

Intergovernmental Hydrological Programme
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**The ninth phase of the
Intergovernmental Hydrological Programme
IHP-IX 2022-2029**

Science for a Water Secure World in a Changing Environment

**Matrix of Key Activities and
Output-level Performance Indicators
Operational Implementation Plan
(IHP-IX OIP Matrix)**

Priority Area 1: Scientific research and innovation

	Key Activities	Performance Indicators (Output)	Implemented by			Initiatives	Biennium execution			
OUTPUT			UNESCO Secretariat	UNESCO Water Family (Chairs, Centres Member)	Partners (UN, INGO, NGO, academia,etc)		41 C/5	42 C/5	43 C/5	44 C/5
1.1. International scientific cooperation strengthened and fostered to address unsolved problems in hydrology, improving scientific understanding of hydrological cycles across river basins and aquifers.		<ul style="list-style-type: none"> Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); 	x	x	x	ISI, IFI, IDI, FRIEND				
		<ul style="list-style-type: none"> Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; 								
		<ul style="list-style-type: none"> Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); 								
		<ul style="list-style-type: none"> Number of key stakeholders who are informed (disaggregated by: sex, age, ...*); 								
	1.Coordination of UNESCO scientific efforts on Unsolved Problems in Hydrology, including hydrogeology/geo-hydrology, in partnership with IAHS, IAH and other water related scientific associations, including organization of the capitalisation of knowledge, results and experience available in the UNESCO Water Family, incl. the Flagships, into published syntheses.									
	2.Establishment and maintenance of an exchange scheme among UNESCO water family and partners for research on Unsolved Problems and New, Emerging Topics in Hydrology.									
	3.Exploration of the emerging research challenges and periodic review of unresolved problems in hydrology, in cooperation with Hydrological Divisions of International Geophysical Organisations (e.g. AGU, EGU) in partnership with IAHS and IAH.									
	4.Establishment and implementation of UNESCO Biennial Award for Ph.D. studies and Biennial Conference series on Unsolved Problems and New, Emerging Topics in Hydrology, in partnership with IAHS, IAH, IAHR and other relevant organizations, such as WMO.									
1.2. Ecohydrology research and innovation at UNESCO-designated sites conducted and shared by the scientific community and UNESCO Water Family, communicated to assess the impact of ecohydrological and nature-based solutions on water cycles and include such solutions in Integrated Water Resource Management (IWRM) and services at all scales and in Sites' management.		<ul style="list-style-type: none"> Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); 	x	x	x	IFI, UWMP				
		<ul style="list-style-type: none"> Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; 								
		<ul style="list-style-type: none"> Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); 								
		<ul style="list-style-type: none"> Number of key stakeholders who are informed (disaggregated by sex, age, ...*); 								

		<ul style="list-style-type: none"> • Number of member states and national stakeholders (basin groups, other specific groups, communities, sectors and the like) supported; • Number of curricula revised to include sustainable water management (disaggregated by country); • Number of training materials produced and disseminated (disaggregated by country). 								
	1. Development and operationalization of a world-leading network/hub for transdisciplinary ecohydrological research, education and dialogue on ecohydrology and nature-based solutions for enhancement of WBRs+CE catchment sustainability potential (water, biodiversity, resilience to anthropogenic climate change, ecosystem services and culture and education) and promotion of Ecohydrology Web Platform (http://ecohydrology-ihp.org/demosites/).									
	2. Expansion of UNESCO ecohydrology sites to demonstrate ecohydrology and nature-based solutions as the sustainable way of water resources management, including in urban areas, in partnership with IAHS, IAHR and ISEH.									
	3. Co-design, standardization and consolidation of protocols of demo sites selection and monitoring to enable knowledge assimilation in partnership with IAHS and other data-related organizations (e.g. ERB); dissemination of progress on protocol standardisation/consolidation, site designation, meta-analysis of demo sites (such as through (co)convening sessions, e.g. in IAHS, IUGG, IWRM conferences).									
	4. Application of the ecohydrology approach within UNESCO water-related designated sites including biosphere reserves, geoparks and natural heritage sites for sustainability and resilience; publishing, sharing and promotion of the research and innovation at UNESCO-designated sites through articles, case studies and a compendium of case studies.									
	5. Investigation on how the catchment/river-basin based ecohydrology concept/nature-based solutions can be extrapolated to large-scale applications (continental/global scale).									
	6. Scientific support, capacity building, and promotion for coordinated implementation of ecohydrology principles including ecohydrological multidimensional enhancement of catchment sustainability potential WBSR+CE, UNSC SEEA ecosystem valuation, IUCN NBS Global Standard, FAO/TNC and World Bank guidelines.									
		<ul style="list-style-type: none"> • Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); 								

