



Asia & Pacific Regional Synthesis Report

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Abbreviations

A&P	Asia and the Pacific
ADB	Asian Development Bank
ADBI	ADB Institute
APWF	Asia-Pacific Water Forum
APWS	Asia-Pacific Water Summit (of APWF)
ASBP-4	Aral Sea Basin Countries-4
AWC	Asia Water Council
AWDO	Asian Water Development Outlook
AWP	Australian Water Partnership
BAPPENAS	Ministry of Planning (of Indonesia)
CACENA	Central Asia and Caucasus
CCA	Climate Change Adaptation
COP	Conference of the Parties – UN Framework Convention on Climate Change
CPS	Country Partnership Strategy (of ADB)
CREWS	Climate Risk Early Warning Systems Initiative
DFRI	Disaster Risk Financing and Insurance Strategy
DMC	Developing Member Countries (of ADB)
DOA	Direct Access Actors
DPF	Disaster Pooling Fund
DRR	Disaster Risk Reduction
EA	East Asia
EMS	Early Monitoring system
EW4ALL	Early Warning for All
EWS	Early Warning Systems
FPV	Photovoltaic power generation
FRDP	Framework for Resilient Development in the Pacific
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEDSI	Gender Equality, Disability, and Social Inclusion
GEF	Global Environment Fund
GRiF	Global Risk Financing Facility
GWOPA	Global Water Operator Partnership Alliance
GWP	Global Water Partnership
HLPW	High-Level Panel on Water
IFAS	International Fund for Saving the Aral Sea
IPCC	Intergovernmental Panel on Climate Change
IWAC	International Water Assessment Center
IWC	International WaterCentre
IWMI	Integrated Water Management Institute
IWRM	Integrated Water Resource Management
IYGP	International Year of Glaciers' Preservation (2025)
JWF	Japan Water Forum
KD	Key Dimension (of AWDO)
KMCRC	Korea-Mekong Water Management Collaboration Research Center
LDC	Least Developed Countries
MPWH	Ministry of Public Works and Housing (of Indonesia)

MYE	Meaningful Youth Engagement
NAP	National Adaptation Program
NCD	National Determined Contributions
NEA	North East Asia
NGO	Non-Governmental Organization
NWS	National Water Security
PDNA	Post Disaster Needs Assessment
PICs	Pacific Islands Countries
PRP	Pacific Resilience Partnership
PWWA	Pacific Water & Wastewater Association
RP	Region Process (session)
RS	Regional Synthesis (session)
SaciWATERS	South Asia Consortium for Interdisciplinary Water Resources Studies
SCM	Stakeholders Consultation Meeting (of WWF)
SDG	Sustainable Development Goal
SEA	South East Asia
SFDDR	Sendai Framework for Disaster Risk Reduction
SIDS	Small Island Developing States
SPC	Secretariat of Pacific Community
SWA	South West Asia
TBC	To be confirmed
UNEP	United Nation Environmental Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
WASH	Water Sanitation and Health
WMO	World Meteorological Organization (UN)
WSAP	Water Scarcity Action Plan
WSP	Water Scarcity Program
WWC	World Water Council
WWF10	World Water Forum 10

1 Introduction

This report describes the approach and outcome of the Asia-Pacific Regional Process for the World Water Forum 10 (WWF10) in Bali-Indonesia in May 2024.

1.1 Concept Note and Drivers of Change in the Region

1.1.1 Concept Note of the Asia of the Pacific Regional Process

The Asia and the Pacific region boast a diverse geography and climate. The region is home to 60 percent of the world's total population, with varying levels of access to water resources, sanitation, and services. Asia and the Pacific's bustling urban centres, experiencing one of the fastest population and economic growth rates, now face increasing demand for water for drinking, sanitation, and industries making it even more susceptible to frequent natural disasters, environmental challenges, and exacerbating water insecurity. In the region, inequality and inequity in access to natural resources and weak governance are socio-politically challenging. Effectively addressing these multifaceted issues demands sustainable and integrated approaches that take into consideration the region's unique characteristics and the diverse needs of its populations.

However, water services need help to keep up with the pace of urban development, already an imperative challenge. In contrast, rural and marginalized areas face even more fundamental gaps to bridge, including limited access to safely managed water, water scarcity due to increasing demands and possible reallocation to meet higher economic needs, inadequate water infrastructure and services, water pollution, socio-economic and gender inequalities, lack of awareness and capacity, limited enabling environments for collective actions for water security issues holistically, and limited financial resources.

The Asia Pacific Region is also home to almost half the world's Small Island Developing States (SIDS), as well as countries with significant populations living on small islands. More than a third (17) of ADB's member countries are SIDS, including the world's only four nations comprised exclusively of low-lying atolls (Kiribati, the Maldives, the Republic of the Marshall Islands, and Tuvalu). As a sub-region, our Pacific Island Countries endure some of the world's lowest levels of access to safe water and sanitation and remain disproportionately impacted by the water-related impacts of disasters and climate change. Approximately, 40% of the region's Pacific population live without access to basic drinking water facilities, and approximately two-thirds live without basic sanitation.

Addressing these challenges requires comprehensive and holistic approaches. Comprehensive solutions encompass various elements, such as leveraging science, knowledge, and innovation, improving access to hydrological data, enhancing resilient water infrastructure, fostering inclusive water governance, promoting collaboration among diverse stakeholders, reducing inequality and poverty, ensuring gender and social inclusion in water governance, enhancing transboundary cooperation, and utilizing innovative financing mechanisms.

The Asia-Pacific region must prioritize the development of quality-oriented societies that promote resilience and sustainability in water management grounded in inclusivity. This can be achieved through concerted efforts at various echelons from interventions at the local level to the sharing of knowledge at regional and global levels. Such actions are imperative towards the realization of regional prosperity as well as the fulfilment of the Sustainable Development Goals (SDGs).

Such endeavours will be envisaged by the comprehensive water management plans rooted in the principles of sustainability, resilience, and inclusiveness through the collaboration of the governments, research agencies, civil society organizations, and private sector stakeholders that participated in the 10th World Water Forum Regional Process. These plans will include locally tailored solutions, shared pathways, enabling conditions, tools and methodologies, and showcases of best practices.

Lastly, we need to understand better the nexus of water-culture-innovation for countries and communities in the region and multi-stakeholders of the other regions in the world, particularly the role of culture in our present and future through showcased practices, debate, and collectively think about how to best utilize and integrate the well of wisdom in our region for scaling impacts. Culturally enabled resilience and shared prosperity will better protect our lives and livelihoods for a better future.

1.1.2 Drivers of change for the region

Climate change is critically important for Asia and the Pacific, considering the high population density and the economic impacts, but it also threatens the diverse ecosystems in the region, the vast deserts, rainforests, and tundra regions. Climate change is also having serious impacts on the functioning of the "Water Towers" of Asia, which refer to the major mountain ranges such as the Himalayas, Hindu Kush, and the Tibetan Plateau. This area plays a crucial role providing freshwater to about 1.9 billion people, about 30% of the world's agricultural production, and supporting their economic activities, by acting like natural reservoirs that store and supply water to a vast expanse of the continent.

Some facts on Asia and the Pacific:

- Over 500 million people without access to basic water supplies, over 1.14 billion people without access to sanitation
- 80% of wastewater generated by cities discharged untreated
- Rising demand for water for food and energy production, outdated infrastructure
- Climate change impacts primarily felt through water with A&P the most disaster-affected region globally with frequency and magnitude of natural hazards and impacts likely to increase
- Fragmented governance depleting environmental quality and resources with a lack of enabling environment for private financing and operational sustainability
- Slow pace of technology adoption, innovations, digitalization, earth observation

Digital revolution. Rapidly developing information and communication technologies are already having a major influence on water management. "Digital water" is transforming the way cities use and manage water. Applications of artificial intelligence (AI) are expected to shift from current maintenance systems based on routine inspections and work schedules to a more predictive approach using intelligent sensors. Advances in AI models, sensors, and robotics will allow mobile repair bots to detect and fix leakages, helping to reduce the significant volume of nonrevenue water. Other applications might include the Internet of Things (IoT) for monitoring water consumption and demand to improve short- and long-term forecasting; and AI-based techniques to optimize reservoir operations, monitor water quality, and monitor and predict water-related disasters, for example in flood forecasting. Broadening the application of AI-based techniques will require a significant upturn in AI-related knowledge generation, awareness, skills, and data collection.

Agriculture in transition. The links between food production systems, the environment, and climate change are complex and in constant flux. Climate change and environmental issues related to water, biodiversity, soil health, and nutrient cycling are seen as the most important drivers of

change, representing a mix of short- and long-term risks which all have implications for water use. These implications cover the following:

- i. Climate and the environment, with a need for adaptation to change the carbon emissions profile of agriculture and reduce its environmental footprint, including on water resources.
- ii. Technological innovation (see above).
- iii. The consequences of dietary change, including more healthy and sustainable diets, a rise in aquaculture, and a quest for alternative protein (including the emergence of disruptive technologies for protein generation).

Growth in renewable energy. Although demand for fossil fuels remains high, the share of renewables continues to grow, driven mainly by wind and solar technologies. In parallel, hydropower is having a resurgence and will be promoted further to complement wind and solar and to provide backup capacity, reservoir storage, and grid voltage stability to balance the intermittent production of solar and wind. This supporting role of hydropower will produce greater diurnal variability of river flows as projects switch on and off rapidly to stabilize grid voltage, leading to impacts for communities and ecosystems downstream. Such interconnectivity strengthens the argument for more coordinated planning and operation of electricity and water resource systems to seek mutual benefits and mitigate impacts. The reduction of renewable energy costs will also stimulate the expansion of desalination projects for water supply, particularly in coastal areas. Overcoming the high cost and carbon emissions from fossil fuel-powered desalination projects is a major step forward, but concerns remain on minimizing the environmental impact of waste products.

Addressing these challenges requires comprehensive and holistic approaches. Comprehensive solutions encompass various elements, such as leveraging science, knowledge, and innovation, improving access to hydrological data, enhancing resilient water infrastructure, fostering inclusive water governance, promoting collaboration among diverse stakeholders, reducing inequality and poverty, ensuring gender and social inclusion in water governance, enhancing transboundary cooperation, and utilizing innovative financing mechanisms.

The Asia-Pacific region must prioritize the development of quality-oriented societies that promote resilience and sustainability in water management grounded in inclusivity. This can be achieved through concerted efforts at various echelons from interventions at the local level to the sharing of knowledge at regional and global levels. Such actions are imperative towards the realization of regional prosperity as well as the fulfilment of the Sustainable Development Goals (SDGs).

Such endeavours will be envisaged by the comprehensive water management plans rooted in the principles of sustainability, resilience, and inclusiveness through the collaboration of the governments, research agencies, civil society organizations, and private sector stakeholders. All these parties were invited to contribute to the WWF10 Regional Process. The result of this process includes locally tailored solutions, shared pathways, enabling conditions, tools and methodologies, and showcase best practices.

Lastly, we need to better understand the nexus of water-culture-innovation for countries and communities in the region and multi-stakeholders of the other regions in the world, particularly the role of culture in our present and future through showcased practices, debate, and collective thinking about how to best utilize and integrate the well of wisdom in our region for scaling impacts. Culturally enabled resilience and shared prosperity will better protect our lives and livelihoods for a better future.

1.2 WWF10 – Integrating the Political, Thematic and Regional Processes

The WWF10 distinguishes three parallel and integrated processes:

- **The Political Process** that involves negotiations, discussions, and the sharing of best practices and policies related to water management and conservation. The participants in the political process worked towards consensus on key issues and made declarations to address water challenges.
- **The Thematic Process** that addresses a wide range of topics (see Table 1) related to water and aims to share results of research and innovative solutions.
- **The Regional Process** that focusses on issues specific to different regions of the world. The regional process provided a platform for countries within a region to discuss common challenges, share experiences, and collaborate on regional water management strategies.

Each process was developed separately for WWF10 but with the aim to contribute to each other. The structures of all three processes are provided by the definition of six sub-themes and 30 topics. An overview of these sub-themes and topics of WWF10 is given in Table 1.

Table 1 Overview of sub-themes and topics of WWF10

	Sub-theme	Topic
1	Water Security and Prosperity	1A. Sound water supply and demand management 1B. Circular economy in the water sector and non-conventional water resources 1C. Water for food & agriculture 1D. Water for energy 1E. Water insecurity and development
2	Water for Humans and Nature	2A. Water quality improvement 2B. Conservation and restoration of freshwater ecosystems and biodiversity 2C. Safe drinking water for all 2D. Water sanitation and hygiene (WASH) for all 2E. IWRM and cross-cutting and cross-sectoral approaches
3	Disaster Risk Reduction and Management	3A. Integrated flood prevention and management 3B. Drought prevention and management 3C. Ecosystem-based DRR in the water sector 3D. Climate-smart sustainable and improved resilience of water infrastructures 3E. Early warning systems for all and emergency response mechanism
4	Governance, Cooperation and Hydro-diplomacy	4A. International collaboration at all levels, incl. transboundary 4B. Decentralized cooperation (e.g. at RBC level) 4C. Enhanced cross-sectoral dialogue and cooperation 4D. Active stakeholder involvement and public participation 4E. Transparent and accountable institutions and legal frameworks, integrity and equity (incl. gender, youth, minorities, etc.)
5	Sustainable Water Finance	5A. Revisiting international water financing architecture with emphasis on transparency, accountability, fairness & equity 5B. Innovative sustainable funding, financing and delivery mechanisms 5C. Improved funding for basic access to safe water and sanitation for all 5D. Special schemes and incentives promoting green finance 5E. Enhanced funding to cope with water crises, water disasters and for climate resilience
6	Knowledge and Innovation	6A. Smart water management and technological innovation 6B. Innovative organizational approaches 6C. Respect and valuation of indigenous and community based knowledge systems and integration into existing policies 6D. Upscaling of water information systems 6E. Enhance access to education & training on water & new concepts

1.3 The Regional Process of WWF10 – Approach and Objectives

Different setting and environmental conditions enable diverse regions to share commonalities in challenges and solutions. Hence, the Regional Process is essential in organizing the World Water Forum, considering that it provides a regionalized voice and priorities, enabling the two other processes to have an in-depth understanding of regional perspectives on the status of the thematic issues and political water agenda. This process also encourages acquiring new knowledge and sharing of experiences and best management practices across different regions.

The Regional Process has its core value in developing, analysing, and presenting case studies and practices related to issues at the local and regional levels. Hence, this process differs from the Thematic Process, which takes a more analytical/ theoretical approach based on global thematic priorities. The Regional Process had incorporated local and regional perspectives throughout its preparatory process and other processes.

The Regional Process is interlinked with the two other processes bearing in mind that the importance of each Sub-theme for the Thematic Process varies in every regional or local context. While the challenges in a particular region might be comparable, understanding the priority issues and solutions in each region or local was considered. The Regional Process also drives the political process through policy recommendations, commitments, and sharing of knowledge and experiences from a regional and local perspective as topics of every discussion within and between five different Political Process segments.

Dialogues and implementation plans can only be responsive when rooted in the local context. WWF10 has reinforced regional processes to articulate thematic and political issues from local and regional perspectives. This has resulted in more customized political commitment for action at the local level and practical solutions for thematic areas. The regional process also targeted understanding different regional experiences and knowledge in water management. To do this, a wide range of multi-stakeholders from regions and sub-regions were invited to draw localized solutions that could be realized in the regional context.

The objectives of the Regional Process were formulated as follows:

- To specify regional priorities and related tangible local action plans to share and implement for the solutions to the priorities identified in the regions.
- To facilitate regional dialogues and cooperation on local/ regional water-related challenges by identifying local and regional water priorities and developing solutions to those challenges.
- To catalyse the exchange of experiences, ideas, lessons, and potential solutions among different regions on common water issues through a set of inter-regional dialogues.
- To strengthen regional stakeholders of water able to raise the political profile of water in the respective region.

1.4 The Asia-Pacific Regional Process – defining the sub-regions

The Asia-Pacific region, as addressed in the Regional Process for WWF10, covers 47 countries, is divided into 5 sub-regions (Table 2 and Figure 1).

Table 2 Sub-regions and countries participating in the Asia-Pacific Regional Process

Sub-region	Countries
Central Asia and Caucasus Region	Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, and Uzbekistan (10 countries)
Northeast Asia	People's Republic of China (PRC), Japan, and the Republic of Korea (3 countries)
Southeast Asia	Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, East Timor, and Vietnam (11 countries)
South Asia	Bangladesh, Bhutan, India, Nepal, Pakistan, Maldives, and Sri Lanka (7 countries)
Oceania & Pacific Island Countries	Australasia Sub-Region: Australia, New Zealand (2 countries) Pacific Island Countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu (14 countries)

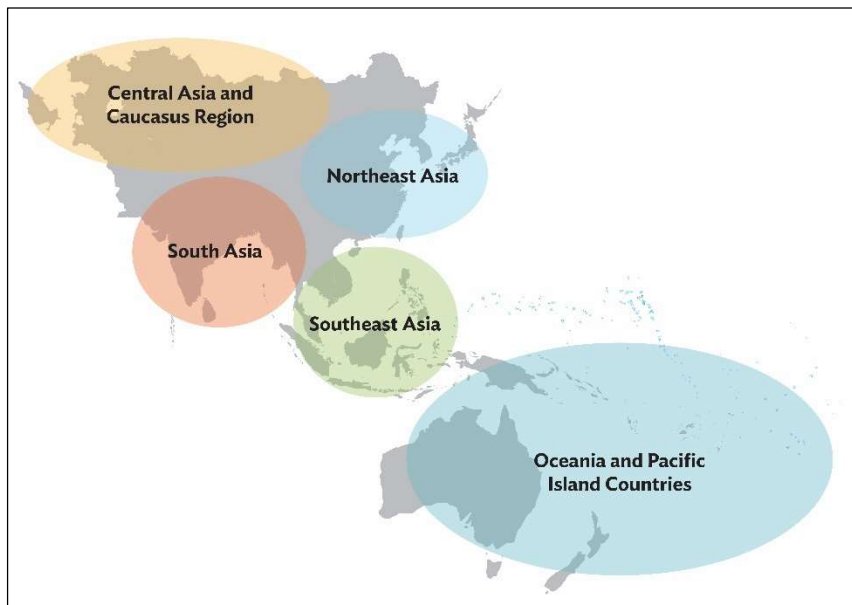


Figure 1 Map of Asia-Pacific sub-regions

The total population in the region is about 4,200 million (based on 2018 census). It is noted that the number of people living in each sub-region differs greatly as indicated in Figure 2. The figure shows also that India, PR China, and Indonesia are, in terms of population, very dominant in their sub-region. The sub-region Oceania & Pacific (with a population of 41 million) includes Australia and New Zealand. Without these two countries the population of the sub-region is only 11.5 million

of which 9 million live in Papua New Guinea. The total population of remaining Pacific Island nations alone in this region is about 2.5 million people.



