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55th Session of the IHP Bureau
(Paris, 20 to 22 June 2017)

PROGRAMME IMPLEMENTATION

Item 4 of the provisional agenda.

This document provides a summary of the implementation of the Programme since the 22nd Session of the IHP Intergovernmental Council, in particular:

- 4.1 Implementation of IHP-VIII (2014-2021).
- 4.2 Regional perspectives on IHP
- 4.3 Report on the implementation of the resolutions and decisions adopted at the 22nd session of the IHP Intergovernmental Council
- 4.4 IHP-WINS
- 4.5 Cooperation with other UNESCO programmes

Actions expected from the Bureau:
4.1 To take note and comment on the progress implementation of IHP VIII The Bureau may wish to take note of the UNGA resolution on the "Law of Transboundary Aquifers" (A/RES/71/150, 13 December 2016) and encourage the implementation of the UNGA resolution by IHP
4.2 To take note and comment on the regional perspectives on IHP
4.3 To take note of the implementation of previous resolutions adopted during the last 22nd IHP Council and provide advice on the next steps, suggesting as well possible contributions from Member States
4.4 To take note of the implementation of IHP-WINS
4.5 To take note of cooperation with other UNESCO programmes

The Bureau may wish to provide its appreciation to the Secretariat, provide advice on next steps on the implementation of IHP-VIII and to take any resolutions regarding the implementation of the programme.

IMPLEMENTATION OF IHP-VIII (Agenda sub-item 4.1)

Theme 1: Water-related disasters and hydrological change

1. The theme aims at supporting institutions at national and regional level to develop research and training programmes on floods and drought risk management related to climate extremes towards strengthening countries adaptation capacity. It also provides Member States with data, tools and methodologies, as well as policy advice, for improved water-related disaster management.

2. **Water Extremes, Floods and Droughts:** The International Flood Initiative (IFI), launched its new implementation plan with a dedicated side-event attended by more than 70 participants during the 22nd Session of the Intergovernmental Council of IHP. The new strategy was developed to align and contribute to the 2030 Agenda for Sustainable Development, the Paris Agreements, and the Sendai Framework for Disaster Risk Reduction. It adopts a holistic risk-based approach to the Integrated Flood Management (IFM) that aims at minimizing loss from flooding under climate change and maximizing the net benefits from the use of flood plains for sustainable development. The International Centre for Water Hazard and Risk Management (ICHARM) category 2 centre under the auspices of UNESCO (C2C), secretariat of IFI, has led the plan for implementation of the new strategy in seven countries (Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka and Vietnam) of the Asia and Pacific Region, which will be progressively expanded to all other regions. IFI organized the side event "Flood resilience in Climate Change is Necessary to Sustainable Development" in October 2016 in Jakarta (Indonesia) during the Eighth Meeting of the High-level Experts and Leaders Panel on Water and Disasters (HELP). The event released the HELP-IFI Jakarta Statement highlighting the importance of IFM approach and inviting national, regional, international partners to collaborate under the new IFI strategy.

3. On the sideline of the 9th GEOSS Asia-Pacific Symposium, an IFI workshop was held in January 2017 in Tokyo (Japan) on "Implementation Planning Workshop on IFI in Asia-Pacific". The IFI session "GEOSS Asian Water Cycle Initiative (AWCI)" discussions focused around four strategic points: 1) Needs, Issues and Benefits to link SDG 6 with SDG 2, 11 and 13, the link between flood and drought, the need to involve private sector in water-related disaster risk reduction and the combination of non-structural and structural measures, 2) linkage to regional and global coordination framework, 3) needs to identify institutional and human capacity development, 4) planning strategy by introducing examples of framework and prototypes, multi-stakeholder platform and stakeholder participation in decision making process. The event was attended by more than 65 participants.

4. The project "Strategic strengthening of flood Warning & Management Capacity of Pakistan phase 2" continued reinforcing the capacity of relevant Pakistani agencies and Afghani agencies regarding flood management, especially forecasting, warning and hazard analysis. Several trainings were conducted, at international (19 experts trained of which 3 women; December 2016) and local levels (72 experts trained of which 24 women) focusing on national experts, relevant provincial government departments, local NGO's including women organizations and progressive farmers from Punjab and KPK provinces.

5. The third ASEAN technical workshop on Remote Sensing Precipitation for Water and Disaster Management" was held in January 2017. The workshop was attended by 53 participants (15 women, 38 men) from Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Vietnam.

6. The project “Urgent Capacity Development for Managing Natural Disaster Risks of Flash Floods in Egypt, Jordan, Sudan and Yemen” was successfully completed in 2016. The project capacitated more than 150 experts (including about 50 women professionals), scientists and young professionals on Flash Flood management. Awareness was raised through the outcomes presented at the Second International Symposium on Flash Floods in Wadi Systems (El Gouna, Egypt, October 2016) and COP22. The project linked national authorities, civil society, universities and local communities for flash flood risk management. The project developed tools including flash floods risk and hazard maps (25, 50 and 100 year flood return period) for four hotspots (Egypt, Jordan, Sudan, and Yemen), remedial measures guidelines (in Arabic) and developed programmes for community awareness raising. The implemented capacity building activities were a good platform for exchanging experience between the national experts and the Japanese partners.

7. IHP supports technology exchange to help countries in strengthening their capacity in water-related disaster risk reduction. A workshop was held in Harare, Zimbabwe in November 2016 on the transfer of and training on African Drought Monitor for Southern African Countries in collaboration with Princeton University, Southampton University and WaterNet. The system was successfully transferred in the Southern African Development Community’s (SADC) region and 35 experts (25% women) from meteorological and hydrological services of 12 countries from SADC (Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe) were capacitated in using the African Drought and Flood Monitoring System. The SADC Climate Services Centre is keen in the use of the system for the Southern Africa Regional Climate Outlook Forum (SARCOF) process.

8. Twenty experts (7 women) including representatives of the following ten SADC countries: Botswana, DRC, Lesotho, Madagascar, Mozambique, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe and representatives of the following River basins: Zambezi Commission (ZAMCOM), Okavango River Commission (OKACOM), Lake Victoria River Commission (LVBC) and Congo Basin attended in March 2017 in Johannesburg a workshop on the review of drought mitigation policies, strategies and plans within SADC. The participants discussed, identified gaps and share experiences on the Disaster Risk Reduction (DRR) frameworks in general and on specific drought mitigation related frameworks and provided recommendations to strengthen drought mitigation framework at country, regional and basin levels within the SADC region.

9. IHP organized the technical session “Early Warning Systems for water extremes and climate change in Africa” during the 6th Africa Water Week in July 2016 in Dar es Salaam (United Republic of Tanzania), with more than 100 experts (20 women, 80 men) participants.

10. **World’s Large Rivers Initiative (WLRI):** WLRI is a collaborative and interdisciplinary network aiming at creating the knowledge base required for a holistic scientific assessment of the state of large rivers and promoting their integrated and sustainable management. The 2nd WLRI Working Group-Meeting was held on June 2016 in Vienna, Austria. The meeting discussed the concept paper of WLRI, including common methodology and a road map and the next steps for the implementation of the initiative. For the first phase of implementation, the working group identified three pilot large rivers to be studied in order to test the methodology of the WLRI. The selected rivers are: Danube (Europe), Mekong (Asia), and Niger (Africa). The 3rd World’s Large Rivers International Conference is planned to be held from 18 to 21 April 2017 in New Delhi, India.

11. **Knowledge Exchange:** The 2nd International conference on African Large River Basins Hydrology of the network Flow Regimes from International Experimental and Network Data/Western and Central Africa (FRIEND/AOC) was held in November 2016 in

Dakar (Senegal) and hosted 130 (20% women and 30% youth) participants, scientific experts, coming from the Sub-Saharan area and from North Africa.

12. The FRIEND programme held the working session “Future directions and revitalizing of FRIEND Programme in line with IHP-VIII and Agenda 2030” on January 2017 at UNESCO Paris headquarters. The meeting gathered representatives of the regional FRIEND networks to discuss on strategic direction to revitalize the network. For each regional coordination team, a call for regional leaders will be opened and circulated also to the Member States and relevant institutions and networks to invite candidates of respective regions for a four years appointment. The terms of reference for the regional leaders are under preparation and will ensure the development of the activities based on regional characteristics. In reinforcing the network, the FRIEND page was opened on the website ResearchGate in February 2017 (https://www.researchgate.net/project/FRIEND-Flow-Regimes-from-International-Experimental-and-Network-Data) to better connect researchers and scientists and better disseminate the results. The ResearchGate page is also under development for each regional FRIEND network, with MEDFRIEND page being opened in February 2017 (https://www.researchgate.net/project/MEDFRIEND-The-FRIEND-IHP-VIII-program-for-the-Mediterranean). In the first two months following their opening (February-March 2017), the FRIEND ResearchGate pages had a total of 1055 visits and 71 followers.

13. IHP continued cooperating with the International Sava River Basin Commission for an improved sediment monitoring and data exchange system for the Sava River Basin and to establish an on-line free database on sediment.