<p>1.3. Research on uncertainty in climatic scenarios, hydrological projections and water use scenarios conducted and recommendations communicated to decision makers and the general public to elaborate adaptive water management strategies.</p>		<ul style="list-style-type: none"> • Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; • Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); • Number of key stakeholders and members of general public who are informed (disaggregated by: sex, age, ...*); • Number of member states and national stakeholders (basin groups, other specific groups, communities, sectors and the like) supported; • Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, ISI, IFI, FRIEND, GRAPHIC	x			
	<p>1.Synthesis on uncertainties in the whole modelling chain (climate, hydrology, water use); Organization of the capitalisation of knowledge, results and experience available in the UNESCO Water Family, including the Flagships.</p>									
	<p>2.Research and preparation of state-of-the-art publications on uncertainty in climatic scenarios, hydrological projections and water use scenarios and intersectoral consultations among research teams (including publication and dissemination of Water Outlook).</p>									
	<p>3.Regional and national intersectoral dialogue and capacity building for adaptive water management in the face of uncertainty.</p>									
	<p>4.Research on groundwater conceptualization and evaluation in continental and large-scale models, in partnership with IAH, IAHS and international professional organizations (EGU, AGU).</p>									
	<p>5.Implementation of pilot projects on, and promotion of, Climate Risk Informed Decision Analysis (CRIDA) and other bottom up approaches that include hydro-climatic and non-climatic uncertainties integrated in hydrological projections and water use in different regions and across various spatial and time scales.</p>									
	<p>6.Contribution to exploration of a new generations of hydroclimatic scenarios (including hydrochemistry, hydroecology) and projections of water demands, via modelling time-variable hydroclimatic systems considering the many non linear and feedback/forward loops.</p>									
<p>1.4. Conducting scientific research on the exploration of</p>		<ul style="list-style-type: none"> • Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); • Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; 					x			

<p>new business models, the role of water utilities, broadening engagement and partnerships, and infrastructure by the scientific community supported to accelerate the circular economy transition of the water sector.</p>		<ul style="list-style-type: none"> • Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); • Number of member states and national stakeholders (basin groups, business groups, other specific groups, communities, sectors and the like) supported; • Number of training materials produced and disseminated (disaggregated by country). • Number of key stakeholders who are informed (disaggregated by: sex, age, ...*); 	X	X	X	FRIEND, UWMP		X	X	
	<p>1.Preparation and dissemination of state-of-the-art (best practices) publications on new business models, the role of water utilities, broadening engagement and partnerships, disclosure practices, and infrastructure in accelerating the circular economy transition of the water sector, as well as other industry sectors.</p>									
	<p>2.Identification of way forward and paradigm shifts of water reuse within a circular economy using ecohydrology demosites both in agricultural and urban settings to explore new water-business models; publication and dissemination of reports and papers.</p>									
	<p>3.Intersectoral dialogue among public, private and civil water stakeholders for promoting the circular economy transition of the water sector and of other industry sectors and expansion of good practices.</p>									
	<p>4.Engagement through dialogue, publications, and events highlighting the opportunities for the corporate world, finance and investment sector and presenting best industry examples.</p>									