Figure 2 Population by sub-region, with dominant countries in these sub-regions

1.5 Water Security Assessment of the Sub-regions

The goal of water management is to enable humans to live in harmony with nature and among themselves. Water is needed to support life and socio-economic activities, and if managed well the impacts of water-related disasters can be minimized. In other words, the aim is to become 'water-secure'. The concept of water security is comparable to other important resource securities such as food security and energy security. A definition of the term is provided in Box 1. Water security has many dimensions: ensuring the

Definition of Water Security

"The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."

UN-Water, 2013

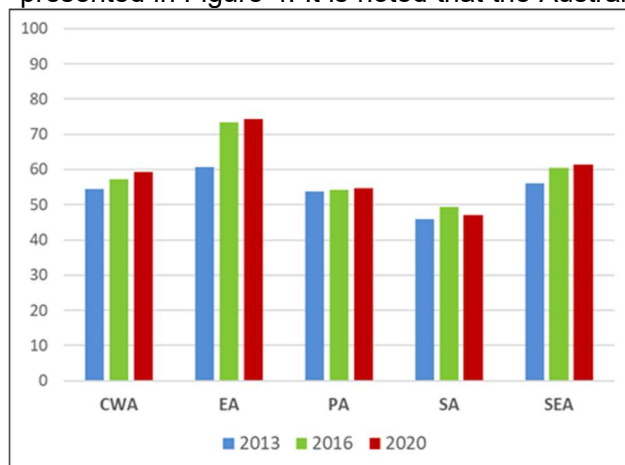
availability of adequate and reliable water resources, mitigating water-related risks and addressing the conflicts that may arise from disputes over shared waters. By specifying the dimensions of water security, decision-makers and stakeholders can form clear objectives within their plans. Approaches are available that aim to quantify Water Security and its various dimensions. The best-known example of such approach is given in the ADB publication "Asian Water Development Outlook 2020" (AWDO 2020) in which 5 Key-Dimensions (KDs) were identified, as demonstrated in Figure 3. The approach is used to measure the level of water security in the 48 countries in the Asia and Pacific Region and scores the countries for each KD at a scale of 1 (extremely poor) to 20 (perfect). Combining the five KDs results in an overall national water security score at a maximum score of 100. Based on the results, countries can identify gaps and solutions and ultimately increase their water security. AWDO 2020 has assessed the water security in the region in 2013, 2016 and 2020. This enables to analyse the progress made in the countries over time.



Figure 3 Approach to water security in AWDO 2020

Source: ADB (2020)

The water security of all countries involved in the regional process over those years is presented in the regional chapters. The average scores of the regions as defined in the regional process are presented in Figure 4. It is noted that the Australia and New Zealand are excluded from the data



in the Pacific sub-region to focus on the developing countries in the sub-region. The figure shows relative weak performance of the regions Pacific, Central Asia, and Southeast Asia and the relatively good performance of East Asia (mainly PRC) and South Asia. All countries show a good progress over time except for South Asia from 2016 to 2020.

Figure 4 National Water Security Score by sub-region

Source: ADB

1.6 Activities carried out in the Asia-Pacific Regional Process

1.6.1 Structure of the Asia-Pacific Regional Process

The Asia-Pacific Regional Process of the 10th World Water Forum has been coordinated by the Asia Pacific Water Forum (APWF: secretariat - Japan Water Forum), Asia Water Council (secretariat - K-Water), and the Asian Development Bank. Firstly, APWF and AWC signed a Letter of Intent with the government of the Republic of Indonesia and the World Water Council on the cooperation to support the organization of the 10th World Water Forum. This was done during the 2nd Stakeholders Consultation Meeting held on 12 October, 2023, in Bali, Indonesia. Since January 2024, the ADB joined APWF and AWC as one of the coordinators of the Asia-Pacific Regional Process, particularly to contribute to the Asia-Pacific Regional Process Synthesis Report.

Following the suggestion from the WWC, the regional processes of the 10th World Water Forum were based on a sub-regional division of the region. The Asia-Pacific regional process was structured into five sub-regions: Northeast Asia, Southeast Asia, South Asia, Central Asia and the

Caucasus, and Oceania and the Pacific Islands. Designated sub-regional coordinators were selected from both APWF and AWC member organizations for each sub-region to facilitate the multi-stakeholder coordination at the sub-regional and country levels.

1.6.2 Establishment of the 10 Topics Framework of the Asia-Pacific Regional

To ensure cohesive multi-stakeholder discussions, the APWF and AWC established the 10-topic framework of the Asia-Pacific Regional Process (Table 3), aligned with the six sub-themes and topics of the thematic process for the 10th World Water Forum. This 10-topic framework was developed prior to the 2nd Stakeholders Consultation Meeting of the 10th World Water Forum held in Bali on 12-13 October 2023. APWF and AWC agreed to develop the specific objectives for the Asia-Pacific regional process, i.e. to identify:

- a. the challenges in the sub-regions and opportunities in addressing the issues and actions;
- b. the breakthroughs, enabling environment and methodologies to address these challenges and enhancing the actions to deliver effective water management practices; and,
- c. locally tailored solutions, pathways, best practices and showcases, tools and frameworks.

Table 3 Ten-topic framework of A&P regional process and link with thematic process WWF10

	Topic framework Proposal	Corresponding with topics of Thematic Process at WWF10
1	Smart water management: opportunities and challenges	1A. Sound water supply and demand management 1B. Circular economy in the water sector and non-conventional water resources 1D. Water for energy 6A. Promote smart water management and technological innovation 6D. Upscale water information systems
2	Addressing water scarcity in A&P: effective tools for sustainable agricultural water management	1C. Water for agriculture
3	Sanitation improvement in A&P	2D. Access to water sanitation and hygiene for all
4	Diverse wastewater management challenges and the innovation to overcome the challenges	2A. Water quality improvement
5	The future of green water infrastructure harnessing the power of nature	2B. Conservation and restoration of freshwater ecosystems and biodiversity 2E. IWRM
6	Basin management for DRR and DRM	3. Disaster Risk Reduction and Management – all topics
7	Empowering youth leadership in addressing water challenges A&P	4D. Ensure active stakeholder involvement and public participation
8	Sustainable, resilient, inclusive sound water cycle from mountain to sea in each basin	2E. IWRM 4A. International collaboration at all levels, incl. transboundary 4B. Decentralized cooperation (e.g. at river basin council level) 4C. Enhanced cross-sectoral dialogue and cooperation 4D. Active stakeholder involvement and public participation
9	Mobilizing water finance for climate adaptation and DRM	5E. Secure and increased funding to prevent and overcome water-crisis, water disasters and enhance climate resilience
10	Roles of culture in solving water challenges	2E. IWRM 4B. Decentralized cooperation (e.g. at river basin council level) 6B. Innovative organizational approaches 6E. Enhance access to education and training on water and new concepts and others

Before the 2nd Stakeholders Consultation Meeting, the APWF and AWC Secretariat had a brief face-to-face meeting in Incheon in September and shared the topic interests of the Asia-Pacific Regional Process. Based on the meeting, the APWF Secretariat revised the 10 topics frameworks integrating the interests of the AWC. APWF shared the Concept Note and the 10 Topics Framework with the AWC. APWF Secretariat also shared the documents to the APWF members in the 30th APWF Governing Council Meeting held on 6th October 2023 and received their members' feedback. AWC Secretariat also shared the documents with the AWC members and received their feedback. Revising the documents based on the feedback of their members, both APWF and AWC members agreed on the concept note and the ten topic proposals.

1.6.3 Topic Selections of the Asia and Pacific Regional Process sessions at WWF10

At the 2nd Stakeholders Consultation Meeting, APWF and AWC organized the Asia-Pacific Regional Process roundtable discussion. The participants discussed the priority issues for each sub-region among the 10 topic frameworks. They selected two priority topics as each sub-regional session, a synthesis of the Asia-Pacific regional process, and topics for discussion through the inter-regional process of the World. A summary of the preparations and discussion at the 2nd Stakeholders Consultation Meeting can be found at the websites of APWF^{1,2}. The topics of the five synthesis sessions of the sub-regional process were proposed in January 2024 and subsequently approved by the WWC.

Table 4 Sub-regional coordinating agencies with their sessions at WWF10

Sub-Region	Coordinating Agencies	Sessions WWF10
North East Asia	Lead: Japan Water Forum Co-lead: Changjiang Water Resources Commission Members: Korea Water Forum and UNESCO Office for East Asia	RP1: River Basin Management under Changing Climate RP2: Incorporating Sociocultural Dimensions in Water Resources Management: Policies, Practices, and Challenges RS1: Youth session: Promoting intergenerational cooperation to create sound water cycle
South East Asia	Lead: GWP South East Asia Co-lead: NOC, MPWH – coordinated with BAPPENAS Members: KMCRC	RP3: Smart Water Management: Opportunity and Challenges RP4: Mobilizing Innovative Financing for Inclusive / Green and climate resilience for all RS2: Resilient and sustainable water scarcity management in Southeast Asia
South Asia	Lead: Women for Water Partnership Co-lead: SaciWATERs & Smart Water Solutions (Nepal) Members: IWMI and Gomal Damaan Area Water Partnership	RP5: Strengthening Resilience: Capacity Building for Gender-Inclusive Proactive Disaster Risk Reduction RP6: Inclusive sanitation management and service delivery with a particular focus on marginalized groups RS3: Towards the International Year of Glaciers' Preservation 2025 - Cooperation, Governance, and Priority Setting for Climate Action and Resilience Building to Glacier Melt

¹ Website: <https://apwf.org/coordinator-of-the-asia-pacific-regional-process-of-10th-wwf/>

² PowerPoint: <https://www.waterforum.jp/pdf/pr/Regional-Asia-Pacific-Result.pdf>

Sub-Region	Coordinating Agencies	Sessions WWF10
Central Asia	Lead: Chair EC IFAS Co-lead: GWP Central Asia	RP7: Mobilizing Water Finance for Climate Resilience in Central Asia and Caucasus RP8: Transboundary Water Cooperation in the Aral Sea basin for a better future RS4: Paths towards Water Security in Central Asia
Pacific Islands & Oceania	Lead: Secretariat Pacific Community (PICs) Co-lead: Australian Water Partnership (AWP) Members: International WaterCentre (IWC)	RP9: Water security and Pacific SIDS RP10: Strengthening engagement in water security to support Pacific resilience RP11: Climate-resilient sanitation in Pacific Small Island Developing States RS5: Water security and resilience of small island communities

Table 5 gives an overview of the subjects selected by the sub-region from the 10-topic framework. Some topics, such as Green Infrastructure and Wastewater Management, were not identified as such in the title of the sessions but were introduced through the speakers' presentations in the sub-regional and synthesis sessions. Moreover, while the selected subject itself directly addresses a certain topic, the program developed around that subject often appeared to be broader and the session included elements of other subjects, such as green infrastructure. RP3 on smart water management also included sanitation issues. Nature-based solutions were often mentioned as effective means for building resilience and adaptive capacity and to achieve environmental sustainability.

For all selected RS subjects a program was developed based on an analysis of the sub-regional challenges (objective a), the breakthroughs (objective b) and local solutions (objective c). The results of this analysis and the set-up and outcome of the sessions at WWF10 are described in the sub-regional chapters (chapters 2 till 6) of this document.

Table 5 Subjects selected by the sub-regions from the 10-topic framework

10-topic framework	NEA	SEA	SA	CA	PAC
Smart water management		RP3			
Water scarcity / agriculture		RS2		RS4	RP9
Sanitation			RP6		RP11
Wastewater management		(RP3)			
Green infrastructure					
Basin management / DRM	RP1		RP5		RP10
Empowering youth	RS1				
Transboundary cooperation			RS3	RP8	
Mobilizing finance		RP4		RP7	
Role of culture	RP2				RS5

RP = Topic Session at WWF10

RS = Synthesis Session at WWF10

Table 5 includes also the 5 synthesis sessions (RS) that the Asia and Pacific sub-regions prepared for WWF10. It is noted that these 'synthesis' sessions are not providing an assessment of the sub-regions or the overall region. Instead, most sessions address also specific subjects but approach these subjects from a broader, not sub-regional, view. As such they are also linked to the topics of the 10-topic framework.

1.7 Guiding Principles for Water Management

The development and management of our water resources to address the diverse and complex water challenges are guided by a range of general principles. These principles are designed to promote sustainable and equitable use of the water resources, considering the needs of different sectors and communities. The main principle is to follow an integrated approach by means of Integrated Water Resources Management (IWRM), which is based on: (i) a holistic approach of managing land, water, and ecosystems, (ii) the involvement of all stakeholders at a basin-level, and (iii) cross-sector coordination. IWRM aims for a sustainable development of the water system including resource conservation, environmental protection, and adaptation to climate change.

Based on the specific conditions in the Asia and Pacific Region, the general concept of IWRM has been broken down to five 'Guiding Principles'³ for water management interventions and initiatives. These Guiding Principles have been used in the Asian and Pacific regional process to structure the messages and policy recommendations resulting from the discussions in the sessions at WWF10. The following five Guiding Principles were used.

- **Building Resilience and Adaptive Capacity**

Asia and the Pacific is the most disaster-prone region in the world. It is expected that economic losses will increase as climate change is likely to amplify and intensify the impacts of the disasters. Building resilience and adaptive capacity to climate-induced disasters such as flood, drought, and tropical cyclones, as well as economic and other shocks and public health emergencies is fundamental for the further development of the region.

- **Promoting inclusiveness and Gender Equality**

An inclusive and gender equality approach to water management has to be promoted to give them equitable to access to water resources and involve them in decision-making processes. Promoting gender equality in water management can empower women by giving them greater control over water resources, decision-making processes, and economic opportunities related to water management.

- **Embracing Environmental Sustainability and Circular Economy**

Environmental sustainability considerations need to be integrated early into the planning process of developments. Emphasis is placed on three dimensions of sustainability: (i) the circular economy,⁴ in which waste is viewed as a resource; (ii) the value of water-ecosystems to communities; and (iii) the potential for mutual benefits from recognizing a nexus approach⁵, capitalizing on the links between water, food, and energy. Nature-based solutions with a greater emphasis on “green” infrastructure will help restore ecosystems and generate multiple benefits

³ The Guiding Principles as used in the Asia and Pacific Regional Process are based on the framework that ADB applies for its support to water sector activities in the region. Reference is made to ADB's Water Sector Directional Guide of November 2022. <https://www.adb.org/documents/strategy-2030-water-sector-directional-guide>

⁴ A circular economy contrasts with a linear economy by emphasizing the importance of reusing resources, in this case water, multiple times to extract maximum value and thereby free up the resource for other uses. Examples include reuse of treated wastewater and recovering and recycling nutrients from fecal sludge.

⁵ The nexus approach aims to ensure overall water security by deepening the understanding of the linkages and trade-offs between water and the food and energy security needs at project, sector, and country levels.

- **Improving Governance and Catalysing Finance**

Good governance is critical for the delivery of effective services across all water subsectors and the sustainable management of water resources. Institutional capacity and resources are essential to address political and socioeconomic risks in implementing good water management. This includes providing an enabling environment for private sector involvement, such as through public–private partnerships and to develop innovative financing arrangements such as green finance, credit enhancement measures, pooled finance, etc.

- **Fostering Innovation and Technological Advancement**

The technological advances of the rapidly evolving digital and communications revolution are redefining what is possible for water resources management and service delivery. This includes the scaling up of innovative technologies and digital solutions, including smart network management, remote sensing and geographical information systems, real-time data generation, artificial intelligence, and digital payment systems.

1.8 Structure of this Report

This report presents the outcome of the Asia and Pacific regional process. This is first done for each of the five sub-regions (chapters 2 till 6). Each sub-regional chapter starts with a short description of the main characteristics of the sub-region. The next section describes the sessions (RP and RS) that the sub-region prepared, including a description of the challenges, breakthroughs, and solutions for the specific subject of the session, as well as the set-up and outcome of the session itself. The sub-regional chapter is concluded with the main messages and policy recommendations of the sub-region. The last chapter (chapter 7) presents the water management policy context in the region and the specific messages and outcomes of the regional process for WWF10. Annex A provides the details of the 11 Regional Process (RP) sessions plans. Annex B does the same for the 5 Regional Synthesis (RS) sessions plans.

The Asia-Pacific Regional Process has been coordinated by the Asia Pacific Water Forum (APWF), Asia Water Council (AWC) and the Asian Development Bank (ADB). The coordination group consisted of:

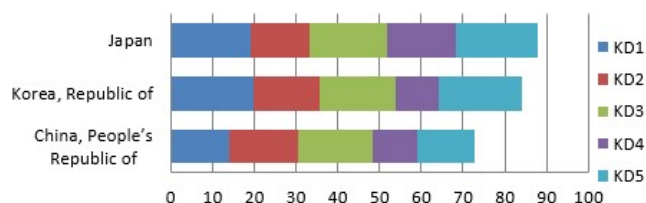
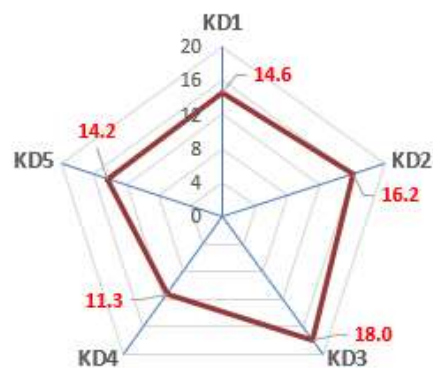
- Asia Pacific Water Forum
 - Ms. Changhua Wu, Chair of the Governing Council
 - Ms. Yumiko Asayama, Chief Manager, APWF secretariat
- Asia Water Council
 - Mr. Taihwan Kim, Planning Director, K-water
 - Ms. Ilhyang Park, Program Officer, K-water
- Asian Development Bank
 - Mr. Lance Gore - Principal Water Resources Specialist
 - Mr. Jitendra K. Singh – Water and Sanitation Specialist
 - Mr. Eelco van Beek – Water Resources Specialist - ADB consultant

2 Sub-region Northeast Asia

Participating countries in the sub-region Northeast Asia were: People's Republic of China (PRC), Japan, and South-Korea.

