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Intergovernmental
Hydrological Programme

IHP/IC-XTR-IV/Inf.3
Paris, 20 September 2021
Original: English

Intergovernmental Hydrological Programme

4th Extraordinary session of the Intergovernmental Council
(Paris, 29 September - 1 October 2021)

PROGRAMME IMPLEMENTATION

Item 3 of the provisional agenda

Summary

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

- 3.1 Implementation of the eighth phase of IHP (IHP-VIII)
- 3.2 Regional perspectives on IHP

Additionally, this document provides information on developments regarding:

- IHP information network system (IHP-WINS);
- Cooperation with other UNESCO programmes;
- Improving global visibility of the IHP through regular water-related events at the UNESCO General Conference and the UN General Assembly

IMPLEMENTATION OF IHP-VIII (Agenda sub-item 3.1)

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, methodologies and tools, as well as policy advice, for improved water-related disaster management. Since the 23rd session of the Intergovernmental Council of the IHP, the following results have been achieved through the knowledge generation and dissemination benefiting more than 4,000 people of which about a third of women, from over 150 countries.

2. Knowledge exchange, generation and disseminations were undertaken through the presentation of 200 scientific papers during the 8th FRIEND-Water Conference focussing on the theme of hydrological processes and water security in a changing world. The International Sediment Initiative contributed to enhance capacity on "Integrated Sediment Management in River Basins" by organizing the International Training Workshop in 2018 in Beijing, China.

3. Methodology and tools development sessions were organized on the topic of Citizen Science for Drought and Water Resources management and on the drought Atlas for pilot African countries to build capacity. A technical workshop on "Subseasonal-to-seasonal Predictability of the Mid-Summer Drought" was organized in LAC. An improved Flood and Drought Monitoring system has been developed for Lake Chad Basin countries and Chile.

4. UNESCO, with the project preparation grant from UNDP/GEF, launched a project on "Strengthening the resilience of Central Asian countries by enabling regional cooperation to assess high altitude glacio-nival systems to develop integrated methods for sustainable development and adaptation to climate change". The project will benefit the following five countries in Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Recently, UNESCO also launched (April 2021) a project "Reducing vulnerabilities of populations in the Central Asia region from glacier lake outburst floods in changing climate" in Kyrgyz Republic, Kazakhstan, Tajikistan and Uzbekistan, funded by the Adaptation fund with \$6.5M USD. The objective of the proposed project is to strengthen adaptation to climate change in Central Asia by reducing societal risks and vulnerabilities associated with Glacier Lake Outburst Floods (GLOF).

5. Participants from across the globe joined an online discussion session on "Transformation of UNESCO activities through e-learning, open science and distance learning" held on 14th May 2020.

6. The following key publications with methodology launched through outreach events: The Andean Glacier and Water Atlas, Climate Risk Informed Decision Analysis (CRIDA): Water Resources Planning & Design for an Uncertain Future, and the Latin American and Caribbean Drought Atlas. Two training workshops on CRIDA were organized in Africa and an open online course on CRIDA was developed, to replace a physical workshop planned in LAC.

7. As part of the Climate Services for Water Management (ClimWaR) project, an online course on Programming for Geospatial Hydrological Applications was developed. The course which ran between 2 March 2021 and 30 April 2021 was attended by 3456 participants from 150 countries, of the participants 28% were females while the youths constituted 19%.

8. An online training course on the methodology of the African drought Atlas was developed, as well the operational drought index, with UNESCO ROSA and CAZALAC, in the context of the project ClimWar.

9. To enhance knowledge on Flood Early Warning systems for Niger and Volta River Basin countries, a project on “Water disaster Platform” was launched to increase climate resilience in Africa. The successful development of the Flood Early Warning System (FEWS) has provided a robust infrastructure with real-time operation for disseminating natural flood information among eleven Niger-Volta basin countries. Four Training of Experts (ToE) sessions were implemented in 2020, with a total of 288 participants trained, including 28 women from 11 VBA and NBA countries. Two Training of Trainers (ToT) sessions were later organized in early 2021, resulting in 44 (9 women) facilitators trained. As a result, the WADiRE-Africa Project has established a solid technological and educational foundation of the FEWS and flood risk management information to enhance West Africa population's resilience and to pave the road for follow-up activities in future.

10. To address the human capacity gaps in the water sector in Africa, UNESCO collaborated with the European Commission's Joint Research Centre (JRC) on the project entitled “NEPAD African Network of Centres of Excellence on Water Sciences and Technology”. Achievements of the project included: (i) 12 National Human Capacity Development (HCD) Frameworks developed and validated, with 2 frameworks in Nigeria; (ii) 11 national HCD Frameworks disseminated to partners/stakeholders; (iii) 30 courses were developed; (iv) 22 Pilot HCD trainings were successfully implemented in the three NEPAD Networks, organized by 10 partner institutions in 9 countries (Ethiopia, Ghana, Kenya, Mozambique, Nigeria, Senegal, South Africa, Sudan, Uganda). Overall, 684 junior/senior technicians and professionals in the water sector have been trained (59% male and 41% female).

11. A co-publication of the policy brief “Planning Water Resilience from the Bottom-Up to Meet Climate and Development Goals” has been produced by UNESCO and the Alliance for Global Water Adaptation (AGWA) in 2021, along with a dedicated video that features the key messages of the publication.

12. Two online training workshops were organised as part of the International Sediment Initiative (ISI): one on Sediment Transport and Measurement and Monitoring (July 2021) and one on River Basin Sediment Monitoring and Management (September 2021), in collaboration with the International Research and Training Centre on Erosion and Sedimentation (IRTCES), China and with Centre for Water Resources and Global Change (ICWRG) Koblenz, Germany.

13. Online expert meetings on global river basin databases were organized in May and June 2021 in collaboration with the International Centre for Water Resources and Global Change (ICWRG – UNESCO Category 2 Centre) and the German Federal Institute of Hydrology (BfG).

14. The 4th International Conference on the Status and Future of the World's Large Rivers was held online in August 2021. Key themes included hydrology, hydraulics and hydroclimatic impacts, sediment transport and river morphology, river pollution, ecology and restoration and integrated river basin management.

15. IHP collaborated with the Vrije University of Brussels and other partners from Palestine, Jordan and Europe launched an eMaster in Water Resources Engineering programme, offering training in the use of remote sensing, internet of things and citizen science to support water resources engineering and water management.

16. IHP initiated the project “Climate vulnerability and water resilience in Small Islands Developing States (SIDS)”. This study seeks to support SIDS in improving resilience to climate change risks impacts on freshwater. Two expert meetings were organized in May and June 2021 in collaboration with the SIDS section of UNESCO. Both expert gatherings provided valuable inputs to develop appropriate methodologies to identify effective responses to hydro-climatic hazards. The outcome of this project will include a framework to assess climate change risks impacts on freshwater based on a water resilience approach in SIDS.

Theme 2: Groundwater in a changing environment

17. Several initiatives aiming to improve knowledge on groundwater resources management and governance are implemented in the framework of Theme 2: Groundwater Resources and Climate Change (GRAPHIC), International Shared Aquifer Resources Management (ISARM), Managing Aquifer Recharge (MAR), World Hydrogeological Map (WHYMAP) and Land Subsidence International Initiative (LASII).

18. Within the framework of the UNESCO WHYMAP initiative the update of the groundwater regional map for the Economic Community of West African States (ECOWAS) is progressing thanks to the cooperation established with the British, German and French Geological Surveys (BGS, BGR and BRGM), IGRAC, ECOWAS and AMCOW.

19. Due to the Covid 19, the UNESCO Land Subsidence International Initiative (LASII) has postponed the organization of its 10th International Symposium on Land Subsidence (TISOLS) to 2022 in the Netherlands. Each International Symposium full papers proceedings are freely available and freely accessible creating an impressive collection of papers on land subsidence. The proceedings of the 10th symposium have already been made available: <https://www.proc-iahs.net/382/index.html>. A map on the global threat of land subsidence was published in 2021 in the journal “Science”.

20. As part of the project Governance of Groundwater Resources in Transboundary Aquifers (GGRETA) phase 3, a number of online training courses were developed and hosted on the UNESCO Open Learning Platform (<https://openlearning.unesco.org/>). The courses were: Introduction to Groundwater Governance (October 2020), Introduction to Groundwater Modelling (January - March 2021) and Groundwater Quality in Transboundary Aquifers (April –May 2021). The courses were attended by participants from all over the world but mainly from African countries. A knowledge-sharing session was organised at the 3rd SADC Groundwater Conference held on 24 November 2020. The session shared lessons learnt from work done in the Stampriet Transboundary Aquifer (STAS) under the GGRETA project phases 1 and 11. Another course on Water Diplomacy is currently being developed and will be launched sometime on or before October 2021.