<p>1.5. Undertaking and sharing assessments on the interaction between humans and water, in line with socio-hydrology by the scientific community supported to develop adaptive pathways, scenarios and strategies for water management.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders who are informed (disaggregated by sex, age, ...*); •Number of member states and national stakeholders (basin groups, other specific groups, communities, sectors and the like) supported; •Number of curricula revised to include sustainable water management (disaggregated by country); •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, IFI, IDI, FRIEND		x		
	<p>1. Contribution to research, knowledge generation and dissemination on socio-hydrology, including socio-hydrogeology, as a follow-up of the Panta Rhei decade and previous IHP initiatives in partnership with IAHS.</p>									
	<p>2. Formulation and initiation of a socio-hydrology scientific dialogue among natural and social sciences researchers (including hydrological, ecohydrological, hydrogeological, social, and climate scientists and agronomists) and local communities/stakeholders (human-water models, case studies).</p>									
	<p>3. Conducting and supporting scientific research to assess the interaction between humans, environment and water, in line with socio-hydrology within an urban / rural setting and develop adaptive pathways, scenarios and strategies for water management.</p>									
	<p>4. Conducting an assessment and preparing a synthesis report on the socio-hydrology-related knowledge within the UNESCO Water Family, including the Flagships.</p>									

<p>1.6. Scientific knowledge, methodologies and tools in addressing water-related disasters, such as flood and drought elaborated and/or enhanced towards timely forecasting.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ... *); •Number of key stakeholders who are informed (disaggregated by sex, age, ... *); •Number of member states and national stakeholders (basin groups, other specific groups, communities, sectors and the like) supported; •Number of curricula revised to include sustainable water management (disaggregated by country); •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, ISI, IFI, IDI, FRIEND, GRAPHIC	x			
	<p>1. Research and knowledge generation on the scientific advances in addressing and timely forecasting of water-related disasters, such as (flash) floods, (flash) droughts and rainfall-induced landslides; and on additional impact of synchronous and/or cascading water-related hazards, in partnership with EGU, AGU, IAHS, ISEH and ICL – International Consortium on Landslides and IPL - International Programme on Landslides including good practices and lessons learned.</p>									
	<p>2. Science-policy dialogue and capacity building on water management that considers wet and dry extremes (floods and drought), including symposia, workshops, and sessions in related events/fora.</p>									
	<p>3. Assessment of impact of past projects, review of lessons learned, and formulation and implementation of new projects at country level or/and basin level in different regions in addressing water related disasters (through deployment of EWS, flood and drought hazard mapping, risk mapping and building capacity) and investigations and publications on why droughts/floods in some catchments are more sensitive to land-use/cover and geomorphic change than in others, in partnership with IAHS.</p>									
	<p>4. Development of online synthesis systems to strengthen water-related disaster resilience and sustainability with functions for users to make maximum use of climate change projection and early warning and share good practices and success/failure stories in each mother tongue.</p>									

<p>1.8. Development and sharing of knowledge and innovative solutions on improving water quality and reducing water pollution by the scientific community supported and communicated to support science-based decision-making, improve knowledge, services and reduce health related risks.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders who are informed (disaggregated by sex, age, ...*); •Number of member states and national stakeholders (basin groups, utilities, regulators, service providers, other specific groups, communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	IIWQ	x	x		
	<p>1.Thematic assessments of water quality at the basin, city, national, regional and global scales to identify key water quality and pollution challenges.</p>									
	<p>2.Promotion of innovative tools and policies and capacity building for water quality management and pollution control, by identifying and disseminating innovative, best technological solutions, nature-based solutions and policies for different stakeholders.</p>									
	<p>3.Development of science-based decision-making guidance on ecohydrological and ecosystem-based approaches to water quality management, with reference to nature-based and hybrid grey-green solutions and cross-cutting outputs.</p>									
	<p>4.Knowledge generation and science-based advice for decision-making, including through conferences and science-policy briefs, on the impact of global change,</p>									

