 2013 and 2014 national consultations on water in the post 2015 development agenda

1.6.2 Participation in meetings abroad :

- Participation in IHP 8 implementation taskforce meetings in Cologne, Germany in 2012 and Nairobi, Kenya in 2013
- Participated in the 37th General Conference and held discussions with the IHP officials in the section of Groundwater Resources and Aquifer Systems among others in Paris, November 2013.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation:

As seen in the representation on the IHP National committee, there is a good network of collaboration that involves the line Ministry responsible for Water Resource Management, Government Parastatal l overseeing water supply in the Country and its wide network of service providers, the academic Institutions that conduct research and train manpower for water resources management, the Private Sector/Civil Society Organizations dealing with Water sector and the network of water professionals and regulatory bodies

One Specific instance of collaboration was the participation in the high level panel UNESCO Strategic workshop on Water Security and Cooperation in Africa held in Nairobi, Kenya in 2013

1.7.2 Completed and on-going scientific projects : Project for Assessment of vulnerability of groundwater resources to pollution in urban areas with specific focus on Kampala, 2012

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

i) Promotion of adaptation to the impacts of climate change on aquifer systems

ii) Promoting the management of transboundary aquifers: case of Karamoja & Turkana regions.

iii) Finalise linkage and collaboration framework between academic institutions and water management and development agencies to improve CB in water related issues

iv)

2.2 Activities foreseen for 2015-2016

i) Continue promoting the management of transboundary aquifers: case of Karamoja & Turkana regions.
ii) Scaling up activities for adaptation to the impacts of climate change on water resources (surface and groundwater)
iii) Eco-hydrology system solution and ecological engineering for the enhancement of water, and ecosystem resilience and ecosystem services
iv) Shaping of the catchment ecological structure for ecosystem potential enhancement, biological productivity and biodiversity.
v) Urban Eco-hydrological – storm water purification and retention in the city landscape, potential for improvement of health and quality of life
vi) Management of climate change induced water related disasters (floods and droughts)

2.3 Activities envisaged in the long term

a. Eco-hydrological regulation for sustaining and restoring connectivity and ecosystem functioning focused on Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies (waste H_2O treatment, irrigation, crop varieties etc.

b. Ground water dependent ecosystems identification, inventory and assessment

c. Continue implementing activities for adaptation to the impacts of climate change on water resources (surface and groundwater)

d. Water education in lower and higher level education institutions

Conclusion

The IHP programme can play a very important role in supporting Uganda to implement its strategic plans for water resources management and development especially through capacity building, improving knowledge base, governance and management.

Recommendations.

The following recommendations are based on the situational analysis conducted by the members of the IHP National Committee:

1. There is great need to develop indicative annual plans for IHP activities at national and regional levels based on the global IHP strategic plan that will lead to regular reporting and accountability for activities.

2. There is need for closer linkages of the global and IHP national committee activities with the national water-related plans and strategies to show relevance and attract national level support.

3. There is a further need to improve governance of IHP at national and regional levels through regular meetings and reporting. Some special support in form of projects can foster such regional networking.

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

NATIONAL REPORT ON IHP RELATED ACTIVITIES

21ST SESSION OF THE IHP INTERGOVERNMENTAL COUNCIL
PARIS, JUNE 2014

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

Two meetings of the United Kingdom National Committee for the IHP were held during the reporting period; on 5 March 2013 and 11 February 2014. Since its formation in 2007 (through the merger of the UK National Committee for the IHP and the UK Inter-Departmental Committee on Hydrology) the *UK Committee for National and International Hydrology* (UKCNIH) has acted as the UK National Committee for the IHP. The committee comprises representatives from UK bodies with a major stake in hydrology and water resources research; the current organisations represented are detailed in Table 1.

Table 1 Representation on the *UK Committee for National and International Hydrology* (as of June 2014).

