

## **International Hydrological Programme**

22<sup>nd</sup> Session of the IHP Council  
(Paris, 13 to 17 June 2016)

### **PROGRAMME IMPLEMENTATION**

Item 6 of the provisional agenda.

This document provides a summary of the implementation of the Programme, in particular:

- 6.1 Implementation of IHP-VIII (2014-2021)
- 6.2 Regional perspectives on IHP
- 6.3 Follow-up to the external evaluation of IHP-VII, including the report on the IHP National Committees survey
- 6.4 Cooperation with other UNESCO programmes

Actions expected from the Council:

6.1 To take note and comment on the progress implementation of IHP-VIII

6.2 To take note and comment on the regional perspectives on IHP

6.3 To take note and comment on the follow-up to the external evaluation of IHP-VII including results of IHP national committees survey, if necessary provide recommendations

6.4 To take note that IHP cooperates with MAB, CI, ERI, IGCP, IOC, PCB/SIDS, ED and to invite IHP to strengthen the intersectoral and further cooperate with SHS in the COMEST programme

The Council may wish to provide its appreciation and provide advice on ways to be more engaged on the implementation of IHP-VIII at the local, regional and global levels, and may wish to take resolutions regarding on options to implement the programme.



## **IMPLEMENTATION OF IHP-VIII (Agenda item 6.1)**

### **Theme 1: Water-related disasters and hydrological change**

1. The objective is to support institutions at national and regional level to improve the knowledge base on floods and drought risk management related to climate extremes towards strengthening countries adaptation capacity. The following paragraphs summarized the main results achieved so far in line with the Nairobi implementation plan.

#### **Focal Area 1.1: Risk management as adaptation to global changes**

2. Floods: With ICHARM (C2C Japan) as leader, UNESCO- IHP and partners revised the strategy and implementation plan for the International Flood Initiative (IFI) (Reference Document IHP/IC-XXII/Ref.5). The revised strategy is aligned with the Sendai Framework, and 2030 Development Agenda including Paris agreement. UNESCO Jakarta Office, in collaboration with other partners organized activities related to floods management leading to strengthening capacities of 31 persons on flood risk management in Asia through better hydro-meteorological modelling for reliable flood forecasting on the Indus tributaries, 90 persons on Effective Mitigation Systems and Adaptation Strategies, 170 persons on an e-Learning MasterClass on Community-Based Flood Management and promotion of South-south Asia-Pacific and Africa Cooperation for Modelling and Managing Hydro Hazards. Capacity of the IGAD Climate Prediction and Applications Centre (ICPACKKenya) has been strengthened by transferring new methodology on seasonal floods forecast for better analysis of water related risk during the Great Horn of Africa Outlook Fora. Forty experts from Egypt, Jordan, Sudan, and Yemen have been trained towards the production of flash flood hazard risk maps.

3. Droughts: The first International Drought Initiative (IDI), Expert Group meeting, was held in Teheran (2015) to share experience, best practices and provide expert knowledge, advice and to help in networking and institutional support for implementing its activities. A regional workshop on Drought was held in Bogor, Indonesia, with 25 experts (23 from Indonesia, one from Mongolia and one from Pakistan) contributing to increasing knowledge on drought and its impacts on groundwater and river flow (hydrological drought). The droughts and floods monitoring systems developed with IHP support are deployed in West Africa, Eastern Africa and in some countries of Latin America and the inception workshop attended by 35 participants for its extension in Southern Africa thanks to SIDA was held in Windhoek in May 2015.

4. The objectives of the International Sediment Initiative (ISI) were revised and a future action plan set up during a workshop held in Beijing, China (2015). The working group on Snow and Ice met in Chile (2015) with 61 participants from Argentina, Bolivia, Chile, Colombia, Ecuador, Germany, Mexico, Peru and the United States of America. To build capacity of students, technicians and professionals, the Snow and Glacier network finalized a technical manual based on Glacier Mass Balance to be published in Spanish.

#### **Focal Area 1.3: Benefiting from global and local Earth observation systems**

5. Within the framework of G-WADI activity, University of California-Irvine's Centre for Hydrometeorology and Remote Sensing (CHRS), developed a freely downloadable user friendly PERSIANN-CCS for iOS- and Android-app called RainMapper. This application allows access to local real-time precipitation useful to

monitor extremes events (<http://www.gwadi.org/news/263>). The Namibia Hydrological Services of the Ministry of Agriculture, Water and Forestry has been using this product for its Daily Flood Bulletin (<http://hydis.eng.uci.edu/gwadi/>). A training document on “Satellite-based Rainfall (PERSIANN) for Planning and Management for Natural Disasters in Monsoon Asia” was prepared and disseminated at the Thai Hydrologist Association’s (THA) 2015 conference. The PERSIANN G-WADI product has been widely disseminated at the occasion of various events in Africa, Arab regions, Asia, Europe, and in Latin America.

6. IHP and the World Glacier Monitoring Service (WGMS) of the University of Zurich jointly launched a freely downloadable Glacier mobile app for iOS and Android (<http://wgms.ch/glacierapp/>) during COP21 in Paris bringing scientifically sound facts and figures on worldwide glacier changes to decision-makers at governmental and intergovernmental levels, as well as, reaching out to the general public.

7. IHP contributed to raise awareness on the direct impacts of climate change through exhibitions on climate change impacts on mountain regions of the world, presented during the World Mountain Forum in Peru (2014), the COP20 (2014) and [COP21 \(2015\)](#). The exhibition featured satellite images of different mountain regions worldwide, highlighting the implications of climate change on mountain ecosystems, water resources and livelihoods.

#### **Focal Area 1.5: Improve scientific basis for hydrology and water sciences for preparation and response to extreme hydrological events**

8. IHP has contributed to improve and share scientific knowledge base on hydrology and water science through its participation to various scientific conferences and workshops including, among others: (a) the 7<sup>th</sup> FRIEND conference on hydrology in a changing world held in Montpellier, France (2014); (b) the 1<sup>st</sup> international conference on Large African River Basins Hydrology in Hammamet Tunisia (2015); (c) three sessions at the International Scientific Conference “Our Common Future under Climate Change” held at UNESCO HQ (2015); (d) At the Stockholm Water Week 2015, the session: “Managing change: strengthening resilience to climate and disaster risks”; (e) the international conference the “Mountains of Our Future Earth” in Scotland (2015); (f) the 3<sup>rd</sup> UN World Conference on Disaster Risk Reduction (2015) in Sendai, Japan; (g) An international workshop “Development of near-term climate scenarios (2020-2035) for vulnerable watersheds to climatic variability at the inter-annual, decadal and climate change time scales” was held in La Serena, Chile, in August 2014; and, (h) an “International Workshop on Climate Change Impacts on Snow, Glacier and Water Resources: Multidisciplinary Network for Adaptation Strategies” in Koblenz (2014), in collaboration with the C2C International Centre for Water Resources and Global Change – Koblenz.

9. In order to translate science into practical solutions and disseminate knowledge to practitioners and the public, during the 7<sup>th</sup> World Water Forum, IHP and partners organized a session under the theme of “Enhancing resilience through robust water policies and appropriate water management leading to recommendations on new solutions to enable the practical implementation of climate adaptation of water resources”. During COP21, and together with IPCC, IHP organized an outreach event on “Raising Awareness of Climate Change: the key findings of the IPCC Fifth Assessment Report”.

10. The policy Brief [“Our mountain water towers: ensuring ecosystem services from mountains under climate change”](#) was published and disseminated during

COP20, in Lima Peru; and, (b) Four policy briefs were finalized and are in the process of been published: “Mapping of Vulnerability of Water Resources to Global Changes in the Andean Region”; “Policy needs for Adaptation Strategies in Water Resources Management”; “Education and Curriculum Needs”; “Climate Change Adaptation Local Practices in the Andean Region”.

11. For practitioners, a training manual on “Climate change mainstreaming in water resources strategies” was published and used to develop Action plans and enhance the capacities of high-level decision makers, water resources planners, and professionals of 11 Arab Member States, during a workshop in Egypt (2015).