21. Two new UNESCO IHP documents were published with the aim at improving knowledge and sharing best practices on their corresponding technical topics: [Conjunctive Water Management: Closing the water cycle](#), and *Managing Aquifer Recharge: A Showcase for Resilience and Sustainability*.

22. The UNESCO project proposal on “Management of Coastal Aquifers and Related Ecosystems in the Mediterranean Coastal Zones” has been financed by the GEF/UNEP and activities have started in July 2020. The project beneficiary countries are: Albania, Algeria, Bosnia and Herzegovina, Lebanon, Libya, Montenegro, Morocco and Tunisia.

23. The GEF funded project "[Mediterranean coastal aquifers management and governance \(MED\)](#)", launched in March 2021, aims at reducing major transboundary environmental stresses in its coastal areas while strengthening climate resilience and water security, and improving the health and livelihoods of coastal populations. The MedProgramme is implemented in nine beneficiary countries sharing the Mediterranean basin: Albania, Algeria, Bosnia and Herzegovina, Egypt, Lebanon, Libya, Montenegro, Morocco and Tunisia. A detailed plan of activities for the first year of the project's implementation has been drawn after exhaustive consultations with the countries and experts are being identified to support their implementation.

24. The UN General Assembly (UNGA) has adopted at its 74th Session (18 December 2019) the Resolution A/RES/74/193 on the "Law of Transboundary Aquifers". The UNGA encouraged UNESCO to provide technical and scientific support to Countries that want assess their groundwater resources UNESCO IHP is organizing the 2nd UNESCO International Conference on the Science and Management of Transboundary Aquifers that will be organized from 6 to 9 December 2021, within the framework of the ISARM initiative.

25. The methodology of the monitoring of SDG indicator 6.5.2 includes the consideration of transboundary aquifers. The second reporting on this indicator in 2020 contributed to a better recognition and assessment of transboundary aquifers by Member States, with new data and information. The monitoring has revealed that knowledge on groundwater systems must be improved in many regions of the world.

26. UNESCO-IHP and the Category 2 Centre IGRAC (Netherlands) are leading, in coordination with UN-Water, the preparation of several events focused on groundwater that will take place next year under the message "Groundwater: making the invisible visible". This includes the celebration of the World Water Day 2022 (22 March) and the organization of a Groundwater Summit (7-8 December 2022).

27. UNESCO-IHP is supporting African Member States by leading three action groups on groundwater assessments, groundwater legal frameworks, and capacity building and education, within the AMCOW's Pan-African Groundwater Program (APAGrop).

28. In the framework of the GGRETA project, a methodology has been prepared recently for the assessment of groundwater related national legislation and it will be tested in several pilot African countries.

29. Several projects currently under implementation by UNESCO-IHP can be highlighted for their contribution to Member States' capacity development through trainings, workshops and tools for informed decision-making in groundwater management and governance. For instance, the Governance of Groundwater Resources in Transboundary Aquifers (GGRETA) Phase 3 has started the establishment of cooperative frameworks for transboundary groundwater governance in River Basin Organizations (RBOs) in Africa. Within the project "Improving IWRM, knowledge-based management and governance of the Niger Basin and the Iullemeden-Taoudeni/Tanezrouft Aquifer System (NB-ITTAS)" governance options were drafted to strengthen integrated and conjunctive management of surface and groundwater resources. The project Enabling implementation of the Regional Strategic Action Programme (SAP) for the rational and equitable management of the Nubian Sandstone Aquifer System (NSAS) aims at initiating the implementation of regional Strategic Action Programme (SAP) for the rational and equitable management of the Nubian Sandstone Aquifer System (NSAS). The annual workplans for the 4 countries (Egypt, Sudan, Chad, Lybia) are under preparation. The project related to the Dinaric Karst Aquifer System (DIKTAS) Strategic Action Plan has been recently approved by GEF and execution will start beginning of 2022.

30. Knowledge and decision-making were improved through the assessment of the impacts of Hurricane Dorian on Bahamas groundwater; a technical mission led by GRAPHIC-LAC (2019) identified mitigation and adaptation strategies to ensure sustainable groundwater management.

31. Capacities on methodological concepts related to the SDG 6 Indicator 6.5.2 monitoring and reporting were strengthened through the workshops "SDG 6.5.2 Implementation for Central America, Mexico and the Caribbean" (Guatemala, Nov. 2019) and a regional training (on-line, May 2020), co-organized by IHP with the Ibero-American Conference of Water Directors (CODIA) and UNECE, with the support of GWP and the the Category 2 Centre CeReGAS (Uruguay). In addition, capacities of 167 experts (41% women) were strengthened in transboundary water management through the webinar "Advances and Challenges in Cooperation on Transboundary Water Management in the Framework of the SDGs and Indicator 6.5.2", co-organized by IHP with CODIA and sponsored by the Government of Andorra (on-line, Feb. 2021).

32. The project "Implementation of the Strategic Action Program for the Guaraní Aquifer: Enabling regional actions", funded by the GEF, was approved, with CAF as implementing agency and UNESCO as executing agency.

33. Scientific and technical cooperation were enhanced at the regional level, through the IHP LAC Working Group for the International Shared Aquifers Resources Management Programme (ISARM) initiative, (on-line, Apr., Jun., Oct. and Dec. 2020, Feb. 2021) and two editions of the on-line webinar "Governance of groundwater and transboundary aquifers" organized in cooperation with CeReGAS.

34. Information exchange was improved between scientists, professionals and groundwater managers through the activities of the IHP LAC Working Group for Groundwater Resources Assessment under the Pressures of Humanity and Climate Change - GRAPHIC (Brazil, Jun. 2019; on-line, Jul. 2020).

35. An online course on groundwater quality in transboundary aquifers was developed and launched on the UNESCO online learning platform. The course which was developed in partnership with WaterNet ran from 12th April to 11th May, 2021. A total of 2,090 participants (390 females and 1700 males) drawn from all the continents enrolled for the course. The course was developed as part of the Governance of Groundwater Resources in Transboundary Aquifers (GGRETA) project Phase 3. Another online course on aquifer vulnerability mapping is being planned and will be launched before December 2021.

Theme 3: Addressing water scarcity and quality

36. To strengthen the capacity to manage water resources in arid and semi-arid areas, IHP works with MS to develop methodologies, guidelines and policy advices to enhance the management of water resources in water stressed regions by addressing water scarcity and quality by sharing innovative tools, methodologies and knowledge, in particular through the Global Network on Water and Development Information for Arid Lands (G-WADI) and the International Initiative on Water Quality (IIWQ) towards the achievement of water-related SDGs. Since the 23rd session of the council, the following results have been achieved through the knowledge generation and dissemination benefiting over 5,000 people of which about a third of women from more than 140 countries.

37. The publication and exhibition "Droughts in the Anthropocene", was launched at UNESCO HQ during the 40th General Conference 2019 and displayed at the UNFCCC COP-25 in Madrid 2019, all together 500 individuals attended.

38. Knowledge is enhanced on Water Cooperation and Diplomacy for the Nile Basin countries and the Lake Chad Basin countries under the BIOPALT project by workshops, which took place from 2018-2019 in Abuja and Maiduguri, Nigeria and Maroua, Cameroon. A total of 117 persons (29 female) from Nigeria, Niger, Cameroon, Central African Republic and Chad have been trained to date.

39. At the 7th African Water Week (AWW7), UNESCO-IHP convened a session on Integrating Gender Equality and Female Empowerment in IWRM as a Strategy to Achieving Water Security.

40. UNESCO co-organized the seminar "Towards sustainable water management in Latin America and the Caribbean" on 5-6 August 2019 in Lima, Peru. The seminar gathered 26 participants (6 women) and provided a platform for sharing best practices and consolidating knowledge on methods to conserve water, increase its availability and improve water use efficiency in the region. As an outcome of the meeting, a publication is currently developed to present a comprehensive inventory of sustainable water management techniques in LAC.

41. Seven webinars were held as part of the webinar series "Adaptation in the age of uncertainty: Tools for climate-resilient water management approaches", in coordination with AGWA and ICIWARM. Topics included the challenges for semi-arid regions, water security and hydropower generation, urban water resilience and urban flooding, and uncertainty and water for agriculture. Furthermore, a Global Conference will be carried out between the 26th and 28th October 2021. This event, organized online, will provide the opportunity to discuss the relevance of bottom-up approaches as a good alternative for resilient water management in the face of climatic uncertainty. Water managers, high-level decision makers, government ministry representatives, private sector representatives, finance sector representatives are expected to participate.