Natural Environment Research Council (NERC)
Centre for Ecology & Hydrology (CEH)
Department for Environment, Food and Rural Affairs (DEFRA)
Department for International Development (DfID)
Department for Transport (DfT)
Welsh Government
Scottish Government
Department of Agriculture and Rural Development, Northern Ireland (DARDNI)
Scottish Environment Protection Agency (SEPA)
Environment Agency (EA)
Northern Ireland Environment Agency (NIEA)
Met Office
British Geological Survey (BGS)
UK Water Industry Research (UKWIR)
British Hydrological Society (BHS)
UK Committee of the International Association of Hydrological Sciences (IAHS)
International Association of Hydrogeologists (IAH)
UK National Commission for UNESCO
UNESCO Category II Centre of Water Law, Policy & Science, Dundee
UK interests in IHP Flow Regimes from International Experimental and Network Data (FRIEND)
UK interests in IHP Hydrology, Environment, Life and Policy (HELP)
UK interests in IHP Water and Development Information for Arid Lands (G-WADI)
UK interests in IHP International Sedimentation Initiative (ISI)
UK interests in UNESCO Ecohydrology projects

The Natural Environment Research Council (NERC) Centre for Ecology & Hydrology (CEH) continues to provide the UK IHP secretariat with Professor Alan Jenkins remaining as Chair of the UKCNIH and Dr Harry Dixon as its Secretary.

1.1.2 Status of IHP-VII activities (including IHP-VIII activities if applicable)

The UK is able to contribute towards the IHP through a number of current scientific research programmes at a national and international scale. Contributions cover a range of IHP-VII and IHP-VIII Themes and Focal Areas. UK researchers continue to play a leading role in many of the cross-cutting and associated programmes of the IHP. Contributions over the reporting period and current activities include those detailed below.

Ecohydrology

Professor David Harper (University of Leicester) continues to play a leading role in coordinating research and capacity building activities in the area of Lake Naivasha (Kenya) and is an advisor to Imarisha Naivasha. The area is an International Ecohydrology Reference Site and IHP HELP basin. The work was highlighted in the UNESCO *Free Flow* publication (see Section 1.5).

Principles of Ecohydrology have also guided initiatives within the Welland catchment in eastern England (as UK HELP basin, see below).

FRIEND Programme

The UK has maintained its involvement in the FRIEND Programme providing support and research contribution to FRIEND initiatives worldwide through the activity of many hydrologists from across the country.

Dr Harry Dixon (CEH) represents UKCNIH on the Steering Committee of EURO-FRIEND. No meetings of the Steering Committee have been held over the reporting period. Gwyn Rees (CEH) is member of the Steering Committee of HKH-FRIEND. Helen Houghton-Carr (CEH) continues to represent the UK on the Steering Committee of Southern Africa FRIEND.

UK scientists presented at a midterm meeting of the Low Flow and Drought group (October 2012, Payerbach, Austria) and attended FRIEND meetings held at the 2013 and 2014 General Assemblies of the European Geosciences Union.

A number of UK authors (from CEH, University of Birmingham and Met Office) had papers accepted for presentation at the 7th FRIEND world conference which was due to be held in February 2014 (Hanoi, Vietnam). Professor David Hannah (University of Birmingham) was on the International Scientific Committee. Some of these authors intend to attend the rearranged conference in Montpellier, France (October 2014).

The UK, through the National River Flow Archive hosted by CEH, has continued to provide data updates to the FRIEND European Water Archive (EWA).

UK scientists have been involved in collaboration between European and North American researchers, focusing on the analysis of climate driven hydrological change in near-natural catchments across these domains – the results of which were published in 2012. Collaborations established through the FRIEND programme led to a successful research bid to the

Belmont Forum focusing on *DRought Impacts and Vulnerability thresholds for monitoring and Early-warning Research* (see section 1.2.3).