National Water Security in North East Asia in AWDO 2020

	Population in '1000	NWS score		
		2013	2016	2020
China, People's Republic	1,395,380	57.1	71.5	72.7
Japan	126,529	87.1	88.4	87.9
Korea, Republic of	51,607	85.9	85.1	84.0
Aver.-pop weighted	1,573,516	60.4	73.3	74.3



KD1: Rural Household Water Security
 KD2: Economic Water Security
 KD3: Urban Water Security
 KD4: Environmental Water Security
 KD5: Water-Related Disaster Security

NWS: National Water Security

Leads, Co-leads and Coordination supporting members North East Asia

Lead	Japan Water Forum	Mikio Ishiwatari	Board Director	jwf@waterforum.jp
		Yumiko Asayama	Chief Manager	asayama@waterforum.jp
Co-lead	Changjiang Water Resources Commission (Agency of MWR)	Zhou Zhulin	Division Director	zhouzhulin@hotmail.com
		Liu Yuan	Program Officer	751122878@qq.com
Coordination supporting member	Korea Water Forum	Eun Namkung	Vice President	enamkung@snu.ac.kr
		Ms. Yoon Jeong Kwon	Manager	yjkwon@koreawaterforum.org
Coordination supporting member	UNESCO Multi-Sectoral Office for East Asia	Ai Sugiura	Programme Specialist for Natural Sciences	a.sugiura@unesco.org

2.1 Characteristics of the sub-region and selected focus topics

This sub-region is facing growing risks from water-related disasters that are being exacerbated by climate change, urbanization, population growth, and development activities. Several significant urban centres, such as Tokyo, Seoul, Shanghai, and Hong Kong are in low-lying coastal areas that are vulnerable to sea level rise, flooding and storms.

The growing risks of water-related disasters call for urgent action. Effective disaster risk reduction (DRR) and climate change adaptation (CCA) are crucial for building quality-oriented societies. The countries in this sub-region have developed integrated structural and non-structural measures as fundamental solutions, including planning supported by scientific evidence, institutional reforms, and capacity building.

Structural measures, including channels, dams, and drainage systems, play fundamental roles in reducing disaster risks alongside non-structural measures, such as early warning systems and awareness-raising activities. These measures are supported by scientific evidence, capacity building, and institutional reforms. However, there is a need to prioritize and strengthen science-based community-driven innovative transformative approaches for effective DRR and CCA.

Understanding the water cycle system from a sociocultural perspective, incorporating local and indigenous knowledge, and addressing the sociocultural aspects is critical for managing water resources properly. Consideration of cultural values, beliefs, and practices is necessary to shape how people value and use water. In addition, sociocultural factors influence the institutional and governance structures that oversee water access and management.

Locally and culturally tailored solutions - selected focus topics of the sub-region

The following subjects were identified as specific for the region:

- Improving dam operation by using science-and engineering technology.
- Using modern information and communication technologies for early warning and evacuation systems.
- Prioritizing ex-ante investment for disaster risk reduction.
- Incorporation of local and indigenous knowledge for culturally sensitive flood management options.
- Emphasize the importance of understanding and integrating the socio-cultural aspects of water management and how cultural values, beliefs, and practices influence the value and use of water resources.
- Stress the importance of incorporation of tangible and intangible water heritage as part of comprehensive transdisciplinary approach in water resources management. This requires incorporating local knowledge, traditions, and practices alongside scientific approaches to formulate effective contextualized policies.
- And, highlight the need to promote participatory approach for community involvement and participation in water-related policy development and decision-making.

Discussion on these issues resulted in the decision to organize the following sessions at WWF10:

- As topic sessions:
 - RP1: River Basin Management under Changing Climate
 - RP2: Incorporating Sociocultural Dimensions in Water Resources Management: Policies, Practices, and Challenges

- As synthesis session:
 - RS1: Youth session: Promoting intergenerational cooperation to create sound water cycle

2.2 Topic 1: River Basin Management under Changing Climate (RP1)

2.2.1 Challenges and opportunities

As climate patterns shift, river basins across the globe are confronted with unprecedented challenges and heightened risks. Shrinking glaciers, irregular rainfall patterns, and extreme weather events are not only altering the traditional flow of rivers but are also significantly increasing the frequency and severity of flood and drought events. These extreme weather conditions have profound impacts on water availability, quality, and ecological balance. They pose significant challenges to water resources management, agriculture, and hydropower generation. The uncertainty and unpredictability of these changes further complicate efforts to plan and mitigate their negative effects.

The impact of climate change on river basins calls for innovative and adaptive strategies to mitigate its negative effects and build resilience against these new and emerging risks. One such strategy is the integration of climate-smart approaches into river basin management. This involves the conservation of water resources, the enhancement of ecosystem services, and the improvement of resilience to climate shocks. It also requires a multi-pronged approach that encompasses water conservation techniques, sustainable land use planning, and the promotion of climate-resilient infrastructure.

Opportunities arise from the need to adopt sustainable and resilience-building practices. By investing in and implementing these practices, river basins can not only mitigate the negative impacts of climate change but also adapt to the new realities of a changing climate. This transition, while challenging, offers the potential for significant environmental, social, and economic benefits, including the preservation of critical water resources, the enhancement of ecosystem health, and the improvement of resilience to climate-related disasters.

2.2.2 Breakthroughs, enabling environment, and methodologies

To address the challenges and harness the opportunities, there is a need for technological, institutional, and policy breakthroughs. Technological breakthroughs in areas such as water-saving irrigation, remote sensing, risk assessment and early warning, and advanced modelling for climate risk assessment, and digital river basin construction can significantly improve river basin management.

Enabling environments need to be created through policies and regulatory frameworks that foster climate-resilient development. This includes promoting integrated water resources management, enhancing cross-sectoral coordination, and facilitating public-private partnerships.

Methodological advancements are crucial in incorporating climate change considerations into river basin management plans. This involves the use of innovative methods to forecast hydrological cycles, carry out jointly scheduling of watershed water projects, develop adaptive management plans, and monitor and evaluate the effectiveness of implemented strategies.

In conclusion, river basin management under a changing climate presents both challenges and opportunities. To address the challenges and opportunities, the session provides locally and culturally tailored solutions and best practices of the Northeast Asia sub-region, including technological, institutional, and policy breakthroughs, coupled with enabling environments and innovative methodologies. Through collective efforts, we can achieve a comprehensive, sustainable, and resilient river basin management to face the forthcoming escalating risks brought by climate change.

2.2.3 Objective and outcome of the session at WWF10

River basin management is becoming a mainstreamed tool to enhance water security and more effectively respond to climate change, and its broad deployment is enabled and empowered by maturing and innovative technological capabilities such as digital twin, smart water conservancy, early warning, risk assessment and management. This is witnessed in the three countries of the sub-region as follows.

In the People's Republic of China

- Much intensified legislative efforts in the last five years, in particular, when the legislators took the first step to stipulate separate laws to strengthen integrated river basin management and water-based ecological integrity for the Yangtze and the Yellow rivers, respectively;
- Setting time-bound national action targets to build a national water network by 2035, enabled by smart technologies; and,
- While protection and conservation are adopted as top priorities, water resources utilization, governed by laws and regulations and enabled by smart solutions, are expected to be managed and delivered in respect of ecological boundaries and play the due role of enhancing climate resilience.

Digital Empowerment in Management and Protection of Hanjiang River Basin

The Hanjiang River is the major tributary of the Yangtze River, with a total length of 1,577 kilometers and a drainage area of 159,000 square kilometres. Since 2022, the Changjiang Water Resources Commission (CWRC) has carried out the digital twin Danjiangkou Reservoir pilot project, which was listed among the 11 digital twin water conservancy pilot projects by the MWR, P.R.C, successfully established a comprehensive monitoring and sensing system with "sky-land-water-inner" integration. Together working with the digital twin Hanjiang River, the project realized holographic real-time mapping between water, reservoirs, and dams and forged an intelligent application system covering multiple services, installing a "smart brain" for comprehensive management of the Hanjiang River basin. The project plays a positive role in ensuring water safety in the Hanjiang River basin, improving the capacity of integrated management of the basin in terms of flood control, hydropower generation, dam safety, reservoir safety, and water supply safety, and water quality safety.

In Republic of Korea:

- Large dams are rapidly adapting low-carbon green growth by developing eco-friendly renewable energy technologies that use water surface and water temperature, in addition to their traditional role of hydroelectric power generation;
- The hydrothermal energy, which uses deep water from the dam reservoir, is expected to reach a capacity of 1.0 GW by 2030 contributing to energy savings and greenhouse gas reduction as well as create quality jobs in the region and revitalize the around dam site;
- Floating photovoltaic power generation (FPV) facilities utilize the expansive reservoir surfaces of dam reservoirs without harming the environment. The largest FPV facility in

South Korea, with a capacity of 41 MW and an area equivalent to 65 soccer fields. It began commercial generation at Hapcheon Dam last year after testing for more than 20 years. Particularly, it has been designed to promote local coexistence, tourism, and social value enhancement, such as sharing profits with residents and providing jobs.

In Japan:

- Following up the Kumamoto Initiative for Water at the 4th Asia-Pacific Water Summit, Japan has committed to proactively contributing to the solution of water-related social issues faced by the Asia-Pacific region by developing “Quality Infrastructure” capitalizing on Japan’s advanced technologies.
- Based on the new policy, “River Basin Disaster Resilience and Sustainability by All”, related laws were revised to take comprehensive and multilayered actions by all stakeholders. To enhance the action by all stakeholder in each river basin, it is important to share the risk assessments information tailored for each stakeholder and to disseminate lessons learned from past disasters.
- Effective use of existing dams by operational improvements such as preliminary release operations that utilize ensemble rainfall predictions and by renewal and upgrading of dams such as enhancement of discharge facilities and raising the dam height are considered hybrid technologies that provide both climate change adaptation and mitigation measures.
- Reservoir sedimentation management is also important both for reservoir and river basin sustainability.

The objective of this session was to provide a platform for key stakeholders and partners in Northeast Asia to:

1. Share pioneering practices and the cases made in the region in order to scale deployment of smart-tech-enabled river basin management;
2. Convene leading expertise and institutional capability to explore how to overcome hurdles and bridge the gaps next to achieve accelerated deployment of river basin management through partnership and collaboration;
3. Strengthen relevant measures to encourage financing at scale to invest in river-basin projects for enhanced water security and climate resilience;
4. Showcase good government policies such as laws and regulations; etc.
5. Stimulate efforts and participation awareness of stakeholders (dam management entities, power production companies, local residents, civic environmental groups, etc.); and,
6. Promote continuous technology development.

The session was carried out successfully, with experts and representatives from various countries attending enthusiastically. The meeting room was overcrowded. Structuring around the two principles “Building resilience and adaptive capacity” and “Fostering innovation and technological advancements”, the highlights of the results of the meeting were:

- A consensus on the participants that countries and stakeholders in the region should further strengthen communication and cooperation to address the challenges brought about by climate change.
- The meeting recommended that investment in the research and application of new technologies and methods should be further strengthened, such as digital twin technology, and the application of digital twin technology in related fields should be promoted as soon as possible.
- The meeting also believed that comprehensive management and utilization research of basin reservoirs under climate change conditions should be strengthened, and the role of

reservoirs in flood protection, disaster reduction, green emission reduction, and other aspects should be fully utilized.

A specific outcome of this session was:

- A call for Open Science in river basin management, including data sharing platforms and initiatives and collaborative research frameworks (UNESCO Regional Office for East Asia)



Figure 5 Panel and attendance of RP1 session

2.3 Topic 2: Incorporating Sociocultural Dimensions in WRM: Policies, Practices, and Challenges (RP2)

2.3.1 Challenges and opportunities

Informed by local indigenous knowledge and cultural practices, effective management of water resources is essential towards sustainable development. Given that water issues are exacerbated by climate change, population growth, and development, it is essential to strengthen water resource management efforts for quality growth.⁶

Countries tend to focus on technical solutions and economic efficiency. For countries to formulate policies and make decisions, they need to understand that sociocultural factors influence the institutional and governance structures that improve water access and management. The region needs to be particularly sensitive to these sociocultural factors. This is because sociocultural factors are diverse and usually not fully understood and considered over the past several decades and the gap between technical based solutions and socio-culturally sound solutions has widen due to rapid economic and social welfare developments.

2.3.2 Breakthroughs, enabling environment and methodologies

- Emphasize the importance of understanding and integrating the socio-cultural aspects of water management and how cultural values, beliefs, and practices influence the value and use of water resources.

⁶ Ishiwatari M, and KE Seetha Ram (Ed.) 2024. Sociocultural Dimensions in Water Resources Management, Asian Development Bank Institute. DOI: <https://doi.org/10.56506/UFZU3909>

- Stress the importance of incorporation of tangible and intangible water heritage as part of a comprehensive transdisciplinary approach in water resources management. This requires incorporating local knowledge, traditions, and practices alongside scientific approaches to formulate effective contextualized policies.
- Highlight the need to promote participatory approach for community involvement and participation in water-related policy development and decision-making.

2.3.3 Objective and outcome of the session at WWF10

The session offered a comprehensive exploration of the intricate relationship between water and society, shedding light on how cultural values, beliefs, and practices influence societal perceptions of water. The session emphasized the need for policies and strategies integrating sociocultural aspects into water resource management, recognizing that these factors play a crucial role in shaping governance structures and improving water access. By analysing cases from various countries, including PRC, Indonesia, Japan, and others, the session provided valuable insights into the evolution of water management mechanisms in response to historical contexts, socio-economic structures, and cultural influences. The lessons learned underscore the importance of integrating local knowledge, traditions, and customs into water resource management approaches, promoting cooperative governance, and adapting strategies to evolving sociocultural dynamics.

The outcomes of this session were:

- The launch of the book “Incorporating Sociocultural Dimensions in Water Resources Management: Policies, Practices, and Challenge” produced by JWF and ADBI.
- Increased global awareness of the value of cultural diversity and indigenous wisdom in shaping inclusive water policies and practices.
- A platform for potential partners, including UNESCO, to collaborate in furthering the cause of culturally sensitive water management.

Showcases of Sociocultural Dimensions in Water Resources Dimensions in Japan, China, and the Republic of Korea

1. [Novel Approaches in Flood Management Policies in Japan: Integrating Sociocultural Wisdom in Climate Change Adaptation](#)
2. [The Shift to Risk Management-Based Water Resources Policy in Japan](#)
3. [Managing Water by the Local Community: Development and Implications of Japan’s Irrigation Management System](#)
4. [Traditional River Engineering for Social Sustainability and Environmental Preservation](#)
5. [Passing on Indigenous Knowledge to the Next Generation through Water Learnings in Kumamoto, Japan](#)
6. [Community-based Disaster Management Through Linking with Traditional Community Mechanisms: Flood Prevention Units](#)
7. [Transforming Water Resources Management Investment: The Evolution of Cost Sharing among Local Communities, Governments, and the Private Sector in Japan](#)
8. [Integrating Safety, Security, and Cultural Values for Integrated Water Resources Management: A UNESCO World Heritage Case Study in the People’s Republic of China](#)
9. [A Review of Public Awareness of Water Source Regulations and River Management in the Republic of Korea](#)

All are in Sociocultural Dimensions in Water Resources Management published by the Asian Development Bank Institute (2024). Citable URL <https://doi.org/10.56506/UFZU3909>



Figure 6 Presenters of session RP2

2.4 Synthesis session: Youth session: Promoting intergenerational cooperation to create sound water cycle (RS1)

2.4.1 Challenges and opportunities

The Asia-Pacific region, particularly Northeast Asia, is confronted with escalating challenges related to climate change and the maintenance of a robust water cycle. The youth, as a significant demographic, offer an untapped potential for innovation and sustainable solutions that can catalyse a societal shift towards improved water management practices. However, meaningful youth engagement (MYE) in water cycle management faces several obstacles, including limited access to decision-making platforms, scarcity of resources, and a lack of intergenerational dialogue that could facilitate the transfer of knowledge and experience.

Opportunities arise from the recognition of these challenges and the commitment to address them. The youth session at the UN Water Conference in March 2023 highlighted the importance of MYE and the establishment of a network among youth groups. This momentum can be harnessed to develop implementable strategies that not only promote MYE but also integrate scientific and social components to solve water issues. The key lies in sharing youth-led projects, adopting best practices, and fostering intergenerational cooperation.

2.4.2 Breakthroughs, enabling environment and methodologies

To achieve breakthroughs in promoting MYE, an enabling environment must be cultivated that supports the following:

1. Capacity Building: Investment in education and training programs to equip youth with the necessary skills to participate effectively in water management initiatives.
2. Inclusive Policy-making: The creation of policies that ensure youth representation in water governance, providing them with a platform to voice their concerns and contribute to decision-making processes.
3. Intergenerational Exchange: Facilitating dialogue and collaboration between different generations to combine the experience of older generations with the innovative thinking of the youth through the establishment of a platform to be co-created.

4. Financial Support: Securing funding for youth-led initiatives, possibly through grants, subsidies, or innovative financing mechanisms that reward sustainable water management practices.
5. Technology and Innovation: Leveraging digital platforms and technological advancements to co-create scalable solutions, enhance water management, and monitor progress effectively.
6. Community-based Initiatives: Encouraging and supporting local projects that allow youth to take the lead in addressing water issues, thereby building a sense of ownership and responsibility.
7. Research and Development: Promoting research in the field of water science and technology to provide evidence-based solutions and encourage innovation.

By focusing on these areas, the region can make significant strides in promoting MYE and drive sustainable water cycle management. The success of these efforts will depend on the collaboration between governments, civil society, the private sector, and most importantly, the youth themselves.