14. Flood risk is better managed in Albania, with a concrete potential to extend the tested approaches in other countries belonging to the Drin River Basin (Greece, Kosovo, the Former Yugoslav Republic of Macedonia and Montenegro). A final report and policy brief document on the impact of crowdsourcing solutions and professional volunteers as human sensors and reporters on DRR has been finalised along with a user guide (in English and Albanian) to operationalise the interface of the system.

15. **Snow and Ice:** IHP continued working in building capacity and raising awareness on the impacts of glacier melting. The international seminar on “The Impact of Glaciers Melting on Water Resources in Central Asia in the Context of Climate Change” was organized in November 2016 in Bishkek (Kyrgyzstan), and attended by 58 experts (14 women). The seminar was an opportunity to share and discuss ongoing and planned projects and initiatives in the field of glacier research, climate change and water to improve coordination of activities among all stakeholders in the region. Two summer schools on “Glacier Mass Balance Measurements and Analysis for young researchers from Kyrgyzstan, Tajikistan and Russia” and “Permafrost and Potentially Dangerous Glacier Lakes”, were held in July - August 2016 in Kyrgyzstan (16 participants of which 4 women). Following the three events, a policy brief is being prepared based on the outcomes and recommendations.

16. **Conclusion and way forward:** Under Theme 1 of IHP-VIII, human and institutional capacities were strengthened in Member States in the areas of water extremes (floods, droughts), glacier melting, sediment and river basin management by the provision of tools, trainings and platform for knowledge sharing and science-policy discussion. More than 15 events (workshops, trainings, conferences and experts meetings) were organized with more than 219 people trained (30% women). Institutional capacity of national and regional hydrological and meteorological institutes of more than 31 countries were reinforced in the thematic topics during the reporting period. IHP will build on this experience and will further strengthen its networks and initiatives to continue reinforcing capacity of Member States in addressing the impacts of water extremes and hydrological changes under global change.

Theme 2: Groundwater in a changing environment

17. **Enhancing sustainable groundwater resources management:** The Tuul River Basin Groundwater Model Delivery took place in September 2016 in Ulaanbaatar, Mongolia. Around 30 experts (30% women) from the Mongolian water sector participated. The workshop delivered the results of development and application of the MODFLOW surface-groundwater flow model of the Tuul River area near Ulaanbaatar. The model products were presented to decision makers for consideration in current water related planning activities.

18. The World Hydrogeological Map (WHYMAP) Programme is currently preparing the World Map of Karst Aquifer, in coordination with all other members of the WHYMAP Consortium in partnership with the Karlsruhe Institute of Technology, the International Association of Hydrogeologist's (IAH) Commission on karst and the German Federal Institute for Geosciences and Natural Resources (BGR). The launch is foreseen in September 2017.

19. The guidelines prepared as a result of the Groundwater Governance project, executed with FAO and World Bank, were widely presented in international events, such as the African and Arab Water Weeks (Tanzania, July 2016 and Jordan, March 2017, respectively) and the 8th Global Environment Facility (GEF) International Waters Conference (Sri Lanka, October 2016). UNESCO is preparing to train national experts from the Arab region in Manama, Bahrain, in May 2017. The guidelines in English and French are available at http://www.groundwatergovernance.org/home/en/.

20. **Strategies for aquifers recharge:** Considering the benefits of groundwater recharge management and its potential to be a significant contributor to the SDGs, UNESCO co-organized the 9th International Symposium on Managed Aquifer Recharge (ISMAR9), in Mexico City, Mexico, June 2016. A strategy to promote managed aquifer recharge (MAR) was launched during the UNESCO-IAH Workshop "MAR for Development" organized in this framework, including sharing the experience on selected successful MAR projects in developing countries to raise awareness of decision-makers and to place MAR within the framework of groundwater storage, conjunctive groundwater management and sustainability. A publication and related factsheets are in preparation.

21. **Adapting to the impacts of climate change on aquifer systems:** The Latin America and Carribbean (LAC) component of the UNESCO GRAPHIC (climate change and human impacts on groundwater resources) network is being strengthened through a regional call to LAC IHP National Committees for new memberships and preparation of potential cases studies.

22. UNESCO trained 28 participants (15 women, 13 men) from six Mekong countries (Cambodia, China, Laos, Myanmar, Thailand and Vietnam) on "Climate change and groundwater resources" during a dedicated workshop for the Mekong River Basin. It was organized by UNESCO Bangkok Office in June 2016 in Sihanoukville, Cambodia and with contributions of resource persons from UNESCO, Republic of Korea and USA. All country case studies on this topic are available under open access in a special issue of the Journal of Groundwater Science and Engineering prepared in partnership with UNESCO (http://gwse.iheg.org.cn/EN/volumn/current.shtml).

23. **Promoting groundwater quality protection:** Within the MedPartnership project a series of indicators have been developed to characterize the sustainability of 26 coastal wetlands dependent on groundwater, located in the South and Eastern Mediterranean area, with the groundwater quality identified and assessed as a main element for the conservation of these wetlands. The proposal for a new phase focused on "Coastal Aquifers and

Groundwater Related Ecosystems", has been approved by GEF. The Inception meeting will take place in May 2017.

24. **Promoting management of transboundary aquifers:** As a result of the IHP work in the global assessment of transboundary aquifers (TBAs) and Small Island Development States (SIDS) groundwater systems, a summary for policy-makers is now available and provides recommendations for the management of these resources. Translation into all UN official languages is on-going. (English available here: http://unesdoc.unesco.org/images/0024/002449/244912e.pdf).

25. UNESCO IHP, as co-custodian agency for SDG indicator 6.5.2 on transboundary water cooperation has led the development methodology for its calculation, together with UNECE (see sub-item 7.1). Among other aspects, IHP was responsible for the development of the transboundary aquifer component. During the first quarter of 2017, both organizations have launched the reporting on this indicator and IHP will assist the countries in the validation, compilation and reporting of results.

26. IHP continues its efforts in the setting up of multi-countries cooperation mechanisms for the governance and management of transboundary aquifers located in Central America, Central Asia, North Africa, Southern Africa and the Sahel region. The related activities include the improvement of the knowledge on the aquifers characterization, the creation of enabling conditions for dialogues at different levels and the strengthening of local capacities on groundwater governance, national and international water law, hydrodiplomacy and gender aspects.

27. The UN General Assembly (UNGA), in its last resolution on the "Law of Transboundary Aquifers" (A/RES/71/150, 13 December 2016), commends the Draft Articles adopted in 2008 to the attention of Governments as guidance for bilateral or regional agreements and arrangements for the proper management of transboundary aquifers. It also encourages IHP to continue its contribution through offering further scientific and technical assistance to the States concerned.

28. **Conclusion and way forward:** IHP continued its efforts to assist Member States in improving the scientific knowledge on groundwater as well as in strengthening groundwater governance frameworks at domestic and transboundary level by organizing workshops, trainings, conferences and experts meetings that trained more than 300 people (35% women) during the reporting period. These activities were supported by mapping and in-depth assessments of the groundwater resources, in particular for transboundary aquifers and aquifers in SIDS. IHP will follow up on UNGA A/RES/71/150 that encourages IHP to continue its contribution through offering further scientific and technical assistance to the States concerned and the monitoring process related to SDG 6 indicator 6.5.2.

Actions expected from the Bureau:
The Bureau may wish to take note of the UNGA resolution on the "Law of Transboundary Aquifers" (A/RES/71/150, 13 December 2016) and encourage IHP's contribution to implementing the Resolution.

Theme 3: Addressing water scarcity and quality

29. The theme contributes to addressing water scarcity and quality challenges. On water scarcity, the objective is to support member states to improve water governance by forecasting and planning for lack of water availability based on sound scientific information and appropriate tools and methodologies. For water quality, the objective is to support

countries to improve water quality and wastewater management by strengthening knowledge and capacity on technical and policy approaches.

30. The Global Network on Water and Development Information for Arid Lands (G-WADI) commemorated more than a decade of activities with an international conference on "G-WADI: More than a decade enhancing water and sustainable development for arid regions", Beijing (China), October 2016. The event was attended by experts from across the network (8 women and 28 men). The conference produced a new strategic direction analysing the challenges and opportunities within the changing landscape of scientific research, water management and policy-making of arid and semi-arid zones to support G-WADI's contribution to the implementation of global goals including SDGs. The English version of the G-WADI strategic position paper has been finalized and will be published in 2017.

31. Within the framework of G-WADI, IHP in cooperation with CAZALAC Category 2 Centre organized the international seminar "Rainwater harvesting techniques: A tool to deal with water scarcity", March 2017 in Santiago, Chile, with the participation of 122 experts (31% women) from Argentina, Aruba, Brazil, Chile, Colombia, Cuba, Ecuador, Honduras, Mexico, Peru, USA and Uruguay.

32. The project "Managing Water Resources in Arid and semi-Arid Regions of Latin America and the Caribbean (MWAR-LAC)" was successfully completed in December 2016. The capacity development actions and international conferences organized within this project reached a total of 324 participants from 26 countries (Brazil, Mexico, Colombia, Argentina, Peru, Venezuela, Chile, Guatemala, Ecuador, Cuba, Haiti, Bolivia, Dominican Republic, Honduras, Paraguay, Nicaragua, El Salvador, Costa Rica, Panama, Uruguay, Jamaica, Bahamas, Saint Lucia, Trinidad and Tobago, USA). Within this project, tools including the Latin American and Caribbean (LAC) Drought Atlas (http://www.cazalac.org/mwar_lac/index.php?id=12) and the Latin American Flood and Drought Monitor (stream.princeton.edu/LAFDM/WEBPAGE/) were developed and implemented through human capacity reinforcement and technology transfer to national and regional hydrological and meteorological institutes. In addition, the user-friendly tools effectively serve to raise awareness on the impacts of floods and droughts and as a solid reference for the scientific community.