G-WADI Programme

The involvement of UK scientists in the development of the G-WADI programme continued between 2012 and 2014. Professor Mike Edmunds (University of Oxford) continues to serve on the G-WADI Steering Committee and has been involved in coordination of activities across the global network. UK contributions over the reporting period include a paper coordinated by Professor Mike Edmunds summarising the first decade of G-WADI activities. This paper, published in a special issue of *Sciences in Cold and Arid Regions* was presented at the G-WADI meeting organised by Asian G-WADI in September 2013 (Beijing, China).

HELP Programme

In 2012 the Category II Centre for Water Law, Policy and Science published a review of selected projects with integrated catchment management experiences, placing particular focus on HELP basins. The review considered links between national "top-down" policy processes and local "bottom-up" catchment scale initiatives and was published by Scotland's Centre of Expertise for Waters (CREW).

Under its renewed Category II agreement (2014-2020), the Centre for Water Law, Policy and Science at the University of Dundee is no longer responsible for the coordination of HELP basins within Europe.

Over the reporting period, activities have continued in the Tweed and Welland HELP basins. In the Welland basin two projects involving the Welland Rivers Trust, University of Leicester and others partners were funded under the *Catchment Restoration Fund* established by DEFRA in 2012. Principles of Ecohydrology are being guiding restoration of the Welland through the town of Market Harborough.

In the Tweed, several linked projects involving the University of Dundee and others have focused on river restoration and natural flood management, as well as governance models, stakeholder engagement and the provision of ecosystem services.

ISI Programme

Professor Des Walling (University of Exeter) continues to act as a member of the ISI Steering Committee and Core Steering Group but UK contributions over the reporting period have been limited by the wider Programme inactivity.

IHP-VII Theme 1:

The British Geological Survey (BGS) led research funded by the UK Department for International Development (DFID) aimed at improving the understanding of the resilience of groundwater in Africa to climate change. The project brought together UK researchers from BGS, the Overseas Development Institute (ODI) and University College London (UCL) with African research institutions in Nigeria, Tanzania and Ethiopia. A series of quantitative groundwater maps for Africa and new data from focused groundwater case studies were published in 2012.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The UK hydrological community continues to convene a comprehensive range of national and local scientific/technical meetings. The British Hydrological Society (BHS) is a UK national society for the advancement of hydrology. The Society's membership is drawn from both the academic (universities and research institutes) and operational sectors. The Society holds regular national and regional scientific and technical meetings related to Hydrology. Over the reporting period numerous meetings have been held focusing on topics such as *Urban Storm Drainage, Changing Extremes in Hydrology, Ecohydrology, Hydrometric Data, Abstraction Licensing* and *Upland Hydrology*. The Society's latest National Symposium was held in Dundee, Scotland in July 2012. *Hydrology Research* is the official journal of the Society and the Nordic Association for Hydrology.

1.2.2 Participation in IHP Steering Committees/Working Groups

UK researchers continue to be involved in wide range of IHP Steering Committees and Working Groups. In relation to the cross-cutting and associated programmes of IHP, UK scientists serve on, amongst others, the committees of FRIEND, HELP and ISI (see section 1.1.2). The UK National Committee for the IHP is represented on the Governing Board of the Category II Centre for Water Law, Policy and Science by Dr Harry Dixon (see Section 1.4).

The UK continues to actively engage with other National Committees in IHP Region 1, providing contributions to consultations and other initiatives. In October 2013, Alan Jenkins represented the UK National Committee for the IHP at the IHP Region 1 meeting in Oslo, Norway.

The UK has actively participated in the implementation planning for IHP-VIII. Professor Alan Jenkins and Dr Harry Dixon have contributed to the Implementation Working Group, including participating in its December 2012 meeting in Koblenz, Germany.

Professor Geoffrey Gooch (Director of the Category II Centre for Water Law, Policy and Science) participated in the *UNESCO Strategic and High-Level Meeting on Water Security and Cooperation* (September 2013, Nairobi, Kenya).