2.4.3 Objective and outcome of the session at WWF10

The Asia-Pacific Region faces mounting challenges related to climate change and maintaining a sound water cycle. In this dynamic landscape of water management, youth engagement is increasingly crucial. Young people possess the potential to drive innovation and sustainable solutions, leading to a societal transformation towards a sound water cycle. The youth session at the UN Water Conference in March 2023 confirmed the necessity of "Meaningful Youth Engagement" (MYE) and established a network among various youth groups, building upon the discussions initiated at the 4th Asia-Pacific Water Summit in Kumamoto, April 2022. Building on this momentum, the Youth Water Forum Asia, hosted by the Japan Water Forum and the Korea Water Forum in Kumamoto in November 2023, proposed activities that integrate both scientific and social components. Promoting MYE is essential for solving water issues. The key to furthering MYE is to share Youth-led projects, adopt the best practices, and engage in intergenerational dialogue.

The objective of this session was to propose implementable strategies to MYE in resolving water cycle problems. The session showcased community-based activities led by youth groups and discuss opportunities for intergenerational cooperation to support youth group activities and explore joint programs of multiple youth groups in the field. Engaging the audience in discussions at the session was facilitated by a moderator. Prior to this session in Bali, an introductory session was organized among panellists and organizers virtually. This preliminary session serves as a platform to discuss and refine the ideas for joint programs and collaborations.

The concrete outcome of the session were:

1. Joint programs were proposed that will provide continuous opportunities for potential partners to collaborate in furthering the cause of youth-driven, culturally sensitive water resources management.
2. Tangible examples of successful cross-cultural initiatives such as cultural inter-generational dialogue for water management, protecting urban tidal flats, and local water management by youth were showcased that integrate local and indigenous knowledge into sustainable water cycle solutions.
3. A Video competition was announced focusing on innovative solutions for water sustainability. The competition targets 15-18-year-olds to create videos on a range of water-related themes, such as water-related research, international exchange activities, or

traditional and volunteer efforts related to water, emphasizing the importance of intergenerational efforts for a sustainable future.

4. Follow-up activities were planned for the next Youth Water Forum Asia in 2024, ensuring continuity and building upon the outcomes of this session.
5. Collaboration opportunities were provided with a platform for potential partners, including UNESCO, to collaborate in furthering the cause of youth-driven, culturally sensitive water resources management. Tangible examples of successful cross-cultural initiatives that integrate local and indigenous knowledge into sustainable water cycle solutions.

2.5 Policy recommendations

The main policy recommendations from the three sessions were:

- River basin management under changing climate: It is necessary to vigorously promote new technologies and methods, such as digital twin technology, to improve the adaptability of river basin management to climate change. Open science and data sharing is important for effectively managing river basins under climate change challenges and guidelines shall be developed..
- Socio-cultural dimensions: Water resource management needs to integrate socio-cultural aspects into its approaches and policies by incorporating local knowledge, traditions and customs. This requires the involvement of communities at operation and decision-making level. A dynamic and adaptive approach should be followed to couple indigenous knowledge, traditional technologies supported by sociocultural aspects with state-of-art technology.
- Youth session: Youth-led initiatives and intergenerational collaboration offer refined solutions to attaining a sound water resource management.



Figure 7 Presenters Youth Session RS1

Showcases of Youth-led initiatives

Japan - Protecting Wajiro Tidal Flat: The Struggle To Save an Urban Tidal Oasis

Students at Fukuoka Institute of Technology Jyoto High School are part of a project to protect the Wajiro Tidal Flat in Hakata Bay, Fukuoka, Japan. They study eelgrass, which plays a critical role in absorbing CO2 and providing a habitat for marine life. They focus on increasing the amount of eelgrass, which is in decline, to improve the marine environment. They also emphasize the importance of preserving tidal flats and increasing shellfish populations to filter organic materials and keep ocean waters clean.

Fukuoka Institute of Technology Jyoto Highschool Science club

https://www.youtube.com/watch?v=PRQaqd0Y_ZM

Japan - Challenges to co-work with local water management by youth

Students at Tomikawa High School created digital maps showing the water supply system and conducted water quality surveys to ensure the safety and sustainability of local water resources. They aim to develop an autonomous water supply system managed by local residents to address the decreasing population challenge in Hidaka Town, Hokkaido, Japan.

Hokkaido Tomikawa High School <https://www.youtube.com/watch?v=8e1xIKoJSmU>

Mongolia - Extract bone charcoal filter from the waste bones of Mongolian cows in order to improve the quality of drinking water in the Gobi region of Mongolia

Darkhan-Erdene.A's research addresses the environmental and health issues in Mongolia's Gobi region caused by high fluoride levels in drinking water and the pollution from waste bones generated by the local animal husbandry. The innovative solution involves converting these waste bones into bone charcoal filters, which can significantly reduce fluoride in water, thereby improving public health and reducing environmental pollution. This approach ingeniously integrates local resources and lifestyle with scientific innovation to promote sustainable development.

Darkhan-Erdene.A, Mongolia University of Science and Technology

South Korea - From People to the Government: Introduction of Cooperation between youth and government in the water system in ROK)

Hayoung Park shares the vision and strategies of ROK's water management and the government's effort to listen to the public's voice through her presentation. 3 key policies, including integrated water management, basin water management, and public safety water management, are introduced, followed by 6 strategies adopted by ROK to reach a sound water cycle, varying from enhancing sustainability to vitalizing international cooperation. She concludes with case studies that show how the youth and civil society work together with the ROK government in the water sector, such as citizen-led committees, workshops, job opportunities, and capacity building.

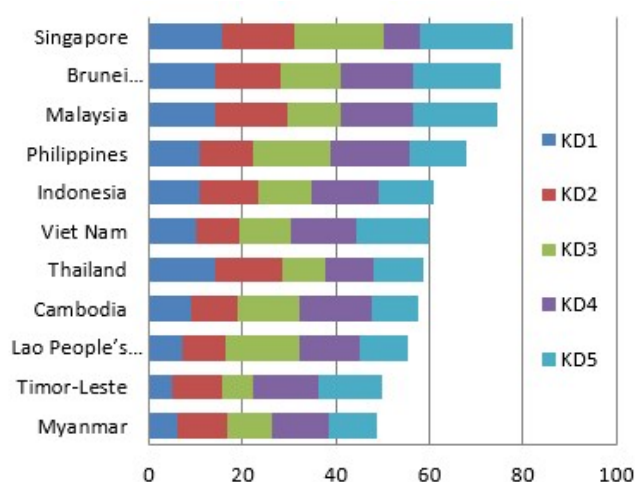
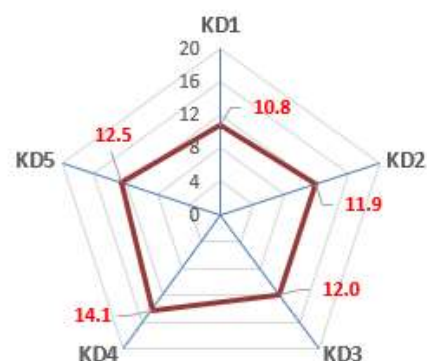
Hayoung Park, Turntable

3 Sub-region Southeast Asia

Participating countries in the sub-region Southeast Asia were: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, East Timor, and Vietnam.

National Water Security in Southeast Asia in AWDO 2020

	Population in '000	NWS score		
		2013	2016	2020
Brunei	442	74.3	74.2	75.5
Cambodia	15,643	55.7	58.6	57.5
Indonesia	265,000	56.6	60.5	61.0
Lao People's Democratic	6,779	49.0	55.6	55.2
Malaysia	32,400	72.6	73.3	74.7
Myanmar	53,860	44.7	47.1	48.6
Philippines	106,600	59.0	67.0	67.8
Singapore	5,639	58.7	79.4	78.0
Thailand	67,831	54.5	56.8	58.6
Timor Leste	1,324	49.2	53.1	49.9
Viet Nam	94,700	54.4	58.5	59.9
Aver.-pop weighted	649,775	56.2	60.5	61.4



KD1: Rural Household Water Security
 KD2: Economic Water Security
 KD3: Urban Water Security
 KD4: Environmental Water Security
 KD5: Water-Related Disaster Security

NWS: National Water Security

Leads, Co-leads and Coordination supporting members South East Asia

Lead	GWP Southeast Asia	Fany Wedahuditama	GWP Southeast Asia Regional Coordinator	fany.wedahuditama@gwpsea.org
Co-lead	The NOC and MPWH coordinated with The Ministry of National Development Planning / Bappenas	Mohammad Irfan Saleh	Director of Water Resources Indonesian Ministry of National Development Planning	mirfans@bappenas.go.id
Coordination supporting member	KMCRC	Minkyeng Park	Manager	min58@kwater.or.kr , hanmekong@kwater.or.kr
		Youngmin Hong	Senior Manager	youngmin@kwater.or.kr
Lead for RS2	FAO Regional Office for Asia and the Pacific	Caroline Amy Turner	Water Scarcity Programme Manager	Caroline.Turner@fao.org

3.1 Characteristics of the sub-region and selected focus topics

Water management in Southeast Asia is characterized by a blend of challenges and opportunities shaped by the region's unique geographical, climatic, and socio-economic conditions. The region includes diverse landscapes such as river deltas, mountainous regions, and extensive coastlines. Major river systems like the Mekong, Irrawaddy, and Chao Phraya are vital for water supply, agriculture, and fisheries. The region's water resources are highly dependent on seasonal monsoons, which can cause both floods and droughts.

Rapid urbanization and population growth in cities like Jakarta, Bangkok, and Manila have led to increased demand for water and sanitation services. Urban water management faces challenges such as inadequate infrastructure, water pollution, and over-extraction of groundwater. At the same time industrialization, urban runoff, and agricultural activities in rural areas contribute to significant water pollution in the sub region. Contaminants such as heavy metals, pesticides, and untreated sewage degrade water quality, posing risks to human health and ecosystems.

Agriculture is the main water consumer in the sub-region, particularly for rice cultivation. Efficient irrigation practices are critical, yet many areas still rely on traditional, inefficient irrigation methods. There is a growing need for sustainable agricultural practices to ensure water availability for other sectors and future generations.

Like other parts of the region, this sub-region is highly vulnerable to climate change, experiencing increasing frequency and intensity of extreme weather events like typhoons, floods, and droughts. Rising sea levels threaten low-lying coastal areas, exacerbating saltwater intrusion into freshwater systems and affecting water availability.

Discussion on the issues and priorities to address them resulted in the decision to organize the following sessions at WWF10:

- As topic sessions:
 - RP3: Smart Water Management: Opportunities and Challenges
 - RP4: Mobilizing Innovative Financing for Inclusive / Green and climate resilience for all
- As synthesis session:
 - RS2: Resilient and sustainable water scarcity management in Southeast Asia

3.2 Topic 1: Smart water management: Opportunities and Challenges (RP3)

With positive economic growth in the region, rapid industrial and population growth is inevitable in Southeast Asia. Demand for water is predicted to increase exponentially especially in industrial and agricultural use, as these are one of the main driving economic forces in Southeast Asia. Besides industrial and agriculture, rapid population growth will add more stress to the region's water resources. Thus, proper water resources management system is required to have a sustainable water future in the region.

The COVID-19 pandemic highlighted the need to improve water security. It caused many challenges in the water sector, and the challenges also made the response to the pandemic more complex, affecting vulnerable populations unequally. Although handwashing and sanitation are fundamental measures to fight COVID-19, 1.5 billion people in rural areas and 600 million people in urban areas still lack access to safely managed drinking water and sanitation in the Asia-Pacific

Region. Challenges in responding to water-related disasters under the pandemic include the reduced capacity of evacuation shelters and impediments to external assistance. The Southeast Asia region is one of the most disaster-prone region in the world. Its monsoon areas account for two-thirds of the global deaths and victims of water-related disasters each year. Supply chain disruptions, deterioration in financial conditions, and lockdowns have hindered the continuity of services in irrigation, water supply, and sewerage, and water resources management facilities. Climate change will further aggravate the cascading multi-hazards.

The water sector plays a vital role in recovering from the pandemic and beyond. By restoring a sound water cycle and implementing smart water management, we can reduce disaster risks, achieve multiple SDGs, and strengthen transboundary cooperation.

3.2.1 Challenges and Opportunities

Rapid urbanisation, climate change, and water demands

By the year 2050, it is projected that around 70% of the population in Asia will reside in city areas. Presently there are about 269 million Asians that do not have access to clean water supply and sanitation, and this is due to the exponential increase in Asia's urban population and the inadequate infrastructure in most Asian countries.

According to the 2030 Water Resources Group, the gap between global water supply and demand is projected to reach 40% by 2030, and in many places, demand is already exceeding sustainable supply. Access to clean water, disposal of sewage and wastewater, water conservation, reuse, and sanitation are critical for a growing city's competing demands – from the public and industrial.

Industrial & agricultural water demand and untreated wastewater

The agriculture industry accounts for roughly 70% of total freshwater withdrawals globally and for over 90% in most Least Developed Countries (LDCs), which includes countries in Asia. Without improved efficiency measures, agriculture water consumption is expected to increase by about 20% globally by 2050.⁷

Projected increase in water demand, primarily from manufacturing, electricity and domestic use will generate further stress on water resources and possibly impact water allocation for irrigation. Water demand for energy, and electricity generation, in particular, will grow significantly as energy demand is expected to grow by more than one third in the period of 2010 – 2035.

Besides water usage and demand, the rate of untreated wastewater in Southeast Asia is alarmingly high. According to United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 80% – 90% of wastewater from industrial usage and agriculture industry is being discharged into rivers and the sea with no proper treatment. In the Philippines, for example, only 10% of wastewater is treated, while in Indonesia 14% is treated and in Vietnam 4% is treated. Because of this, untreated wastewater contaminated the overall water ecosystem. By 2030, the United Nations are aiming to reduce the percentage of untreated water by half.

⁷ <https://www.asiawater.org/market-insights/>

Current efforts to overcome the challenges

Many strategic efforts have been implemented by governments and non-government stakeholders. Waste and sanitation programs in Southeast Asia has been implemented by governments and its development partners to keep up with the rapid growth of population. As in other countries, in Indonesia, very large community-based water supply and sanitation programs (they are called PAMSIMAS and SANIMAS) have been rolled out since 2004 with the support of several major donors, complemented by many national and international NGOs to ensure safe water supply, sanitation and hygiene (WASH) access for people in the rural areas. As for the access in urban areas, strategic efforts from water operators have been facilitated through the establishment of Global Water Operators' Partnerships Alliance (GWOPA). GWOPA is an international network created to support water operators through Water Operator's Partnerships (WOPs), peer support exchanges between two or more water operators, on a not-for-profit basis, with the objective of strengthening their capacity, enhancing their performance and enabling them to provide a better service to more people.

On the issue of managing sustainable supply and efficient demand amid climate change, FAO and the Australia Water Partnership have launched its Water Scarcity Program (WSP) in Cambodia, Indonesia, Thailand and Vietnam with focus on resilient and sustainable agriculture and food security. WSP is expected to help countries to build its capacity to conduct water accounting which will be the basis for water allocation and further Water Scarcity Action Plan (WSAP). In addition, The World Meteorological Organisation (WMO) through its Climate Risk Early Warning Systems Initiative (CREWS) that will be implemented in Cambodia and Lao, is also contributing to the effort in water-related disaster risk reduction in the region.

From the private entities (multinational companies), many private companies have been contributing to the achievement of water security in the region. There are two main water related programs from the private companies' sustainability programs, they are the WASH project and Water Replenishment project. These two types of projects are being implemented in Southeast Asian countries, although limited to the companies' area of concern (catchment where they are operating).

With these many efforts on the ground, one of the challenges is to align these government and non-government efforts. Based on this need, GWP Southeast Asia, has developed Integrated Water Security Open Program to help to identify who is doing what, where and how, to help to better facilitate alignment and collaboration to accelerate the achievement of water security goals.

Now that all strategic efforts are identified, and the platform for alignment and collaboration is in place (with further improvement), smart water management with the support of innovative technical solutions and financing will be crucial to help to overcome technical challenges and accelerate the achievement of water security goals. The experience of Singapore, Korea, Japan, Australia and other countries that have already successfully implemented smart water management will be valuable to be shared with Southeast Asian countries.

3.2.2 Breakthroughs

Based on the strategic context, challenges, current and urgent future efforts, the proposed way forward is to strengthen inclusive, just, resilient and sustainable water governance which supported by science & technological solutions, and innovative financing. For strengthening inclusive, just, resilient and sustainable water governance, a comprehensive Smart Water Governance

Improvement Program shall be developed and implemented in Southeast Asia countries to ensure strong enabling environment as the foundation for smart water management.

Following up the smart water governance improvement program, science-based innovative solutions should be promoted and supported by the water business associations for implementation at economic scale. Without the support of the water business association, science-based innovative solutions will not be able to be implemented at scale. In addition, the financing for this economic scale implementation also needs to be thought of. Innovative financing such as establishing platform such as “Silicon Valey for Water” would help to open doors to non-traditional financing, such as venture capitals, and accelerate the science-based innovative solutions at economic scale.

3.2.3 Objective and Outcome of the Session at WWF10

The session discussed country-wide scale best practices of smart water management employed by countries amid their limited resources and growing development and climate change pressures. Singapore, Korea, Japan, Australia, and Netherlands are among the countries that have shown exemplary practices in smart water management in such challenging situations that can be referred by developing countries in Southeast Asia. It is therefore important to share the stages of developing smart water management that can ensure higher resiliencies for all.

The objectives of this session are:

- To examine the critical elements of transforming conventional water management into smart water management through country sharing in implementing Smart Water Management amid challenging situations.
- To explore pathways toward systemic change, innovation, and meaningful collaboration for transformational, resilience and sustainable smart water management in Southeast Asian countries.

The outcomes can be described as individual innovations - united effort to realize smart water management in Southeast Asia facilitated to achieve SDGs with as concrete solutions the establishment of a SEA Smart Water Management Support Facility.