## **Conclusion and way forward**

12. During the report under theme 1, IHP has contributed to improve the knowledge base on water related disasters and hydrological change and to develop and disseminate tools and methodologies benefiting from global and earth observation for improved water risk management. Awareness was raised on water related disasters through participation and organization of high impact events including world water forum, COP21 and related events, world water week and Africa water week. The new strategy of IFI has been aligned with agenda 2030, Sendai Framework and Paris agreement and this will be the same for other flagship programmes including G-WADI, IDI, ISI and FRIEND. IHP will continue to work with Member states, C2C and scientific community to further develop and dissemination of tools, methodologies and enhance capacity to address water related disasters through the different flagships with alignment with the 2030 development agenda. Theme 1 activities will also contribute to the implementations of the water related SDGs.

## **Theme 2: Groundwater in a changing environment**

13. The objective of Theme 2 is to contribute to water security by ensuring groundwater resources management and governance sustainability. Actions were undertaken along the lines set at the 2013 Nairobi meeting. The main results achieved in each of the Theme 2 Focal areas since the 21<sup>st</sup> IHP Council (June 2014) are set forth below, along with concluding remarks and the way forward.

### **Focal Area 2.1: *Enhancing sustainable groundwater resources management***

The World Hydrogeological Map (WHYMAP)

14. *The knowledge and information on groundwater resources was increased at the global level. Main achievements: One new map produced on Groundwater Vulnerability to Floods and Droughts*

15. A report on the fifty years of IHP activities on “Hydrogeological Mapping”, was released presenting the progress achieved in the mapping of the groundwater resources of the world. UNESCO and the German Federal Institute for Geosciences and Natural Resources (BGR) developed a new global map to highlight aquifers with the highest vulnerability to floods and droughts. The map was presented at the 7<sup>th</sup> World Water Forum (WWF7) in April 2015. The WHYMAP consortium is composed of UNESCO IHP, UNESCO IGCP, UNESCO IGRAC centre, BGR, the UN International Atomic Energy Agency, the International Association of Hydrogeologist,

the Commission of the Geological Map of the World. The WHYMAP consortium met the 30<sup>th</sup> June 2015 with the aim to take measures to strengthen the programme and evaluate needs for the elaboration of new thematic maps. WHYMAP aims at collecting, compiling and visualising hydro-geological information at a global scale, to convey groundwater related data in an appropriate way for the global discussion on water issues and to give recognition to invisible underground water resources.

#### Groundwater Governance

16. *Tools for water governance were improved at the global and regional levels. Main achievements: Global diagnostic tool on groundwater governance and guiding principles completed.*

17. As culmination of a four-year project that included a series of regional consultations to assess the present groundwater governance status in all regions of the world, a series of regional reports, a global diagnostic and groundwater governance guiding principles were prepared and presented at a High-Level expert consultation organized at UNESCO HQ in February 2015 with 11 experts from international organizations, national water authorities and geological surveys and academia, A special session was at the 7<sup>th</sup> World Water Forum (WWF7) was devoted to a discussion about the main findings of the project with international stakeholders. The project, "Groundwater Governance: A Framework for Action", was implemented by UNESCO-IHP, the Food and Agriculture Organization (FAO), the World Bank and the International Association of Hydrogeologists (IAH) and financed by the Global Environment Facility (GEF). The material produced by the project and the technical reports are available at: <http://groundwaterportal.org/project/groundwater-governance-gwg>.

#### **Focal Area 2.3 - Adapting to the impacts of climate change on aquifer systems**

##### Groundwater and Climate change

18. *The policy – science interface was strengthened. Main achievements: Policy paper on groundwater and climate change launched during COP21.*

19. The IHP GRAPHIC working group prepared a [Position Paper](#) that was launched at COP21 that highlights the important role groundwater has in the context of adaptation to and mitigation of the impacts of climate change. This paper is a call to action and outlines several key recommendations that are particularly relevant for future international climate negotiations. The position paper benefitted from high-quality data obtained through cutting-edge technologies such as the GRACE satellite.

#### **Focal Area 2.4 - Promoting groundwater quality protection**

##### Groundwater and water quality

20. *Scientific knowledge base on groundwater and ecosystems increased and a new tool for decision making produced. Main achievements: Innovative methodology and characterization of the dependency of coastal wetlands on groundwater resources were released*

21. An assessment of Mediterranean coastal aquifers in 13 countries was completed in 2015 and provided important baseline information on groundwater use

and pollution concerns as well as the legal, institutional and policy framework for groundwater resources management in the region. As part of this assessment, an innovative methodology combining different knowledge areas and fields of expertise was developed to characterize and map the degree of dependency of coastal wetlands on groundwater resources, which will contribute to the formulation of groundwater resources management policies. The methodology was applied in 13 countries and 26 representative Mediterranean coastal wetlands. The results of the project indicate that the majority of wetlands studied are groundwater dependent. Priority actions for the protection of Mediterranean coastal aquifers were also established and endorsed by the participating countries.

### **Focal Area 2.5 - Promoting management of transboundary aquifers**

22. *The capacity of decision makers strengthened through access to expanded scientific knowledge base on transboundary aquifers (TBAs). Main Achievements: The first ever indicator-based global assessment of 199 transboundary aquifers as well as of groundwater systems in 42 Small Island Developing States was completed in 2015.*

23. A transboundary waters global assessment was undertaken with the financial support of the GEF. UNESCO IHP was responsible for the component of transboundary aquifers. The component's overriding goal was to assess the current state of transboundary groundwater resources globally as a basis for long-term monitoring and to develop scenarios for possible future groundwater resources developments. Only the TBAs with a surface area greater than 5 000 km<sup>2</sup> were considered for the assessment. Prior to this assessment aquifers boundaries and precise locations were known for only some of these large aquifers. Activities also included the publication of a new version of the Map of transboundary aquifers presented at the 7<sup>th</sup> World Water Forum as well as the further development of the Global Groundwater Information System (GGIS) established at the UNESCO IGRAC center that provides now access to the online inventory of 592 transboundary aquifers including all range of surface areas, of which 366 are located outside Europe.

### **Conclusion and way forward**

24. In the current reporting period, IHP has increased the scientific knowledge base on the world's groundwater resources by undertaking detailed assessments of aquifers in Central Asia, Central America, Southern Africa and Southeast Europe; by establishing the first-ever global baseline assessment of transboundary aquifers; and through the publication of new groundwater maps. During COP21, awareness was raised about the role of groundwater in climate change mitigation and adaptation strategies, including in SIDS. Groundwater governance at the regional and global levels has been promoted, and action can be taken with IHP National Committees that wish to pilot the groundwater governance guiding principles in their countries.

25. In order to foster the Theme 2 communication and promote groundwater resources to a larger audience, a web-based video "Groundwater, the Hidden Resource" was prepared with the Category 2 Centre IGRAC. The IHP Secretariat and the Permanent Delegation of the Netherlands organized a side event during the 198<sup>th</sup> session of the UNESCO Executive Board to launch the video that to date has been widely circulated into several social media : <https://vimeo.com/110370013>.



26. Looking ahead, IHP will continue its work to collect data, expand inventories and assess global groundwater resources as well as to support countries in the establishment of cooperation mechanisms for groundwater resources management. IHP will also focus on new activities, including the preparation of a technical guide on the conjunctive management of surface water and groundwater resources at the basin level in order to improve water governance, availability and security of water-related services, while minimizing impacts on other resource users and ecological processes, in a cost-effective way. *A new WHYMAP initiative is under way to prepare a new map on the main Karst aquifers of the world*. Theme 2 activities will also provide valuable tools to contribute to the achievement of the SDG 6 and other water-related goals.

### **Theme 3: Addressing water scarcity and quality**

27. The theme contributes to addressing Water scarcity and quality challenges. On water scarcity, the objective is to help member states to predict and plan for water scarcity based on the sound scientific knowledge and appropriate tools. For water quality, the objective is to support countries to improve water quality management by strengthening knowledge and capacity on technical and policy approaches. The following paragraphs present the main results achieved so far in line with the Nairobi implementation action plan.

#### **Focal area 3.1 Improving governance, planning, management, allocation and efficient use of water resources**

28. Under Global G-WADI (<http://www.gwadi.org/>), the capacity of 60 experts from 12 countries from Asia, Africa, the Arab region, America and Europe was enhanced during a G-WADI workshop on water resources Management in Arid and Semi-Arid Areas held in Khartoum, Sudan in 2016. To support policy making, two case studies were prepared on G-WADI methodologies and tools, and were disseminated in Chile, Serbia, Namibia, Thailand, Oman and US. A South East European G-WADI network was established in 2014 in Belgrade, Serbia to coordinate G-WADI activities in the region. The Asian G-WADI network held its 6<sup>th</sup> meeting in 2015 in Teheran, Iran, the meeting came up with a set up recommendations to enhance activities in the region. The Arab G-WADI network held its 2<sup>nd</sup> steering committee meeting in Oman and a regional workshop was held on “Climate Change Mainstreaming Capacity Building for Water Resources Management Strategies resulting in the formulation of Action Plans in Egypt.