42. Enhanced capacities to mitigate conflicts capabilities related to water resources in Latin America and the Caribbean through the course "Analysis, prevention and resolution of conflicts in the management of water resources" (Uruguay, October 2019), co-organized by IHP with CODIA and the Directorate of Water, Ministry of Environment and Energy of Costa Rica with the support of AECID.

43. IHP's work on water quality and emerging pollutants has provided the scientific basis for relevant policy development. Recommendations of UNESCO study on "Pharmaceuticals in Aquatic Environments in the Baltic Sea Region", conducted by IHP's International Initiative on Water Quality (IIWQ) jointly with the Helsinki Commission on Baltic Marine Environment Protection (HELCOM), provided the scientific basis for the formulation of new policies on emerging pollutants in the Baltic Sea region. These findings were welcomed in the HELCOM Ministerial Declaration 2018 "*as the information basis for developing measures to prevent pharmaceuticals from reaching the Baltic Sea and to identify upstream measures and end-of-pipe solutions to minimize the input of contaminants of emerging concern to the aquatic environment*". Based on the recommendations of the UNESCO study, HELCOM Ministers adopted, in 2018, a new test indicator (diclofenac) to monitor the health of the Baltic Sea. Furthermore, the Baltic Sea regional framework for hazardous substances has been updated. UNESCO co-organized with UN Environment and other organizations a Webinar "Emerging Pollutants in Wastewater: An Increasing Threat" in February 2020.

44. The source-to-sea approach to water quality and emerging pollutants was promoted by disseminating knowledge and research findings through the publication of the Special Issue on “Source-to-sea Management” in IWRA Journal “Water International” (volume 46, 2021 - Issue 2), in collaboration with IWRA, SIWI and other partners. New policy developments resulting from the UNESCO-HELCOM study on pharmaceuticals in the Baltic Sea region were published in the Special Issue as a success case on the source-to-sea approach to reducing pollution in freshwater and marine environments. A webinar on Source-to-sea management was organized to launch the Special Issue in April 2021, with the attendance of over 450 participants. UNESCO IHP serves in the Steering Committee of the inter-agency collaborative Platform on Source-to-sea, hosted by SIWI.

45. IHP’s work on microplastics in freshwater has resulted in the promotion of research in this field and has influenced research priorities at the international level. Experts, who have contributed to the UNESCO study on “Microplastics in Freshwater Environments”, have developed a new regional research project on “Microplastics in Europe’s Freshwater Ecosystems”, funded by the EU Horizon 2020 programme. The project brings together a consortium of 12 universities and 12 partner organizations. UNESCO is an official partner of the project and will play a key role in disseminating research results of the project to policy-makers. UNESCO will facilitate multi-stakeholder dialogues to promote action on microplastics in freshwater and will host the project’s final Conference in Paris in 2023.

46. IHP has significantly enhanced capacity building on water quality and emerging pollutants at the national level. Over 320 policy-makers, water professionals, researchers and young professionals (of which 40% women) from 84 developing countries and economies in transition were trained through UNESCO-IHP International Initiative on Water Quality Training Workshops on Emerging Pollutants in four regions: Africa, Arab States, Asia and the Pacific, and Latin America and the Caribbean between September and December 2018. Young professionals were trained on water quality as part of annual UNEP/UNESCO/BMU International Short Courses on Integrated Water Resource Management – Quantity, Quality, and Health in 2018, 2019 and 2020, training 20-22 young professionals from developing countries and emerging economies every year.

47. IHP is promoting the satellite-based water quality monitoring approach, using remote sensing data from satellite Earth Observation (EO) validated by in-situ measurements, through the UNESCO World Water Quality Portal of IHP’s International Initiative on Water Quality (IIWQ). The technical capacity of African and Latin American countries on water quality monitoring was strengthened by applying this innovative approach to operational water quality monitoring of Lake Chad Basin, in the framework of the intersectoral UNESCO Project “Biosphere and Heritage of Lake Chad” (BIOPALT), and to the Plata River Basin, in coordination with Intergovernmental Coordinating Committee of the La Plata Basin Countries (CIC Plata). The UNESCO Water Quality Portal for the Lake Chad Basin has been developed. An online Training Course “Water quality monitoring using satellite earth observation: UNESCO Water Quality Portal for the Lake Chad Basin” was organized on 23-24 March 2021 for over 30 water quality professionals of the Lake Chad Basin Commission (LCBC) and representatives of water-related Ministries of the five countries sharing the Lake Chad Basin. The development of the Portal for La Plata Basin has been initiated in 2021.

48. Knowledge sharing on water quality and climate change has been promoted. Technical contributions on the impact of climate change on water quality and ecosystems; innovative adaptation and mitigation strategies were provided to five chapters of the WWDR 2020 "Water and Climate Change". A policy brief on water quality and climate change, with focus on freshwater cyanobacteria harmful algal blooms (HAB) has been prepared, with the aim to facilitate knowledge sharing on climate change adaptation and mitigation to protect water quality (the first draft completed, to be published by the end of 2021).

Theme 4: Water and human settlements of the future

49. Theme 4 of IHP-VIII: Water and human settlements of the future, 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. Overall, more than 8600 experts (3840 women) had their knowledge enhanced and over 100 professionals were trained in sessions organized.

50. To support Member States in achieving Urban Water Security, there is a need to establish baselines so that the progress they make can be measured. To that end the current status of water, wastewater and waste management, taking into consideration climate change actions has been drawn for 6 African capitals (Abuja, Bangui, Harare, Libreville, Windhoek and Yaoundé) and four more are being finalized (Abidjan, Lagos, Lusaka and Nairobi) by young female experts, resulting also to a network of cities and experts. A project aiming to support water supply in the City of Nairobi (using urban groundwater) and improve the current situation of at least one million citizens has been initiated with the financial and technical support of the Republic of Korea having the ownership of the Ministry of Water and Sanitation. Furthermore, sustainable water provision for more than 1000 people of pastoralist communities, in Turkana region, Kenya is possible through the generous support of the Government of Slovakia. In Gabon, efforts to capacitate the public water sector have been initiated, in a massive effort that is coordinated with the Office of the President, while research is being conducted to climate proof the water supply of the greater Libreville region. Similar activities are being designed for Bhutan, Timor Lester, Uzbekistan and Vietnam.

51. With multiple partners including the i-WSSM (International Center for Water Security and Sustainable Management), UNESCO Jakarta organized a series of regional and global technical discussions and public events during the Korea International Water Week (KIWW), the 45th Congress of the International Association of Hydrogeologists, and the Board of Council meeting of the Asia Water Council Korea in the Republic of Korea during September 2018.

52. The Secretariat co-published with the International Water Security and Sustainable Management (iWSSM) Centre in the Republic of Korea, the first two Volumes of the Global Water Security Issues on Water Security and the Sustainable Development Goals and on Water Reuse Within a Circular Economy Context; similarly with the Regional Centre on Urban Water Management RCUWM at the Islamic Republic of Iran, on Urban Water Management in Arid Zones.

53. Steps to strengthen cooperation between Megacities around the globe to better manage their water resources and services taking into consideration the effects of climate change have been taken with the establishment of the Megacities Alliance for Water and Climate (MAWAC). A pre-Conference of the 2nd International Conference on Megacities, Water and Global Change (rescheduled for Jan. 2022) attracted over 6,000 participants. In July 2020, a webinar was organized in July 2020 to discuss the effects of COVID-19 to water resources and service delivery in 14 Megacities. Strengthened networking and cooperation of megacities in LAC through three regional meetings of the Megacities Alliance for Water and Climate (MAWAC) (Sao Paulo in 2019, on-line in May and August 2021).

54. Steps to strengthen cooperation between Megacities around the globe to better manage their water resources and services taking into consideration the effects of climate change have been taken with the establishment of the Megacities Alliance for Water and Climate (MAWAC). A pre-Conference of the 2nd International Conference on Megacities,

Water and Global Change (rescheduled for Jan. 2022) attracted over 6,000 participants. In July 2020, a webinar was organized to discuss the effects of COVID-19 to water resources and service delivery in 14 Megacities. An initial regional webinar for ASPAC was organized in June 2021 as the first step towards the development of a regional MAWAC chapter.

55. A training webinar on the W12+ Waterwise Solutions Database was held on 4 March 2021. The main objective was to showcase the functionality and purpose of the new database, solicit feedback from the audiences, and encourage uptake of software by potential users.