The UK maintains links with the UNESCO Division of Water Sciences. Over the reporting period the National Committee for the IHP provided a UK response to the Member State consultations on the implementation of IHP-VIII and feedback to the IHP-VII evaluation team. In March 2013, the Chair of the IHP Intergovernmental Council visited CEH to hold discussions with the National Committee Chair.

Nationally Professor Alan Jenkins and Dr Harry Dixon (as Chair and Secretary of the UKCNIH) represent UK involvement in the IHP in UK National Commission for UNESCO initiatives – for example, providing IHP related input to the Commission's 2013 assessment of the Wider Value of UNESCO to the UK. Through the Commission the IHP National Committee provides advice on relevant policy issues to the UK Permanent Delegation to UNESCO. Over the reporting period this input has included significant work on potential improvements to UNESCO's Category II Centre network – a UK National Commission Policy Brief was published on this topic in 2012.

1.2.3 Research / applied projects supported or sponsored

The European Union continues to be an important source of funding for UK international research activities. For example, CEH are collaborators in the 2014-2017 project entitled *EartH2Observe* (*Global Earth Observation for Integrated Water Resource Assessment*). Funded under the European Union Seventh Framework Programme for Research, the project will contribute to the assessment of global water resources through the use of new Earth Observation datasets and techniques.

A number of UK funded research initiatives of relevance to the IHP have been established over the reporting period. For example*: Unlocking the Potential of Groundwater for the Poor (UPGro)*, is a 2012-2019 international research programme which is jointly funded by UK's Department for International Development (DFID), Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC). The programme focuses on improving the evidence base around groundwater availability and management in Sub-Saharan Africa (SSA) to enable developing countries and partners in SSA to use groundwater in a sustainable way in order to benefit the poor.

In 2013, a joint programme was funded by the UK's Natural Environment Research Council (NERC) and the Ministry of Earth Science (MoES) in India to allow UK researchers to collaborate with Indian scientists to research *Drivers of Variability in the South Asian Monsoon*.

In April 2012 a joint collaborative research action focusing on *Freshwater Security and Coastal Vulnerability* was launched between the Belmont Forum and the G8 Research Councils Initiative on Multilateral Funding. Six international research consortia were awarded funding under the Freshwater Security Theme, with UK researchers participating in three. The funding call is allowing UK researchers to participate in partnerships with more than 15 other countries, including Belmont Forum countries Australia, Brazil, Canada, China, France, Germany, India, South Africa.

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

Close links are maintained between the UK National Committee for the IHP (see section 1.1) and other international organisations/ programmes. In November 2012 Professor Alan Jenkins (Chair of the UKCNIH) replaced Dr Ann Calver as UK Hydrological Adviser to the UK's WMO Permanent Representative, representing UK involvements in the WMO Commission for Hydrology (WMO-CHy). UK scientists continue to be actively involved in a wide range of WMO initiatives.

Linkages with the IAHS are maintained through Professor David Hannah, Chair of the UK National Committee for IAHS, and UK scientists continue to contribute to a wide range of IAHS Commissions and activities. UK hydrologists (co-)convened a number of symposia and workshops at the IAHS - IAPSO - IASPEI Joint Assembly on *Knowledge for the future* (July 2013, Gothenburg, Sweden) as well as editing IAHS Red Books on conference themes. The UK, through the British Hydrological Society, is playing an active role in the recently formed (IAHS supported) *Network of National Hydrological Associations* (NHS).

Professor Mike Acreman (CEH) continues to offer support to the Ramsar Convention on Wetlands as a member of the Scientific and Technical Review Panel.

UK hydrogeologists continue to be actively involved in a number of Commissions and Working Groups of the IAH. Hydrogeologists from the BGS contributed to the 39th IAH Congress (September 2012, Niagara Falls, Canada).

In Europe, the UK (through NERC/CEH) are partners in the EU Joint Programming Initiative, *Water Challenges for a Changing World* and leading a Working Group on *Managing Hydro-climatic Extremes* as part of the European Technology Platform for Water (WssTP).