#### **Focal area: 3.2. Dealing with present water scarcity and developing foresight to prevent undesirable trends**

29. Achievements of the project “[Managing Water Resources in semi-Arid Regions of Latin America and the Caribbean](#)” (MWAR-LAC) were presented during a dissemination workshop held in Brussels, Belgium in 2016. One of the outcomes of this project was the establishment of Chilean and Peruvian Drought Observatories ([http://www.cazalac.org/mwar\\_lac/index.php?id=49](http://www.cazalac.org/mwar_lac/index.php?id=49)). The project also developed: (a) the Latin American and Caribbean Drought Atlas; (b) the Latin American and Caribbean Flood and Drought Monitoring Systems, and strengthened local stakeholders’ capacities to address the multi-faceted aspects of water management under critical conditions in the LAC region.

30. A G-WADI side event on Data and Products to Address Flood and Drought Challenges in Semi-Arid Regions: Case Studies from Different Regions, was



organized during the 7<sup>th</sup> World Water Forum in 2015 in Daegu Korea to present results activities of the network.

31. UNESCO Cairo Office and the Arab Water Council initiated a regional cooperation to promote non-conventional water resources management in the Arab region within the framework of the Arab Strategy for Water Security. A regional consultation organized in Cairo in 2015 led to the adaptation of a conceptual framework for a regional initiative to support policies, action plans, technology, capacity, investment and practices needed to ensure sustainable development and management of the increasingly important non-conventional water resources in the Arab region.

32. Within the HELP initiative a “Forum on Integrated Water Resources Management for Peace and Development” was organized in Davao City, Philippines (2014).

**Focal area: 3.4. Addressing water quality and pollution issues within an IWRM framework - improving legal, policy, institutional, and human capacity**

33. Addressing water quality and pollution issues in a sustainable way requires a comprehensive approach to strengthen the legal, policy, institutional and human capacities, which is one of the IIWQ activity focuses.

34. *The state-of-the-art scientific knowledge, new technologies, innovative policy approaches and best practices on water quality monitoring promoted:* The International Initiative on Water Quality (IIWQ) promoted the state-of-the-art scientific knowledge, new technologies, innovative policy approaches and best practices on water quality monitoring to support countries globally in the implementation and monitoring of SDGs targets related to water quality through the major IIWQ International Symposium on “Scientific, Technological and Policy Innovations for Improved Water Quality Monitoring in the Post-2015 SDGs Framework”. The Symposium was held in Kyoto-Otsu, Japan (2015) and attended by 80 participants (of which 8 women experts and over 20 women participants) from 24 developed and developing countries from all regions, shared and learned from country experiences.

35. *Water quality priorities and challenges in different regions identified and assessed through IIWQ Regional Consultations on Water Quality:* Strategic issues and challenges on water quality faced by different regions were identified through IIWQ Regional Consultation Meetings on Water Quality. The IIWQ Workshop on “Water Quality in the Americas” (US, 2015) took place with the participation of 27 experts (of which 7 women experts) from 21 countries<sup>1</sup> from the North America, Latin America and the Caribbean. The IIWQ Regional Meeting on “Water Quality in Europe: Challenges and Best Practices” (Germany, 2015) was held with the participation of 46 experts (of which 19 women experts) from 23 countries<sup>2</sup> from Western, Central and Eastern Europe. The meetings also provided a platform for

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<sup>1</sup> Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Caribbean region, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, United States of America, Uruguay, Venezuela

<sup>2</sup> Albania, Armenia, Bosnia and Herzegovina, Colombia, Denmark, France, Germany, Greece, Ireland, Italy, Japan, The Netherlands, Poland, Russia, Senegal, Serbia, Slovenia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Uzbekistan,

sharing and promoting national case studies on best practices to address specific water quality and wastewater challenges.

**Focal area: 3.5. Promoting innovative tools for safety of water supplies and controlling pollution**

36. One of the key areas of IIWQ activities focuses on pollution control, prevention and reduction through effective management of wastewater, industrial effluents and agricultural run-offs, as well as safe wastewater reuse.

37. *New knowledge on emerging pollutants generated and scientific research on the issue promoted:* The knowledge base and research on emerging pollutants, which is a new water quality challenge, was greatly enhanced by 16 case studies in the framework of the project “Emerging Pollutants in Wastewater Reuse in Developing Countries” covering 20 countries (Australia, Brazil, Canada, China, Ethiopia, India, Kenya, Kuwait, Mexico, Mongolia, Nigeria, Norway, Rwanda, Saint Lucia, Thailand, Tunisia, Ukraine and Vietnam) and involving 67 experts from 47 institutions.

38. *Scientific knowledge and best practices on water quality disseminated and promoted through a wide range of the following IIWQ activities:*

The scientific knowledge base on a range of water quality issues, including safe water, pollution control/attenuation, and wastewater management, has been strengthened through a number of scientific and technical meetings. IHP led two main themes of the 7<sup>th</sup> World Water Forum (Korea, April 2015): Theme 1.1 “Enough Safe Water for All” of the Thematic Process; and Main Focus 2 “Resource recovery from water and wastewater” of the Science and Technology Process. Under these two themes, IHP organized 15 thematic and scientific sessions on access to safe water, water quality, water pollution and wastewater reuse and disseminated innovative technical and policy solutions. Each of these sessions was attended by 50-100 participants, with good representations of various stakeholders such as policy-makers, researchers, governmental and international organization representatives, the private sector and the civil society, as well as women participants.

39. *Best practices on integrated approaches to water quality and wastewater management promoted through technical sessions on the nexus approach:*

Best practices on integrated approaches to water quality and wastewater management within an IWRM framework were shared and disseminated through two IHP sessions at the Dresden Nexus Conference 2015 on “Advancing a Nexus Approach to the Sustainable Management of Water, Soil and Waste” (Germany, 2015). The Conference brought together over 350 participants of which about one third were women. IHP, as Lead Convener of the Academia Stakeholder sessions on water quality and access to water and sanitation, promoted the role of scientists and researchers in addressing water quality issues at the global level by contributing to the UN-Water Annual International Zaragoza Conference “Water and Sustainable Development” (Zaragoza, January 2015), attended by over 100 participants from all regions.

40. *African countries supported to cooperatively address water quality and pollution issues:*

IHP supported African countries to cooperatively address water quality and pollution issues by facilitating the sharing of scientific knowledge and policy experiences among African countries, by organizing five technical sessions on water quality and

wastewater management at the 5<sup>th</sup> Africa Water Week (Dakar, May 2014), attended by over 200 participants from all African countries.

41. *Capacity building on water quality and wastewater reuse strengthened in the Arab region through expert and training workshops:* The Expert Group Meeting on “Future Water Collaboration in the Arab region”, organized by UNESCO Cairo Office in Sharm El Sheikh, Egypt (2014), with participation of 18 top regional water experts including 2 women, identified water quality as the most pressing water problem in the region. In cooperation with Sultan Qaboos University, UNESCO Doha organized a training workshop on greywater use for sustainable food production in rural areas (2015) with the aim of enhancing Oman’s capacity in wastewater management and reuse.

## **Conclusions and way forward**

42. During this period, the International Initiative on Water Quality (IIWQ) has substantially strengthened the knowledge base and policy framework on global water quality and wastewater issues and supported countries to improve their capacity to assess and respond to specific water quality challenges. In particular, the numerous IIWQ activities implemented during the period resulted in improved scientific understanding and policy guidance on water quality and wastewater issues through: the generation of new knowledge and supporting research on specific water quality issues such as emerging pollutants; fostering international scientific cooperation and policy exchange on cooperatively addressing water quality and wastewater challenges in different regions of the world; sharing and disseminating existing knowledge and scientific information on water quality issues among various stakeholders; and promoting innovative technologies, policy tools and best practices on wastewater reuse and resource recovery. Altogether about 2400 participants from 88 countries from all regions participated in and benefitted from the IIWQ activities over this period.