Follow up linkages with events for this session are:

- GWP SEA – Innovative Solutions for Water Secure World and Sustainable Development Webinar Series
- GWP SEA – Integrated Water Security Open Program
- GWP SEA – SEA Catchment Knowledge Hub (piloted first in Indonesia – in Collaboration with Indonesia Water Coalition)
- KOMEC – Development of the Water-related Decision Support System Utilizing the Digital Technology in the Mekong Region Project
- KOMEC – Mekong-Korea International Forum (Theme: Climate Resilience through Digital Water Management in the Mekong Region)

Key messages of the session were:

- Critical elements in smart water management transformation are based on ability to manifest principle of efficiency, sufficiency, sustainability, and resiliency in every aspect of program implementation. Each principle should be supported with a clear framework and roadmap of applied innovative technologies that suits the local context.

The policy recommendations from the session were:

- High-level country agreement on the establishment Smart Water Management Centre of Excellent Facility should be established to allow easier access to best practice and lessons learned from countries in implementing smart water management (**SEA Smart Water Management Facility**).
- Encourage dedicated technical assistance through consolidated, both internal and external, support for countries to take the smart water management transformation path to accelerate the achievement of water security goals in the region (**SEA Water Portfolio Fund Coalition**). Reference is made to the practical action under RP4.

Showcases from countries that joined the RP3

Korea - Water Loss Management

- The government of Korea, through K-Water, has been implementing long-term and short-term Non-Revenue Water (NRW) management projects by integrating traditional methods and digital technologies. One critical lesson learned is the importance of gaining a high level of competence in traditional methods before introducing new technologies.
- Digital technologies are not silver bullets. Integrating traditional methods and digital technologies can offer much more effective solutions in managing NRW. If local water utilities do not master the traditional methods, the cutting-edge smart water management system may not be sustainable.

Japan - Smart Sewerage Management

- Comprehensive flood control by sewerage

Relying only on infrastructure measures is insufficient for recent heavy rains due to climate change. Comprehensive inundation countermeasures combining hardware and software is necessary. Comprehensive flood control must include stormwater storage piping, pumping stations for stormwater, and an information system for rain and flood hazard maps. For sewerage management, Japan has developed technology for Sewerage pipe-jacking methods. This technology allows pipes to be installed without digging up the ground. Enabling construction that takes sites and traffic conditions in urban areas into account. In addition, Japan has developed pump gate equipment that is space-and-time efficient using full-speed, full-level horizontal-shaft submersible pumps.

- Circular economy in wastewater management

In order to treat wastewater, it is necessary to pull out and treat sewage sludge appropriately. Sewerage law obliges appropriate sewage treatment through dewatering, recycling as fuel or fertilizer, and incineration. Japan has connected sewage sludge to food by developing fertilizer made from sewage sludge (BISTRO Sewerage). This smart sewage management system was introduced in Saga.

- Asia Water Management Partnership (AWaP)

To contribute to the achievement of SDGs, specifically on SDG 6 target 6.3 (Halving the ratio of untreated sanitary wastewater), AWaP was established in July 2018 to mainstream sanitary wastewater management in Asia. AWaP will focus on (i) raising consciousness for sanitary wastewater management, (ii) monitoring sanitary wastewater management, and (iii) solving common issues.

Indonesia - Irrigation Modernization

Indonesia has approximately 7,3 million Ha of irrigation area. However, only 11% of the irrigation area is supplied by reservoirs. While reservoirs are not sufficient to cover the whole irrigation area, irrigation infrastructures also suffer from damage due to, among others, (i) exceeded service life, (ii) natural disasters, (iii) unoptimized management, (iv) limited operation and maintenance; and (v) inadequate rehabilitation.

The government of Indonesia has decided to implement a national program on the modernization of irrigation. Modernization of irrigation consists of 5 pillars: (i) enhancing irrigation water supply reliability; (ii) improving irrigation facilities and infrastructures; (iii) refining irrigation management systems; (iv) strengthening irrigation management institutions; and (v) empowering human resources management.

One of the case studies is the Rentang irrigation area. The result of this case study is that implementing the five pillars has improved water productivity from 0,59 kg/m³ to 1 kg/m³. Canal efficiency has reduced water loss by more than 50 percent. The reliability of the water supply has improved from 43.299 Ha to 86.423 Ha. Most importantly, weekly monitoring of water allocation has improved water efficiency to 1 kg/m³ as mentioned above.

Malaysia - National Water Balance Management System (NAWABS)

Malaysia's water balance scenario consists of 43% evaporation, 51% surface runoff, and 6% groundwater recharge. Of the surface runoff, 17% is stored in 104 dams, 1.16% is managed in water treatment plants (with 0.4% lost as non-revenue water), 2.1% is used for agriculture, and 80-85% is released to the sea. Climate change has disrupted this balance, leading to significant impacts. Floods affect 10.1% of Malaysia's area, exposing 21% of the population to risk and causing economic losses of up to 36 million Ringgit (USD 9 billion). Drought reduces paddy yield by 25%. In response, Malaysia prioritizes water management, emphasizing the need for trained water managers and improved data management to enhance planning and decision-making. Flood and drought management are key priorities.

Malaysia developed the National Water Balance Management System (NAWABS), a comprehensive river basin management tool to address data management. NAWABS supports better planning and operational decisions regarding water prioritization, allocation, quality, dam management, drought indexing, and auditing. It predicts droughts two months in advance and issues warnings 14 days ahead, aiding in water shortage preparedness. NAWABS is gaining acceptance among state governments as a decision-making tool.

Vietnam - Improving Water Security Through Demand-Oriented Management Approach – Case Study in Danang City

Rapid urbanization and water-intensive lifestyles in many large cities and provinces in Vietnam are significantly increasing water consumption demands, challenging current water infrastructure and management institutions and risking future water security. To address these challenges, cities and provinces often employ a supply-oriented management approach as the primary solution to meet current and future demands.

The government of Danang City, in collaboration with the Institute for Global Environmental Strategies (IGES), has conducted a research project to evaluate the effectiveness of a demand-oriented management approach with smart water use solutions as a complementary measure to the supply-oriented approach. The project aims to address the city's water security challenges and proposes scaling up the solutions.

The combination of both approaches has managed to help Danang city to optimally manage water resources. The demand-oriented approach helps to promote smart water use lifestyles among Danang residents through participatory research, demonstrations and education on reducing water and energy consumption through water-energy nexus. The supply-oriented approach helps to enhance the city's water security by improving the energy efficiency of water pumping systems, leading to benefits such as increased water safety and supply capacity, energy savings, CO2 emission reductions and lower operation costs for the utility.

Thailand - Smart Water Management in Irrigation

Thailand, in collaboration with the TSRI-NRCT Spearhead Research Program, has a project to improve water management efficiency at the local level. This project aims to reduce water access disparity in the Thor Tong Daeng (TTD) Irrigation Project area, save irrigation water by reducing conveyance loss, and summarize good water management practices through participatory training.

The project uses hardware (in-situ soil moisture sensors, water level monitoring, and automatic gate control), software (water demand planning, allocation, release, and feedback), and community-based action research (meetings, interviews, and online data collection).

Research findings were::

- Implementing real-time IoT monitoring for water delivery and demand management reduced irrigation water usage by at least 15%.
- Surveys in five TTD districts showed a 16%-33% increase in household income from rice cultivation, amounting to 1,942 – 3,948 Baht per rai (USD 360 – 750 per Ha).
- Community enterprises for azolla, lemon, and lemongrass cultivation increased income by 1,634 – 35,756 Baht per rai (USD 310 – 6,700 per Ha).
- Social improvements included increased community cooperation, better water sharing, and reduced conflict.
- Participation in group activities and adherence to rules improved.

In conclusion, tracking systems with sensors in irrigation projects enhance water delivery efficiency and reduce losses. Developing water user groups facilitates knowledge transfer, improves water management planning, reduces conflict, and increases farmer incomes, serving as a model for smart water management.



Figure 8 Presenters and participants session RP3

3.3 Topic 2: Mobilizing Innovative Financing for Inclusive / Green and Climate Resilience for All (RP4)

The Southeast Asia region is one of the most disaster-prone region in the world. Its monsoon areas account for two-thirds of the global deaths and victims of water-related disasters each year. Supply chain disruptions, deterioration in financial conditions, and lockdowns have hindered the continuity of services in irrigation, water supply, and sewerage, and water resources management facilities. Climate change will further aggravate the cascading multi-hazards.⁸

A fundamental obstacle all cities in Southeast Asia must overcome on the path to a water secured and climate-resilient region is the lack of capital and access to finance. International adaptation finance flows to developing countries remain between five and ten times lower than the estimated needs, and the gap is widening. As the impacts of climate change intensify (increasing floods and drought incidents), the developing world urgently needs financial mechanisms to mobilise funds to help vulnerable countries and communities adapt and build disaster-resilient infrastructure.

3.3.1 Challenges and Opportunities

Growth of population coupled with urbanization, especially in developing countries, is resulting in increased exposure to risk from hazards of all kinds. Climate change is exacerbating known risks

⁸ Mikio Ishiwatari, Akhilesh Surjan, Good enough today is not enough tomorrow: Challenges of increasing investments in disaster risk reduction and climate change adaptation, Progress in Disaster Science, Volume 1, 2019, 100007, ISSN 2590-0617,

and rearing unknown complications experienced through heat stress, water scarcity, water and vector borne diseases and even extreme events. Increased investment in disaster risk reduction (DRR) and climate change adaptation (CCA) is required from global actors, regional and national governments as well as local actors including corporates, non-profits, municipalities, and individuals.

The Sendai Framework for Disaster Risk Reduction, adopted in 2015, stresses that proactive investment in DRR is highly cost-effective in protecting human lives and preventing economic damage and can save recovery costs.⁹ The third Asia-Pacific Water Summit adapted 'The Yangon Declaration: The Pathway Forward'. One of the key declarations of this summit was doubling investments to address water-related disasters and increase water security in the Asia-Pacific region.¹⁰ The High-Level Panel on Water (HLPW), established jointly by the United Nations and the World Bank, recommends doubling investment in water-related DRR within the next 5 years in the Outcome Document published in March-2018.¹¹ Key measures for investment include: (i) reducing risk to acceptable levels through structural and non-structural investments; and (ii) managing the residual risk through disaster preparedness measures, such as early warning systems and financing arrangements for disaster relief and recovery.¹²

Despite recent global, multilateral, and regional impetus, most countries are not able to proactively investment enough in DRR. In contrast, investment in DRR and CCA is far behind compared with investments in expansion of human settlements and development of infrastructure and services.

3.3.2 Current efforts to overcome the challenges

Many countries have started integrating DRR into national development plans. Some countries also formulated long-term plans that cover targets, policies, projects, and other related issues pertinent of DRR.¹³ These approaches are helpful in promoting DRR in some of the major disaster-prone countries in the Asian region as detailed below through selected cases.

From the 1970s, budget is allocated for flood prevention in Malaysia's five-year development plans.¹⁴ Philippines development plans mention DRR policies and approaches. Indonesia's national development plans have included DRR approaches and major projects. Vietnam adopted National Strategy for Natural Disaster Prevention, Response and Mitigation (2007–2020) comprising necessary approaches for DRR to minimize human losses and economic damage.

⁹ UNISDR, Sendai framework for disaster risk reduction 2015–2030, UNISDR, Geneva (2015)

¹⁰ Asia-Pacific Water Forum, Yangon declaration: the pathway forward, Japan Water Forum, Tokyo (2017)

¹¹ High-Level Panel on Water, Outcome document: making every drop count, United Nations, New York (2018)

¹² Asian Development Bank (ADB), Understanding disaster risk for advancing resilient development: knowledge note, ADB, Mandaluyong (2018)

¹³ S.V. Prabhakar, A. Abu-Bakar, S. Becker, J.J. Pereira, D.S. Solomon, Insurance for disaster risk reduction and climate change adaptation—an overview, S.V. Prabhakar, J.J. Pereira, J.M. Pulhin, G.S. Rao, H. Scheyvens, J. Cummuins (Eds.), Effectiveness of insurance, effectiveness of insurance for disaster risk reduction and climate change adaptation: challenges and opportunities, IGES, Hayama (2015)

¹⁴ A.M.H. Shah, Z. Mustafa, K.W. Yusof, Disasters worldwide and floods in the Malaysian Region: a brief review, Indian J Sci Technol, 10 (2) (2017), pp. 1-9

Stand-alone DRR finance mechanisms

The Philippines established stand-alone DRR finance mechanisms. The Philippine government's national disaster risk reduction and management fund is specifically used for mitigation, prevention, and preparedness activities. Thirty percent of the fund is marked as a quick response fund, while the remaining comprises a stand-by fund for relief and recovery programs. Local governments are also required to dedicate 5% revenue as the local disaster risk reduction and management fund and are to be used to support pre-disaster and preparedness activities.¹⁵

Sharing costs with local governments and communities

Decentralization of responsibilities and cost between national, sub national and community in addressing the financing gap is also a good practice that has been done by some governments. In Indonesia for example, the government has developed a National Resilient Village Program where village government has the responsibility to build their capacity on mitigation and adaptation, with the support from national, provincial, and local governments.

No regret investment principles

Given the need for and importance of paying attention to water-related disasters, the High-level Experts and Leaders Panel on Water and Disasters (HELP), drafted 'principles on investment and financing for water related disaster risk reduction', which was launched during the 8th World Water Forum in Brazil. Building on a cooperation between the Global Water Partnership (GWP), the HELP and Japanese government, a session on DRR was organized in Southeast Asia (Vietnam, VACI 2018), with the main objective to consult on investment and financing for water related-disaster risk reduction principles. The draft principles comprise the following:

- Water-related disaster risk reduction is indispensable for socio-economic development
- Ex-ante measures of water related disaster risk reduction should be prioritized
- Governments should improve their fiscal systems and allocate sufficient budget for water related disaster risk reduction
- The international community should expand financing for water related disaster risk reduction
- Financing for science and technology should be strengthened to support sound investment decisions

3.3.3 Breakthroughs

Financing loss and damage from Climate Change

The concept of loss and damage was first raised in the 1991 climate change negotiations by Vanuatu as a facility to compensate small island developing states for the devastating impacts of sea-level rise. Subsequently, the term "loss and damage" has come to be understood as any negative consequences of climate change on economic, social, and environmental systems.

This concept was further elaborated at the Conference of Parties (COP-13) in Bali, Indonesia, in 2007. The Bali Action Plan emphasised the need for enhanced action on adaptation, including disaster risk reduction strategies and means to address loss and damage. Moreover, the COP-18 in Doha in 2012 agreed to establish institutional arrangements to address loss and damage under the United Nations Framework Convention on Climate Change (UNFCCC). The following

¹⁵ Government of the Philippines, Philippine Disaster Risk Reduction and Management Act. Republic Act No. 10121. Manila (2010)

summarises the progress and evolution of loss and damage in COPs of UNFCCC from 2007 through 2022.

The most recent COP-27 in Egypt's Sharm el-Sheikh reached a breakthrough agreement on the Loss and Damage Fund for vulnerable countries hit by climate change. The new pledge during the COP-27 was more than 230 million US dollars to help vulnerable communities through concrete adaptation solutions.

The COP-27 made two important decisions: Decisions 2/CP.27 and 2/CMA.4 established funding arrangements for responding to climate-induced loss and damage. These new funding arrangements will assist developing countries that are particularly vulnerable to the adverse effects of climate change. The assistance includes providing and mobilising new and additional resources to complement existing funding support.

Disaster risk financing: disaster pooling fund

Indonesia has made significant strides in bolstering its capacity to mitigate the risks associated with frequent natural disasters. This has been achieved via the implementation of a range of policies, with particular emphasis on fiscal measures and institutional frameworks. The government launched the Disaster Risk Financing and Insurance (DRFI) Strategy in 2018 with the goal of improving disaster management capacities and increasing economic resilience in the face of calamities. The DRFI instrument, known as the Disaster Pooling Fund (DPF), works in tandem with the state budget. The World Bank has committed to disbursing a US\$500 million loan package through the "Indonesia Disaster Risk Finance and Insurance" initiative to fund the DPF from March 2021 to March 2024. The Global Risk Financing Facility (GRiF) has also contributed US\$14 million to this loan. Furthermore, Indonesia is nearing completion of the Adaptive Social Protection (ASP) roadmap, which integrates climate change adaptation and catastrophe risk management into the social protection system. While DPF has been in operation since 2021, the DRFI roadmap has yet to be fully implemented.

3.3.4 Objective and Outcome of the Session at WWF10

The session discussed the strategic directions and a customizable roadmap for the public sector, private sector, international organizations, intermediaries, and others to collaborate towards catalysing greater financing and innovation for the water sector. We must fundamentally re-align the trillions of public and private financial flows and investment with adaptation and resilience goals. To re-align the trillions of public and private financial flows and investments, one of the key factors is to enhance the public sector so that it can deliver and review a sound project business case. The objectives of this session were:

- To identify and examine out-of-the-box innovative financing mechanisms that can catalyse the acceleration of water security goals at country and regional level.
- To investigate the existing leverages that can help to re-align trillions of public and private financial flows and investments for resilience and sustainable water security at the country and regional level.

The outcomes of the session were:

- Identification of individual innovations and united efforts to realize smart water management in Southeast Asia facilitated to achieve SDGs
- Increased water investment from multi funding windows, especially the private sector in Southeast Asia to accelerate the achievement of SDGs

With as possible concrete solutions a SEA Water Portfolio Fund Coalition (supported by existing donors such as GCF, Adaptation Fund, GEF, Climate Fund, etc.) This platform aims to help to synchronize and synergize existing water portfolio fundings of various donors agencies to ensure strategic impact in SEA. This coalition is not aimed to create another water funding window platform, but rather it's to align the different funding platforms to address the same water security targets.

Follow up linkages with events of this session were:

- SEA Water Financing Coalition Funding High-Level Discussion (TBC – end of 2024)
- SEA Water Financing Coalition Funding Technical-level discussion (TBC – end of 2024)

The key messages of the session were:

- Effective financing strategy should be aimed to contribute to resilient and sustainable development. Effective financing strategy should be measured through its ability to ensure expected results (performance-based financing), capacity to mitigate the risks associated with frequent natural disasters (disaster risk financing), and maximization of the social, economic, and environmental value of infrastructure investments (value-based infrastructure financing).
- Alignment of existing water portfolio fundings through shared-performance indicators (such as safe water and sanitation access, wetland rehabilitation, etc.) shall be explored to allow synergy and acceleration to achieve water security goals in the region.