33. The training on "Application of Satellite Remote Sensing to Support Water Resources Management in Latin America and the Caribbean" was organized in Foz de Iguazú, Brazil, in July 2016, by IHP, the C2C International centre for Hydroinformatics in Brazil (CIH) and NASA Applied Remote Sensing Training (ARSET). A total of 70 (37% women) water professionals, managers and staff from governmental agencies and institutes from 10 LAC countries (Argentina, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Nicaragua, Peru and Salvador) took part in the training.

34. Within the framework of G-WADI, IHP and the Center for Hydrometeorology and Remote Sensing (CHRS) at the University of California, Irvine, jointly launched the iRain mobile application on the occasion of COP22. The iRain app, developed by CHRS, provides global precipitation monitoring in near real-time based on satellite data. The free access to such data is especially relevant in countries where data availability is scarce. The application features a user-friendly interface with an innovative approach to crowd source precipitation data, facilitating stakeholder involvement in data collection and validation and promoting citizen science. The software is available on different platforms (web: http://irain.eng.uci.edu/; iOS: https://itunes.apple.com/us/app/irain-uci/id982858283?mt=8; Android https://play.google.com/store/apps/details?id=irain.app&hl=en).

35. The Namibia Hydrological Services (NHS) continues using G-WADI's GeoServer data to prepare a daily flood/hydrological drought bulletin with up-to-date information on flood and drought conditions for local communities.

36. The International Initiative on Water Quality (IIWQ) of IHP implemented a range of activities (described below in paragraphs 36-40) in the framework of IHP-VIII Focal Area 3.4 "Addressing water quality and pollution issues within a framework of Integrated Water Resouces Management (IWRM) – improving legal, policy, institutional, and human capacity" and Focal 3.5 "Promoting innovative tools for safety of water supplies and controlling pollution".

37. The extrabudgetary Project "Emerging Pollutants in Wastewater Reuse in Developing Countries" have resulted in the strengthening of the knowledge base, research capacity and scientific cooperation on emerging pollutants. Furthermore, the project promoted the knowledge transfer and generation on emerging pollutants through the 16 IIWQ technical and policy case studies, which include three (3) global, two (2). regional and 11 national case studies covering 20 countries (Australia, Brazil, Canada, China, Ethiopia, India, Kenya, Kuwait, Mexico, Mongolia, Nigeria, Norway, Rwanda, Saint Lucia, Thailand, Tunisia, Ukraine and Vietnam). The results and findings of the case studies have been approved to be published as a new UNESCO publication series, entitled "*Emerging Pollutants in Water Series*". The first case study report (volume) in the series – *Pharmaceuticals in the aquatic environment of the Baltic Sea region*, which presents the first-ever regional assessment of the occurrence of pharmaceuticals in the aquatic environment (wastewater, river water and seawater) – was published in March 2017. Other case study reports are in preparation. Results of selected case studies were presented at the IIWQ Technical Event on "Addressing emerging pollutants to achieve the SDGs" during the 2016 Stockholm World Water Week, attended by over 60 participants, including four women experts/speakers and 32 women attendees.

38. IIWQ facilitated science-policy discussions on the impact of climate change on water quality and adaptation responses through dedicated discussions at the COP22 and the international water and climate community. The IIWQ side-event at COP22 brought together 6 policy-makers and experts (3 women), representing different stakeholders such as a government institution (Morocco), a regional organization (Arab Water Council), a basin organization (Morocco), a water-related UNESCO category 2 centre (Egypt) and UNESCO Chair (Spain). IIWQ organized a major Technical Event on "Water quality and climate change: Connecting the dots" during the 2016 Stockholm World Water Week, attended by over 110 participants including 5 women experts/speakers and 57 women attendees.

39. With the aim to improve water quality data and information at the global level and to support countries for monitoring SDG Target 6.3 on water quality, IIWQ expanded its activities on water quality monitoring to the use of remote sensing and satellite-based data. A new IIWQ project on "Use of earth observation (EO) and satellite data for water quality monitoring" was initiated, building on results of the past and ongoing IIWQ activities.

40. IIWQ has continued its active support to African countries to cooperatively address water quality challenges towards the achievement of the SDGs by facilitating the knowledge exchange and dissemination and promoting best practices and science-based policy-making, leading once again the Sub-Theme "Sustainable Wastewater and Water Quality Management" of the 6th Africa Water Week in Dar Es Salaam, July 2016. For this purpose, IIWQ and other programmes of IHP organized five (5) thematic sessions on various water quality and wastewater issues under this Sub-theme. The IIWQ Thematic Session on Emerging Pollutants, in which three case studies in different countries and basins of Africa (Tunisia, Nigeria, Lake Victoria Basin) were presented by local (African) experts, provided a platform for the exchange of research results and knowledge. The two IIWQ sessions,

attended by about 60 and 100 participants respectively (about 30% women), furthermore raised awareness on emerging pollutants and the science-policy interface on water quality.

41. **Conclusion and way forward:** Under Theme 3 through the development and provision of innovative tools, methodologies and knowledge sharing platforms IHP has supported Member States in addressing water scarcity and quality issues. Major achievements include the strengthening of initiatives including G-WADI and IIWQ, and improved water resources management in countries through the application of EO and satellite data for water resources management, including the provision of innovative tools such as iRain. More than 12 events (workshops, trainings, conferences and experts meetings) were organized with more than 564 participants (32% women) in the reporting period. The MWAR-LAC project was successfully completed with more than 324 people being capacitated in the LAC region and a new UNESCO publication series "*Emerging Pollutants in Water Series*" has started presenting case studies from IIWQ. IHP will expand the capacity development related to the provision of data, tools and methodologies to countries and will continue providing science-policy advices in addressing water quality and scarcity issues.

Theme 4: Water and human settlements of the future

42. 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 providing sound solutions.

43. **Awareness Raising:** Awareness on UNESCO's work on Urban Water Management in all of its focal areas was risen during the Singapore International Water Week (Singapore, Thailand, July 2016), African Water Week (Dar Es Salam, Tanzania, July 2016), World Water Week (Stockholm, Sweden, August 2016), HABITAT III, Korean International Water Week (Daegu, Republic of Korea, October 2016), Water and Cities Conference (Bratislava, Slovakia, October 2016), COP 22, SAFEWATER, (Zurich, Switzerland, November 2016), and Law, Justice and Development Week (Washington D.C., USA, December 2016). In total more than 600 people were sensitized, of which 15% women from at least 50 countries.

44. **Training:** Training was organized by IHP and the International Water Association's (IWA) Specialist Group on "Water Security and Safety Management" during the IWA World Congress in Brisbane (October 2016) on "Crisis Management at Water Utilities: Concept, Preparedness and Latest Technology Development in Decision Support System using Artificial Intelligence". 23 attendees from 14 countries (Australia, China, Iran, Japan, Kenya, Malaysia, New Zealand, Portugal, Saudi Arabia, Sierra Leone, South Africa, Swaziland, Sweden, and Vanuatu) have followed this training day, among which 8 women. IHP with W-Smart association and the city of Sydney delivered further training on "Eco-Resiliency & Crisis Management" in Sydney (October 2016). 51 participants, among them 13 women, attended the workshop with 15 overseas experts, in particular from the water utilities of Tokyo, London, Paris, Singapore, Republic of Korea, Madrid, Liège (Belgium) and Nouméa (New Caledonia). In total 74 experts were trained, 21 women and 53 men.

45. **Knowledge production:** Four publications are being elaborated in 2016-2017: on the Global Water Pathogen Project, Smart Water Systems, Water Management in Human Settlements in arid and semi-arid areas and Impacts of Urban Floods on Water Quality.

46. **Networking:** closer cooperation with UN HABITAT and IWA has been pursued and an agreement for cooperation is being formalized within the framework of the Global Alliances for Water and Climate (GAWC; COP 22 http://climateaction.unfccc.int/media/1113/2-gca-water-report.pdf). Publications on sanitation

and joint research on current urban water management challenges are being discussed. Established in cooperation with IWA, a group of experts on intermittent water supply with the participation of the Regional Centre for Urban Water Management (C2C) and two water related Chairs, the UNESCO Chair on Water Access and Sustainability (University of Cincinnati, USA) and the UNESCO Chair in Sustainable Water Services (Tampere University of Technology (TUT), Finland). Furthermore, IHP's Theme 4 participation at the IWA World Congress (Brisbane, Australia, October 2016) included: (i) the Strategic Council meeting, (ii) the Specialist Group Leaders Forum, (iii) the session on Climate Change, (iv) the Emerging Leaders Forum. The participation in such events have increased the visibility of the Organization and its work to IWA and have resulted in the commencement of discussions to further and institutionalize the cooperation. To this end, discussions are going to be held with IWA's current President, Ms Diane D'Arras.