43. The International Initiative on Water Quality has come as the leading international scientific programme on water quality, promoting scientific programme, knowledge sharing, effective technology and policy approaches to improve water quality for enhanced water security and sustainable development. The communication and outreach has been an important part of all activities undertaken, which has resulted in a greater visibility of the IIWQ as the leading global water quality programme and expanded the dissemination. The development and launching of the new UNESCO brochure and website dedicated to the International Initiative on Water Quality, as well as the Emerging Pollutants brochure and website, increased further the impact and visibility of IIWQ activities.

## **Theme 4: Water and human settlements of the future**

44. The thematic area aims at supporting cities and rural settlements facing climate change, population growth, deterioration of urban infrastructure systems and other global challenges in understanding the issues and in adopting an approach based on the interdependence of the different water systems. The following paragraphs summarize the activities since the last IHP Council using as a basis the five focal areas of the theme and the guidance provided at the 2013 IHP Nairobi meeting.

#### **Focal area 4.1 Game-changing approaches and technologies**

45. Within the “game-changing approaches and technologies” focal area, in 2015, UNESCO-IHP made a presentation during the international conference on the “Water-Food-Energy Nexus” and met with K-Water researchers for exchanges on Smart Water System’s technologies and developments to explore further networking and knowledge exchange among researcher, practitioners and policy maker. During the same month, UNESCO’s IHP-LAC working group on Urban Waters met and provided technical support to the ITU (International Telecommunication Union) to conduct a Focus Group on Smart Water Management (FG-SWM) in the region.

46. On December 2015, the technical workshop “Water Eco-Security 2015” was co-organized by UNESCO-IHP, the Syndicat Interdépartemental d’Assainissement de l’Agglomération de Paris (SIAAP), W-Smart (an international association of water utilities), the Association of Metropolitan Water Authorities (AMWA, from the USA), and the University Denis Diderot. An important part of the workshop was dedicated to the new developments and experimentations on Smart Water Systems. The capacity of a total of 56 experts, 11 of which were female, from 16 countries was improved as a result of the meeting.

#### **Focal area 4.2 System-wide changes for integrated management approaches**

47. UNESCO-IHP organized a meeting in Paris (2015) with Mayors and key actors from Lebanon, Israel and Palestine to promote coastal ecosystems preservation and monitoring measures for alleviating public health risks and environmental hazards due to the spilling of untreated wastewater along the East Mediterranean Coast. The meeting decided to pursue an extrabudgetary project that will facilitate the Member States actions towards environmental sustainability and health protection while supporting Member States in reporting on SDG 6.

#### **Focal area 4.3 Institution and leadership for beneficitation and integration**

48. In pursuing institution and leadership for extracting the maximum benefits from water (beneficitation) and integration and at the invitation of the Foreign Ministry of Foreign Affairs of Singapore, UNESCO-IHP made a presentation during the Asia-Europe Seminar on Sustainable Management of Wastewater and Sanitation in Singapore (2015) and is cooperating with them for organizing a session at the Singapore International Water Week.

#### **Focal area 4.4 Opportunities in emerging cities in developing countries**

49. The International Conference “Water, Megacities and Global Change”, was co-organized by UNESCO-IHP in Paris (2015), during the first week of the COP21. The conference brought together 388 scientists, public and private operators, elected officials, and representatives of international institutions and NGOs from 20 countries who had the opportunity to exchange knowledge on a variety of issues challenging the development of Megacities ([www.eaumea.org](http://www.eaumea.org)). An output of the conference was a Declaration (Reference Document IHP/Bur-LII(I/Ref5) committing to setting up a cooperation platform, within two years, to facilitate the dialogue on adapting to or mitigating the effects of climate change related to water in Megacities. In particular, the platform will seek to support Megacities in learning from each other’s experience, exchange best practices, partner with appropriate technical, academic, and financial

institutions, and design and implement their individual responses to the challenge. It was further proposed that a Task Force under the auspices of UNESCO-IHP would be set up in 2016 to provide the preliminary conditions for the establishment of this platform (Reference Document IHP/Bur-LIII/Ref4).

50. Cooperation with the International Water Association (IWA), focusing on the UNESCO theme “Water and Human Settlements” and the IWA Programme “Cities of the Future”; was initiated. The first coordination meeting took place in The Hague, the Netherlands, in 2015. UNESCO-IHP is supporting the launching of a new Specialist Group in IWA on Intermittent Water Supply – which is a major challenge in developing countries cities - and provides support to the reviewing process of IWA’s “Water Wise Cities” publication scheduled to be launched during the its world congress in Brisbane, in 2016.

## Others

51. In our efforts to provide the state of the art knowledge outlet on issues related to sanitation, UNESCO-IHP is revising the reference book “Sanitation and Disease: Health Aspects of Excreta and Wastewater Management.” published in 1983 (by R.G. Feachem, D.J. Bradley, H. Garelick and D.D. Mara). To that extent, two workshops with the authors and editors of the chapters of the future book were organized in Lisbon (2015) in conjunction with the 18th International Symposium on Health-Related Water Microbiology and in Leeds (2016) prior to the 11<sup>th</sup> IWA Specialist Group Conference on Wastewater Pond Technologies. The project is funded by the Bill and Melinda Gates Foundation and is mobilising 133 experts from 40 countries.

52. A group of 18 experts, seven of whom are women, in urban water-related issues to advise, guide, support and disseminate IHP’s work on Theme 4 from Australia, Canada, France, India, Israel, Japan, Lebanon, Mexico, the Netherlands, Palestine, Philippines, Singapore, Uganda, the United Kingdom and the United States of America has been established. The group had two meetings on 2015, one at UNESCO-HQ in conjunction with the international conference “Our Common Future under Climate Change” and the other one during the COP21. A third meeting is scheduled to take place in 2016, in Singapore during the International water week, with a session organized with the participation of 7 of this expert group. These experts are taking active participation in all the activities of IHP Theme 4.

## Conclusion and way forward

53. Overall, under theme 4 of IHP-VIII there were numerous knowledge exchange sessions supported benefiting more than 500 people, in at least 30 countries and 56 people were trained, 20% of which female. Awareness was risen among policy makers and practitioners on new technologies to be used, on system-wide changes for integrated management approaches and in pursuing institution and leadership.

54. The activities undertaken thus far have been reflecting the Nairobi Implementation workplan but do not necessarily respond to all the identified deliverables; the short fall is due to the limited regular programme budget (that does not suffice to implement what was planned) and the fact that the post was vacant for some time. A new programme officer has been identified and assumed the responsibility of Theme 4 as of February 2016 and a number of project proposals to raise extrabudgetary funding and respond to the shortcoming have been drafted and submitted to donors.

## **Theme 5: Ecohydrology, engineering harmony for a sustainable world**

55. To face the increasing challenges in the sustainable management of ecosystems, there is a need for new approaches combining hydrology and biota for water security regarding its quality and quantity. As part of the implementation of IHP-VIII, Theme 5 encourages Member States to adopt the ecohydrological best practices in natural resources master plans as an important component of the integrated water resource management approach. Such ecohydrological solution oriented and best practises are currently applied in 23 “Ecohydrology Demonstration Sites” in 15 countries around the globe. A demonstration site is a long-term monitoring project dealing with issues such as erosion, algal blooms, urban floods and anthropogenic activities, among others, which applies the most-appropriate and cost-effective ecohydrological engineering solutions in order to enhance and optimize ecosystem services for society.

### **Focal Area 5.1 – Hydrological dimension of a catchment**

56. UNESCO HQ and UNESCO Office in Jakarta jointly organized the International Training course “Ecohydrology: a tool for IWRM implementation at the River Basin level in Jogjakarta, Indonesia (2014), which was attended by 29 participants from the region (China, Indonesia, Malaysia, Pakistan and Thailand), 15 females and 14 males.

57. The International Conference on Ecohydrology on the theme “Ecohydrology Approaches Facing the Global Water Environment Challenges” was organized in Jogjakarta, Indonesia (2014), to synthesize information and knowledge gaps for addressing issues related to critical water environment systems; and to discuss how ecohydrology and eco-technology could provide low cost environmentally sound technology for sustainable water management, especially in the Asia Pacific region. The conference was attended by 150 participants from 29 countries.