<p>1.9 Development and sharing of new technologies using, earth observation, Artificial Intelligence and Internet of Things by the scientific community and service providers are communicated to and/or used for capacity strengthening of water stakeholders to increase their use in hydrological planning and assessment as well as monitoring and distribution networks.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders who are informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (basin groups, utilities, regulators, service providers, other specific groups, communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	<p>G-WADI, IFI, IDI, FRIEND, IIWQ, WLRI</p>		x		
	<p>1. Facilitation of the development, and promotion, of tools and methodologies based on earth observations, Artificial Intelligence (AI), Machine Learning (ML) and Internet of Things (IoT) for water resources assessment and monitoring and promote use of software applications such as rainwater harvesting, observation and as well as flood and drought monitoring.</p>									
	<p>2. Pilot projects and programs, including publications addressing guidelines on the effective and safe use of new technologies to examine applicability to country conditions, to adoption/upscaling and to produce recommendations in cooperation with WMO and other partners, as appropriate.</p>									
	<p>3. Joint development of scientific activity and capacity building program with AMCOW and NEPAD Water CoE on technologies and innovation to support African Water Vision 2025 and Agenda 2063.</p>									
	<p>4. Use of Earth observations, satellite remote sensing and UAV technologies, for freshwater quality monitoring by developing and applying the UNESCO Global Water Quality Portal to basins around the world in different regions, in cooperation with UNEP, the World Water Quality Alliance and other partners, as appropriate and including the development of new systems.</p>									
	<p>5. Development and sharing of new knowledge on Smart Water Management systems.</p>									

<p>1.10 Conducting and sharing of research on integrating citizen science in the hydrological discipline by the scientific community and other stakeholders supported, to improve understanding of the water cycle enabling science-based decision making.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ... *); •Number of key stakeholders, including members of the general public, who are informed (disaggregated by sex, age, ... *); •Number of member states and national stakeholders (basin groups, citizen groups, utilities, regulators, service providers, other specific groups, communities and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, IIWQ	x	x		
	<p>1. Citizen science pilot studies in different regions for water resources monitoring and crowdsourced assessments by local stakeholders, including validation of data quality to ensure adequate accuracy.</p>									
	<p>2. Country and community level projects integrating indigenous knowledge in water and land management, through citizen and open science methodologies to build water resilience.</p>									
	<p>3. Collaboration with AMCOW and/or NEPAD Water CoE to pilot crowdsourced/citizen science-based project monitoring water quality towards improved water management, involving, among other collaborators, the Citizens AND HYdrology (CANDHY) Working Group on water towards improved water management).</p>									
	<p>4. Continued Research and Development and capacity building work, including development of a citizen science toolbox, its promotion through training programmes and in cooperation with non-governmental organizations as catalysts.</p>									

<p>2.5 Capacities of skilled professionals and technicians at water-related tertiary and vocational education strengthened to identify the main gaps for sustainable water management towards providing appropriate tools to governments and societies to address those gaps and the Agenda 2030 targets.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists, educators, trainers and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, civil servants, professionals who are informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (national statistical institutes, other specific groups, basin groups, communities, sectors and the like) supported; •Number of curricula revised to include sustainable water management (disaggregated by country); •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	FRIEND		x		
	<p>1. Full development and promotion of the new water education indicator and web-based observatory for SDG 6.</p>									
	<p>2. Development of methodology and practical guide for the identification of capacity gaps and needs in the tertiary and vocational education agents (professionals, teachers, technicians etc.), prepared by core group of UNESCO Water Family members, and intersectoral dialogue and consultation at country level to identify and address the gaps and needs, including training of trainers, and country-level implementation of toolkits and e-learning modules. (Refer to output 2.4.)</p>									
	<p>3. Capacity building to bridge education-policy gaps in water and sustainable development by equipping professionals and technicians with relevant tools and knowledge.</p>									
	<p>4. Establishment of a UNESCO water family educational platform open to the Member States and partners to enhance learning opportunities and sharing of good practices and lessons learned, also valorizing Ecohydrology Demosites, MAB Biosphere Reserves and other UNESCO designated sites.</p>									
	<p>5. Expanding and upscaling the NEPAD/EU Human Capacity Development project in Africa, in partnership with EU Joint Research Centre (JRC) and AMCOW.</p>									