47. **Flagship initiatives:** Within the framework of the Megacities Alliance for Water and Global Change, a number of events were organized to raise awareness on the initiative and to disseminate the related publications produced and their best practices. In particular, the book "Megacities, Water and Global Change" (http://unesdoc.unesco.org/images/0024/002454/245419e.pdf) was launched in English during HABITAT III (http://en.unesco.org/events/launch-publication-water-megacities-and-global-change-habitat-iii) (Quito, Ecuador; October 2016) and French at the COP 22 (Marrakech, Morocco, November 2016). Awareness was raised at International Conference of WaterLinks, (Manila, the Philippines, July 2016), World Water Week, HABITAT III, Korean International Water Week, and COP 22. The *Global Water Pathogen Project* is experiencing delays in the delivery of the dynamic platform of the project as the coordination of 160 authors from more than 40 countries is challenging. It is expected that the product will be ready by the end of the August 2017.

48. Within the reporting period, the **Advisory Board of Theme 4** met twice, resulting in the proposal on four white papers to be developed by the Members of the Board (water engineer of the future; establishment of observatories on urban water management; science and technology in the service of urban water management; education in urban water management).

49. **Conclusion and way forward:** Overall, under theme 4 of IHP-VIII there was a major campaign to raise awareness on issues related to Urban Water management and the related work of IHP, covering all high level and exposure events, such as HABITAT III, COP22 and all major International Weeks. IHP work was disseminated to more than 600 people, of which 15% women from at least 50 countries. Furthermore, 74 people were trained, 28% of which women and four publications are scheduled to materialize in 2017. New networking opportunities with C40, GAWC and IWA are being explored, while existing, like the Megacities Alliance, are being strengthened. 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). New financing and projects are scheduled for the second half of 2017 on Climate Change and Water Security.

Theme 5: Ecohydrology, engineering harmony for a sustainable world

50. The theme addresses the increasing challenges in the sustainable management of ecosystems, where 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 resources management approach. The activities carried out since the 22nd IHP Council (June 2016)

addressed the issue of disseminating the ecohydrological concept in Member States, with particular reference to Africa, among other regions, through conferences, workshops, dedicated training courses and participation of the Water Family in international events.

51. During the 6th Edition of the Africa Water Week (May-June 2016, Dar Es Salaam, Tanzania), IHP and the C2C International Centre for Coastal Ecohydrology (ICCE) organized the session “Ecohydrology for sustainability and water security in Africa” attended by 48 participants from several African countries (17 women). The objective of the session was to raise the awareness of the participants regarding the Ecohydrological methodology as innovative, low energy-low costs advanced science approach where ecosystem processes and ecosystem biotechnologies are used.

52. At the 5th Ecosummit 2016, August-September 2016 in Montpellier, France, IHP together with the C2Cs European Centre for Ecohydrology (ERCE, Poland), ICIWaRM, UNESCO-IHE chair on Ecohydrology, the African Regional Centre for Ecohydrology (ARCE, Ethiopia), organized a session on “Ecohydrology, Biotechnology and Engineering for Sustainable Development Goals” (65 participants; 30 women), a side event on “Integrating Sustainability Science around the hydrological cycle (15 participants; 8 women) and a session on “Improving the urban water cycle through green infrastructures” (45 participants; 20 women). The sessions showed that ecohydrology can provide innovative approaches combining ecological engineering, ecosystems biotechnologies and system solutions to support monitoring of SDG 6 (targets 6.5 and 6.6); ecohydrological processes and their application can overcome challenges such as adaptation of urbanizing and urbanized areas to the challenges of growing populations, climate extremes and declining ecological potential.

53. The Ministry of Water, Irrigation and Electricity of Ethiopia and IHP, together with ERCE, ICCE, UNESCO-IHE and ARCE organized the 2nd African International Symposium “Ecohydrology for Water, Biodiversity, Ecosystem Services and Resilience for Africa” (November 2016), Addis Ababa, Ethiopia, attended by 130 participants from 15 countries (20 women, 8 African countries Cameroon, Ethiopia, Kenya, Nigeria, South Africa, Sudan, Tanzania and Tunisia). The symposium adopted the “Way Forward” which focuses on major strategic goals in Ecohydrology, application of integrated land use plan with integration of ecohydrological solutions, capacity building and education, institutionalize and mainstreaming ecohydrology in existing, local, national and regional institutions, as well as networking. The Symposium was followed by the Advanced Training Course in “Ecohydrology and Systemic Biotechnological Solutions for Implementation of Sustainability in Africa”, attended by 40 participants (10 women, 30 men) from eight (8) African countries (Cameroon, Ethiopia, Kenya Nigeria, South Africa, Sudan, Tanzania and Tunisia). .

54. The Universidad Estadual do Norte Fluminense (UENF) in Brazil, together with the UNESCO Chair in Ecohydrology: water for ecosystems and societies” of the University of Algarve and the C2C International Centre for Coastal Ecohydrology (ICCE, Portugal) and IHP organised the international conference “Ecohydrology: water security for ecosystems and societies” held in in Campos de Goytacazes, Brazil in March 2017. The conference was attended by 82 participants (38 women, 44 men) from 22 countries, 14 of which from LAC (Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Peru, Panama, Paraguay and Uruguay), 2 from Africa (Ethiopia and Nigeria) as well as from France, Greece, the Netherlands, Portugal, Tunisia and USA. Three UNESCO Water Chairs (Chair in Ecohydrology: water for ecosystems and societies in Portugal, the Chair on Water and Education for Sustainable Development in Argentina, the UNESCO Chair on Water, Women and Development in Brazil), three C2C (ICCE in Portugal, ARCE in Ethiopia, the International centre for Hydroinformatics in Brazil) and IHE were among the participants. The conference addressed the status of water resources and ecohydrological issues, environmental flows and ecological disasters and how socio-economic and

regulating aspects are related and contribute to the Ecohydrology management principles. The discussion highlighted the need to reorganize an ecohydrology group in LAC.

55. Development is ongoing of the modular ecohydrology and IWRM curricula and comparative studies of applying ecohydrology and IWRM in Asia and Africa through UNESCO Category 2 water Centres Humid Tropics Centres Kuala Lumpur (HTCKL), Regional Centre for Urban Water Management (RCUWM) of Teheran, Iran; Asia Pacific Centre for Ecohydrology (APCE), Indonesia, UNESCO water chair on Ecohydrology at the Capital Normal University, China, Regional Centre on Integrated River Basin Management (RC-IRBM) of Kaduna, Nigeria and the UNESCO Chair on Water Resources from Khartoum, Sudan http://mucp-mfit.org/knowledge-platform-on-south-south-cooperation-for-water-security/. Draft reports on the study related to comparative studies for customizing IWRM for better water management at river basin level and the compilation of the water management curriculum have been submitted by the C2C Humid Tropic Centre in Kuala Lumpur (HTCKL), Malaysia. The final reports are being finalized by HTCKL to reflect comments from UNESCO.

56. The Asia Pacific Centre for Ecohydrology (APCE) has established an advanced ecohydrology demosite in the Saguling Reservoir of the Upper Citarum River basin and in peatland area in Central Kalimantan (http://dev.iucp-ifit.org/index.php/project/ecological-and-eco-hydrological-solutions-for-sustainable-management-in-indonesia-and-asia-pacific-region/).

57. Following the inauguration of the first UNESCO Green Academy in Bahir Dar, Ethiopia, in 2016, the establishment of other UNESCO Green Academies are being considered and guidelines were produced (available in English at http://www.unesco.org/fileadmin/MULTIMEDIA/FIELD/Addis-Ababa/images/Green.pdf). UNESCO Green Academies involve young and elder people, to participate in maintaining rain-water harvest, storage and utilization for biomass production/food-production, waste-water recycling, application of renewable energy, and the establishment of Youth-Clubs (science-education clubs) for girls and boys.

58. **Conclusion and way forward:** Over 380 participants (133 women) attended the above events from June 2016. Over 40 participants (10 women) were trained in ecohydrology. Awareness was raised and knowledge was shared through the brochure “Ecohydrology as an integrative science from molecular to basin scale” printed (500 copies) in July 2016; 350 copies were distributed in the above events. The brochure, in English, is available on line at http://en.unesco.org/themes/water-security/hydrology/ecohydrology. 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

59. The objective of Theme 6 is to guide and provide technical support through demonstration projects and development of prototype materials and tools at national/regional levels in selected Member States/regions. IHP has conducted a wide range of courses and workshops at all levels for water experts, technicians and teachers. The activities have been focusing on Africa, the world’s youngest region, confronted with high levels of unemployment and working poverty, requiring specific consideration for youth education, empowerment and job creation.

60. **IHP-WINS:** IHP has developed the Water Information Network System (IHP-WINS, presented in sub-item 4.4; http://ihp-wins.unesco.org): an interactive open-access database, launched in January 2017. IHP-VIII helps Member States in their quest for Water Security. This objective entails a growing need for enhanced public awareness, improved standards and better coordination among water stakeholders and makes the use of advanced technologies indispensable. To address this challenge, IHP-WINS is a global reference database covering the entire water cycle. It provides continuous updates and new data, allowing users to create tailor-made maps incorporating specific information. A video presentation of IHP-WINS is currently available in English, Spanish, French, Portuguese and Japanese (https://www.youtube.com/results?search_query=IHP+WINS).