58. As a contribution to the delivering of SDG 6.5 on Integrated Water Resources Management (IWRM), UNESCO Jakarta has supported a workshop on “Comparative Studies of Applying Ecohydrology and IWRM for Upscaling Water Security in Asia & Africa through UNESCO Category 3 Water Centres meeting held in Kuala Lumpur (2016) in Malaysia and with more than 150 participants (including 53 females and 97 males).

### **Focal Area 5.3 – Ecohydrology system solutions and ecological engineering for the enhancement of water and ecosystem resilience and ecosystem services**

59. UNESCO Office, Jakarta in collaboration with Perbadanan Putrajaya (Putrajaya Corporation) organized an international seminar on “Ecohydrology Management of Putrajaya Lake and Wetland: Ecosystem Services Economic Assessment” in Dewan Seri Melati, Perbadanan Putrajaya, Malaysia (2016). Attended by 218 participants (including 127 males and 91 females), the seminar was part of the dissemination process of the findings of the research on ecosystem services economic assessment initiated by UNESCO Office Jakarta with the support of the Malaysia Fund in Trust (MFIT) and conducted by Perbadanan Putrajaya, in collaboration with Eco Development Facilities Sdn. Bhd. (EDFSB) and University Putra Malaysia (UPM) experts.

### **Focal Area 5.4 – Urban Ecohydrology**

60. In July 2014, UNESCO organized a series of events on sustainable landscapes management in Australia. The first event organized in partnership with the University of Western Sydney, was the PERI-URBAN 2014 International Conference Sydney under the topic “Peri-Urban Landscapes; Water, Food and Environmental Security”. The second event was the Sustainable Landscape Futures International Conference which took place at the University of Canberra on the theme “Sustainable Landscape Futures: Solving complex problems through sustainability science”.

61. These two events produced the Sydney Declaration titled “Expanding Cities Sustainably” and the Canberra Statement, which both conclude that “sustainability is a “way of living” that requires a holistic approach”, and highlight the key role that IHP needs to play in these processes.

### **Focal Area 5.5 – Ecohydrology regulation for sustaining and restoring continental to coastal connectivity and ecosystem functioning**

62. A workshop on coastal ecohydrology took place in the Bahamas (2015) and attended by 10 Caribbean SIDS (12 males and 7 females). The training included ecohydrological principles and application for integrated management of water resources, integrated coastal management, planning, and policy. Within this context, the training workshop highlighted the importance of a strong partnership between the academic and management sector, in a framework of a participatory approach. It was also an important experience to know in detail the challenges for water management in the Island States of the Caribbean (SIDS) in order to achieve water security which depends on the need for an integrated management of fresh water (surface and groundwater) and marine resources.

### **Other international events**

63. UNESCO and IRSTEA organized the International Conference Ecohydrology 2015: “Measuring, Modelling and Managing of the natural processes related to water flows, Social values of the linked ecosystem services” in 2015, France. The event was attended by approximately 100 participants from 20 countries facilitating knowledge exchange and networking opportunities.

64. An “Ecohydrology Demonstration Sites” workshop was organized in 2015 in Lyon France, as part of the International Conference Ecohydrology 2015. The demonstration sites case studies presented were from 14 countries (Argentina, Australia, China, Croatia, Ethiopia, France, Germany, Indonesia, Italy, Kenya, Malaysia, Philippines, Poland and Portugal); the full report is available at <https://onedrive.live.com/redir?resid=C002CD679EA8AE9B!4546&authkey=!AOp1c678qZQFR8w&ithint=file%2cpdf>

### **The Ecohydrology web platform**

65. The Ecohydrology networking platform (web platform) was designed since 2015 together with the International Centre for Hydroinformatics (CIH) in Brazil. The platform aims to provide access to the information exchange network and the procedure of data sharing and make data on demonstration sites available to all. It is also being designed to be a portal to inform on general ecohydrological events, conferences and seminars, funding opportunities for project proposals and mainly to host the criteria and guidelines and online application to become a UNESCO Ecohydrology programme demonstration site. The web platform contains a “Demo



site Card” for each site, a harmonized/normalised and simplified visualisation of the main characteristics, achievements and results obtained by each demo sites and represented in a one-page format. The web platform <http://ecohydrology-ihp.org/> was launched during the International Conference “Ecohydrology 2015”, in Lyon, France.

66. Guidelines and criteria for ecohydrological demonstration sites application were produced (Ecohydrology guidelines “*How to build a demo site card*”; “*Low cost advanced methodology for mitigation impacts from molecular to catchment scale*”) and contained in the ecohydrology web platform <http://ecohydrology-ihp.org/>. Both were launched during the International Conference “Ecohydrology 2015” in Lyon, France. So far 15 countries (2 in Africa, 4 in Asia – Pacific, 6 in Europe and 3 in Latin America and the Caribbean) have adopted and applied the guidelines for 23 demonstration sites.

### **Conclusion and way forward**

67. In the reporting period, the Ecohydrology programme was revitalized through the establishment of the Scientific Advisory Committee (SAC) which met 4 times until the end of February 2016. The SAC is composed by several UNESCO category water centres and chairs (APCE, ERCE, ICCE, ICIWaRM, UNESCO-IHE) and gives advice on the design and development of the activities related to Theme 5 with particular reference to the IHP-VIII implementation strategy and related matrix. The design of new guidelines and criteria for ecohydrological demonstration sites were adopted by 15 countries in 23 demonstration sites.

68. In order to raise Theme 5 communication and promote the ecohydrology concept to a larger audience a web-based platform was designed and is now operational at the following website <http://ecohydrology-ihp.org/>.

69. Looking ahead, Theme 5 will continue its work to disseminate the ecohydrology concept and provide solution-oriented approaches for the enhancement of ecosystem services for the benefit of society in new demonstration sites. It will also provide the most appropriate and cost-effective ecohydrological engineering solutions for each ecosystem as management tools for Integrated Water Resources Management (IWRM) and will contribute to the achievement of the SDG 6 and other water related goals.

### **Theme 6: Water education, key for Water Security**

70. The objective of the Theme is to guide and provide technical support through demonstration projects and development of prototype materials at national/regional levels in selected Member States/regions. UNESCO-IHP has conducted a wide range of courses and workshops at all levels for water experts, technicians and teachers but also young civil servants in several regions.

#### **Focal area 6.2 - Addressing vocational education and training of water technicians**

71. UNESCO-IHP via the HOPE-Initiative conducts a wide range of short, intensive and highly specialized courses, which aim at upgrading and refreshing the knowledge and skills of Technicians, Scientists, Engineers and mid-career professionals. These included the organisation of the Open Water 2015 Symposium and Workshops in Addis Ababa, Ethiopia (2015), where 120 scientists from 24 countries participated, 30% of whom were female; the QSWAT / QGIS Interface for Soil and Water Assessment Tool (SWAT) training (2015) attended by 24 participants

(5 female and 19 males) from nine nationalities and the, AquaCrop training in Addis Ababa, Ethiopia (2015), where a total of 10 (4 female and 6 males) participated. Typically, applicants come from governmental and non-governmental agencies dealing with agricultural water resources management, from extension services formulating practical advice to farmers, or from a relevant research or higher education institution. Finally, under the same initiative, an Introduction to MODFLOW-2005 and ModelMuse with hands-on training was held in Pretoria, South Africa (2015) involving seventeen (7 females and 12 males) participants from eight different institutions and three different countries (Botswana, Namibia and South Africa). The establishment of UNESCO's HOPE contributes to the dissemination of innovative practices in the area Open Standards Policies and Initiatives preparing people for green jobs that particularly contribute to preserving the environment while improving human well-being and social equity.

### **Focal area 6.3 - Water education for children and youth**

72. Educational tools were also improved for the teaching of water issues in the K-12 curriculum in six African countries (Cape Verde, Cameroon, Angola, Guinea-Bissau, Mozambique and Sao Tome and Principe). In Cape Verde, UNESCO reinforced water education and provided drinking water in three schools with the support of a private donation. In the context of the project IESCEE-Cameroon, a school manual for Francophones was revised and co-published by UNESCO and Afrique Vivante: "Leçons d'eau : 3 générations à l'école des sciences appliquées", 158 pages, ISBN: 979-10-91994-01-9. The manual was published on 2016, following the World Water Day event.