Theme 5: Ecohydrology, engineering harmony for a sustainable world

56. The activities carried out addressed the issue of disseminating the ecohydrological concept in Member States and the inclusion of new demonstration sites in the network, through conferences, workshops, dedicated training courses and participation of the Ecohydrology Water Family in international events.

57. Overall, 1,865 person (784 women) were mobilised within the activities; 1,591 participants (653 women) attended the events in 2018, 2019, 2020 and 2021 and approximately 274 participants (of which 131 women) were trained in Ecohydrology, Coastal Ecohydrology and Economic Value of Ecosystem Services and environmental flow (in Indonesia, Dominican Republic, China, Brazil (2), Colombia, Tanzania, Malaysia and Ecuador).

58. During 2018-2019 four (4) new sites were approved to be part of the IHP EH Network of demonstration sites, namely Paltas and Galapagos in Ecuador, Lyon in France and Fenxi City in China. Early 2020 two (2) further sites were accepted in the network: Rio Teusaca and Cienaga de Zapatosa in Colombia; as of July 2021, one new (1) site was approved, namely the Hongfeng Lake Area in Guizhou Province, China (for a total of 28 sites in 19 countries). A publication on past, present and future of ecohydrology demonstration sites in Latin America and the Caribbean was prepared with inputs from all LAC sites.

59. From November 2020, the Ecohydrology Open Online Courses consisting of the 3 modules “Fundamental of Ecohydrology”, “Application of Ecohydrology” and “Trans-disciplinarity for Ecohydrology” are on line at the ecohydrology web platform ecohydrology-ihp.org.

60. As of July 2021, over 16,000 “demosite cards” were downloaded from the ecohydrology web platform. Concerning other communication tools, the International Society for Ecohydrology (ISEH) was formally set up in April 2019; Facebook page www.facebook.com/IntSocEH: Results of reaching of publications in the ISEH Facebook, as of July 2020: over 15,000.

61. Increased knowledge on the interactions between forest systems and water resources in the context of rainfall-runoff-vegetation relationships, through the IHP Technical Publication "Background of the relationship between forest mass and water availability in Chile" (2019) elaborated by the Hydrology Technological Centre of the University of Talca (CTHA) with experts from the University of Chile, University of Concepción and the Austral University of Chile.

Theme 6: Water education, key for Water Security

62. In close cooperation with members of the UNESCO Water Family, especially with a consortium of the UNESCO Chair on Water and Culture and the Category II Regional Centre for Groundwater Management (CeReGAS) based in Uruguay, and with the UNESCO Chair on Water Resources Management and Culture in Italy, two methodological proposals have been prepared for a new indicator to evaluate water education at the tertiary level of the formal education systems, following IHP Council Resolution XXIII-8, to be globally applied in the context of the 2030 Agenda and beyond it. Proposals for concrete definitions and the methodologic approaches have been shared and commented by partner institutions. Follow-up actions, including finalizing guidelines for data gathering and for the use of the new indicator, as well as the formal engagement of Member States and Associate Members through the Ministries of (Higher) Education and equivalents, including Least Developed Countries (LDCs) and Small Island Developing States (SIDS), are being activated.

63. The preparatory process and the role as co-leads with UN DESA of the UN-Water SDG 6 Capacity Development Initiative, established in March 2021 by the UN-Water Senior Programme Managers as a UN-Water initiative to support the capacity development accelerator of the SDG 6 Global Acceleration Framework, have been assisted. The Director-General of UNESCO addressed a speech on the new initiative in July 2021 at a SDG 6 Special Event of the High-level Political Forum on Sustainable Development, co-coordinated with UN DESA. A draft concept note on the initiative has been prepared by its coordination team, shared with the UN-Water partners and will be finalized in the upcoming months.

64. The IHP Secretariat improved the coordination of water education initiatives implemented by UNESCO Field offices in Africa and in Latin America and the Caribbean (LAC), regions with the highest share of the populations under the age of 19 and of 24, respectively. Water education was promoted in partnership with UNICEF in Sudan to support efficient and safe use of water. Interacting with the Dakar Office, a process to mobilize youth civil society organizations and citizens towards the 9th World Water Forum (WWF) is being supported. A process to adapt water education in the curricula for future water professional in the Maghreb to the emerging regional and global challenges in relation to sustainable water management is being conducted by the Rabat Office.

65. In LAC, three editions (2018-2019) of an on-line course on water security were held. In Asia and the Pacific, a specific curriculum for water education focusing on ecohydrology, integrated water resources management and sustainability science for climate change impact resilience for Africa linking to science and policy was elaborated in collaboration with partners and a new platform (Catalogue of Hydrologic Analysis - CHA; web and mobile apps) was developed.

66. As an example of IHP joint work, the online conference Addressing Groundwater Resilience under Climate Change was co-organized by IHP's sections and partners (the International Water Resources Association -IWRA- and the International Association of Hydrogeologists -IAH-, in October 2020). The conference had 2662 registrations from at least 130 countries. The organization of the ISARM International Conference on Transboundary Aquifers to be held in December 2021 is being supported. Furthermore, draft publications, books, materials, reports, documents, and project proposals have been revised.

67. Globally, the UNESCO Water Family trained 22,880 people (41% women) in 2018-2019 through 863 activities in 124 countries. Over 31,400 participants (41% women) attended 459 international events of the UNESCO Water Family.

68. Complementary actions for water education and capacity development took place under the thematic focal area 6.3., engaging youth, and including Indigenous Peoples. For instance, IHP held seminars and workshops during the LAC Open Science Forum - CILAC 2018 (Panama) and in Brazil in 2019, and, with funding from the Spanish Agency for International Development Cooperation (AECID), in the Ecuadorian Amazon region in 2018.

69. The Global Network of Water Museums (WAMU-NET), based on the IHP Council Resolution XXIII-5 and supported by the Resolution XXIV-7, strengthened interactions among water museums worldwide. WAMU-NET promoted formal and informal water education and the diversity of cultural expressions, inter alia through two editions of the art contest "The Water We Want", involving over 6000 students between 8 and 18 years of age. In Latin America and the Caribbean, a regional chapter of the Water Museums Network was established, and a regional meeting took place in December 2019.

70. To ensure continuation of capacity building in Southern Africa and beyond during the pandemic and to reach a larger audience, a UNESCO open learning platform (<https://openlearning.unesco.org>) was developed. To date, a number of courses have been hosted on the platform.

71. Through direct support and networking with partners (World Water Council Youth Delegates Programme, World Youth Parliament for Water, Association of Young Professionals of Water and Sanitation of Senegal) IHP increased the engagement of young water professionals and youth in several events, such as the UN High Level Political Forum (New York, July 2018), the Africa Water Week (Gabon, October 2018), the UNFCCC COP24 (Poland, December 2018), the Stockholm World Water Week (Sweden, August 2019 and 2021) and the 40th session of the General Conference of UNESCO in 2019. The recommendations of the IHP co-organized session (2018 Africa Water Week) were accepted as the Youth Declaration which calls for the strengthening of water education in Africa, improved representation and participation of youth in decision-making processes and increased support for the use of youth-led research and innovation products in the governance of the water sector.

72. IHP also supported the Special Rapporteur on the human rights to safe drinking water and sanitation and partners with organizing the Human Rights Youth Challenge (2019 & 2020). In addition, in partnership with Action against Hunger, the Youth Delegates of the World Water Council and young water leaders are being trained focusing on enhancing capacities for an informed participation ahead of the 9th World Water Forum (Dakar, Senegal, March 2022).

73. Strengthened capacities of over 2500 participants through the three editions from 2018 to 2020 of the on-line course "Water Security and the Sustainable Development Goals (SDGs)" from the virtual education platform of the International Centre for Hydroinformatics (CIH) and the academic coordination of the UNESCO Chair Water and Education for Sustainable Development (Argentina), and the collaboration of 8 UNESCO Chairs and 5 UNESCO Category 2 Centres. In addition, the course manual was published in December 2020.

74. Strengthened knowledge of experts and decision-makers on regulatory frameworks based on IWRM through the course "Harmonization of legal frameworks in the management of water resources in Latin America" (on-line, November 2020), co-organized with CODIA, the Uruguayan National Water Department (DINAGUA), the Ibero-American Network, the National University of Cuyo (UNCUYO) in Argentina, the Federal University of São Paulo (UNIFESP) in Brazil and the University of Zaragoza in Spain, with the support of AECID. Increased knowledge and awareness of almost 4000 citizens on water-related issues

through the weekly webinar "Water and your City" organized by IHP, and CONAMEXPHI (January to April, 2021).