61. **FREEWAT:** FREE and open source software tools for WATER resource management (FREEWAT) is developed under the Framework of the HOPE-Initiative and ICT4Water. The software aims at promoting water management and planning. A training of 10 young water experts from Southern Africa (1 woman and 9 men) in the FREE and open source software tools for WATER resource management (FREEWAT) was organized during June-July 2016 at UNESCO's headquarters in Paris. The aim of the course was to train trainers of water experts and contribute to the improvement of the skills of African Water Specialists to optimize the use of data in monitoring water resources. Upon completion of the training, the participants are expected to train other experts in their country in how to use the software. For more information please consult the following link: http://www.hope-initiative.net/.

62. On 30 September 2016, the IHP Secretariat organized the International Symposium “Fostering inclusive and sustainable economic growth, employment and decent work, Sustainable Development Goal 8 (SDG#8) through Information Communication Technology (ICT) job creation tools for ensuring water security (SDG#6)”. The objective was to look at how the improved use of ICT can facilitate the efficient management of water resources and create opportunities for innovative jobs for young water professionals. Open to the public, the event provided an opportunity for policy makers, members of civil society and users of the FREEWAT software to discuss best practices and lessons learnt from using free and open source software tools for water resources management. About 70 participants attended (30 women and 40 men).

63. **Sixth Africa Water Week (AWW):** During the 6th AWW, IHP organized a side event on ‘Fostering SDG #8: Innovative Job Creation and Young Water Professionals Role’ to raise awareness on how E-learning and E-science can be important for supporting inclusive Knowledge Societies and create innovative jobs in the water sector. The side event was attended by 62 participants (45% women).

64. **Youth Forum at the Budapest Water Summit:** In improving the participation of young water professionals in global policy dialogue, IHP in cooperation with the World Water Council (WWC) convened a Youth Exchange Session in preparation for the 8th World Water Forum (8WWForum) during the Youth Forum at the Budapest Water Summit in Hungary in 2016. The session was organized as part of the strategy to improve youth involvement in 8WWForum. During the session, the youth delegates’ programme of the WWC was launched. About 70 young women and men attended the Budapest Youth forum.

65. **COP22:** IHP facilitated the inclusion of young water professionals in COP 22 in Morocco (2016) by supporting the organization of a side event with the World Youth Parliament for Water on Youth involvement on Water and Climate. The event was held on water day at UNESCO’s pavilion at COP 22 in the civil society area (Green Zone). It provided young women and men the opportunity to advocate for their priorities and share lessons learnt from working on youth related projects. Three other events took place,

including one on the HOPE-Initiative, entitled ‘Fostering Innovative Job Creation’, one on the FREEWAT platform: ‘Open source and free software for water resource management’, as well as a side event entitled ‘Fostering SDG#8: Innovative Job Creation and Young Water Professionals’, which highlighted opportunities in the water sector and showed the key role of water education in achieving SDGs 8 and 6. About 60 persons attended the event (35% women).

66. In September 2016, a training for young civil servants from ministries and departments of water sector from Central Asia and Afghanistan was held in Almaty, Kazakhstan. The event was hosted by the recently established Chair on Water Resources Management at the German-Kazakh University. The training was attended by 44 participants (14 women) among which 11 young civil servants (2 women). During the event the participants discussed the instruments of interstate cooperation on transboundary waters, climate change impact on water resources, as well as the best practices in the field of climate change adaptation. The event contributed to enhancing capacities among the representatives of water-related ministries and departments from Central Asian countries and Afghanistan in order to facilitate the dialogue on water resources management in the region.

67. Training modules on IWRM and climate risk management study were developed and provided to universities, young civil servants and water managers in Central Asia. The module on Climate Risk Management course, which has been successfully mainstreamed in Kyzylorda State University (Aral Sea region) as an elective course starting from 2016-2017 academic year was prepared and a 3-day training for university teachers was organized attended by 48 participants (30 women). Five expert meetings were also organized throughout 2016 to discuss water education standards in Kazakhstan with a total of more than 95 participants (29 women). As an outcome, recommendations on the improvement of water education are under finalization for submission to the Ministry of Education and Science of Kazakhstan, by the International Fund for saving the Aral Sea Executive Board in Kazakhstan (EB IFAS), an implementing entity of this project.

68. Over 35 Iranian water experts (10 women and 25 men) were trained on "Technical and Legal Principles and Concepts of Transboundary Aquifers” in a training held in Yazd, Iran, in November 2016; and over 30 experts (12 women and 18 men) from Iran, Malaysia, Oman, Pakistan and Turkmenistan were trained on “Water Journalism” in collaboration with RCUWM Category 2 Centre (Tehran, Iran, December 2016).

69. Awareness was raised about the most pressing water challenges and on integrated methods to address them at “The International Conference on Water and Environment in the New Millennium: Education and Capacity Building” (Tehran, Iran, December 2016). The event was attended by more than 200 experts, scientists, water managers and stakeholders, academics, researchers and policy makers (40% women). The conference provided a platform for sharing knowledge and experiences on innovative teaching methods for water education, including E-learning. A workshop held as part of the conference focused on developing a new curriculum for training water policy-makers with cross-disciplinary knowledge in the fields of hydrology (surface and groundwater), water engineering, water law, water and environment economics, socio-hydrology and ecohydrology.

70. **Conclusion and way forward:** Around 9700 persons (near 40% women) were trained through at least 180 training courses implemented during the past three years. Dozens of scientific workshops, sessions, side events were also held during international, regional conferences and forums, reaching out to thousands of people. Member States have been supported to strengthen water education approaches at all levels and through all six IHP Themes for water security. Some specific key challenges remain in the water education area: the need for improved and adequate training of professionals, and the need to extend

water education to all levels and stakeholders. IHP will keep improving water resources management in the context of climate change involving young people through advocacy, but also with the perspective of facing the problem of unemployment. It will keep improving gender equality and providing tools in this regard. As ICT's create new job opportunities, especially in the African region, where they have expanded in the last decade, IHP will keep developing innovative tools in coherence with today's realities. IHP-WINS will be further developed in view of implementing and monitoring the IHP-VIII, by centralizing available data as a precious resource for decision-makers and stakeholders in the design and support of operations, management, and decision making for sound water resources governance.

71. **Water-related Chairs' and category 2 centres' participation in IHP activities and events:** During the reporting period, more than 12 water-related Category 2 Centres and 9 UNESCO Chairs participated in more than 13 activities and events addressing all thematic areas. Further details are available in the summary table presented in the Reference Document IHP/Bur-LV/Ref_3.

Actions expected from the Bureau:
To take note and comment on the progress implementation of IHP VIII

4.2 REGIONAL PERSPECTIVES ON IHP

72. In **Africa**, 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 related to all the 6 Themes of IHP-VIII have been implemented by the different offices in Africa in partnership with national IHP committees, UNESCO chairs, centres and scientific networks and regional organizations in the region. A new IHP National Committee was established in Zimbabwe in 2016.

73. IHP is implementing the project dedicated to human capacity development in the water sector in Africa through the New Partnerships for Africa's Development (NEPAD) African Network of Centres of Excellence in Water Sciences and Technology (CoE) to address sustainably lack of water professionals. The project is funded by the European Union Joint Research Centre (JRC) and implemented in partnership with Stellenbosch University for the SADC CoE network and with the University of Dakar for the Western Africa network. National strategies on human capacity development will be prepared in nine countries (Botswana, Burkina, Ghana, Malawi, Mozambique, Nigeria, Senegal, South Africa and Zambia). Other regional initiatives in Africa include: the regional programme on transboundary water management in Sahel region; the programme on the review of hydrological norms in West and Central Africa; the SADC Integrated Water Resources Management Initiative (SADC-WIN) project was launched at the World Water Day Summit and Expo in Durban, South Africa in March 2017, and regional consultations have been started to generate support from donors.

74. A Regional experts' meeting on Water Quality in the SDG framework was organized in December 2016 through Abuja office, in cooperation with Category 2 Regional Centre for Integrated River Basin Management (RC-IRBM, Nigeria). A total of 50 experts, 15 women and 35 men, from 8 West African countries participated. The output of the event was the preparation of a needs assessment of the countries in terms of water quality.

75. In January 2017, UNESCO offices in Jakarta and Abuja, RC-IRBM and National Water Resources Institute (NWRI) organized an Inter-Regional Workshop on South-South Cooperation for Upscaling IWRM and Ecohydrology as Tools for Achieving Water Security in Africa. A total of 62 people attended (of which 22 women), from 15 countries in the West African Sub region (Benin, Burkina Faso, Ghana, Guinea, Ivory Coast, Liberia, Mali

Mauritania, Nigeria, Niger, Senegal, Sierra Leone and Togo); Asia and the Pacific; the five (5) Regional River Basin Organizations in Africa; UNESCO Water Family; the Economic Community of West African States' (ECOWAS) Commission Water Resources Coordination Centre and other water-related Institutions. The main outcome of the event was the development of a tool to assess IWRM in the region.