73. The Caribbean and the Community of Portuguese Language Countries (CPLP) held several courses from March to December 2015 in São Paulo, Brasilia and Rio de Janeiro on strengthening the integrated management and sustainable use of water resources. With the support of AECID and CODIA, UNESCO provided capacity building training courses for technicians and decision-makers. UNESCO's Office in Montevideo also organized, in 2015, a Conference on "Water Diplomacy in Latin America and the Caribbean: the contribution of UNESCO's cooperation on water" in collaboration with the Argentine Council for International Relations (CARI) in Buenos Aires. UNESCO-IHP initiated also a regional cooperation with UCO, ALECSO and Queen Rania Teachers Academy (QRTA)-Jordan leading to the organization of a regional workshop on Water Education Guidelines for teachers in the Arab region held in Amman, Jordan (2015). Through this initiative, working Group Sessions were held on "Water Education Project for Teachers in the Arab region" in Cairo, Egypt (, 2015) and attended by experts from Jordan, Egypt, Sudan, Tunisia, UAE and Oman.

74. Overall, efforts should continue to be made to improve and update water education at all levels. During 2014-2015, UNESCO-IHP and its water family, was able to train 3509 persons (50% male and 50% female) and made available several new tools dealing with water education to the member states.

75. During the reporting period, IHP continued to strengthen water-related capacities at all levels. Capacities for gender mainstreaming in the water sector were reinforced in collaboration with the five UNESCO Chairs devoted to this topic through collaborative actions and a training workshop for water sector professionals, government officials and NGOs of four countries (Dominican Republic, 2014). The project "Water Education to Implement Integrated Water Resources Management (IWRM)", was concluded, leading to the customisation of the UNESCO guidelines on

IWRM to include regional perspectives in managing climate extremes (floods and droughts), urban water management issues and linking environmental sustainability with consumptive water demand and the development of education material and implementation of workshops on IWRM training at the river basin level. Along the Volga Basin, youth and communities' awareness were strengthened through the joint UNESCO/Coca-Cola HBC Eurasia programme, including seminars, youth meetings, concerts, environmental games and educational materials. Water education sessions were conducted at the 7th World Water Forum. The project on knowledge based and capacity building on water resources within the framework of One UN in Rwanda was concluded and a follow-up will continue with the Rwanda IHP committee to produce policy briefs on the project findings.

### **Focal area 6.5 - Education for transboundary water cooperation**

76. Regarding the strengthening of institutional capacities, a regional workshop was organized with a focus on transboundary Water Security and cooperation in the West African Sub-region (2014, Nigeria) with the presence of 48 IHP National Committee members, policy makers and researchers. An educational toolkit on "Changing Perspectives on Water Management" is ready for distribution to ASP-NET schools in India. Advocacy for youth was supported at the 3<sup>rd</sup> World Conference on SIDS (Samoa, 2014), through a side event on Career Prospects in the Sciences, including the water sector. In Latin America and the Caribbean, two workshops were conducted in Uruguay for training teachers, applying the methodology developed by IHP and Project WET. Three courses on hydrological modelling were held for the Caribbean, Central America. IHP also contributed to the Ibero-American Symposium on Water Education and Culture in Mexico.

### **Conclusion and way forward**

77. Looking ahead, IHP will continue involving participants of varying ages, genders and disciplines and from diverse geographical backgrounds. The activities will address stakeholders' interests and expectations regarding current needs and the way to move forward. IHP is analysing current water-related issues in a comprehensive manner and will continue to share experiences as well as new ideas on water education, water security and sustainable development, including the intersections among these issues.

78. IHP activities highlighted that all levels of water education are often exposed to common challenges: Activities need to raise the profile of water-related capacity-building opportunities so as to present water-related programmes as attractive options to individuals and communities. IHP will keep supporting water-related programmes by disseminating information on their existence and addressing financial obstacles to enrolment. IHP will also continue to adapt water education to local settings and cultures, and also valuing indigenous communities' approaches to water.

79. In this new era of Technology, IHP will keep adapting water education as societies evolve and will integrate innovative elements such as the use of new technologies, digital media and other interactive activities adapted to younger audiences. The water education programme will be involving both women and men at all levels of education and, in particular, in Community education. Promote women's career opportunities in the water sector and providing gender equality tools at all levels in the water sector, higher education and Academia.

### **REGIONAL PERSPECTIVES ON IHP (Agenda item 6.2)**

80. In **Africa** (Group Va), access to safe drinking water and sanitation, recurrent water-related disasters both floods and droughts and lack of human capacity are the main key challenges. IHP activities have been implemented in line with the Africa water vision 2025 by the different offices in Africa in partnership with national IHP committees, UNESCO chairs, centres and scientific networks and regional organizations in the region. The following main regional initiatives have been developed and promoted: (a) Regional programme for the Sahelian countries on sustainable and peaceful management of cross-border water resources has been prepared by Dakar office within the framework of the UN Integrated Strategy for the Sahel; (b) Regional programme on the review of hydrological norms for the design and management of hydraulic infrastructures for Central Africa and West Africa; (c) Regional programme on capacity building in partnership with EU and NEPAD water centres of Excellence.

81. Awareness has been raised on addressing Water Security challenges in Africa and on post-2015 and the need to adopt science-based tools and guidelines for sustainable water resources management during various events, including the Kenya National Water Summit (2014), 1<sup>st</sup> IGAD Water Dialogue (2014, Nairobi), 3<sup>rd</sup> China-Africa water conference held in Cape Town (2015), the 2<sup>nd</sup> NASAC-IANAS water workshop held in Nairobi (2015) and the official regional launching of the World Water Development Reports 2015 and 2016 in Nairobi, Kenya. To facilitate cooperation and information exchange among experts and IHP national committees within the region an online platform was put in place by Nairobi office

82. Collaboration and partnership have been promoted and enhanced with key regional water stakeholders in Africa, including the African Ministers' Council on Water (AMCOW), the African Network for Basin Organizations ANBO, the Economic Community of West African States (ECOWAS), the Economic Community of Central African States (ECCAS), the Intergovernmental Authority on Development (IGAD), and the Southern African Development Community (SADC) towards addressing Water Security challenges and promoting water cooperation in Africa.

83. In the **Arab region** (Group Vb), Water scarcity is the most significant water resources challenge. UNESCO has been supporting Member States within the framework of the Arab Strategy for Water Security (2010-2030) with emphasis on regional cooperation towards developing water resources policies, educational frameworks, and action plans to enhance the member states' preparedness to address water scarcity issues in light of the potential impacts of climate change. UNESCO offices in the Arab region with active coordination from UNESCO Cairo (UCO) as the UNESCO Regional Bureau for Sciences in the Arab States, have managed to engage increasingly regional experts, governments, and regional organizations through series of consultations to define and plan key activities with most impacts and cost effectiveness including the following three highest priorities: (a) non-conventional water resources with special focus on desalination, brackish water, wastewater treatment, irrigation water, industrial water, water harvesting, inter-alia; (b) IWRM and integrated planning; and (c) water (use) efficiency with special focus on water use in agriculture, industry, water supply, including reuse and flood management.

84. The 15<sup>th</sup> Regional "expanded" meeting of the Arab National IHP Committees, Centres and Chairs was held in Sharm El Sheikh, Egypt in 2015. UNESCO Cairo succeeded to establish a partnership with ISESCO, ALECSO, GIZ, LAS, AWC for the initiation of Arab G-WADI Network capacity development project on "Capacity building for water security in response to water scarcity in the Arab region and adapting to climate change and climate variability". The project was further

elaborated and approved during the Arab G-WADI second steering committee meeting in Muscat, Oman (2015).

85. An online cooperation facility for the Arab IHP National Committees was developed through partnership with the Sudanese National Commission for UNESCO, the Regional Centre for Capacity Building and Research in Water Harvesting (Category 2 Centre in Sudan), and the Water Research Centre at the University of Khartoum. IHP, through UNESCO Rabat Office launched the resEAU-Maghreb platform in December 2015 to facilitate cooperation and information exchange between water experts in the Maghreb region(<http://res-eau-maghreb.eu/>).