REGIONAL PERSPECTIVES ON IHP (Agenda sub-item 3.2)

In Western Europe and North America

75. The Regional Bureau for Science and Culture in Europe has worked closely with IHP national committees as well as water related category II centres and chairs and other key stakeholders from the region, including internal partners such as ICTP and WWAP, as well as sub regional partners to implement IHP VII and IHP priorities in the region.

76. UNESCO's regional network of water stakeholders has been strengthened and regional synergies between these stakeholders has been enhanced. Best practices and common approaches relating to water management, disaster risk reduction and climate change adaptation in SE Europe and the Mediterranean have been analysed and understanding across the region of WWDR 2019/2020/2021 main messages has been enhanced.

77. The Regional Bureau organized a major regional symposium on water equity in March 2019, in collaboration with WWAP, ICTP, UNESCO water family members and other partners, which aimed to examine how UNESCO and its partners in the region could promote integrated water resources management that ensures access to safe water and sanitation for all and increases the resiliency of the most vulnerable segments of the region's populations to climate change and disasters. In October 2020, the Regional Bureau organized a regional Symposium on Bridging the science policy gap in river basins in South-East Europe: the role of UNESCO IHP and its partners. The symposium brought together the National authorities in the riparian states and regional commissions in the river basin commissions, such as International Commission for the Protection of the Danube River (ICPDR), International Sava River Basin Commission (ISRBC), IHP National Committees and UNESCO water family members, academia, scientific committees, NGOs and other key water stakeholders. The symposium explored how UNESCO, its scientific networks and its partners can better support transboundary cooperation in river basins of the region, and in particular promoted a stronger nexus between scientific networks and decision makers. The symposium highlighted successful cooperation in river basins in areas such as flood management and data sharing and explore new avenues for cooperation

78. The Regional Bureau also participated, along with IHP Paris, in a regional symposium in Thessaloniki, Greece in March 2019 on the implementation of SDG 6 in SE Europe and the Mediterranean which was organized by the new category II centre on integrated and interdisciplinary water resources management. Key outcomes of the meeting included positioning UNESCO as a key interlocutor on SDG 6 in the region and strengthening links with UNESCO water family members. In Fall 2020, the Regional Bureau participated with the IHP Secretariat in the regional webinar "From the Myths of Hercules to the reality of climate change" organized by the same UNESCO category II centre. The webinar explored ideas for joint activities and potential cooperation between UNESCO category II centres in the field water resources management and engineering in the era of climate change

79. The Regional Bureau organized in November 2019 a regional conference on how climate change is affecting the region, notably its water resources. A particular focus was on

UNESCO sites, as well as the role of youth in the climate change debate in the region. A key outcome of this work is ensuring that Member States in the region are better equipped to address the effects of climate change on water resources, notably within UNESCO sites. In 2020 work in this area is being continued, notably with WWAP, which has focused WWDR 2020 on the nexus between climate change and water. In April 2020, the Regional Bureau organized, in coordination with WWAP, and in the context of the UN issue-based coalition on environment and climate change for Europe and Central Asia, a webinar on the 2020 WWDR. The webinar, which was opened by the ADG for Natural Sciences and the Executive Secretary of UNECE, focused on how resident coordinators and UNCTs could best use the data and resources from the WWDR at the national level. UNESCO along with UNECE are the lead agencies in the water resources task team within the IBC and are within this context planning various webinars and guidance material on water resources management for the RCs and UNCTs in the coming months.

80. In July 2021, the IBC on Environment and Climate Change launched the Guidance on integrating environment and climate change in processes for UNSDCF. Integrated water resources management (IWRM), was selected as one of the key thematic priorities in mainstreaming environment and climate change across CCAs and UNSDCF.

81. In Fall 2021, a project funded by Bulgarian Government is being initiated in relation to climate change adaptation and disaster risk reduction notably water related disasters. The project aims at contributing to a more climate resilient region notably more climate resilient UNESCO designated sites. This will be done through institutional and professional capacity building for UNESCO designated site managing authorities and other relevant stakeholders.

82. UNESCO Regional Bureau is also supporting regional hydrological cooperation through the IHP Danube network, by supporting the establishment of a secretariat for the network and providing technical support and a platform for dialogue of IHP Danube stakeholders.

In Eastern and Central Europe

83. The activities mentioned above organized by the Regional Bureau involve countries both in Western Europe as well as Eastern Europe, as the Bureau has a mandate covering both regions.

84. In the past biennium, specifically for Eastern Europe, substantial progress has been made to solidify partnerships with sub-regional water commissions, such as the International Sava River Basin Commission (ISRBC), and with other river basin commissions for the Danube and the Drin. Also within the context of the IBC on environment and climate change, the Regional Bureau organized jointly with UNECE in June 2020 a webinar on management of water resources in the Drin river basin. Of particular note is the work being undertaken by the Regional Bureau and ISRBC in 2021 to prepare an outline of the Sediment Management Plan for the Sava River Basin. The Regional Bureau is also cooperating with ISRBC within the context of the EU funded SHELTER project related to disaster risk reduction, notably water related disasters, within heritage sites. The Sava River basin is one of 5 open labs within the project looking at the effects of disasters, notably floods, on cultural and natural heritage.

85. To ensure greater impact in this region with great needs but limited funding, the Regional Bureau has combined water activities with DRR and UNESCO site activities, as well as extrabudgetary projects such as the Drin pilot project related to the integrated management of groundwater in Albania and Montenegro, as well as EC funded projects such as IREACT and SHELTER which focus on flood management in the region.

In Latin America and the Caribbean (LAC)

86. Ensuring universal access to water services and water security remains a key priority in the region, in line with IHP-VIII and the SDGs. IHP governance in LAC was strengthened at the XIII Meeting of the National Committees and Focal Points of IHP-LAC (30 LAC Member States and Associate Members present), which adopted nine decisions concerning the implementation of the programme in the region. In 2021, the XIV Meeting of the National Committees and Focal Points of IHP-LAC was also held with the participation of 30 LAC Member States and Associate Members. On this occasion, 10 resolutions were adopted and counted with the participation of 9 UNESCO Chairs, 5 category 2 Centers, WWAP, 13 regional WG and partners and over 220 attendees. The second day was celebrated in collaboration with CILAC, where IHP organized 2 sessions.

87. IHP activities and events in LAC to raise capacities and institutional practices counted over 20,000 participants from over 25 Member States and Associated Members, focusing on IHP-VIII themes and on priority areas for the achievement of SDG6. The IHP regional capacity-building effort with the Ibero-American Conference of Water Directors (CODIA) and the support of AECID plays a key role in this area.

88. Knowledge was fostered through 9 IHP-focussed sessions, 27 webinars, 10 online courses, 2 projects, technical assistance, congresses like the II and III Congress of Ecology and Sediments, and the LAC Conference on Megacities, Water and Climate Change and publishing books, plus several scientific and technical publications, including its scientific journal Aqua-LAC. Three IHP co-organized sessions aimed at raising Member States reporting capacities on water cooperation and seven webinars were organized on water and COVID-19 with WHO Americas. The IHP "Water Security and SDGs" online course, which attracted over 2,500 students through the three editions from 2018 to 2020 and a specific course targeting women from vulnerable communities in the context of COVID-19 was launched. IHP participates on the Amazon Project and on the Tri-national Trifinio-Fraternidad Biosphere Reserve, in the scope of the GRETA project. Technical assistance was provided to LAC governments. IHP strengthened a holistic environmental flow concept in water policies through collaboration with the CONAPHIs, particularly in Centroamerican countries. Lastly, UNESCO published books on LAC Public Policies for Water and Sanitation, Water and Forest Systems, and associated with publications on water quality and ecohydrology.

89. Regional and international cooperation are strengthened by 2 new regional working group, a new regional sub-group, 2 new networks and 2 projects. Based on proposals put forward by IHP National Committees and Focal Points, the new IHP working groups covering priority areas for the region are the Hydrogeomorphology of the Andean-Amazon Basin (2018) and Water Resources of the La Plata Basin (2019). In addition, the IHP-LAC Regional Antarctic Water Science Sub-Working Group was established (2021). A GEF project was initiated aiming at strengthening the governance of the Guarani Aquifer and UNESCO is implementing a project on the governance of transboundary groundwater in El Salvador and Honduras. IHP co-organized the launchings of WWDR2019, WWDR2020 and WWDR 2021 and a side event on "The value of water in the 2030 agenda" at the LAC Forum 2030. A new category 2 Regional Experimental Center for Sanitation Technologies was established in Uruguay and five new water-related Chairs were established or approved. In LAC, UNESCO water-related Centres and Chairs held coordination meetings, open dissemination events (2020, 2021) and co-organized an on-line course on Water Security.