76. In the **Arab Region**, the implementation of IHP-VIII progressed in all themes and IHP had a high presence at COP22 (Marrakech, Morocco, November 2016) with more than 17 events organized (sub-item 6.4). In cooperation with the Food and Agriculture Organization (FAO) Regional Water Scarcity Initiative, an expert meeting on knowledge building and capacity development on Groundwater Governance is being prepared in Manama, Bahrain, May 2017. Participation of 40 experts from 18 Arab Countries is foreseen. The event aims at establishing a regional action plan to build national and regional capacities in support of implementing of the groundwater governance global framework for action.

77. During the 4th Arab Water Week, "Managing Water Systems within Fragile Environments in the Arab Region" (19-21 March 2017), two sessions were organized and chaired by IHP on (a) groundwater governance and (b) managing groundwater aquifers towards sustainability. Each session was attended by nearly 40 participants (eight and ten women respectively), UNESCO Cairo Office (UCO) also supported, fully and partially ten speakers (two women) from Jordan, Tunisia, and Egypt to provide technical presentation of their work on groundwater during the conference.

78. Five keynote speakers from Egypt, Jordan, Morocco and Sudan were supported to provide technical presentations during the 12th Water Science and Technology Association Conference (Manama, Bahrain, March 2017). In addition, an IHP special session on groundwater governance was held during the conference with 50 participants (14 women) representing Gulf Cooperation Council (GCC) countries in addition to Egypt, Lebanon, Morocco and Sudan, were informed about the Groundwater Governance project and discussed related challenges affecting the Arab Region.

79. A regional workshop of teacher trainers organized in Sharm El Shiekh (Egypt, September 2016) trained more than 20 participants representing UNESCO associated schools in 5 Arab countries, namely: Lebanon, Sudan, Oman, Jordan and Egypt. Currently, more than 120 teachers are trained and involved in the water education programme.

80. In **Asia and the Pacific**, the "24th IHP-Regional Steering Committee (RSC) for South East Asia and the Pacific Meeting" in conjunction with "The International and National Water Dialogue on the Delivery of SDG 6 in Mongolia and Wider Asia and the Pacific Region" was held in October 2016 in Ulaanbaatar, Mongolia. Over 60 participants (9 women) from IHP RSC member countries (Australia, China, Indonesia, Japan, Republic of Korea, Malaysia, Mongolia, Myanmar, New Zealand, Philippines, Papua New Guinea, Thailand and Vietnam) as well representatives from a range of Mongolian organizations took part in the meeting. The discussion was divided into three topics: Water Security in Arid Environment, Integrating UNESCO Initiative in Water and Environment Sciences and the Mongolian Perspective on Water Security. During the meeting synergies were explored between IHP, MAB and UNESCO Global Geoparks, including the potential role of geoparks as demonstration site for IWRM. The discussions yielded a draft synthesis on further actions and activities to be conducted in Mongolia for the delivery of SDG 6. In particular, the participants highlighted the need for science-based, transdisciplinary, socially inclusive, local knowledge based, reliable and accessible data intensive water governance to manage both water quality and quantity.

81. The delivery of UNESCO IHP-RSC, IDI, IFI special session: "Regional delivery of SDGs a focus on Hydroinformatics and Education for Hydrohazards" took place in June

2016, during the 7th International Conference on Water Resources and Environment Research in Kyoto, Japan. The panelists identified the next practical steps and direction for Asia and the Pacific region to be undertaken by IHP in order to help towards a water secure region and deliver Sendai Framework for Disaster Risk Reduction, the SDGs and the Paris Agreement on Climate Change in seven recommendations entitled: “Actions for strengthening regional water cooperation for a water secure region”. Following this, the Kyoto/Nagoya 26th IHP-Training course "Coastal Vulnerability and Freshwater Discharge" for Asia and the Pacific region was organized in November 2016 in Nagoya, Japan, with 23 participants, 14 women and 9 men.

82. Key recent IWRM activities of IHP in Asia-Pacific region include: (i) 13 participants (3 women and 10 men) the representatives from UNESCO Category 2 Centres, UNESCO Water Chairs, water experts attended special session on “Strategic Water Planning and Management” (12 July 2016 at the Singapore International Water Week) to introduce the “Strategic Water Management: International Experiences and Practices" developed and co-published through a collaboration between Asian Development Bank (ADB), General Institute of Water Resources and Hydropower Planning and Design, Ministry of Water Resources, China (GIWP), UNESCO, and World Wide Fund for Nature United Kingdom (WWF-UK). The discussion centred around international and regional experiences on strategic water management and the importance of implementing IWRM as a tool to ensure water security under the Development Agenda 2030 in Asia and the Pacific; (ii) 200 participants attended an International Conference: Asia Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions (23-25 November 2016 in Rawalpindi, Pakistan). IHP presented 26 recommendations around the seven key areas of discussions ranging from disaster management to nexus approaches and livelihood, nexus approaches and energy, as well as IWRM. They will be diffused among all countries in the Asia and the Pacific region to raise awareness, share findings and foster concerted and collaborative partnership among drylands of the region and beyond. http://jfit-for-science.asia/asia-pacific-policy-dialogue-on-water-energy-and-food-security-for-poverty-alleviation-in-dryland-regions/.

83. UNESCO Jakarta supported the international workshop on “Sustainability Framework for IWRM, Water Governance, water tariffs and pricing policies in urban areas”, in collaboration with the Ramon Aboitiz Foundation Inc. (RAFI) and Metro Cebu Development and Coordinating Board (MCDCB), in August 2016, Cebu City, Philippines. The participants discussed the main principles of sustainable water pricing and the trends and challenges of their actual implementation in the water pricing policy in Australia, Malaysia, Portugal and Philippines.

84. The International Scientific Conference “Water Resources of Central Asia and Their Use” was organized in September 2016 in Almaty, Kazakhstan, supported by UNESCO Almaty and IHP. The conference was attended by more than 130 participants (36 women), including high-level representatives, international organizations, water scientists and experts from Central Asia, Belarus, Germany, Russia, and Switzerland. The outcomes of the conference have become essential for strengthening water cooperation in Central Asian countries. The decision of the conference emphasized that consolidating available research and technical capacities in water, interaction of scientific communities at national and interstate level, as well as education on water at all levels is crucial for the sustainable water resources management in Central Asian countries.

85. In the **Latin America and the Caribbean** (LAC) region, ensuring universal access to water services and water security remains a key priority, in line with IHP-VIII and the SDGs. In coordination with UNESCO Montevideo Regional Office for Science, UNESCO Offices in the region (Brasilia, Havana, Kingston, Lima, Quito and San José), IHP-VIII implementation advanced across all themes. The terms of reference of IHP-LAC working groups (including

on G-WADI, IFI, ISI, urban waters and ecohydrology) were adopted. Quarterly distance meetings of the UNESCO water centres and Chairs are in place, resulting in strengthening the IHP network and in the preparation of an online course on water security for the region and in combined communication efforts. The IHP-LAC webpages are currently under review and being translated into English.

86. IHP was designated coordinator of the South America regional process for the 2018 World Water Forum.

87. In LAC, capacities of Cuban institutions on erosion and sedimentation management were strengthened in collaboration with GEF, via a training session in Habana (November 2016) for 18 professionals (39% women). IFI has been implemented in collaboration with disaster risk reduction activities, and continue promoting its main outcomes and tools; the hydrological maxima initiatives was launched for the Caribbean in Aruba (December 2016). A technical publication on Water and Forest Systems was launched. IHP also contributed to the post-disaster UN activities in Ecuador following the earthquake on 16 April 2016.

88. Groundwater governance capacities and cooperation were enhanced in collaboration with CeReGAS - Regional Center for Underground Water Management (Centro Regional para la Gestión de las Aguas Subterráneas). A workshop on “The General Principles of Transboundary Water Cooperation” was organized in the context of SDG 6 - Sustainable Development Goal 6, together with CODIA - Conference of Ibero-American Water Directors (Conferencia de Directores Iberoamericanos del Agua), CEPAL - Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe), and UNECE - Economic Commission for Europe (Mexico, October 2016), for 16 participants (25% women) from Brazil, Chile, Costa, Dominican Republic, Ecuador, Honduras, Nicaragua, Panamá, Paraguay, Peru and Rica.

89. Three water-related sessions were organized in the framework of the LAC Open Science Forum CILAC 2016 (September 2016). Support was provided to the establishment of a Regional Youth Parliament for Water for LAC, in an event with over 40 young people (Cartagena, August 2016). Capacities of teachers and educators were enhanced at the symposium on “Water is Life. Let’s Protect it!” (Uruguay, October 2016); and through the workshop on “The Water Cycle in Terrestrial Ecosystems”, with the Spanish Agency for International Development Cooperation (AECID) and the Embassy of Israel (September 2016). Support was provided to the intersectoral workshop for the prevention and management of extreme hydrometeorological phenomena and measures to adapt to climate change (Guatemala, December, 2016) and the work on the hydrological risk management in relation to sustainable development in the Caribbean (Aruba, December 2016), with 23 participants (26% women)..