The policy recommendations of the session were:

- High-level country agreement on the water security key performance indicators as the anchor to re-align the trillions of public and private financial flows and investment with adaptation and resilience goals.
- Development of effective financing strategy and mechanism to ensure achievement of expected results (performance-based financing), capacity to mitigate the risks associated with frequent natural disasters (disaster risk financing), and maximization of the social, economic, and environmental value of infrastructure investments (value-based infrastructure financing).
- Enhance the capacity of public sector and other key stakeholders to ensure effective programs delivery in realizing resilient and sustainable development on the ground.

Showcases introduced in RP4

CDP - Mandatory Disclosure for Water Security

The global north's dependence on external water use has led to unsustainable practices in global supply chains. CDP aids companies in disclosing efforts to manage water sustainably, involving both buyers and suppliers. This collaboration is expected to improve products and foster innovative solutions.

CDP's "Stewardship at the Source" report shows that 1 in 5 companies (623) report significant supply chain water risks, totaling USD 77 billion. Companies integrating suppliers into risk assessments are 7x more likely to report these risks. However, only 50% of buyers (1,542) engage with suppliers on water issues. 118 global brands offer financial incentives to leadership teams to achieve water goals. CDP's efforts show that businesses can reduce water risk costs by up to three times through proper mitigation investments. Engaging suppliers also makes companies 14x more likely to report opportunities. Despite this, Southeast Asia (Indonesia, Malaysia, Philippines, and Singapore) shows insufficient disclosure.

The EU's Corporate Sustainability Reporting Directive (CSRD) mandates water disclosure from January 1, 2024, via the European Sustainability Reporting Standards (ESRS). This shift towards transparency affects about 40% of G20+ jurisdictions and is likely to influence Southeast Asia, where many MNC branches are located.

World Bank - Thirsty for Change – Financing Water

Policy recommendations for public finance include:

1. **Government budgetary actions:** Ensure predictable funding for water agencies, support operation and maintenance, and reward service performance.
2. **Water agency-level actions:** Implement cost recovery and demand management, improve staffing and systems, and enhance data access and transparency.

Beyond public finance, recommendations include enabling long-term financing by improving the financial sustainability of water agencies, supporting institutional and regulatory reforms, and encouraging private sector solutions and financing. Additionally, diversifying and expanding finance options, advancing climate outcomes, and increasing private participation in infrastructure projects and risk mitigation are crucial.

DFAT - Performance-Based Grants Program

Water operators often struggle to deliver beneficial services, hindering their bankability and service levels. To address these issues, the Government of Indonesia, in collaboration with DFAT, implemented a performance-based grants program. This program uses Indonesia's existing monitoring and evaluation system for water utility performance and focuses on four key components, measured by seven indicators:

1. **Governance:** Business plan.
2. **Financial Sustainability:** Operating ratio and billing collection effectiveness.
3. **Operational Efficiency:** Non-revenue water and energy efficiency.
4. **Service Quality:** Water quality and continuity of supply.

Performance-based measurements followed by grants incentivize improvements. For example, operators increasing household access to water with expected quality receive reimbursements. This mechanism, combined with technical assistance, effectively improves the bankability of water operators, maintaining high performance and enabling better financing in the water sector.

Asian Development Bank - Value-Based Infrastructure Financing

Value-based infrastructure financing involves capturing and monetizing the positive externalities created by infrastructure. ADB's reports, "Sustaining Transit Investment in Asia's Cities" (2019) and "Infrastructure Financing Through Value Capture in Indonesia" (2021), discuss this concept, focusing on the Value Cycle of creation, capture, and capitalization. A common example is land value capture.

Lower state capacity typically means fewer economic agents can be efficiently taxed. Taxes are often collected at concentrated economic activity points like ports and airports. As state capacity develops, indirect taxation becomes predominant, with a narrow tax base providing most revenue, as seen in advanced economies.

Land value capture moves beyond the "government pays" and "user pays" binary to include "beneficiary pays." Both government and private sectors can utilize value capture, though institutional and regulatory frameworks significantly impact its success, often requiring reforms.

This approach applies to the water sector too. Wastewater services are public goods with low willingness to pay, making cost recovery challenging. Cleaner areas don't directly increase land values, raising questions about using land value or rental taxes for sanitation investments. In contrast, water supply is a private good with easier cost recovery, but many networks exclude peri-urban populations. Connecting homes to the water supply increases property values significantly, presenting a value-capture opportunity.

The government can identify and capture existing value in various sectors, particularly water, to predict future financial benefits while considering climate impacts.



Figure 9 Presenters session RP4

3.4 Synthesis session: Resilient and sustainable water scarcity management in Southeast Asia (RS2)

In Southeast Asia, water resources form the foundation of agricultural productivity and economic growth. However, the Asia-Pacific region faces increasing water scarcity driven by population growth, rapid industrialization, urbanization, and climate change. From 1975 to 2010, the population living under high or severe water scarcity increased from 1.1 billion to over 2.6 billion, while those experiencing green-blue water scarcity—where there is insufficient water for both environmental and human needs—rose from 200 million to nearly 1.5 billion.

Agriculture, which accounts for a large part of the region’s freshwater usage, is crucial for Asia’s food production but increasingly competes with other sectors for water. This competition is heightened by the region’s rapid economic expansion, placing further strain on water systems. Water scarcity issues manifest through insufficient availability, over-utilization, variable supply, and poor water quality, posing significant risks to the region’s development.

The FAO estimates a 50% increase in global food production is needed by 2050 to meet rising demand, which will intensify the competition for scarce water resources among urban, industrial,

and environmental sectors. Agriculture, as the largest consumer of water, is a major driver of water scarcity and significantly impacts water quality.

To effectively address Southeast Asia's escalating water challenges, implementing robust water accounting and allocation systems is crucial. Enhanced water management tools can help quantify water use, identify inefficiencies, and optimize distribution among agricultural, industrial, and urban users. This strategic approach is essential for ensuring sustainable water use and supporting the region's agricultural needs amidst growing scarcity pressures.

3.4.1 Context

In mainland Southeast Asia, water scarcity is most pronounced in Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam. The central dry zone in Myanmar and the areas north and east of Bangkok, Thailand, are particularly affected by significant water stress. The Mekong and Red River Deltas in Vietnam face acute water scarcity. While Laos and Cambodia are not as severely impacted at present, inadequate water storage infrastructure may present future challenges. This situation is especially concerning given the increasing competition for water resources between agricultural, energy, urban, and environmental needs.

Across island Southeast Asia, countries such as Indonesia, Malaysia, the Philippines, and Singapore are experiencing water scarcity hotspots, particularly in highly populated areas like Bali, Java, and Manila. In Malaysia, cities such as Kuala Lumpur and Malacca face water scarcity due to high population density. These urban centres often struggle with limited surface water availability and unreliable public water supply, leading to extensive private groundwater extraction. This over-extraction can result in groundwater depletion, water quality degradation, and infrastructure damage from land subsidence and flooding. Additionally, reduced water availability for natural habitats and ecosystems can lead to the degradation of wetlands, rivers, and forests, further impacting biodiversity and environmental health. Cities like Bangkok, Jakarta, and Manila are prime examples of urban areas grappling with these complex water scarcity challenges, where balancing human and environmental water needs is increasingly difficult.

3.4.2 Objective and Outcome of the Session at WWF10

The objectives of this synthesis session were:

1. Increase awareness and foster collaboration among diverse stakeholders regarding water scarcity in Southeast Asia.
2. Highlight national successes and challenges in managing water scarcity in Southeast Asia.
3. Promote south-south learning to share best practices in water management across Southeast Asia, with an emphasis on adaptable strategies suitable for various local contexts.
4. Raise awareness of various national and regional initiatives to tackle water scarcity, emphasizing the value of shared experiences and regional technical cooperation.
5. Advocate for the broader use of water accounting and management tools to help stakeholders across Southeast Asia better understand and address competing water demands.

During the synthesis session on water scarcity at WWF10, participants engaged in a thorough discussion on several key policy recommendations aimed at addressing the pressing water challenges in Southeast Asia. The need for accurate water accounting systems was emphasized, as precise measurement and monitoring of water usage are fundamental for understanding

resource availability. This data-driven approach allows for identifying inefficiencies and overuse, which is particularly crucial in water-stressed regions, enabling informed management decisions for sustainable and equitable water distribution.

The importance of establishing and enforcing stringent water quality regulations was also highlighted. Participants noted that maintaining usable water availability requires addressing contamination from agricultural runoff, industrial discharge, and urban wastewater. By setting and enforcing high standards, these regulations protect both water resources and public health, ensuring that water remains safe and usable for all sectors.

Proactive water-sharing and allocation mechanisms were discussed as necessary to prevent over-allocation and costly crisis-driven adjustments. Experts pointed out that anticipating future demands and potential shortages ensures that water resources are distributed fairly among agricultural, industrial, urban, and environmental needs, reducing conflicts, and promoting long-term sustainability.

There was a consensus on the fundamental need for investing in both human and financial resources to implement effective water scarcity management policies. The discussion underscored the importance of training and capacity-building for water management professionals, as well as securing funding for the development and maintenance of water infrastructure and management programs. Such investments are crucial for building the necessary skills and resources to tackle water scarcity challenges effectively.

The concept of river basin management was presented as an integrated approach to balance competing needs and optimize water use across sectors and regions. Managing water resources at the basin level allows for a holistic understanding of interconnected water systems, ensuring that allocation and use of water are optimized considering the various demands placed on these resources.

Effective water management requires strong institutional coordination across different levels of government and sectors. The session highlighted the need for clear governance structures and communication channels to ensure consistent policy implementation. Coordination among institutions ensures that all stakeholders work towards common goals, enhancing the effectiveness of water management efforts.

Integrating climate change policies into water management strategies was another key point of discussion. Participants emphasized the importance of considering climate change impacts, such as altered precipitation patterns and increased frequency of extreme weather events, in planning and decision-making. This integration is essential for building resilience and ensuring the long-term sustainability of water resources in the face of climate change.

Lastly, the session highlighted the vital role of inclusive stakeholder engagement in water management processes. Engaging a wide range of stakeholders ensures that decision-making is equitable and considers the needs and interests of different communities and sectors. In regions with severe water scarcity impacts, inclusive engagement helps build consensus, ensure fair allocation, and foster cooperation among all parties involved.

The outcomes of the session were:

1. Enhanced understanding and awareness among stakeholders about the critical water scarcity issues in Southeast Asia.

2. Strengthened regional collaboration and exchange of knowledge and practices to manage water scarcity more effectively.
3. Identification of successful national strategies and potential areas for improvement in water management practices.
4. Increased adoption of water accounting and management tools across the region to improve efficiency and sustainability in water usage.
5. Development of actionable policy recommendations to address water scarcity, incorporating insights from regional initiatives and stakeholder experiences.

3.5 General policy recommendations from the sub-region

1. The Asia-Pacific region is experiencing significant water scarcity due to factors like population growth, rapid industrialization, urbanization, and climate change, which is impacting its agricultural productivity and posing risks to economic growth and development.
2. Effective management and strategic allocation of water resources, including the implementation of robust water accounting systems, are crucial to addressing the challenges of water scarcity in Southeast Asia, especially to support agriculture and ensure sustainable water use amidst competing demands from various sectors.

Showcases RP5

Experiences of Indonesia

Indonesia has abundant water resources but are unevenly distributed seasonally and geographically. Only 6% of water resources are in Java, which houses 57% of Indonesia's population, causing water shortages. Water needs are projected to increase by 31% by 2045. Rice irrigation uses up to 80% of the available water. By 2045, 67% of the national GDP and over 60% of the population will be in river basins with high water stress. During the dry season, 24 out of 128 river basins will not meet water needs.

To address this, the long-term policy direction for 2025-2045 aims to:

1. Manage needs and supplies to ensure water balance in each river region.
2. Increase water storage capacity to 200m³ per capita.
3. Address the increasing need for irrigation and energy and manage water stress.
4. Utilize water resources based on environmental care along the supply chain.
5. Integrate structural and non-structural approaches to enhance regional resilience against flooding with a return period of at least 100 years (specific cities: Medan, Palembang, Jabodetabek, Kedungsepur, Gerbangkertasusila, IKN, Makassar, and Manado).

For irrigation, the government will focus on increasing water efficiency through modernization. Indonesia will strengthen the water accounting and allocation approach by collaborating with FAO and the Australia Water Partnership. This approach will consider water provision interventions and future needs amid climate hazards.

Experiences of Lao PDR

Water scarcity in Lao PDR arises from six factors:

1. **Geography:** Its landlocked location limits maritime water access, and rugged terrain makes water distribution challenging.
2. **Climate Change:** Irregular rainfall and prolonged droughts reduce water availability for agriculture, industry, and domestic use.
3. **Population Growth:** Increasing demand strains limited water resources.
4. **Pollution:** Industrial activities, urbanization, and agricultural runoff pollute water supplies.
5. **Agricultural Practices:** Traditional farming and inefficient irrigation wastewater.
6. **Infrastructure:** Inadequate facilities for water storage, treatment, and distribution worsen water scarcity, especially in rural areas.

A study on the Lancang-Mekong River Basin shows increased droughts in recent decades, significantly impacting lower Mekong countries, including Lao. Water scarcity, especially from February to May, affects irrigation, reducing crop yields and threatening food security and livelihoods. As agriculture is vital for Lao, this has serious implications.

The Lao government addresses water scarcity by developing policies, investing in infrastructure, promoting international cooperation, and strengthening water accounting to support informed decision-making by managers and policymakers.

Experiences of Thailand

Thailand ranks 9th globally for suffering from extreme weather events. Water shortages persist even when reservoirs are full, with total water allocation at 63,882 MCM against an average demand of 69,334 MCM. Recognizing this, the government developed short-term and mid-term plans. The short-term plan focuses on flood and drought prevention and resolution, while the mid-term plan includes a 20-year water resources management master plan. This plan addresses consumer water management, production sector water security, flood management, good water governance, water quality management, and water conservation.

To combat water scarcity, the government has implemented nine countermeasures:

1. Monitor and provide water reserves and plan machinery and equipment in risk areas.
2. Efficiently fill water sources.
3. Define water allocation and plan crops for the dry season.
4. Manage water resources with the river basin committee prioritizing usage.
5. Enhance water use efficiency.
6. Monitor and resolve water quality issues.
7. Strengthen water management.
8. Raise awareness and engage in public relations.
9. Monitor and evaluate operations.



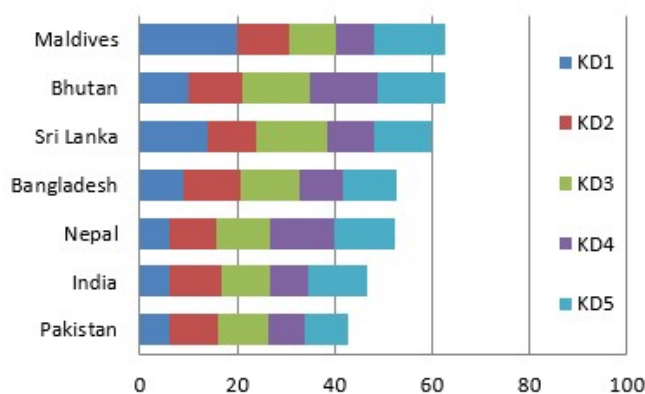
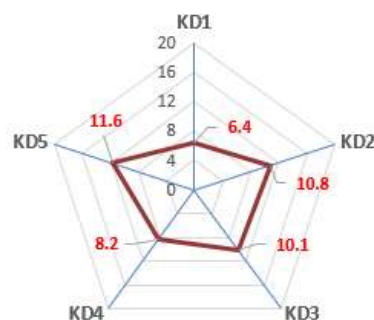
Figure 10 Presenters and audience session RS2

4 Sub-region South Asia

Participating countries in the South Asia sub-region were: Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

National Water Security in South Asia in AWDO 2020

	Population in '000	NWS score		
		2013	2016	2020
Bangladesh	164,600	47.0	51.6	52.8
Bhutan	734	60.1	61.3	62.8
India	1,332,000	46.3	50.0	46.8
Maldives	512	53.2	60.4	62.8
Nepal	29,102	50.7	53.2	52.3
Pakistan	212,820	40.8	42.5	42.7
Sri Lanka	21,670	56.4	58.5	60.0
Aver.-popul. weighted	1,761,438	45.9	49.4	47.1



KD1: Rural Household Water Security
 KD2: Economic Water Security
 KD3: Urban Water Security
 KD4: Environmental Water Security
 KD5: Water-Related Disaster Security

NWS: National Water Security

Leads, Co-leads and Coordination supporting members South Asia

Lead	Women for Water Partnership	Kusum Athukorala	GWP South Asia Regional Chair / Women for Water Partnership	mkusumathukorala@gmail.com
Co-lead	SaciWATERs	Jayati Chourey	Executive Director	jayati@saciwaters.org
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Co-lead	IWMI	Mark Smith	Secretary-General	mark.smith@cgiar.org
		Manohara Khadka	Country Representative - Nepal	M.Khadka@cgiar.org
		Santosh Nepal	Researcher- Water Resources and Climate Change	s.nepal@cgiar.org
Coordination supporting member	Gomal Damaan Area Water Partnership (GDAWP)	Brig Aslam Khan		brig.aslam@gmail.com
Lead for RS3	United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)	Anshuman Varma	Economic Affairs Officer, Environment and Development Division	varmaa@un.org
		Ms. Hitomi Rankine	Chief, Environment and Development Policy Section, Env. and Development Division	rankine.unescap@un.org

4.1 Characteristics of the sub-region and selected focus topics

South Asia encompasses a wide range of geographical features, including the Hindu Kush Himalayan (HKH) mountain range, the Indo-Gangetic plains, and extensive river systems like the Ganges, Brahmaputra, and Indus. These rivers are crucial for water supply, agriculture, and hydropower, but their management is complex due to seasonal variability and transboundary nature. A main source of water of these rivers are the glaciers of the HKH region.

South Asia has some of the world's highest population densities, with rapidly growing urban centers like Delhi, Mumbai, and Dhaka. This urban growth places immense pressure on water resources and infrastructure, leading to challenges in providing adequate water supply and sanitation services. Industrial discharge, agricultural runoff, and inadequate sewage treatment contribute to significant water pollution in South Asia. Improving water quality management and enforcement of environmental regulations are critical.