90. In the context of the on-going COVID-19 pandemic, IHP and WHO Americas issued a preliminary assessment paper, organized two courses and six webinars in support of the water sector.

91. Updated knowledge on glaciological research activities and standardized glaciological monitoring methodologies through the webinars "Current status of glaciers in Latin America" organized by the IHP-LAC Snow and Ice Working Group (October 2020) and the establishment of an IHP LAC Regional Working Sub-Group on Antarctic Water Sciences (2021).

92. Networking and knowledge dissemination on the hydrogeomorphology, hydro-sedimentary dynamics, anthropogenic impacts, deposition processes, generation of hydroclimatic information and hydrological models in the Andean-Amazon basin by 153 experts (43% women), with IHP webinars on "Understanding the hydrogeomorphology of the Andean-Amazon basin" (on-line, Dec. 2020).

93. Increased knowledge on telemetry and its practical applications of 207 experts (32% women) from 17 countries through the IHP webinar "Experiences in Hydrometry, its applications and innovations in Latin America with emphasis on South America" (on-line 2021).

94. Assessment of impacts on the water post La Soufrière volcano eruption in St. Vincent and the Grenadines through technical assistance (2021).

95. Enhanced capacities to guarantee water security and universal access to water and adequate sanitation in the region through the webinar "Water management and governance during and after COVID-19 in LAC" (on-line, May 2020). The event was attended by 350 participants and co-organized by IHP with WHO Americas/PAHO, the Inter-American Association of Sanitary and Environmental Engineers (AIDIS) and CODIA. Enhanced capacities on water access strategies during the pandemic through the webinar "Challenges to guarantee access to water in the context of COVID-19", co-organized with WHO Americas/PAHO, the Global Analysis and Assessment of Drinking Water and Sanitation (GLAAS-UN Water) and the regional water centres under the auspices of UNESCO: CERSHI, CERTS, CAZALAC and CEHICA (on-line, May 2020). The document "Urgent actions for providers of drinking water and sanitation services against COVID-19" was also launched by CERSHI in this event, attended by more than 140 technicians, experts and decision makers. Enhanced knowledge of more than 320 technicians through the webinar "Management tools for the water sector in LAC to face COVID-19" (Apr. 2020), co-organized with WHO Americas with presence of the UN Special Rapporteur on Human Rights for Safe Drinking Water and Sanitation.

96. Increased knowledge on frequencies and intensities of droughts in the LAC region, available monitoring technological tools and strategies of the most affected countries to face them, through a cycle of 4 webinars "Droughts in Latin America and the Caribbean" co-organized by IHP with CAZALAC (Sep. - Oct. 2020) with more than 300 attendees. Strengthened capacities to manage water resources in arid and semi-arid areas in the region through the IHP LAC Working Group for the Global Network on Water and Development Information for Arid Lands (G-WADI), which organized webinars, virtual workshops and courses. Strengthened capacities of more than 250 participants through the course "Characterization, monitoring and nature of droughts" co-organized with CODIA and CAZALAC, with the support of AECID (on-line, Apr. 2021).

97. Increased knowledge on the status and the management of water quality in LAC via the publication of the book "Water Quality in the Americas" (2019), developed by 21

Academies of the International Network of Academies of Science (IANAS) in collaboration with IHP-LAC, CODIA and the Interacademy Partnership (IAP).

Asia and the Pacific

98. In response to the Covid-19 pandemic, an ASPAC regional virtual meeting under the heading “The Answers are in the Water” enabled an extensive regional exchange of news and views from contributors to IHP and with participation of 150 participants (65% female) from 20 countries, the UNESCO Water Family in Asia and the Pacific. The event was followed by a Special Online Session of the IHP Regional Steering Committee for Asia and the Pacific (RSC-AP) held in October 2020 with participation from more than 50 delegates from 16 countries across the region, supported by Japan Funds-in-Trust. The session was associated with the 3rd Catalogue of Hydrologic Analysis Workshop, presenting the first volume of the CHA (the Catalogue of Hydrologic Analysis, a new collaborative publication series) on flood and drought management, and advanced the development of the second volume on dam and reservoir operation. A full regional virtual/blended session of the RSC-AP will be hosted by Vietnam in Hanoi, 24-25 November 2021.
99. In 2020, UNESCO organized water capacity building events and activities in Asia and the Pacific with participation by a total of 2,448 people, of which 1,306 were women. Highlights include the development by UNESCO of an Asia and the Pacific regional water education curriculum for climate change impact resilience drawing on ecohydrology, IWRM and sustainability science supported by Japan Funds-in-Trust. The curriculum is scheduled for publication in Q3 2021. In parallel, a “Water Management Curricula using Ecohydrology and IWRM” designed for sub-Saharan Africa was developed on the basis of resources originally published by the HTC-KL Category 2 Centre in Malaysia. A fully interregional undertaking, the preparation of the document engaged and relied on the contributions of multiple Category 2 Centres and UNESCO Chairs in both regions, supported by Malaysia Funds-in-Trust. The document will be published in early 2022.
100. A regional online regional workshop supporting the monitoring and implementation of the SDG indicator 6.5.2 (Transboundary Water Cooperation) was organized by UNESCO, UNECE and other partners in September 2020 with participation of 63 delegates across the Asia region to support member states in Southeast Asia, East Asia, and South Asia and to collect, report and make use of data for the 2nd reporting exercise on SDG indicator 6.5.2.
101. UNESCO developed an ASPAC regional pedagogical framework for the development of online virtual field trips in support of tertiary-level water management education. On the basis of this document, UNESCO worked with Centres and Chairs in the region to develop a series of online virtual field trips on the topics of climate change; natural hazards, water and disasters; water use; urban water and sustainability; water security; water and human health; regulated rivers; mining and forestry. The first completed virtual field trips will be launched in November 2021 at the RSC-AP meeting in Hanoi.
102. Linking to water and gender event in 2019, a joint WWAP, Apia and Jakarta Office high-level online discussion for the Pacific island countries was held on 27 November 2020 with participation of 58 delegates (33 women) from nine countries. The event assessed how the integration of gender perspectives in water resources management contributes to reinforcing social inclusion, eradicating poverty, and moving towards

environmental sustainability for Pacific sub-region. The webinar also saw the launching of the UNESCO WWAP Toolkit in the Pacific and initiated a capacity development programme for the Pacific on gender, water and climate.

103. In close coordination with UNESCO Bangkok Office, UNESCO Publishing and the external publisher Springer, three subregional books on the water-energy-food nexus are under preparation for publication in late 2021.
104. In Timor-Leste, documentation of a network of community water retention and spring restoration initiatives is ongoing in partnership with local community organizations, with a view towards eventual recognition as an Ecohydrology demosite. Promotional and educational videos outlining the purpose, objectives and impacts of the spring restoration activity as well as maps were produced for use in public forums and community settings with the objective of generating public awareness.
105. In collaboration with the World Water Council and youth water organizations across Asia and the Pacific, an online satellite event for the 9th World Water Forum was held in December 2020. An online survey was conducted prior to the event with a total of 82 responses identified key WWF9 priorities among regional youth, identifying universal and equitable access to safe drinking water as the most important target of SDG 6.
106. UNESCO initiated the development of a regional situational baseline analysis of the existing IHP framework in each ASPAC member country. Comprising three subregional reports prepared in parallel, the final document will include a set of strategic recommendations on the organization of IHP National Committees and focal points in the region. This information will help inform and monitor the implementation of the new the IHP-IX strategic plan.

In Africa

107. A number of interdisciplinary and transdisciplinary projects and activities were embarked to promote water security, water resources management and management of climate-related disasters in Member States.
108. For instance, a global assessment mission of human and technical capacities was conducted for "Intelligent management of water resources" for engineers and technicians from main line ministries; supporting the Gambia in improving flood and natural disaster management through a project on the use of UAVs and early warning systems; supporting Cyclone Idai affected countries for disaster preparedness; development of national hydrological profiles for the effective management of shared water resources in the Sahel areas of West Africa; and the launch of a project on B-RESILIENT: Biosphere Reserves as Observatories for Climate Change Adaptation in Southern Africa, which establishes linkages between the IHP and MAB Programme, as well as integrating initiatives with the Education Sector through Education for Sustainable Development (ESD).
109. Moreover, IHP promoted capacity development of regional and national authorities as well as educational institutions in Africa on issues related to transboundary aquifers and groundwater governance; integrating groundwater management with river basins; climate change mainstreaming into the design and implementation of water infrastructure; effective management of water quality and emerging pollutants in water and wastewater in sub-Saharan Africa; water diplomacy and peaceful conflict management on the natural resources of Lake Chad; ecohydrology; and Integrated Water Resources Management (IWRM).