<p>2.6 Capacities of decision makers, and water managers and key water sector institutions strengthened allowing them to take advantage of new technologies and research to enhance better decisions, design and implementation of integrated and efficient water policies.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists, civil servants, educators, trainers and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, policy-makers, professionals who are informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (technology groups, other specific groups, basin groups, communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, ISI, , FRIEND				
	<p>1. Coordination of the UN-Water initiative to building capacity to accelerate SDG 6, with UN DESA as co-lead.</p>									
	<p>2. Building capacity to mainstream research recommendations and relevant technology including nature-based solutions/ecohydrology in decision-making for middle/upper level civil servants, water managers, and professionals.</p>									
	<p>3. Science-policy dialogue in countries and regions, including through workshops to science-policy gaps and to strengthen institutional capacities in water and sustainable development.</p>									
	<p>4. Capacity building, including refresher, hands-on workshops, to showcase the effective use of new technologies, data and information, good practices and to jointly assess applicability opportunities and barriers, including support to facilitators who assist stakeholders to apply science and technology effectively, protect their lives and assets, and continue their livelihoods and businesses by making maximum use of the online synthesis systems.</p>									

<p>3.3 Comparing and validating open access data on water quantity, quality and use and their sharing by the scientific community supported for sustainable water management.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientist, and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, civil servants, professionals, partner agencies who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (data and statistics entities, other specific groups, basin groups, communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	<p>WHYMAP, IIWQ</p>				
	<p>1. Enhancement of the capabilities and user-friendliness of IHP-WINS, including the extension of IHP-WINS with new members, new data and new contributions from members.</p>									
	<p>2. Facilitation and support for enhanced access to validated data, metadata and information, and coordinated access across the major water and related data bases, including the population and promotion of databases and platforms to make groundwater-related data accessible to multiple stakeholders and improvement of the capabilities of the global MAR portal hosted by UNESCO-IGRAC.</p>									
	<p>3. Participation in and support to coordination of water data services, including with UN-Water, FAO, UNEP, UNICEF, WMO, WHO, GEO, other agencies, programmes, partners and water operators.</p>									
	<p>4. Scientific data comparison and cross validation across domains and facilitation for use by the scientific community to enhance compatibility and harmonization across disciplines and teams.</p>									

<p>3.4 Capacity of scientific community strengthened to develop, share and apply scientific tools for data processing (like data assimilation and visualization methods, quality assurance protocols to connect existing databases and outreach protocols).</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists, key stakeholders, members of public and private sector groups who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, civil servants, and professionals who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (data and statistics entities, other specific groups, basin groups, communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	<p>G-WADI, WHYMAP</p>				
	<p>1. Promotion of research and the tools involving open source and public domain environment; implementation of ontology principles under the premises of normalization, standardization and interoperability making compatible the results of the research in any IT format.</p>									
	<p>2. Capacity development of stakeholders in public and private sectors, and civil society in hydrological data collection, validation, interpretation and sharing as well as data entry, storage and subsequent access processes.</p>									
	<p>3. Development and sharing of data analysis methods including information fusion, data integration, assimilation, and visualization, e.g. through mobilization of UNESCO city networks like MAWAC.</p>									
	<p>4. Enhancement, especially, of ground network observation and satellite observation capacity and integrated water-cycle observation capacity; and improvement of data integration and analysis capacity, e.g. through actions including trainings programmes, summer schools, and other means.</p>									

Priority Area 4: Integrated water resources management under conditions of global change

	Key Activity	Performance Indicator (Outcome Level)	Implemented by			Initiatives	Biennium execution			
OUTPUT			UNESCO Secretariat	UNESCO Water Family (Chairs, Centres, Member States/IHP National Committees)	Partners (UN, INGO, NGO, academia, etc)		41 C5	42 C/5	43 C/5	44 C/5
4.1 Conducting and sharing of research on inclusive and participatory approaches by the scientific community, to ensure open, active, meaningful gender-responsive engagement of youth, local and indigenous communities supported to enable all stakeholders to be part of the water management process.		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists, key stakeholders, members of civic groups who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, civil servants, professionals, and members of key groups reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (youth groups, local/indigenous groups, other specific groups and communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, FRIEND		x		
	1. Conducting and sharing scientific research in inclusive and participatory water management with gender emphasis and engagement of youth, local and indigenous communities, e.g. in selected demonstration sites (such as Ecohydrology demosites, CRIDA applications and UNESCO designated sites); studies and country level pilots including stocktake on stakeholder participation in water management at all levels, and a country pilot showcasing modalities and benefits of engagement.									
	2. Development and dissemination of best practices and innovative solutions to engage communities, youth, women, indigenous groups and national minorities in water management, including through country-level, regional and global dialogues, at all levels and across sectors.									