1.2.5 Other initiatives

See other sections of report.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

See other sections of report.

1.3.2 Organisation of specific courses

The UK continues to provide and contribute to a wide range of hydrological training and education both nationally and overseas, including an extensive range of postgraduate degrees in hydrology and relates subjects. See other areas of report for examples, including current educational initiatives by the Dundee Category II Centre.

The British Hydrological Society offers a studentship scheme to help support members who wished to study hydrology at postgraduate masters level.

1.3.3 Participation in IHP courses

See other sections of report.

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

UNESCO Category II Centre for Water Law, Policy and Science (University of Dundee)

The Centre for Water Law, Science and Policy was officially launched as a Category II Centre under the auspices of UNESCO in November 2006. The Centre underwent a successful Category II status renewal evaluation in December 2011, and a new agreement was signed by UNESCO and the UK Government in May 2014. In 2012 Professor Geoffrey Gooch was appointed Director of the Centre.

The Centre produces a wide range of research and policy output relevant to the IHP at a national and international scale. Examples of current and recent projects over the reporting period include the European Union funded LAGOONS project (investigating integrated water resources and coastal zone management in European lagoons in the context of climate change) and the GENESIS project (assessing climate change and land-use impacts on groundwater).

As part of the *Ecosystem Services for Poverty Alleviation* (ESPA) programme funded by the Department for International Development (DFID), the Economic and Social Research Council (ESRC) and the Natural Environment Research Council (NERC), the Centre are contributing to a project *Assessing Health, Livelihoods, Ecosystem Services and Poverty*

Alleviation in Populous Deltas. The Centre's contribution involves the legal, institutional and policy analysis and working with stakeholders to secure better policy outcomes.

Research is ongoing under the NERC *Changing Water Cycle* programme (2010-2014) investigating *Hydrologic and Carbon Services in the Western Ghats: Response of Forests and Agro-ecosystems to Extreme Rainfall Events.* The project is being co-hosted by the Centre and the University of Lancaster.

In the field of education and training, the Centre continues to deliver a postgraduate Master (LLM) programme in Water Law as well as PhD training and an annual *International Law and Transboundary Freshwater Workshop* (5th Annual Workshop, June 2014, Dundee, UK). The workshop is supported in part by the Global Water Partnership and draws in a wide variety of participants, both students and presenters. Over the reporting period, the Centre has further developed its educational activities related to IHP, establishing a portfolio of short continued professional development courses suitable for water processionals and managers interested in learning more about water law, policy and science.

Professor Geoff Gooch contributed to a side event at the 37th UNESCO General Conference on Water Education and Capacity Development (November 2013, Paris, France).

1.5 Publications

No list is maintained of UK publications related to the IHP. See other sections of report for examples of related publications.

UK researchers contributed to the book *Free Flow: Reaching Water Security Through Cooperation* published by UNESCO in support of the 2013 International Year of Water Cooperation. Chapters were authored on *Sharing water observations: turning local data into global information* (CEH *et al*), *Water cooperation for sustainable utilization: Lake Naivasha, Kenya* (University of Leicester *et al*) and *Integrated water resource management – combining perspectives from law, policy and science* (Centre for Water Law, Policy and Science, University of Dundee).

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

UK scientists have led and contributed to numerous international scientific meetings in relation to the IHP over the reporting period, both in the UK and abroad. See other sections of the report for examples of these meetings.

In January 2013, the University of Dundee hosted a photography exhibition by Gil Garcetti entitled *Women, Water and Wells* to mark the International Year of Water Cooperation.

1.6.2 Participation in meetings abroad

See other sections of report.

UK hydrogeologists, including researchers from the British Geological Survey (BGS), University of Strathclyde, Thames Water and Overseas Development Institute (ODI) participated in the regional consultation meeting for the Global Environment Facility (GEF) Groundwater Governance project (March 2013, The Hague, Netherlands).

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

See other sections of report.