The region heavily relies on the monsoon season, which brings most of the annual rainfall within a few months. This leads to challenges in water storage and distribution, causing floods during the rainy season and water scarcity during dry periods. Climate change exacerbates these issues, increasing the frequency and intensity of extreme weather events and the base flow in the rivers from the glaciers of the HKH region. In the event of extreme events, data shows that women and girls in South Asia are disproportionately affected by flood disasters due to their roles and social vulnerabilities.

Women are underrepresented in water management decision-making processes, although they are often the primary users of water for domestic purposes (drinking water, sanitation, and hygiene) and they are actively involved in agricultural activities requiring irrigation water. Efforts are being made to involve women more actively in water governance and to empower them to take leadership in community water management.

Discussion on these issues resulted in the decision to organize the following sessions at WWF10:

- As topic sessions:
 - RP5: Strengthening Resilience: Capacity Building for Gender-Inclusive Proactive Disaster Risk Reduction and Management
 - RP6: Inclusive sanitation management and service delivery with a particular focus on marginalized groups
- As synthesis session:
 - RS3: Towards the International Year of Glaciers' Preservation 2025 - Cooperation, Governance, and Priority Setting for Climate Action and Resilience Building to Glacier Melt

4.2 Topic 1: Strengthening Resilience: Capacity Building for Gender-Inclusive Proactive Disaster Risk Reduction (RP5)

4.2.1 The Context

South Asia is recognized as one of the most vulnerable regions to climate risks, confronting challenges including cyclones, extreme variability in monsoons, floods, food and water insecurity, and heatwaves. Over the past two decades, more than half of South Asians, approximately 750

million people, have been affected by one or more climate-related disasters.¹⁶ According to the World Bank's analysis, floods alone could impose an annual cost of up to \$215 billion by 2030, potentially leading to 40 million climate migrants in the region by 2050. Individual hazards intensified by climate change also cascade and compound, creating complex and enduring disaster risks that disproportionately affect disadvantaged social groups, such as low-income communities, women, and the elderly. Ubiquitous poverty and other social asymmetries in the region, along with acute environmental degradation, further increase the susceptibility of disadvantaged communities to natural hazards and climate change, creating a vicious loop of vulnerability and disaster risk.

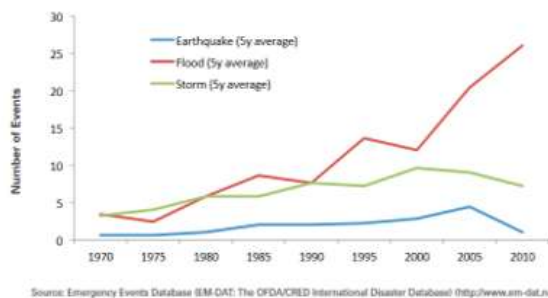


Figure 11 Number of Disaster Events in South Asia (1970-2010)

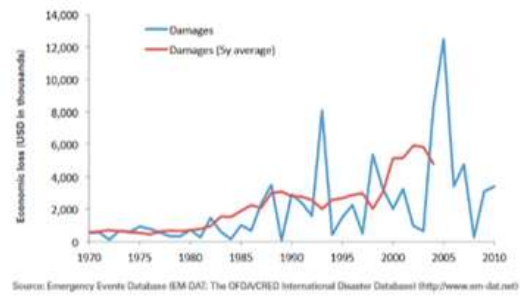


Figure 12 Trends in Economic Losses Natural Disasters in South Asia (1971-2010)

Sendai Framework for Disaster Risk Reduction (SFDDR) (2015-30)¹⁷: The SFDDR outlines seven global targets¹⁸ for the next 15 years, encompassing a substantial reduction in global disaster mortality, affected populations, and economic losses. It emphasizes the importance of minimizing disaster damage to critical infrastructure and basic services, fostering international cooperation, and increasing access to early warning systems and risk information. The framework also recognizes the importance of building environmental resilience as an integral part of disaster risk reduction.

Role of Stakeholders: 36.a(i) Women and their participation are critical to effectively managing disaster risk and designing, resourcing, and implementing gender-sensitive disaster risk reduction policies, plans, and programs; and adequate capacity-building measures need to be taken to empower women for preparedness as well as to build their capacity to secure alternate means of livelihood in post-disaster situations.

Gender Perspective: The SFDDR (2015-2030) recognizes the crucial need for integrating a gender perspective into disaster risk reduction (see above box). It acknowledges the specific vulnerabilities women face due to pervasive gender inequality and underscores the indispensable role of women, including grassroots women, in risk reduction efforts.

¹⁶ Disaster Risk Management in South Asia: The Regional Overview, The World Bank Group, 2012: <https://documents1.worldbank.org/curated/en/648281468170977802/pdf/763020WPOP11400Box0379791B00PUBLIC0.pdf>

¹⁷ Sendai Framework for Disaster Risk Reduction 2015 -2030; https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf?_gl=1*10w3e3d*_ga*MTE2ODA0MDE4NS4xNzAxMTQ3Mjc1*_ga_D8G5WXP6YM*MTcwMTE0NzI4NC4xLjAuMTcwMTE0NzI5MC4wLjAuMA.

¹⁸ <https://www.undrr.org/implementing-sendai-framework/monitoring-sendai-framework>

Effective Gender Participation as a Proactive Disaster Risk Reduction Strategy:

The intensity and complexity of rising disaster risks call for inclusive disaster management strategies, where gender mainstreaming is a key element. Achieving effective gender mainstreaming in disaster risk reduction necessitates an investment in capacity building through skill development and education. This should be complemented by creating an enabling societal environment, advocating for gender-responsive policies, inclusive institutions, and community engagement to empower women in disaster risk reduction efforts. It also requires reorientation of curricula to build in a gender perspective while training professionals for disaster risk reduction.

4.2.2 Objective and Outcome of the Session at WWF10

In a commitment to gender and social inclusion, the organizing partners (Women for Water Partnership (WfWP) and SaciWATERS,) have launched various capacity-building initiatives at different levels across South Asia related to climate change and proactive disaster risk reduction. While significant progress has been made over two decades, the journey continues towards realizing the envisioned paradigm shift, marked by successes, lessons learned, challenges faced, and future needs and opportunities.

In this context, the organizing partners organized a session at WWF10 to underscore the urgency of prioritizing gender perspectives in disaster risk reduction and climate resilience efforts in South Asia. The organizing group, led by the Women for Water Partnership (WfWP) & SaciWATERS, aimed to extend discussions beyond the usual 90-minute sessions and foster a participatory and ongoing dialogue and actions. Prior to the World Water Forum 2024, a series of collaborative regional multi-stakeholder consultations known as '**Signpost to Bali (STB)**' were conducted across South Asia. These consultations aimed to amplify the voices of marginalized groups, particularly women and youth from the region. The STB activities were organized by WfWP and SaciWATERS, in partnership with Youth for Resilience, SCOPE, Dasra, NIDM, NCWF, SARNET, Hisaar Foundation, and numerous other valued individual and organizational partners. The initiative "**Bali & Beyond**" was launched during this process to further advance gender-inclusive disaster risk reduction and management (DRRM) policies and practices.

The session shared successful initiatives from the region, focusing on capacity-building for gender-inclusive proactive disaster risk reduction. It also facilitated discussions on challenges and strategies for integrating gender into water, disaster risk management, and climate change curricula, leveraging the valuable insights and lessons gained from the South Asian experience to inform and inspire similar initiatives worldwide. By advocating for gender-inclusive proactive strategies in disaster risk reduction, the session contributed to a more resilient and inclusive future for South Asia and beyond.

The specific objectives of the session were:

- Raise awareness about integrating gender perspectives into disaster risk reduction in South Asia, emphasizing capacity building.
- Showcase successful capacity-building initiatives, ranging from formal higher educational programs to community-based initiatives, in Nepal, Bangladesh, Sri Lanka, and India for gender-inclusive disaster risk reduction.
- Discuss challenges in mainstreaming gender in water, disaster risk management, and climate change curricula, and explore strategies.
- Identify innovative approaches for overcoming barriers to gender mainstreaming in disaster risk reduction.

- Promote international collaboration among stakeholders in disaster risk reduction and gender inclusion, emphasizing capacity-building exchange.

The outcomes of the session can be summarized as

- Increased understanding of women's vulnerabilities to climate-related disasters in South Asia, with a focus on building capacity.
- Recognition of gender-inclusive approaches in building resilience to disaster risks, supported by capacity-building efforts.
- Dissemination of practical tools for integrating gender perspectives into disaster risk reduction efforts.
- Opportunities identified for cross-sectoral collaboration to mainstream gender considerations, leveraging capacity-building initiatives.
- Recommendations for policymakers, practitioners, and educators on prioritizing gender inclusion, with a focus on capacity-building strategies.
- Establishment of networks to support ongoing efforts in gender-inclusive disaster risk reduction, emphasizing capacity building.

Showcase to Strengthen Resilience: Capacity Building for Gender-Inclusive Proactive Disaster Risk Reduction in South Asia

1. Strengthening Gender-Inclusive Disaster Risk Reduction in South Asia through Higher Education

The "Crossing Boundaries" and "SAWA Leadership Program" exemplify excellent practices in capacity building for gender-inclusive disaster risk reduction and management. Initiated by SaciWATERs in collaboration with four South Asian universities *i.e.* Anna University (India), Bangladesh University of Engineering and Technology, Nepal Engineering College, and the University of Peradeniya (Sri Lanka), these programs have established innovative higher education and research opportunities in Integrated Water Resources Management (IWRM). The Crossing Boundaries project began in 2005, offering Masters and Ph.D. programs integrating technical expertise with interdisciplinary and gender-sensitive approaches. The SAWA Leadership program, which evolved from this initiative in 2012, focuses on gender-inclusive interdisciplinary training in water and climate change sciences, fostering regional and transboundary cooperation.

Over the years, more than 300 fellowships have been awarded, significantly promoting women's participation in STEM fields focused on water and climate change studies. Notably, it emphasizes gender inclusion in the sector, with a 75% quota for female students, and provides comprehensive support, including mentoring, career counseling, and internships. These programs not only enhance technical skills but also promote the creation of an enabling societal environment and inclusive institutions. By building a network of well-equipped women professionals, these initiatives address gender disparities and promote inclusive, proactive disaster management strategies in South Asia

2. Empowering Communities and Local Governments in Sri Lanka:

The Marga Institute - Centre for Development Studies in Sri Lanka has adopted a gender-sensitive approach in its efforts to promote community and local government capacity building. They have been actively facilitating training sessions and capacity-building activities aimed at enhancing understanding of gender equality at the grassroots level. During the COVID-19 pandemic, there has been a notable shift in community perspectives, recognizing the crucial role of women, particularly in conflict resolution. Additionally, the institute has provided training to Local Government Authorities on Result-Based Management, enabling them to establish specific indicators related to public health, public utilities, physical planning, and WASH (Water, Sanitation, and Hygiene).

	<p>The Bleeding Tides is a powerful narrative that sheds light on the intersection of climate change and women's health in the cyclone capital of India, the Sundarbans. Climate change impacts men and women differently. The impact of climate change on women in Sundarbans is multifaceted and complex. One of the lesser-known impacts is on the menstrual and reproductive health of women, who are disproportionately affected by increased salinity & pollution in the region. The film reveals how the lack of safe water for drinking, sanitation and hygiene, along with the lack of livelihood options and limited healthcare access, has triggered a public health crisis in this region.</p> <p>Watch this impactful documentary featuring real stories from the Indian Sundarbans on https://youtu.be/MX-4PkypSFM</p> <p>For further details and to support the cause, please write to jayati@saciwaters.org. Visit www.saciwaters.org</p>
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Figure 13 Presenters session RP5

4.3 Topic 2: Climate resilient and inclusive WASH with a particular focus on inclusive sanitation management and service delivery for marginalised groups in South Asia (RP6)

Water, sanitation, and hygiene (WASH) are crucial for public health and well-being, yet they remain major challenges in South Asia, a region prone to climate change and natural and human-caused disasters. Access to improved water has increased from 73% to 93% since 1990. However, over 134 million people still do not have access to improved drinking water. Similarly, significant progress has been made in recent years towards improving sanitation coverage, with the proportion of the population with access to improved sanitation facilities increasing from 30% in 2002 to 87% in 2022. Despite this progress, over half of the region's population lacks access to safely managed sanitation facilities, leaving millions vulnerable to preventable diseases and health hazards.

South Asia is highly vulnerable to both natural and anthropogenic disasters. Each year, floods, cyclones, droughts, and earthquakes displace and bring suffering to millions of people, particularly pregnant and lactating women, persons with disability, and socio-economically disadvantaged

groups. Around 12.5 million people were displaced in South Asia in 2022 due to natural disasters. Insufficient access to clean water, sanitation facilities, and inadequate hygiene practices exacerbate the situation for those affected by disasters, leading to a rise in waterborne diseases and hindering recovery efforts. Particularly in rural areas, limited access to clean water, inadequate sanitation facilities, and poor hygiene practices contribute to health problems and hinder overall well-being. Many rural communities lack proper infrastructure for water supply, sanitation, and waste management, leading to the contamination of water sources and the spread of waterborne diseases. Applying a Gender Equality, Disability, and Social Inclusion (GEDSI) lens to the water, sanitation, and hygiene sector in South Asia is essential as it focuses on identifying and addressing the specific challenges faced by women, persons with disability, and other groups of people marginalised due to caste, gender, ethnicity, geography, and religion. Thus, the region needs to prioritise inclusive water security and access, as well as safely managed sanitation and equitable sanitation services.

South Asia is behind the track to achieve SDG targets for WASH. As shown in Figure 7, only 93% of the population (1.78 billion) has access to basic drinking water, 49% of the population has safely managed sanitation, but still 12% has limited, 3% has unimproved, and 9% has open defecation. There is still a great disparity of these services between urban and rural population. Nine out of ten people in South Asia have access to at least basic drinking water services, but safely managed drinking water is still limited. A quarter of the population does not have access to a basic sanitation service or a handwashing facility with soap and water present.

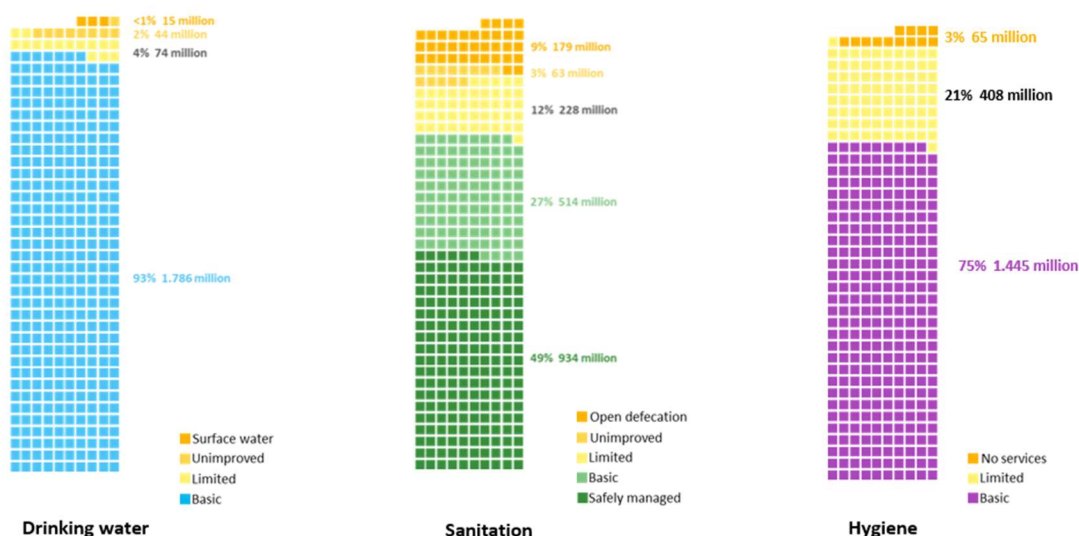


Figure 14 Population using different drinking water, sanitation, and hygiene services in 2022, South Asia

Source: WHO/UNICEF JMP, 2023; www.washdata.org

Inadequate sanitation is particularly severe for marginalized groups living in informal settlements with limited sanitation and water supply infrastructure. They are more likely to be exposed to untreated wastewater, sludge, and related diseases, as public sanitation services frequently do not extend to these areas. This underscores the urgent need for targeted interventions and improved sanitation infrastructure to ensure the well-being and health of individuals in marginalized communities.

Inclusive sanitation, defined as sanitation that is accessible, equitable, and non-discriminatory, is essential for achieving SDG 6 on Clean Water and Sanitation but also a critical component of SDG

11 on Safe and Resilient Cities, SDG 3 on Good Health and Well-being, and SDG 5 on Gender equality. Poor sanitation in South Asia results in substantial economic losses, primarily stemming from adverse effects on public health, water resources, and the environment.^{19,20} Therefore, improved sanitation infrastructure with effective and safe faecal sludge management is particularly important for designing inclusive sanitation services.

4.3.1 Challenges and opportunities

The challenges to achieving inclusive sanitation management and service delivery in South Asia are mainly financial constraints, focus on centralized approaches, weak governance and implementation, and limited inclusion of marginalized groups. Historically, sanitation is recognized as a public service and the governance structures and approaches have been mainly focused on investing in centralized sewer networks. However, many people in South Asia use on-site sanitation systems where safe disposal and treatment is costly and difficult, therefore, often leading to mismanagement and contamination of surrounding area.²¹

Historically, countries facing limited resources for water infrastructure development focused on investing in water supply rather than on wastewater and sanitation. Centralized design and planning of sanitation infrastructure did not pay much attention to decentralized faecal sludge management solutions. Adequate funding for the comprehensive development of sanitation has been a constant challenge. Consequently, little or no attention was paid to making sanitation solutions locally adapted and inclusive, considering the needs of marginalized groups. In the context of climate change and climatic extreme events, building climate-resilient WASH systems is very crucial. Traditional WASH systems might not be able to cope with the brunt of climate change and extreme events and there is urgent need to make WASH system climate resilient.