110. In addition, IHP organized a number of events and outreaches with significant outputs/outcomes. For instance, the organization of the Seventh IHP Africa Regional Steering Committee Meeting in Praia, Cabo Verde saw the launch of two Mobile Apps (“Rainwater Harvesting” and “Know Water”) developed by the IHP and stakeholders and the adoption of the ‘Praia Statement’ which outlines the agreements and recommendations for future actions of IHP in Africa. IHP supported AMCOW’s communication outreach on groundwater in Africa and also collaborated with UNESCO MSRO in Africa and its partners to organise the Africa Water Week in 2018.

111. A virtual kick off meeting for a project Addressing Climate Risk and Building Adaptive Capacity in South Africa’s Biosphere Reserves: Towards Sustainable Water and Ecosystem Management was held. The project will be implemented in South Africa.

112. To address the flood and drought monitoring gap in Southern Africa Region, National Flood and drought monitors were developed for Namibia, Mozambique and Zimbabwe.

113. A project on ‘Comprehensive Resilience Building in Chimanimani and Chipinge’, Zimbabwe, was launched on 19 March 2021. The overall objective of the project is to reduce the vulnerability of communities in the Chimanimani and Chipinge Districts to natural disasters, such as floods, droughts and landslides; and to enhance water resource management as well as ecosystem services in response to the uncertainty of future climate change.

114. To build capacity to the Southern Africa region and beyond an online course on the Introduction to Climate Risk Informed Decision Analysis (CRIDA) was developed running from 2 November 2020 to 31 January 2021. 843 participants from 114 countries participated in the first CRIDA online course with 42% of the participants being females.

In the Arab States

115. Activities undertaken by the Regional Bureau for Science in the Arab region focused on disseminating knowledge, promoting good water governance, expanding water education, building capacities of the water sector at national and regional levels, promoting inter-regional water cooperation, and protecting cultural heritage from water-related disasters. This was accomplished through organizing and co-organizing thirteen (13) special sessions and side events in regional and international conferences including the 1st, 2nd and 3rd Cairo Water Week (2018, 2019, and 2020), the 5th Arab Water Week (2019), the 3rd Arab Water Conference (2019), three (3) high level panels during the IHP 1st International Water Conference (2019), Regional Land and Water Days (2019), and the 3rd Arab Water Conference, eleven (11) dedicated capacity building workshops and short courses, three (3) expert group meetings. The bureau has also supported technical studies and expert missions aiming to assess the impacts of water related disasters on UNESCO Cultural Heritage sites including Petra (Jordan), Abu-Mena (Egypt), and Al-Nuri and Kerma (Sudan). The Bureau works closely with Regional UN entities include FAORNE, UN-ESCWA, and the secretariat of the Arab Ministerial Council on Water (LAS) and actively participate in regional water fora.

116. Overall (2019-2021), more than 1685 (536 women) Arab water experts and educators were mobilized within these activities. Of these 1214 attended UNESCO organized side events and special technical sessions, 471 were trained, through the Bureau’s capacity building activities. These trainings included quantifying the WEF nexus, hydrologic modelling, incorporating water resources issues in climate change negotiations and in INDCs, AI-based satellite observation of precipitation, ground water governance,

wastewater management, urban water management, cultural heritage protection from water-related disasters and water education. In addition, more than 45 experts (20 women) were mobilized to develop knowledge and provide policy advice on gender mainstreaming in IWRM, and protection of cultural heritage from water related disasters. Along with these, more than 300 school children (including 200 girls) in Egypt and the za'atari refugee camp in Jordan were engaged in innovative portrayals of water conservation.

117. In addition to successfully holding the 17th session of the Arab National IHP committees (July 2019), UNESCO, through the Regional Bureau for Science for the Arab States, has actively participated in preparatory processes relevant to SDG6 (water and sanitation) and SDG13 (climate change) for the Arab Sustainable Development Forum 2019 and contributed to the development and review of the relevant chapters of the Arab Sustainable Development Report, published by UN-ESCWA in July 2020.

118. UNESCO Regional Bureau for Science is also a coleader of the Regional One-UN launched IBC on Water, Climate, and food security, a partner of the high level technical advisory committee of the Arab Ministerial Council on Water, and an active member of the Task Force on updating the Arab Strategy on Water Security and its action plan. The bureau co-leads the Water Governance working group within the regional FAO Water Scarcity Initiative.

119. Following the COVID-19 Pandemic, UCO/IHP developed a short (2 minutes) animated video in Arabic and 3 posters: highlighting the role of clean freshwater in combating COVID-19 and promoting water conservation, especially at the household level. More recently, a training webinar for enhancing awareness on combating COVID-19 and water conservation targeting school students in the Arab Region within age groups 8-12 years; 15-17 August 2021; more than 20 teachers (including 10 women) from 9 Arab countries (Mauritania; Algeria, Libya, Lebanon, Syria, Oman, Kuwait, Qatar and Yemen) participated in the webinar.

120. An interactive virtual regional training on groundwater governance was organized in May, 2021, more than 95 Arab water experts (38 women) from 16 Member States benefited from the training. All training material including lectures, exercises, and training manuals are made available, in the Arabic Language, on the Bureau's website.

121. The Regional Bureau is organizing four technical sessions during the 4th Cairo Water Week (Oct 24-28, 2021). These include sessions: climate change impact on flash-flood induced sedimentation in the Nile, water conservation campaign in rural areas in Egypt, Household Water Insecurity Experience index (HWISE), and incorporating water in Arab INDC planning and implementation.

122. Upcoming capacity building activities include a virtual regional training on Managed Aquifer Recharge (MAR) in cooperation with UNESCO C2C RCTWS (19-29 Oct. 2021), Virtual Regional Training on Water for Food Security using Optimization Models (Nov 3-10, 2021), Virtual Regional Training on Groundwater Modeling in cooperation with LAS's Arab Center for Studies of Arid Zones and Dry Lands (ACSAD) (26 Sept-7 Oct, 2021).

123. The 18th Session of the Regional Meeting of the Arab National Committees for IHP will be held in Cairo, Egypt, (31 Oct- 2 Nov, 2021).

124. In cooperation with UNESCO Ramallah Office, the Regional Bureau supported the mapping of the water sector in Palestine. The study aims to identify points of entry for UNESCO's contribution to building the capacity of the sector. In addition, and in cooperation with UNESCO Office in Khartoum, the regional bureau has supported the undertaking of a

study on impacts of rising groundwater table on the Al-Nuri and Kerma heritage sites in Sudan and is supporting the holding of the 3rd Khartoum national IWRM Forum (Dec. 2021).

IHP WATER INFORMATION NETWORK SYSTEM, IHP-WINS

125. The IHP Water Information Network System (WINS) online platform (available at <http://ihp-wins.unesco.org/>) is an open-access online library and networking hub. It incorporates a wide range of water-related content (georeferenced information, maps, reports, publications, etc.) on water resources at all levels, and adopts a participatory approach to foster a greater access to information and knowledge. WINS is freely accessible to Member States and water stakeholders (technicians, scientists, other UN agencies, etc.). Transparency and respect of authorship is guaranteed as content benefit from metadata in a standardized format and from a Digital Object Identifier (DOI). This allows for an accurate identification and crediting of any contribution, and easy later sharing. As such, the platform contributes to close the gap between North and South in terms of access and the sharing of knowledge.

1. Overall, more than 530 persons have joined the platform (+230% compared to March 2018) and over 430 items are now hosted on WINS. As of August 2021:
 - 53 Member States are members of the platform of which 7 in Western Europe and North America, 6 in Eastern Europe, in 5 Latin America and the Caribbean, 6 in Asia and the Pacific, 23 in Africa, 6 in the Arab States;
 - Six (6) Category-2 Centres (from Brazil & Paraguay, Chile, Germany, Iran, Japan, the Netherlands) are members of the platform;
 - Seven (7) UNESCO Chairs (from Argentina, Greece, Iran, Lao People's Democratic Republic, the United Kingdom and the United States of America) are members of the platform.