1.7.2 Completed and ongoing scientific projects

See other sections of report.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2014

UK hydrologists will organise and contribute to wide range of forthcoming activities, including:

- The British Hydrological Society's 12th National Symposium (September 2014, Birmingham, UK).
- 5th Annual International Law & Transboundary Freshwaters Workshop, co-organised with Global Water Partnership (June 2014, University of Dundee, UK).

2.2 Activities foreseen for 2015-2016

The UKCNIH is in the early stages of developing plans for an event at the International Water Resources Association (IWRA) *XVth World Water Congress* (May 2015, Edinburgh, UK) to highlight current and future activities related to the IHP and Hydrology and Water Resources Programme of WMO in the field of integrated catchment management science and application. While the event is still to be confirmed the planned scope will incorporating international experiences in catchment management, while also highlighting examples of current initiatives within the UK.

2.3 Activities envisaged in the long term

UK scientists intend to continue their participation in the IHP, contributing to a wide range of initiatives and programmes as funding permits.

Report compiled by Dr. Harry Dixon and Professor Alan Jenkins (NERC Centre for Ecology & Hydrology) on behalf of the UK Committee for National and International Hydrology. June 2014.

For further information regarding the activities outlined in this report please contact Dr Harry Dixon (harr@ceh.ac.uk).

INFORME NACIONAL SOBRE ACTIVIDADES RELACIONADAS AL PHI

Contenido del Informe

1. ACTIVIDADES REALIZADAS EN EL PERÍODO JUNIO 2012 - MAYO 2014

1.1 Reuniones del Comité nacional del PHI

1.1.1 Decisiones concernientes a la composición del Comité nacional del PHI.

El Comité Nacional del PHI Uruguay (CoNaPHI Uruguay) fue creado en el año 1976. Los importantes cambios sucedidos en nuestro país en la institucionalidad del agua en los últimos 10 años dejaron su concepción inicial, reflejada en su integración, claramente perimida. El Comité no incluye a actores que hoy se reconocen fundamentales como los usuarios del agua y la sociedad civil en general representada por múltiples organizaciones, incluyendo la academia que ya no se limita a una Universidad, ni tampoco incluye a nuevas instituciones y niveles de gobierno. Por tanto, el CoNaPHI no ha tenido un funcionamiento efectivo en los últimos años. Estamos en una etapa de transición y reformulación, de acuerdo a la nueva realidad del agua en nuestro país.

1.1.2 Estado de las actividades del PHI-VII (incluyendo las actividades del PHI-VIII si es aplicable)

1.2 Actividades a nivel nacional dentro del marco del PHI

1.2.1 Certámenes científicos y técnicos nacionales/locales
1.2.2 Participación en Comités de dirección/Grupos de Trabajo del PHI

Se participó de la X Reunión de Comités Nacionales y Puntos Focales de América Latina y el Caribe y del Evento de Cierre del Año Internacional de la Cooperación en la Esfera del Agua en diciembre 2013 en México, con una delegación que incluyó al Director de la Dirección Nacional del Agua del Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente (DINAGUA-MVOTMA) (http://www.mvotma.gub.uy/el-ministerio/institucional/autoridades/item/10002424-director-nacional-de-agua-dinagua.html).

1.2.3 Proyectos de investigación o de aplicación apoyados o patrocinados

En coordinación con la Oficina Regional UNESCO Montevideo, del 18 al 20 de abril de 2012 en Montevideo, se realizó la Primera Consulta Regional del nuevo proyecto *Gobernanza de las Aguas Subterráneas: Un Marco Global para Acciones Nacionales* para América Latina y el Caribe. Este proyecto es el resultado de la fructuosa cooperación entre el Programa Hidrológico Internacional (PHI) de la UNESCO, el Fondo para el Medio Ambiente Mundial (GEF), la Organización para la Agricultura y la Alimentación (FAO), la Asociación Internacional de Hidrogeólogos (AIH) y el Banco Mundial.