	3. Scientific studies on the implications of the global changes on water resources and the role of water management in response to global changes, including spatial-temporal optimization considering global change, in support of adaptive decision-making.									
	4. Raising awareness and building capacity of the professionals, decision-makers and communities in the use of methodologies and tools to inform planning and management of water under global changes.									
	5. Support and facilitation of the development and use of methodologies and tools in mainstreaming global changes, including within urban water management (e.g. extended application of City Blueprint Framework) and for climate change (e.g. CRIDA); raising awareness towards sustainable water consumption under uncertainty and global changes.									
4.9 Implementing integrated water resources management at all levels, through transboundary cooperation as appropriate by Member States, supported, in coordination with UN-Water and UNECE, to achieve SDG target 6.5.	<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of member states supported in improving their transboundary water systems (surface water and groundwater) management and governance; •Number of Member states submitting reports on the SDG 6.5.2 indicator on transboundary cooperation; •Number of key stakeholders, civil servants, professionals, and members of key groups who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (urban groups, climate services, other specific groups and communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, FRIEND ISARM, WHYMAP		x			

Priority 5: Water Governance based on science for mitigation, adaptation, and resilience

	Key Activity	Performance Indicator (Outcome Level)	Implemented by			Initiatives	Biennium execution			
OUTPUT			UNESCO Secretariat	UNESCO Water Family (Chairs, Centres, Member States/IHP National Committees)	Partners (UN, INGO, NGO, academia ,etc)		41 C5	42 C/5	43 C/5	44 C/5
5.1 Awareness raising of decision makers at all levels on the importance of science-based water governance by the UNESCO Water Family supported, to enhance the overall resilience of communities to effects of global change.		<ul style="list-style-type: none"> •Number of key stakeholders, civil servants, professionals, and members of key groups who are sensitized (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (urban groups, climate services, other specific groups and communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, IFI, FRIEND, GRAPHIC				
	1. Organizing, co-organizing sessions in intergovernmental meetings, UN platforms and processes, and major international and regional events with relevant tailored messages and science-based governance recommendations.									
	2. Active participation and engagement in international and regional campaigns/processes to promote the role of science-based water governance in resilience against global changes.									

	<p>3. Sharing with the decision makers the benefits of science-based water governance by developing the link with experimental research basins, ecohydrology demosites, engaging with the UNESCO Water Family and enhancing the understanding of the consequences of such governance.</p>									
	<p>4. Engagement with public decision-makers in development planning, pandemic and disaster response, and climate change adaptation/mitigation to provide science-based water input.</p>									
<p>5.2. Integration of sound science in water governance instruments improved reflecting adaptation to climate change and IWRM, integrating surface and groundwater for their uptake by decision makers.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, decision makers and members of key groups who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (urban groups, climate services, other specific groups and communities, sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	<p>IDI, FRIEND, ISARM, GRAPHIC, WHYMAP , UWMP</p>		x		

	<p>1. Publication and dissemination of case studies on science-informed water governance for management of surface and groundwater, in IWRM context and for climate change adaptation, also linking with experimental research basins and the UNESCO Water Family.</p>									
	<p>2. State-of-the-art research and publications on the instruments of water governance, both surface and groundwater, for increased climate resilience and IWRM implementation.</p>									
	<p>3. Coordinated implementation of a set of urban water management actions and solutions, including the establishment of the Megacities Alliance for Water and Climate (MAWAC) and its cooperation platform based on IHP-WINS.</p>									
	<p>4. Capacity development of stakeholders in implementing sound and adaptive, context-specific and location-based water governance in local, national and transboundary water resources with focus on climate change and water-related disasters.</p>									