126. A training on WINS was provided to the African IHP National Committees, during the 7th IHP Africa Regional Steering Committee Meeting in Praia, Cabo Verde (1-3 Oct. 2019). A 4-day training on the platform was also provided to 30 water-related stakeholders (students, researchers, technicians, ministry's representatives) from Africa and the Arab States during the 2019 Open Water Symposium, organized by the Division in Rabat, Morocco (28-31 Oct. 2019). Dedicated presentations of the platform were also made at the Jeju Asian Water Week (Oct. 2018), the GEF's 9th International Waters Conference (Nov. 2018), the COP24 (Dec. 2018).

COOPERATION WITH OTHER UNESCO PROGRAMMES

127. On 15 November 2019 the Division of Water Sciences and the Division of Ecological and Earth Sciences supported the organization of a joint side event, 'From Knowing to Doing: Education for Sustainable Development and Climate Action- Award Ceremony of the 2019 UNESCO-Japan Prize on Education for Sustainable Development,' coordinated by both the Natural Sciences and Education Sectors during the 40th session of the General Conference. The panel discussion looked at the role of education, knowledge and youth empowerment in climate action, and showcased how young people are already actively involved in climate related issues around the world, both inside and outside the classroom. It explored examples from a variety of UNESCO programmes, such as the UNESCO Associated Schools Network (ASPnet), Biosphere Reserves (MAB) and the Intergovernmental Hydrological Programme.

128. In United Nations World Water Development Report (WWDR) 2019, IHP led Chapter 3 and contributed to Chapter 9 along with the UNESCO Multisectoral Office in Abuja. Similarly, in WWDR2020, IHP co-led four Chapters: Prologue, Chapter 1, Chapter 3 and Chapter 13. In 2021 edition, contents of which are currently being developed, IHP is leading Chapter 7 and contributing to Regional Perspectives Chapter via UNESCO Nairobi Office (See Agenda Item 9.3 for further details on IHP's contributions). The specific chapters in these reports acknowledge contributing colleagues and IHP's logo is featured on the front cover of the WWDR among other lead agencies.

129. IHP closely collaborates with the Man and Biosphere Programme (MAB) of UNESCO on the implementation of water quality related activities of the intersectoral UNESCO Project "Biosphere and Heritage of Lake Chad" (BIOPALT). In the framework of the project, IHP is applying the satellite-based water quality monitoring approach to operational water quality monitoring of Lake Chad Basin through the UNESCO World Water Quality Portal. To this end, satellite-derived data on key water quality parameters of Lake Chad Basin, as well as on the surface variability of Lake Chad, will be available via the UNESCO Portal. Three in-situ water quality measurement campaigns were carried out on Lake Chad and in its tributaries Chari and Logone rivers between July 2020 and April 2021 for the calibration and validation of the satellite-derived data of the Portal. A training on innovative approaches to water quality monitoring and the use of the UNESCO Water Quality Portal for Lake Chad was organized for over 30 policy-makers, water professionals and researchers from water-related ministries and agencies of Cameroon, Chad, Central African Republic, Niger, and Nigeria, sharing the Lake Chad Basin.

130. At the request of the government of Jordan (Petra Development and Tourism Region Authority –PDTRA) UCO/IHP in partnership with the culture sector at UNESCO Amman, and the UNESCO World Heritage Centre, UNESCO Chair Office (UCO)/IHP organized expert missions (Sept 2-4, 2018, and Feb 13-14, 2019) to Petra world heritage site to assess flash flood risk management and prevention. UCO/IHP provided technical support in coordinating a Preliminary hydrologic/hydraulic study towards the development of the Terms of Reference for TOR and a Project Document for a comprehensive study aiming to reduce flood risk at the site. An EXB project of 70,000 US dollar was awarded to Amman office from World Heritage Centre (WHC) as a result and the project has been recently completed.

131. UCO/IHP in partnership with UCO/CLT provided technical support to the Government of Egypt in Addressing Groundwater Logging impacts on the Abu Mena Archaeological Site. UCO/IHP and CLT organized a technical mission to the Abu-Mena monastery, followed by a national expert consultation hosted jointly by UCO/IHP CLT to identify short-mid-and-long-term strategy to address the problem.

132. UCO/IHP and UCO/CLT co-organized, with UNESCO Chair on water hazards and cultural heritage (Italy), the Italian Embassy, and the National Research Institute of Astronomy and Geophysics (NRIAG) of Egypt, a 5 days summer course on groundwater hazards and cultural heritage. 30 engineers and specialists from Egypt benefited from the training and exchanged expertise on protection of cultural heritage from natural hazards, including primarily water related hazards such as erosion, water logging, and floods.

133. UNESCO Rabat (URAB) and UCO with the support of the HQ and ISESCO, organized the first meeting of the Steering Committee of the Arab-African Initiative on Biosphere Reserves "AABRI" in Senegal on 26 and 27 November 2018. This joint initiative MAB-IHP launched during COP 22 and 23 aims to make biosphere reserves an observatory of climate change and an experimental space of sustainable development solutions with focus on water issues.

134. The Be-Resilient project was initiated in 2020 as a joint IHP-MAB initiative, with a virtual kick-off event, followed by a set of targeted planning meetings on project objectives. Capacity building was already started using virtual online platforms, and initial activities focused on strengthening Monitoring and Early Warning Capacities and the identification of landslide susceptibility in pilot areas in the region. Climate change impact assessment was also initiated, with results expected during 2021. Low cost weather stations to be installed in pilot Biosphere Reserves were procured and are currently being tested.

IMPROVING GLOBAL VISIBILITY OF THE IHP THROUGH REGULAR WATER-RELATED EVENTS AT THE UNESCO GENERAL CONFERENCE AND THE UN GENERAL ASSEMBLY

135. A side event was organized during the Science Commission of the 40th Session of the General Conference of UNESCO on 18 November 2019. It served to launch 15 case studies from Africa, Asia and the Pacific, Europe and North America, Latin America and the Caribbean, and Arab States, compiled in the publication “Droughts in the Anthropocene”, which showcases the social, environmental and cultural impacts of droughts and water scarcity. Case studies, presented as videos, attracted approximately 500 viewers from a range of country delegations to the 40th General Conference of UNESCO. The publication and the side event were the result of the work of IHP in partnership with GRID-Arendal, the University of Southampton and the U.S. National Integrated Drought Information System (NIDIS).

136. UNESCO organised a side event, on Island Fresh Water Resilience – SIDS cooperation with UNESCO during the 74th UN General Assembly and on the day of the Mid-Term Review of the SAMOA Pathway, on 27 September 2019. The event involved a dialogue between governments and technical experts, and highlighted UNESCO’s cooperation with Saint Kitts and Nevis, São Tome e Principe, Seychelles and Vanuatu, focused attention on the specific needs and challenges of SIDS regarding water quality, wetland conservation and water availability. The event was chaired by Dr Kosi Latu, Director General of the Secretariat of the Pacific Regional Environment Programme (SPREP). Dr Shamila Nair-Bedouelle, Assistant Director General for the Natural Sciences spoke on behalf of the UNESCO Director General. The event was simulcast and then re-edited and released by UNTV, with over 17 000 viewers. HE Jose Cardoso Cassandra, President of Principe autonomous region, Republic of São Tome & Principe, gave a presentation on the country’s Biosphere reserves and the conservation and presentation programmes. HE Barry Faure, Secretary of State of Foreign Affairs and the Blue Economy, Seychelles, recalled that the Island of Aldabra, a UNESCO biosphere reserve and a UNESCO World Heritage, is home to the world’s largest population of giant tortoises. He reiterated that “Seychelles calls upon UNESCO to continue its commitment towards SIDS”. The Minister of Public Works and Water Services of Saint-Kitts-and-Nevis, Ian « Patches » Liburd, took this opportunity to renew the commitment of Saint-Kitts-and-Nevis to work with UNESCO’s International Hydrological Program for Small Island Developing States of the Caribbean to strengthen water security, a major challenge for the island notably in connection to desalination.

137. UNESCO provided contribution to the Fifth UN Special Thematic Session on Water and Disasters: Build Back Better Towards a More Resilient and Sustainable World Science and Technology Panel, STSWD5, June 25th, 2021. Dr Shamila Nair-Bedouelle, Assistant Director General for the Natural Sciences highlighted the importance of science and technology for a sustainable, resilient and climate-adaptive society in the post-COVID-19 era based on the lessons learned from the pandemic. The event was able to raise awareness and promote actions for building back better towards more resilient and

sustainable society in the post-COVID-19 era by addressing the issues of water and disasters as well as other development issues, such as urbanization, food, environment and climate change.

138. UNESCO collaborated with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the German Federal Ministry for Education and Research (BMBF) on the organisation of the forum “Water Dialogues for Results towards Bonn 2021: Accelerating cross-sectoral SDG 6 implementation”, held in May 2021.