86. In the **Latin America and the Caribbean** (LAC) region (Group III), ensuring universal access to water services and water security remains a priority, in line with IHP-VIII and the SDGs. In addition, several areas are severely affected by droughts and floods, as well as by the pollution of water resources. In coordination with UNESCO Montevideo Regional Office for Science, UNESCO Offices in the region assisted Member States in capacity building efforts, the elaboration of regional strategies, the strengthening of the knowledge base and the reinforcement of international collaboration along transboundary resources and for technological and knowledge transfer. The XI Meeting of IHP-LAC's National Committees and Focal Points (Chile, 2015), with the presence of 28 Member States, representatives of Category 2 Centres and UNESCO Chairs, as well as observers from the UN System and other partners, resulted in the adoption of fourteen resolutions and several recommendations concerning water governance and the implementation of IHP-VIII in LAC in the 38C biennium. A celebration of the 50 years of the water programmes of UNESCO took place on October 2015, followed by meetings of UNESCO water-related centres and UNESCO Chairs and of several IHP-LAC working groups.

87. A "Regional Strategy for the evaluation and management of Transboundary Aquifer Systems in the Americas" was prepared and published as part of ISARM-Americas. The knowledge base on the impact of glacier retreat in the Andes advanced with the support of FUST, with several conclusions presented in Chile (2015). Work on sedimentation was reinforced through the activities of the IHP ISI-LAC working-group (Mexico, 2015).

88. The capacities of high-level decision makers in the water sector were reinforced in cooperation with the IberoAmerican Conference of Water Directors (CODIA) and AECID, through the conduction of three advanced courses on water diplomacy, economics and gender mainstreaming (Bolivia and Uruguay, 2015). Additional IHP capacity development activities comprised workshops on coastal ecohydrology (Bahamas, 2015), monitoring and evaluation of groundwater (St. Kitts and Nevis, 2015), water diplomacy (Argentina, 2015), disaster risk management in the Caribbean (Cuba, 2015), water for mass-media professionals (Uruguay, 2015 and Mexico, 2016), and groundwater governance (Uruguay, 2016). Support was also provided to a river hydraulics symposium (Uruguay, 2015). IHP has provided technical contributions to the Ramsar COP (Uruguay, 2015), pledging to work together at the regional level, and promote synergies and projects of common interest, as an example of joint cooperation with MAB activities.

89. In the **Asia and the Pacific** region (Group IV), water-related disasters, sustainable urban water and water management including capacity development remain a priority. As the Regional Science Bureau for Asia and the Pacific, UNESCO Jakarta in cooperation with other field offices and in collaboration with UNESCO water family namely IHP National Committees, Category 2 water Centres, UNESCO water chairs, research and training institutions and other partners, provided support

for scientific research, technical projects, cooperative research networks, capacity-building, community-based initiatives, training and non-formal education at national and regional level.

90. A regional process session was held on Water and Cities entitled “Water & Cities: Ecotechnologies and Ecohydrology for Urban Water Security in Asia Pacific” of all regions, Asia and the Pacific has the greatest number of urban population and also the largest number of people without access to safe water supply and sanitation, and Asian rivers are the most polluted in the world. Also, a regional conference on “Ecohydrology Approaches Facing the Global Water Environment Challenges” was held in Indonesia (2014). The conference was attended by approximately 150 participants (scientists, practitioners, and academia with various field of expertise, and discussed relevant Millennium Development Goals (MDGs) and forthcoming Sustainable Development Goals (SDGs).

91. The 22<sup>nd</sup> UNESCO-IHP Regional Steering Committee Meeting for Southeast Asia and the Pacific was held in 2014. The meeting was attended by 49 participants from 16 countries. It discussed possible cooperation commitments in the region for the implementation of IHP-VIII in several strategic areas; IWRM, AP HELP, AP Ecohydrology, Water Security, Water related disasters, Water Education, and the region’s contribution to the 7<sup>th</sup> World Water Forum where the region convened a side event on “Post 2015 Water-related actions in Asia Pacific”.

92. The 23<sup>rd</sup> Meeting of the IHP Regional Steering Committee for Southeast Asia and the Pacific was held in 2015 in Medan, Indonesia. Thirteen Member States (Australia, China, Indonesia, Japan, Malaysia, Mongolia, Myanmar, New Zealand, Papua New Guinea, Philippines, Republic of Korea, Thailand and Vietnam) sent their country report along with an observer country Pakistan and three UNESCO Category 2 Centres APCE, HTC-KL and ICHARM. This meeting was the occasion to welcome for the first time Brunei Darussalam as an observer. A special commemoration of the 50 years of International Hydrological Programme/International Hydrology Decade took place on 20 October 2015, and it was the occasion to acknowledge through UNESCO IHP RSC SEAP awards to 10 individuals in the region which contributed outstandingly to IHP over the years.

93. In the **European** region, aligning with the provisions of the EU Water Framework Directive (WFD) is a priority for most of the EU and pre-accessing countries, in particular when it comes to the co-management of shared water bodies. While the WFD is mainly aimed at assuring good-quality waters, the most of the countries are also facing the challenge of properly addressing investments in infrastructure, resource constraints and reforms of national administrations. This is also a region deeply affected by water-related disasters (floods, droughts, pollution) and climate change effects on water availability, leading to a need for more integrated approaches in water resources management. In this connection, Member States can count on various water-related UNESCO Centers (3 existing + 1 new in Greece) and Chairs (5 existing + 1 new in Slovenia) established in the region. IHP National Committees of **Central and Eastern Europe** (Group II) have also a long-standing tradition of cooperation with major transnational River Basin bodies such as the International Commission for the Protection of the Danube River (the XXVI Conference of the Danubian Countries on Hydrological Forecasting and Hydrological Bases of Water Management was held in Deggendorf, Germany, in September 2014) the International Sava River Basin Commission, and more recently the Drin River Basin Partnership, and have demonstrated their capacity to deliver relevant knowledge to these policy making platforms.

94. Within the Sava River Basin, shared by Slovenia, Croatia, Bosnia and Herzegovina, Montenegro and Serbia, a cooperative effort associating the UNESCO Venice Office, the International Sava river Basin Commission (ISRBC), the European Sediment Network (SedNet) and the Sediment Initiative has led to the establishment in 2014 of core expert group for the implementation of a 3-years project dedicated to Establishment of the Sediment Monitoring System for the Sava River Basin. This project, which has already delivered of a first sediment balance for the Sava Basin, will support the implementation of the Protocol on Sediment Management signed by the parties of the Framework Agreement on the Sava River Basin (FASRB) in July 2015.
95. As far as floods mitigation and management is concerned, the Venice Office successfully contributed to the achievements of the EU funded project FLOODIS, providing a high accuracy, professional location-based solution for flooding events alerting and management. To conclude the project in October 2015, the Regional Workshop on “Increasing Resilience to Emergencies through Earth Observation, Crowdsourcing, and Satellite Navigation Systems” was organized in Paris HQ’s, with 40 participants coming from Albania, France, Greece, Italy, Malta, The Netherlands, Russia and Serbia.
96. Croatia hosted a cross-sectoral Workshop on flood risk management measures & links to the EU WFD in Zagreb on 11-12 November 2015. The event was jointly organized by the UNESCO Venice Office, the World Meteorological Organization (WMO), the International Commission for the Protection of the Danube River (ICPDR) and the International Sava River Basin Commission (ISRBC). This capacity-building workshop addressed interests and needs of a broad range of participants (around 100) including representatives of the institutions and organizations involved in integrated flood risk management, policy and decision makers at the national and international level, authorities dealing with water and flood management, the civil protection sector and experts in the field of floods.
97. The “Protection and Sustainable Use of the Dinaric Karst Transboundary Aquifer System” (DIKTAS) GEF-funded project was concluded in 2015. The project was, the first initiative globally attempted to introduce sustainable integrated management principles in a one of the world’s largest transboundary karstic freshwater aquifer (shared by Albania, Bosnia and Herzegovina, Croatia and Montenegro). Important milestones of the project include the international conference “Karst without Borders” celebrated in June 2014 and a number of more recent workshops.
98. IDI and Water for Sustainable Development and Adaptation to Climate Change (WSDAC) UNESCO Category 2 Centre organized a meeting hosted by the Institute for the Development of Water Resources “Jaroslav Černi” in Belgrade, Serbia (2014). The meeting, attended by representatives and experts from the region, launched the Southeast European secretariat for the G-WADI Programme, and also aimed at identifying gaps and needs of the member states to address floods and droughts.
99. In **Western Europe and Northern America** (Group I), sustainable water resources management remains a top priority. During the COP21 in Paris, France (2015), UNESCO-IHP organized and contributed to various events, including the IPCC Outreach Event: “Raising awareness on Climate Change: Key findings of the IPCC 5th Assessment Report (AR5)”, International Conference on “Water, Megacities and Global Change” and the “Water and Climate Day” at the UNESCO Pavilion at Le Bourget.