El objetivo principal del proyecto es la sensibilización y la toma de conciencia sobre la importancia de una adecuada gestión de los recursos hídricos subterráneos para prevenir y revertir la crisis global del agua.

1.2.4 Colaboración con otras organizaciones o programas nacionales e internacionales

El Centro Regional de Gestión de Aguas Subterráneas Categoría II UNESCO, está colaborando en la implementación de la componente "aguas subterráneas" del proyecto TWAP (*Transboundary Waters Assessment Programme)* financiando por el GEF.

La Dirección Nacional de Aguas (DINAGUA), con la valiosa colaboración del Programa PHI de la Oficina Regional UNESCO Montevideo, ha asumido tareas y ha desarrollado articulaciones ad hoc ante cada asunto que se ha presentado. Así, en estrecha colaboración con la Dirección Nacional de Medio Ambiente (DINAMA) se ha estado llevando adelante la puesta en marcha del Centro Regional (Categoría II de UNESCO) para la Gestión de Aguas Subterráneas.

1.2.5 Otras iniciativas

En el marco del Día Mundial del Agua, el 22 de marzo de 2013, se realizó una "Caminata por el agua", en la que 40 niños de la escuela Nº 17 Brasil caminaron una distancia de 4 kilómetros por la ciudad de Montevideo. Durante el recorrido cargaron mochilas conteniendo 4 litros de agua y acompañaron la caminata con actividades educativo-recreativas. Esta actividad se realizó en cooperación con la Oficina Regional UNESCO Montevideo, la Administración Nacional de Educación Pública y la Red de Escuelas Asociadas de la UNESCO. http://www.comisionunesco.mec.gub.uy/

En setiembre de 2013 se realizó otra caminata por el agua con características similares, en la Rambla del Cerro de Montevideo, con niños y niñas de la Escuela No.137 "Grupo Escolar María Noya". La misma contó con gran participación de familiares de los niños. Al final se realizó una merienda compartida en el Parque Vaz Ferreira, al pie del Memorial de los Desaparecidos. http://www.comisionunesco.mec.gub.uy/

1.3 Cursos académicos o de adiestramiento

1.3.1 Contribución a cursos del PHI
1.3.2 Organización de cursos específicos

En septiembre 2012 en Uruguay se ha establecido una Cátedra sobre Agua y Cultura en la Facultad de Ciencias Sociales de la Universidad de la República, integrada al trabajo del PHI-LAC (http://www.fhuce.edu.uy/index.php/destacados/2367-catedra-unesco-agua-y-cultura). Esta Cátedra está articulando con DINAGUA para la sistematización de las experiencias de Gestión Participativa de los Recursos Hídricos que se están desarrollando en el país a partir del mandato constitucional. Asimismo, existe una Cátedra de Gestión de Zonas Costeras (http://www.mcisur.edu.uy/) en el Centro Universitario Región Este de la Universidad de la República.

1.3.3 Participación en cursos del PHI

El PHI de la Oficina Regional UNESCO Montevideo invitó a la RedPEA (http://www.comisionunesco.mec.gub.uy/) a participar del taller "Planeta azul". Enfoque metodológico para el estudio de los sistemas terrestres relacionados con el agua" organizado por el PHI y diversas instituciones argentinas, israelíes e internacionales como UNESCO. La RedPEA invitó a 12 docentes de Biología, Física, Química, además de un representante del Plan Ceibal (http://www.ceibal.edu.uy/) y otro de los Clubes de Ciencia. El taller se realizó en la ciudad de Resistencia, Chaco (Argentina) entre el 14 y el 18 de noviembre de 2011.