<p>5.3. Sciences -based assessment and development of guidelines, for strengthening water-related content in Nationally Determined Contributions and National Adaptation Plans, conducted to strengthen water-based climate policy-action nexus for adaptation and mitigation.</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, decision makers and members of key groups who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (specific groups and communities, climate-related sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, FRIEND		x		
	<p>1. Development and pilot implementation of vulnerability assessment framework for hydro-climatic hazards and practices, towards and in NDCs and NAPs, establishing links to open data when appropriate, on climate change (e.g. linking to ISIMIP, ISIPedia and Climate Services such as COPERNICUS) towards climate adaptive paths, especially in SIDS.</p>									
	<p>2. Establishment, in close cooperation with UNFCCC, of a service for coordinated support to Member States on education and capacity development into NDCs and NAPs with a view to mobilizing public/private funds and investments.</p>									

	3. Development of a science-based framework and guidelines for the assessment and inclusion of surface and groundwater-related and ecohydrology-related contents in NDCs and NAPs.									
	4. Joint assessment of selected NDCs and NAPs with country partners and recommendations to incorporate water-related content in adaptation and mitigation components.									
5.4. Conducting and sharing of research on novel approaches of adaptive water management by the scientific community supported and capacities of Member States strengthened to enhance sound water governance.		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, decision makers and members of key groups who are reached out and informed (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (specific groups and communities, climate-related sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x	x	x	G-WADI, IDI, FRIEND, ISARM, MAR, GRAPHIC, WHYMAP		x		

	<p>1. Supporting and facilitating the research on novel approaches to adaptive water management, including adaptive urban water management; dissemination of the research results; training and refresher programs for related public officials, water managers, professionals and water operators.</p>									
	<p>2. Development and pilot implementation of guidelines for incorporating science-based tools and methodologies into the principles of good groundwater governance and adapt them to local contexts and promote the principles of good groundwater governance through the organization of the Groundwater Summit (Dec. 2022).</p>									
	<p>3. Science-policy dialogue (including citizen science) in support of Member States to incorporate in their policies and practices, sound water governance and adaptive water management approaches.</p>									
	<p>4. Collaboration with regional centres of expertise on the development and implementation of projects and activities, e.g. with AMCOW and/or NEPAD Water Centres of Excellence, in novel approaches in adaptive water management.</p>									

<p>5.5 Capacities of the scientific community and decision makers strengthened on new frameworks and tools, to underpin water governance and build resilience</p>		<ul style="list-style-type: none"> •Number of knowledge products (books, reports, assessments, statistics, tools, methodologies etc.) produced and disseminated (disaggregated per country); •Number of peer-reviewed articles, patents, scientific journal editions, scientific conference proceedings produced and disseminated; •Number of scientists and key stakeholders who have improved knowledge (disaggregated by sex, age, ...*); •Number of key stakeholders, decision makers and members of key groups who are sensitized (disaggregated by: sex, age, ...*); •Number of member states and national stakeholders (specific groups and communities, climate-related sectors and the like) supported; •Number of training materials produced and disseminated (disaggregated by country). 	x		x	G-WADI, FRIEND				
	<p>1. Engagement with the science community and government partners, for state-of-the-art research, publications and capacity building on new and emerging frameworks and tools to support water governance and build resilience, including support to accelerate the Agenda 2063 of the African Union.</p>									
	<p>2. Development and implementation of upscalable, multi-purpose projects to strengthen water governance, build resilience across sectors, and encourage positive behavior change.</p>									

	<p>3. Collaboration with strategic regional frameworks, such as, but not limited to, strategic cooperation with relevant regional frameworks, including AMCOW and NEPAD Water CoE on water governance and achievement of Agenda 2063 targets, for an evidence-informed change.</p>									
	<p>4. Development and implementation of projects to strengthen efficiency, effectiveness, and stakeholder confidence and engagement, around frameworks and objectives such as IWRM, nexus, resilience to shocks, disasters, and climate change.</p>									