100. UNESCO-IHP and ICIWaRM organized a poster session on “Advances in Global Water Resources Management” through UNESCO-IHP during the American Geophysical Union (AGU) in San Francisco, USA (2015). The session presented several IHP undertaken activities and discussed upon how academic and governmental partnerships with IHP can be strengthened to improve water science research and to translate knowledge into actions.

101. International Workshop was held on “Climate Change Impacts on Snow, Glacier and Water Resources: Multidisciplinary Network for Adaptation Strategies” hosted by the UNESCO Category 2 Centre International Centre for Water Resources and Global Change in Koblenz, Germany (2014).

102. UNESCO-IHP organized several sessions on the occasion of the World Water Week 2015 hosted and organised by the Stockholm International Water Institute (SIWI) held in Stockholm, Sweden (2015). In this occasion, the IHP participated at the UN-Water Stakeholder Dialogue, which focused on how to realize the Post-2015 agenda for water and sanitation, highlighting opportunities, challenges and the role of UN-Water and its members and partners.

#### **FOLLOW-UP TO THE EXTERNAL EVALUATION OF IHP-VII, INCLUDING THE REPORT ON THE NATIONAL COMMITTEES SURVEY (Agenda item 6.3)**

103. The IHP Secretariat pursued follow-up to the recommendations of the evaluation, inter alia through improving communication, outreach and visibility of IHP and the coordination of the UNESCO Water Family (cf. IHP/IC-XXII/Inf.1, sub-item 4.9 and IHP/IC-XXII/Inf.5). As part of this endeavour, the Secretariat conducted the IHP National Committees Survey in 2015, to which by 15 October 65 Member States had replied. Subsequently, the Secretariat shared the report of the survey with the Bureau members.

104. The Council may wish to discuss further improvement of the communication and cooperation of the National Committees’ network and with the UNESCO Water Family in the light of the presentation by the Secretariat.

#### **COOPERATION WITH OTHER UNESCO PROGRAMMES (Agenda item 6.4)**

105. IHP collaborated with MAB, Education, Communication and Information and External Relations Sectors to organize a media workshop during the outreach event “Raising Awareness of Climate Change: Key Findings of the IPCC 5th Assessment Report” on 7th December 2015 organized by IHP during the COP21.

106. IHP has been cooperating with all sectors within the Intersectoral Climate Change Task Force of UNESCO and particularly during COP21.

#### **Cooperation with the Man and the Biosphere Programme (MAB)**

107. The cooperation between the International Hydrological Programme (IHP) and the Man and the Biosphere (MAB) Programme is clearly expressed through the implementation of several joint activities. Throughout the past biennia, the IHP-MAB cooperation has covered a wide range of fields and aimed to encourage the

incorporation of ecosystems approach in water resources management with emphasis on mountains and dry lands.

108. IHP and MAB are finalizing a joint publication “Mountain Ecosystem Services and Climate Change – A Global Overview of Potential Threats and Strategies for Adaptation”.

109. IHP and MAB co-organized a joint session during the International Conference on Mountains in the Anthropocene in Kunming, China (2016).

110. UNESCO-IHP in collaboration with MAB Programme organized the Exhibition “Mountains: early warning systems for climate change”, which was opened by Director General during the 38th General Conference of UNESCO. The exhibition was also shown at the Cité Universitaire de Paris, France, during the United Nations Climate Change Conference (COP 21) in December 2015. During the 20th session of the Conference of Parties (COP-20), IHP and MAB jointly produced the exhibition “Climate change impacts on mountain regions of the world” (displayed in Lima) and published the policy brief “Our Global Water Towers: Ensuring Ecosystem Services from Mountains under Climate Change” launched in a special event at the Lima Municipality.

111. Under the IHP-LAC Water and Culture Regional Programme and the LINKS Programme, technical cooperation was provided to support work led by indigenous representatives of Latin America with a special emphasis on Colombia and other Andean countries to propose to the Organisation a new international nomination for sites: The Spiritual Reserves of Humanity.

112. A project on “Applying the transboundary biosphere reserve model to promote peace in the Lake Chad basin through sustainable management of its natural resources” was approved for funding by the African Development Bank. In support, the Lake Chad Basin Commission (LCBC) has been jointly prepared by MAB, IHP and the UNESCO World Heritage Centre (CLT/WHC). The hydrological component of the project will contribute to enhance the capacity of IHP National Committees of the countries members to LCBC and to update the hydrological knowledge base of the Lake Chad basin.

113. Cooperation with MAB is provided within the International Consortium on Landslides (ICL): IHP is currently the UNESCO Division of Water focal point for ICL, being part of the Board of Representatives (BoR) and the Scientific Technical Committee (STC). The Director of the Division of Ecological and Earth Sciences is currently the Chairperson of the Global Promotion Committee of the International Programme on Landslides of ICL. The International Consortium on Landslides (ICL) was established during the UNESCO-Kyoto University joint symposium “Landslide Risk Mitigation and Protection of Cultural and Natural Heritage” organized in 2002, as a non-profit and non-governmental organization now consisting of 51 member institutions from 32 countries. UNESCO’s role is to advice, support and to contribute to the activities of ICL in pursuing the systematic translation of scientific and technological advances into concrete landslide disaster mitigation measures and into educational and informational disaster preparedness tools for several kinds of stakeholders. This also includes numerous activities dealing with the improvement of relevant monitoring and early warning mechanisms. UNESCO contributed to the

drafting of the ISDR-ICL Sendai Partnerships 2015-2025, for Global Promotion of Understanding and Reducing Landslide Disaster Risk, “Tools for Implementing and Monitoring the Post-2015 Framework for Disaster Risk Reduction and the Sustainable Development Goals” which was presented and adopted during the World Conference on Disaster Risk Reduction in Sendai, Japan, March 2015.

#### Cooperation with the International Oceanographic Commission (IOC)

114. IHP continues its cooperation with the IOC in the execution of projects in the Global Environment Facility’s International Waters (IW) focal area, with the completion in 2015 of the “Transboundary Waters Assessment Programme” components on transboundary aquifers (IHP), large marine ecosystems and open oceans (IOC) as well as the approval of the forthcoming project “Strengthening IW Portfolio Delivery and Impact” to be executed jointly by IHP and IOC.

#### Cooperation with the International Geoscience Programme (IGCP)

115. IHP and the International Geoscience Programme (IGCP) co-organized a Working Group Meeting on “The 3rd Pamir’s High Elevation International Geophysical Expedition (HEIGE)” that took place at UNESCO Headquarters in Paris, France, (2015). This working group meeting was organized with potential partners to review research and activities and to develop a plan of actions within the framework of such project. It also seeks to establish common goals in research programs, to identify local expertise, and to enable joint work for answering urgent scientific questions in the regional context. UNESCO’s Almaty Office will further support the follow-up activities on the project of the 3rd Pamir’s HEIGE.

116. As members of the “Worldwide Hydrogeological Mapping and Assessment Project (WHYMAP) Consortium” IHP and IGCP continued their cooperation for the preparation of the “World Karst Aquifer Map” (WOKAM-WHYMAP) – a first draft of which is already available.

#### Cooperation with the Policy and Capacity Building Division (PCB)

117. In collaborating with Policy and Capacity Building Division’s SIDS platform and as a contribution to the UNESCO Climate Change and SIDS Platforms, IHP launched a set of publications on the role of groundwater in climate change mitigation and adaptation, one of them with special focus given to SIDS.

#### Cooperation with the Social and Human Sciences Sector (SHS)

118. IHP collaborates with the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) of UNESCO on water ethics, including the ethical considerations of new technologies, water pollution and climate change.

#### Cooperation with the Education Sector (ED)

119. IHP is collaborating with the Education Sector on several activities pertaining to water education, including with UNITWIN for the coordination of water-related Chairs, the Associated Schools Network and with the unit on Education for Sustainable Development (ESD). IHP conducted a workshop on “Water Education and Capacity Building: Key for Water Security and Sustainable Development” at the UNESCO World Conference on ESD (November 2014), contributing to its conclusions.