En ese marco, un grupo de docentes participantes, presentaron a los Programas de Participación 2012-2013 el proyecto "El Planeta azul desde la perspectiva uruguaya". El objetivo general del proyecto fue contextualizar y divulgar las actividades propuestas en el material "El Planeta Azul" a las realidades locales de Uruguay, generando un espacio de reflexión en torno al recurso agua en general y al cuidado del acuífero Guaraní en particular, así como también fomentar la participación ciudadana en temas de ciencia y tecnología. Este proyecto se desarrolló durante el año 2013. Los docentes involucrados recorrieron más de 700 kilómetros, para realizar los ocho talleres: 3 de capacitación docente, 2 para estudiantes de formación docente, 3 con estudiantes de enseñanza media. El número de participantes fue de 147, y las salidas de campo y trabajos de laboratorio en diversos departamentos, incluyeron: Balneario Lago Merín, Cerro Largo, Aratirí, Yaguarón, Colonia del Sacramento, Fray Bentos. Asimismo se dieron 16 conferencias, se distribuyeron más de 400 materiales de consulta, y se registraron los talleres, salidas de campo, etc. fotográficamente. (www.planetaazuluruguay.org).

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

En marzo 2012, la Agencia Nacional de Investigación e Innovación (ANII - http://www.anii.org.uy/web/) firmó el convenio de cofinanciación de Maestrías con la UNESCO- Institute for Water Education (IHE), que consiste en la cobertura total de los estudios, estadías, viáticos y pasajes de los estudiantes. El programa de maestría se trata de 14 cursos desarrollados en 12 meses. Una vez finalizados los cursos, los participantes conducen durante 6 meses una fase final de investigación. En este convenio se acordaron doce becas. Desde octubre de 2012 a la fecha, 5 estudiantes ya culminaron su formación de maestría, 5 se encuentran en proceso de evaluación y las dos becas restantes se encuentran en proceso de convocatoria.

1.5 Publicaciones

1.6 Participación certámenes científicos internacionales

1.6.1 Certámenes realizados en el país

1.6.2 Participación en certámenes en el extranjero

1.7 Otras actividades a nivel regional

1.7.1 Relaciones/cooperación institucionales

Actualmente DINAGUA está coordinando con la Universidad de la República (UdelaR) para participar en el grupo que trabaja la temática de Aguas Urbanas a nivel LAC, Esta iniciativa esta co-coordinada a nivel regional por Uruguay.

1.7.2 Proyectos científicos concluidos y en marcha

2. ACTIVIDADES FUTURAS

Uruguay integra el Consejo Intergubernamental del PHI desde 2011 y hasta 2015. El Sr. Daniel González Director de DINAGUA fue nombrado representante de nuestro país para participar en dicho Consejo.

2.1 Actividades planificadas hasta diciembre 2014

"El Planeta Azul desde la perspectiva uruguaya" busca una institucionalización de la metodología y los contenidos del proyecto. Así, ha mantenido contactos con las autoridades del Consejo de Formación Docente y con el Consejo de Educación Secundaria de la Administración Nacional de Educación Pública de nuestro país (ANEP). En el entendido que estos temas son procesos, se continúa trabajando en el mismo sentido.

La Cátedra UNESCO Agua y Cultura iniciará en agosto de 2014 una nueva edición de la *Maestría en Manejo Integrado Costero del Cono Sur* (http://www.mcisur.edu.uy/). Por otra parte, se espera respuesta para formalizar su integración a la Red de Cátedras relativas al agua de la UNESCO en LAC que fuera aprobada por la UNESCO en septiembre 2013.

2.2 Actividades previstas para 2015-2016

Como se dice al inicio en el primer punto, se impone la designación de un nuevo Comité Nacional del PHI, que recoja los cambios producidos a nivel institucional y de la sociedad civil en el tema agua en los últimos años y permita una actualización al día de hoy. Con esto se espera lograr un funcionamiento efectivo de la CoNaPHI.

2.3 Actividades vislumbradas a largo plazo

Cabe informar que se ha aprobado por la ANII y la UNESCO- Institute for Water Education (Centro UNESCO –IHE) un nuevo convenio que ofrece 25 becas para uruguayos en dicho Centro a partir del año académico 2014-2015 hasta el año académico 2019-2020. http://www.anii.org.uy/web/