90. Within the scope of G-WADI LAC, an International Seminar on Water Harvesting Techniques was organized in Santiago de Chile (March 2017). The International Conference on Ecohydrology for Global Aquatic Ecosystems in Fluminense, Brazil (March 2017) counted with a session on LAC activities, with about 50 participants.

Actions expected from the Bureau:
To take note and comment on the regional perspectives on IHP

REPORT ON THE IMPLEMENTATION OF THE RESOLUTONS AND DECISIONS ADOPTED AT THE 22ND SESSION OF THE IHP INTERGOVERNMENTAL COUNCIL (Agenda sub-item 4.3)

Resolution XXII-1: "Proposal for a procedure to update the IHP statutes and the rules of procedure of the IHP Council"

Requests the IHP Secretariat to carry out a consultation process with all the IHP National Committees and UNESCO Member States following that the Bureau is to review the Statutes and Rules of Procedure of the IHP Council and to present proposals to the 23rd Session of the IHP Council regarding the areas of the Statutes, which should be updated to improve the functioning of the IHP Council and its Bureau;

Further requests the IHP Bureau to consult closely with their electoral groups and all IHP National Committees and Focal Points in developing their proposals so as to ensure a wide range of opinions are taken into account;

Requests the assistance of the IHP Secretariat to prepare the necessary documentation to be submitted at least three months prior to the 23rd session of the IHP Intergovernmental Council, so that the proposed revisions of the Statutes and Rules of Procedure can be discussed and decided upon at the meeting.

Asks that this process also includes an update and review of the procedures, working methods and statutes, as well as a clarification on the interpretation of the Statutes and Rules of Procedure regarding, among others: 1) whether members of the IHP Bureau are elected on personal capacity or as representatives of Member States, and 2) to propose scenarios that could ensure that all regions are represented in a specific IHP Bureau session if a Bureau member is unable to attend;

Requests the assistance of the IHP Secretariat to prepare the necessary documentation to be submitted at least three months prior to the 23rd session of the IHP Intergovernmental Council, so that the proposed revisions of the Statutes and Rules of Procedure can be discussed and decided upon at the meeting

RESULTS / ACTIONS TAKEN

91. A consultation process was launched on 1 August 2016 inviting Member States to send their consolidated comments and suggestions on how to update and improve the Statutes and Rules of Procedure of the IHP Council, taking into consideration the specific questions raised by IHP-IC/Resolution XXII-1 and the Bureau Reference documents. All related documents were attached and a deadline of 3 October was set. Due to the poor reply received, an extension to 31 December was set in a follow-up e-mail. At the closing of the consultations, three regional responses were received from Regions I, Va and Vb. Additional to the group response of Region I, that represents 27 countries, five individual responses from Member States were received. Similarly in Region Va (47 countries) and Vb (19 countries), one individual response per region was received. Five (5) responses were received from Group II, three (3) from Group III and four (4) from Group IV.

92. On the question on whether Bureau Members should be elected in their personal capacity or as a representatives of their country, there is a clear preference of Member States to have Bureau Members elected as a representative and not in personal capacity.

93. On examining scenarios to ensure that all regions are represented in a specific IHP Bureau session if a Bureau member is unable to attend, Member States clearly requested that the replacement should be from the same country.

94. A document with all the suggested changes in language is provided as a reference document for the Bureau's comments

Resolution XXII-2: "Financing of the International Hydrological Programme"

Requests the IHP Secretariat to provide to the future IHP Council sessions:

i. updated versions of the IHP Implementation Matrix, based on inputs to be provided by the UNESCO Water Family

ii. a comprehensive financing plan showing how the updated IHP Implementation Matrix is financed

iii. a comprehensive overview, as in Table 1 of document IHP/IC-XXII/6, of how IHP's activities are financed from both Regular Budget and Extrabudgetary resources, including an analysis of the financial needs of underfunded themes and a fundraising proposal to accommodate those needs.

RESULTS / ACTIONS TAKEN

95. The update of the IHP Implementation Matrix is ongoing, as well as the preparation of the comprehensive financing plan, and the comprehensive overview of how IHP's activities are financed. For the current situation, please refer to the "Report of the IHP Finance Committee" (Inf. Doc 6 "Institutional developments at UNESCO", Item 3.4).The complete documents will be submitted to the 23rd Session of the IHP Council in June 2018.

Resolution XXII-3: "Implementation of the proposed IHP communication and outreach strategy"

Requests the IHP Secretariat to further strengthen the implementation of the most important outreach and communication activities, such as updating the IHP website and

i. to send, at least on a quarterly basis, an update on relevant activities of the UNESCO Water Family to its network, and

ii. to prepare, jointly with the Committee, reviewed and updated Terms of Reference for the Committee and present them to the 23rd session of IHP Council;

[…]

Requests the IHP Secretariat to consult with UNESCO Water Family in order to improve IHP's visibility, to appropriately reflect on its holistic and important role in the whole matter of water.

RESULTS / ACTIONS TAKEN

96. The Secretariat acted upon the Council's requests and continued the implementation of the Communication and Outreach Strategy as reported in IHP/BUR-LV/6 on Institutional developments at UNESCO, under sub-item 3.6.

Resolution XXII-4: "Implementation of the initiative Groundwater Governance: A global framework for action"

Requests the IHP Secretariat to support and provide technical assistance to Members States interested in using the project tools to improve their groundwater governance;

RESULTS / ACTIONS TAKEN

97. As a follow up of this Resolution, the IHP network is being mobilized through the organization of regional experts meetings in order to identify and agree upon the process to be used for the implementation of the tools developed. The first working meeting will be held early June and will be organized by the category 2 centre CeReGAS. It will be attended by selected experts among a series of nominations provided by the IHP National Committees from LAC countries. Similar working groups from other regions (Africa and Asia) will also meet later this year. The preparation of a new project proposal, to be presented to the GEF, is also planned.

Resolution XXII-5: "The creation of a working group for the establishment of the Megacities Alliance for water under climate change"

Decides to establish an IHP Working Group for helping the establishment of the Megacities Alliance for water under climate change; and for proposing mechanisms to promote international synergies between megacities at the local level and Member States at the national level;

Endorses the terms of reference of the IHP Working Group included in the reference document IHP/Bur-LIII/Ref. 4

RESULTS / ACTIONS TAKEN

98. The original Terms of Reference of the Working Group had to be redrafted according to advances made for the Megacities Alliance during HABITAT III and COP22; the detailed objective, agenda and budget of the Megacities Alliance project have been consequently published in a concept note on December 2016 (IHP/Bur-LV/Ref.4). This concept note has been approved in February 2017 by the other founding members of the Megacities' Alliance, and is now consistent with other parallel initiatives, in particular for the Global Alliance for Water and Climate (GWAC) created during COP22 in Marrakech with the support of France and Morocco.

99. The Secretariat will launch a call for the identification of experts to form the Working Group in April 2017.

Resolution XXII-6: "The monitoring and review of IHP programmes and major initiatives"

Asks the IHP Secretariat to enhance and standardise the information requested based on UNESCO's management systems, so it can be utilised in the monitoring of the Programme's implementation;

Decides to adopt the proposed approach for the evaluation of IHP's programmes and major initiatives outlined in IHP/IC-XXII/Ref.4 and

requests the IHP Secretariat to prepare and commission such a review and to report the findings to the 23rd session of the IHP Council;

Requests the IHP Secretariat, based on the results of the evaluation, to propose to the 23rd session of the IHP Council, relying on a consultation process with the IHP National Committees, a new mechanism for the ongoing, routine collection and reporting of monitoring information on the outputs, impacts and governance for all IHP Programmes and major initiatives and a defined set of criteria, against which the IHP Council can periodically assess their progress and potential future road maps.

RESULTS / ACTIONS TAKEN

100. Immediately after the 22nd Council, IHP Secretariat communicated with the UNESCO Internal Oversight Service (IOS) in order to receive guidance on the evaluation of major initiatives. IOS advised that first a desk top study for each of the initiatives be conducted in order to have a baseline for the future assessment work. Following the elaboration of desktop studies, the Terms of Reference for an external consultant were drafted as IOS does not have currently the capacity to support the Secretariat with this task. In search for financing to conduct this assessment (an estimated amount of EUR 45-50,000 is required), the Secretariat contacted the Executive Office of the Science Sector (SC/EO) and requested financial support. SC/EO replied negatively. The Secretariat is searching actively for a solution to the financial obstacle and regular budget availability will be evaluated to request the contribution of regional and national offices.

Resolution XXII-7: "IHP support to Member States for a sound science based implementation of the Sustainable Development Goal No 6 and of water related goals

Requests the IHP Secretariat to provide support to Member States to build their institutional capacities, human resources and a sound basis in science capacity for the monitoring and implementation of SDG 6 targets and those of other water related goals;

Invites the Director-General of UNESCO to open a separate special account for IHP, designated "IHP Fund for the Implementation of SDG 6", to receive financial support to take actions at the request of the Member States for capacity building activities in support of Member States for the implementation of the SDG 6 targets and those of other water related goals, and to present its financial regulations to the 39th session of the General Conference;

Requests the IHP Secretariat to establish the draft financial regulations for the special account and to mobilize the UNESCO's Water Family to voluntarily contribute proactively to the implementation and reporting process on SDG 6 targets and those of other water related goals;

Decides to include on the agenda of the 23rd session of the IHP Council an item related to this special account.

RESULTS / ACTIONS TAKEN

101. The IHP Water Information Network System (IHP-WINS; http://ihp-wins.unesco.org) was launched in January 2017 as a tool for the implementation and monitoring of the eighth

phase of the IHP (IHP-VIII), and to address the request of the IHP's 22nd Intergovernmental Council to "provide support to Member States to build their institutional capacities, human resources and a sound basis in science capacity for the monitoring and implementation of Sustainable Development Goal 6 (SDG 6) to 'ensure availability and sustainable management of water and sanitation for all' targets, and those of other water related goals".

102. The IHP Secretariat, in consultation with the Bureau of Strategic Planning (BSP), has prepared and submitted to the necessary documentation for the establishment of a special account. This special account will enable IHP to receive the financial assistance it needs to meet the demands of Member States, mainly in the field of capacity development in support of Member States and the major initiatives approved under the strategic plan IHP-VIII.

103. IHP has led the development of the step-by-step methodology to calculate the SDG target indicator 6.5.2. on transboundary cooperation, together with UNECE (http://www.unwater.org/publications/publications-detail/ar/c/428764/). During the first quarter of 2017, IHP and UNECE invited all countries with transboundary basins on their territory to report on their national value of the SDG 6.5.2 indicator. In order to enable the establishment of a global baseline for 2018, supporting activities include the realization of technical webinars, tutorials, and virtual and physical (missions) support to strengthen national monitoring and reporting capacities of Member States. For additional information please see: http://www.sdg6monitoring.org/news/2017/1/11/global-implementation-of-sdg-6-monitoring-the-2017-integrated-baseline-process

Resolution XXII-8: "Proposals for the establishment of water-related category 2 centres under the auspices of UNESCO"

Requests the assistance of the IHP Secretariat to prepare the necessary documentation to be submitted to the governing bodies of UNESCO toward the creation of a centre in conformity with the IHP strategy for UNESCO category 2 water-related centres and the Integrated Comprehensive Strategy for Category 2 Institutes and Centres (document 37 C/18 Part I and Annexes), as approved by the 37th session of the General Conference (37 C/Resolution 93)."

RESULTS / ACTIONS TAKEN

104. The 22st session of the IHP Council noted the comments by the IHP Bureau that led to the endorsement of the proposal from Mexico.

105. The Secretariat undertook the required fact-finding mission to Mexico from 16 to 20 January 2017 to assess the feasibility of the centre. The feasibility study concluded that the centre could make contributions to UNESCO and to IHP and that its establishment would be in line with the integrated comprehensive strategy for category 2 institutes and centres, under the auspices of UNESCO, as approved by the General Conference in 37 C/Resolution 93 (FR, SP, RU, AR, CH) It was also determined that the government demonstrated the commitment to support the proposed centre and the capacity to carry out the proposed activities.

106. After a special consultation with the IHP Bureau members on 6 December 2016, and in compliance with Article XII paragraph 28 of the Rules of Procedure of the IHP IGC on special consultation by correspondence, the IHP Council Members were invited on 15 February 2017 to review the revised proposal for the International Centre on Water and Transdisciplinarity (CIRAT) at the Botanical Garden in Brasília, Brazil.

107. In case of approval of the Council and favourable results of the feasibility studies, the Director-General will present her report to the 202th session of the UNESCO Executive Board (October 2017) on the evaluation of the feasibilities of establishing the proposed water-related centres. The Executive Board will consider the endorsement of the centres and the recommendation that the General Conference (GC), at its 39th session (November 2017), approves the centres and authorizes the Director-General to sign the corresponding agreement.

Resolution XXII-9: "Contribution of the IHP to the preparation and follow-up of the 22nd Conference of Parties (COP 22) of the United Nations Framework Convention on Climate Change (UNFCCC) to be held in Marrakesh, Morocco, in November 2016"

Calls upon the IHP Secretariat to prepare a working document with a view to eventual submission towards the 201st session of the Executive Board of UNESCO with:

i. a strategy to raise the issue of water at the appropriate level of importance within COP 22 process;

ii. concrete proposals concerning the contribution of IHP to the implementation of decisions made at COP 21 and COP 22, as well as to the implementation of the IHP itself, in response to the needs of Member States in the coming years.

RESULTS / ACTIONS TAKEN

108. As a follow-up to Decision 30 of the 200th UNESCO Executive Board (200 EX/Decision 30), the IHP Secretariat has prepared and submitted a document on IHP's contribution to the implementation of the outcomes of COP21 and COP22 (201 EX/5 Part I (D)) (FR, SP, RU, AR, CH) which will be presented by the Director-General to the 201st Executive Board of UNESCO in April 2017.

Actions expected from the Bureau:
To take note of the implementation of previous resolutions adopted during the last 22nd IHP Council and provide advice on the next steps, suggesting as well possible contributions from Member States.

IHP-WINS (sub-item 4.4 of the Agenda)

109. IHP Water Information Network System (IHP-WINS; http://ihp-wins.unesco.org) was launched at UNESCO's HQ in Paris in January 2017 as a tool for the implementation and monitoring of IHP-VIII IHP-WINS is also designed to assist Member States in monitoring and implementing the 6th Sustainable Development Goal, to "ensure availability and sustainable management of water and sanitation for all" supporting thus the IHP Intergovernmental Council's request at its 22nd session (Resolution XXII-7; June 2016).

110. IHP-WINS is an accessible, interactive and user-friendly platform for a wide audience of water-related stakeholders, consisting of three main components, to provide:

i. GIS data on the state of water resources at the global, regional, national and local level, allowing users to visualize and generate maps,
ii. a platform for inter-disciplinary collaboration and knowledge sharing among water stakeholders (e.g. databases, reports, graphs, tables, videos, webinars, etc.), and

iii. a platform to be used by water stakeholders to build networks (i.e. discussion groups).

111. The platform is gradually building a repository of, and links to, sources of information from other UN organizations, regional organizations, and national institutions, including UNESCO Category 2 Centres and Chairs specialized in water-related issues.

112. Data is uploaded in accordance to a set of user-defined permissions. The IHP Secretariat ensures data quality entry, which is further reinforced through a data rating system and the possibility to leave comments.

113. The IHP Secretariat has sent to Member States information and explanatory notes on the steps to access all functionality of IHP-WINS, requesting them to nominate three focal points who will be provided with contributors accounts (one manager, two users) to the platform. More information: http://unesdoc.unesco.org/images/0024/002476/247631e.pdf.

Actions expected from the Bureau:
To take note of the implementation of IHP-WINS.

COOPERATION WITH OTHER UNESCO PROGRAMMES (sub-item 4.5 of the Agenda)

114. IHP maximizes synergies by cooperating with other existing UNESCO programmes, including the International Geosciences and Geoparks Programme (IGGP), the Man and the Biosphere (MAB) Programme, the Earth and Ecological Sciences Division, and the Communication and Information (CI) Sector. Furthermore, IHP provided technical contribution from water prospective to the UNESCO Task Force on Climate Change.

115. IHP and MAB joint publication “Mountain Ecosystem Services and Climate Change: A Global Overview of Potential Threats and Strategies for Adaptation” is in its final stage following the approval of UNESCO publication board. The publication is based on the project “Climate Change Impacts in Major Mountainous Regions of the World: Multidisciplinary Network for Adaptation Strategies (Africa, Asia, Latin America and Europe)”.

116. Several UNESCO Natural Sciences Programmes have already been contributing to the IHP-WINS database since the opening of the platform in January 2017, including MAB with the World Network of Biosphere Reserves (WNBR), (669 biosphere reserves in 120 countries, including 16 transboundary sites) and IGGP on UNESCO Global Geoparks, (119 Geoparks in 33 countries). Further to that, the IHP demonstration site on “Water and environmental sustainability education linked with ecotourism in Langkawi Geopark”, in Malaysia, is carried out in a UNESCO Global Geopark. The UNESCO World Heritage Sites list was also added to the platform (1052 sites: 814 cultural, 203 natural, and 35 mixed properties, in 165 countries).

117. The Hydro Open-source software Platform of Experts (HOPE) Initiative, brings together Science, Education and CI sectors in steering its direction having UNESCO-UNEVOC, the specialized Centre for Technical and Vocational Education and Training (TVET), and CI Sector in its Advisory Committee.

118. The first joint Arab/African MAB/IHP meeting was held in Tangier, Morocco (18-20, October, 2016). Nearly 80 participants attended the meeting representing both MAB and IHP in the Arab Region and Sub-Saharan Africa. As a major outcome of the meeting, the participants proposed the establishment of an inter-regional initiative on biosphere reserves as laboratories for monitoring climate change and sustainable development with water as a fundamental linkage.

119. Within the framework of UNESCO's work on DRR, IHP collaborates with the Section on Earth Sciences and Geo-Hazards Risk Reduction for the international conference on multi-hazard early warning planned to be held in May 2017 in Cancun, Mexico.

120. IHP cooperated with the Culture, Social and Human Sciences and Education sectors in a unified presence at HABITAT III and all sectors are working together in establishing a UNESCO Urban Hub / Platform.

Actions expected from the Bureau:
To take note of cooperation with other UNESCO programmes.