Innovative approaches and solutions are required to make sanitation service chains more inclusive. New pathways towards a more sustainable and inclusive sanitation delivery prioritize decentralization, technology standardization, and community engagement.³

In South Asia, significant progress has been made in recent years towards improving sanitation coverage, with the proportion of the population with access to improved sanitation facilities increasing to 87% in 2022. Several promising inclusive sanitation initiatives have emerged in South Asia, often involving multi-stakeholder partnerships between governments, the private sector, NGOs, and community-based organizations. In the last decade, decentralized sanitation on-site sanitation solutions have gained traction and proven to be successful in small-scale community and town-level projects, even when state funding is limited. The benefits of decentralization include increased access to sanitation in informal areas, adaptability to local contexts, affordability due to low-cost and small-scale systems, and the involvement of multiple stakeholders.

¹⁹ Naoyuki, Yoshino., Eduardo, Araral., K., E., Seetharam., K., E., Seetharam., K., E., Seetharam. (2019). Water Insecurity and Sanitation in Asia. Social Science Research Network

²⁰ Maksud, Bekchanov., Pablo, Evia. (2018). Resources recovery and reuse in sanitation and wastewater systems: Options and investment climate in selected South and Southeast Asian countries. Research Papers in Economics.

²¹ Kelkar, V. (2019). A literature review evaluating new approaches to resolving the sanitation challenge in developing Asia. Asian Development Bank, 976. <https://www.adb.org/publications/evaluating-new-approaches-resolving-sanitation-challenge-developing-asia>

4.3.2 Objective and Outcome of the Session at WWF10

The session addressed the issues and obstacles related to inclusive sanitation management and service provision in South Asia, focusing on marginalized groups. Women, children, and individuals with disabilities encounter specific difficulties in accessing WASH facilities, especially in rural areas. The lack of inclusivity in policies and practices exacerbate these vulnerabilities. Moreover, there is a pressing need to adapt WASH practices to be climate-resilient in the face of the climate crisis. The conversation in this session involved various stakeholders who will lead the efforts to make the water and sanitation sector more climate-resilient and enhance inclusive sanitation management and service delivery in South Asia. The session also included a presentation on the outcomes of the South Asia regional consultation and panel discussions to address, challenges, barriers, and solutions for improving inclusive WASH in South Asia.

The specific objective of the session was to:

- Address challenges and obstacles related to inclusive and climate-resilient WASH in South Asia, particularly focusing on sanitation management and service provision for marginalized groups.
- Discuss strategies to enhance inclusivity and climate resilience in the water and sanitation sector, with a focus on improving access for women, children, and individuals with disabilities in rural areas of South Asia.

The outcomes of the session were:

1. Increased awareness of the vulnerability of the WASH sector to climate change and extreme events
2. Improved understanding of gender equality, disability inclusion, and social inclusion in the WASH sector, ensuring equitable access to water security and safely managed sanitation
3. Key recommendations for the governments to prioritise climate-resilient and inclusive WASH policies in their policy frameworks and secure investment to achieve this.
4. Improved understanding and collaboration between WASH and other pertinent sectors, such as Water Supply, Health, and multiple water resource usage, are essential.
5. Enhanced understanding of the need for a holistic perspective and systematic investment to make the existing WASH system inclusive and climate resilient.



Figure 15 Presenters session RP6

4.4 Synthesis session: Towards the International Year of Glaciers' Preservation 2025 - Cooperation, Governance, and Priority Setting for Climate Action and Resilience Building to Glacier Melt (RS3)

4.4.1 The context

There is a critical need to strengthen cooperation to address the challenges posed by glacial and snow melt and its interactions with other climate-related phenomenon and the demand for water. The Hindu Kush Himalaya, Karakoram and the Pamir Mountains, also known as the 'Third Pole', are among the world's highest. These mountainous regions encompass the largest mass of ice and snow outside of the North and South Poles and is home to almost 55,000 glaciers.²² Also referred to as the 'Water Tower of Asia', these ranges are the source of 10 major rivers, namely the Amu Darya, Brahmaputra, Ganges, Indus, Irrawaddy, Mekong, Salween, Tarim, Yangtse and Yellow River.²³ They are crucial to the water security of two billion people in Central, Northeast, South and Southwest, and Southeast Asia who depend on them for freshwater resources for consumption, sanitation, food and energy production as well as inland waterways transport, tourism and ecosystem services.²⁴

However, climate change is shifting glacial and snow melt patterns. Glaciers in the Third Pole are melting at a faster rate than the global average ice mass and it has been projected that by 2050 the glacier mass in the Everest region will shrink by 39%-52%.²⁵ The accelerated rates of melting and retreat of glaciers induced by global warming and altered precipitation regimes—and further reinforced by factors such as black carbon deposition—are driving water-related disasters and impacting multiple sectors, with women, smallholder farmers and indigenous and marginalized communities among those most vulnerable. For example, as reiterated in recent research²⁶, glacial melt is a contributor to flash floods, landslides, and Glacial Lake Outburst Floods. In the agricultural and energy sectors, increased water flows in the short term elevate the risk of downstream flood damage to farm production and to dams and hydropower facilities. In the long term, reduced water flows and drought are expected to deepen water scarcity which can jeopardize food security and undermine the operation of the hydropower facilities. The impacts will vary by river basin, depending on the relative contributions of glacial melt, snow melt and precipitation throughout the year, while land use, infrastructure investments and demographic change will also continue to play an important role in shaping the picture at the local level.

Effective management, adaptation and investment strategies will rely on appropriate governance architectures for transboundary collaboration. Better monitoring and understanding of ongoing and projected changes in water demand and supply, impacted communities and sectors and priorities for building resilience will support effective planning and investment in affected areas.

²² The World Bank (2021). Glaciers of the Himalayas. Climate Change, Black Carbon, and Regional Resilience. Available at <https://openknowledge.worldbank.org/server/api/core/bitstreams/ff8b1264-d631-5d3d-814f-80f509c82aa9/content> (pp. 1).

²³ ICIMOD (2019). Water Security in the Hindu Kush Himalaya. HIMAP Chapter 8 Brief (pp. 2).

²⁴ UNEP (2022). A Scientific Assessment of the Third Pole Environment. Available at <https://wedocs.unep.org/bitstream/handle/20.500.11822/39757/ASATPE.pdf> (pp. IV).

²⁵ The World Bank (2021). Glaciers of the Himalayas. Climate Change, Black Carbon, and Regional Resilience. Available at <https://openknowledge.worldbank.org/server/api/core/bitstreams/ff8b1264-d631-5d3d-814f-80f509c82aa9/content>

²⁶ Ibid (pp. 1-2).

Governments in Asia have taken significant steps forward, with approaches shaped by geography, culture, and other factors. In Central Asia, the International Fund for the Aral Sea is promoting cooperation for the management of transboundary water resources. In the Mekong River Basin, also highly vulnerable to climate change and impacts of glacial melt, the Mekong River Commission is enabling dialogue and collaborative action on shared water resources management including monitoring, forecasting, and basin planning.²⁷ South and Southwest Asia's cooperation is being cemented by high-level political cooperation, among other developments. There are important opportunities for learning from the progress made to date across these and other vulnerable sub-regions.

4.4.2 Objective and Outcome of the Session at WWF10

The session, co-organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), International Water Management Institute (IWMI), and the Asia-Pacific Water Forum (APWF) took a closer look at ongoing scientific cooperation and key aspects of transboundary cooperation needed to address glacial melt and related impacts.

The outcomes included:

- Increased awareness of the **key vulnerabilities** to, and **challenges** posed by, glacial melt in Asia.
- Shared assessment of the state of **scientific cooperation** and **critical gaps**.
- Enhanced understanding of progress achieved, and the lessons learned in different sub-regions of Asia regarding **key aspects of transboundary cooperation** such as integrated river basin management and monitoring, science-policy interface, financing and investment, and cross-border institutional coordination.

The United Nations General assembly adopted a resolution in December 2022 to declare 2025 as the International Year of Glaciers' Preservation (IYGP). In this context, an international conference on glaciers preservation will be held in Tajikistan in 2025. The discussion in the session helped to shape contributions to this international conference.

The specific policy recommendations resulting from this session were:

- Glacial melt is a reality which will impact more than 2 billion people in the river basins of South Asia, Central Asia, Northeast Asia and Southeast Asia. More frequent and severe droughts and floods and declining water flows are starting to impact water security, human security, food security and trade, energy production, transportation, and a broad range of economic activity.
- Political commitment to transboundary collaboration, governance, and scientific cooperation that meets evolving needs is urgent. Progress is being made, but not quickly enough. Investments in infrastructure and nature-based solutions, effective and credible early-warning systems, joint planning and research, environmental monitoring networks, and science communication are needed. Legal agreements that work, including the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), lay a foundation for building trust. Communities and sectors must be engaged and empowered to adapt - good examples such as those involving open data sharing and community-based early warning systems can be built on.

²⁷ <https://www.mrcmekong.org/>

- At the same time, immediate action is needed to prevent conflict and rolling crises. Development partners' actions and support are urgently needed. A framework for action is needed to mobilize the right projects and investments.
- The International Year for Glaciers' Preservation 2025 calls attention to these needs and will be a critical milestone for action.

4.5 Policy recommendations

The main policy recommendations from the 3 sessions were:

- Capacity building for gender-inclusive proactive disaster risk reduction: Recommendations for policymakers, practitioners, and educators on prioritizing gender inclusion, with a focus on capacity-building strategies.
- Inclusive sanitation with focus on marginalized groups: Recommendations to governments to prioritise climate-resilient and inclusive WASH policies in their policy frameworks and to secure investment to achieve this.
- Glacier melt: The urgency of political commitment to transboundary collaboration and governance and scientific cooperation that meets evolving needs; and calling upon all stakeholders to help mobilize this commitment on the occasion of the International Year for Glaciers' Preservation 2025.

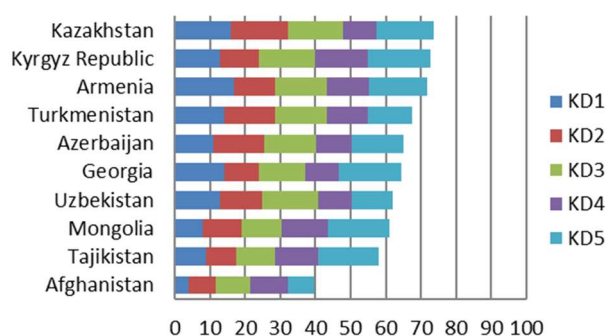
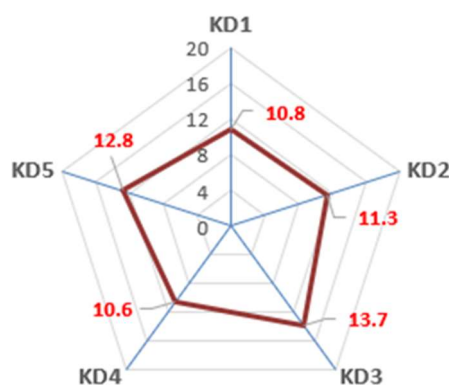


Figure 16 Presenters synthesis session RS3

5 Sub-region Central Asia and Caucasus Region

Participating countries in the Central Asia and Caucasus Region sub-region were: Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, and Uzbekistan. It is important to note that at the forum the main attention within regional process was devoted, mainly, to issues of the Aral Sea basin, territory of which is only a part of the entire sub-region.

	Population in '1000	NWS score		
		2013	2016	2020
Afghanistan	30,075	39.2	40.0	39.5
Armenia	2,971	65.3	72.0	71.8
Azerbaijan	9,940	63.5	66.8	65.1
Georgia	3,727	60.3	62.8	64.4
Kazakhstan	18,276	66.5	72.6	73.7
Kyrgyz Republic	6,257	62.5	68.3	72.6
Mongolia	3,208	55.4	62.6	61.1
Tajikistan	9,026	49.5	54.7	58.1
Turkmenistan	5,851	62.5	66.4	67.6
Uzbekistan	32,955	55.7	64.2	62.1
Aver.-pop weighted	122,286	54.5	57.2	59.3



KD1: Rural Household Water Security
 KD2: Economic Water Security
 KD3: Urban Water Security
 KD4: Environmental Water Security
 KD5: Water-Related Disaster Security

NWS: National Water Security

Leads, Co-leads and Coordination supporting members Central Asia and Caucasus

Lead	Chair of the Executive Committee of the International Fund for Saving the Aral Sea (IFAS)	Serik Bekmaganbetov	Representative of EC-IFAS Chair country	serik.ifas@gmail.com
		Murat Bekniyazov	Representatives of EC-IFAS chair country	murat.ec.ifas@gmail.com
		Zhanar Mautanova	Director, International Water Assessment Center	mautanova@mail.ru
Co-lead	GWP CACENA	Vadim Sokolov	Chair of the TAC, GWP CACENA / Head of Agency of IFAS, Uzbekistan	vadim_sokol@mail.ru
		Mrs. Guljamal Nurmukhamedova	Regional Coordinator of GWP CACENA,	nurmuhag@mail.ru

5.1 Characteristics of the sub-region and selected focus topics

Central Asia stretches from China in the east to the Caspian Sea in the west, Afghanistan and Iran in the south to Russia in the north, and includes Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Those last five countries have a population of more than 80 million people (2023) and are located in the centre of the Eurasian continent, covering an area of approximately 3.9 million square kilometres. The climate in the sub-region is harsh continental, arid, with hot summers and cold winters. Steppes and semi-deserts cover most of the territory, and the Tien Shan and Pamir Mountains with centuries-old glaciers rise from west to east.

The water resources of Central Asia are the basis for achieving water, food, energy, and environmental security, as well as ensuring socioeconomic stability in the countries. The rivers Amu Darya (Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) and Syr Darya (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) are the largest transboundary river basins connecting Central Asian countries. From a hydrological perspective, the region is unique in that it is divided into three main zones:

- Runoff formation zone (upper reaches in southeast mountainous areas).
- Runoff transit and dispersion zone (central part).
- Delta zone (northwest).

Both rivers form the Aral Sea basin, which was formerly one of the largest lakes on Earth. The Aral Sea's anthropogenic-natural ecological disaster, which has resulted in the loss of up to 90% of its water volume since the 1960s and the appearance of the Aralkum desert in its stead, necessitates the Central Asian countries to establish diverse forms of cooperation. Simultaneous efforts and actions are required due to the growing issues of global climate change, which already has an impact on the environment, society, and economy throughout the region and beyond.

It is important to note that each topic selected from the topic proposal for the Asia-Pacific Water Forum (see section 1.5 in Chapter 1) is pertinent to Central Asia. Key themes of WWF10 relate not only to SDG 6 on Clean water and Sanitation", but also to the SDGs 3, 5, 7, 8, 13, 14, 15 and others.

Locally and culturally tailored solutions - selected focus of the sub-region

The following subjects were identified as specific for the sub-region:

- Irrigated agriculture: key issues – uses 80-90% of total water, almost all irrigated lands affected by salinization; goal – achieve food security with less water.
- Transboundary dimension: goal – to increase effectiveness of cooperation in the face of growing modern challenges, and involve Afghanistan into regional cooperation.
- Water and Environment: goal – to find practical ways to ensure sustainability of ecosystems, especially the Aral Sea zone, which is still degrading.
- Water and sanitation: goal – agree on ways to achieve maximum possible targets on access by population of the regional countries to high-quality drinking water supply and sanitation.
- Water and climate: goal – to elevate capability to seize the opportunity of scaling deployment of finance to deliver climate goals and targets.
- Water delivery infrastructure: issues – aging of the existing water infrastructure, large unproductive losses of water during delivery to water consumers. The goal is to coordinate

joint actions for rehabilitation and development – with the final aim to minimize the unproductive conveyance losses.

- Water-related disasters: goal – to agree joint actions to improve the effectiveness of preparedness for water-related emergencies.

Discussion on these issues resulted in the decision to organize the following sessions at WWF10:

- As topic sessions:
 - RP7: Mobilizing Water Finance for Climate Resilience in Central Asia and Caucasus
 - RP8: Transboundary Water Cooperation in the Aral Sea basin for a better future
- As synthesis session:
 - RS4: Paths towards Water Security in Central Asia

5.2 Topic 1: Mobilizing Water Finance for Climate Resilience in Central Asia and the Caucasus (RP7)

5.2.1 Challenges and Opportunities

The most common challenging issues for the Caucasian sub-region are the low access to proper drinking water supply and sanitation, water ecosystems degradation, floods, and in some zones water scarcity. For Central Asia, they are increasing water deficit (droughts in irrigated zones) and water ecosystems degradation. Climate change aggravates all these problems.

Climate change will further increase the number of extreme weather conditions in the region, that is, periods of drought and high summer temperatures, a change in the mode of water formation, which can lead to further negative consequences. In this context, all countries' efforts consolidation is necessary to limit the negative impact on the environment. Timely identification and development of measures framework for climate risk management will mitigate or prevent the negative effects of climate change.

UNEP's Adaptation Gap Report 2022 "Too Little, Too Slow. Climate adaptation failure puts world at risk" is stressing reasons for concern, especially for Central Asia and the Caucasus. The report shows that the status of adaptation planning in Central Asian and Caucasian countries are behind global progress in adaptation actions.

The University of Notre Dame's Global Adaptation Initiative (ND-GAIN) country index is a measurement tool that helps governments, businesses and communities examine risks exacerbated by climate change, such as over-crowding, food insecurity, inadequate infrastructure, and civil conflicts (<https://gain.nd.edu/our-work/country-index/rankings>). In 2023, the ND-GAIN country index assessed the Central Asia and Caucasus countries as vulnerable to climate change impacts and ranked them out of 185 countries, as following (lower scores means the country is ranked better in terms of vulnerability). The first number is the rank, the number between brackets is the ND-GAIN country index.

- Kazakhstan – 36 (59,8)
- Georgia – 38 (58,5)
- Armenia – 49 (56,9)
- Mongolia – 59 (54,2)
- Kyrgyz Republic – 65 (53,3)
- Azerbaijan – 65 (53,3)

- Uzbekistan – 72 (52,2)
- Tajikistan – 98 (47,6)
- Turkmenistan – 117 (44,2)
- Afghanistan – 179 (32,8)

As part of their obligations under the UN Climate Conventions, all 8 countries of the region regularly submit their national communications on climate change. The presentation of the first and second communications by all 8 countries (during 1998 - 2010) showed that they started to pay increasing attention to impacts of climate change and specific adaptation and mitigation measures. However, at the same time, attraction of investments by the countries of region from international funds for adaptation and mitigation remained practically unrealized up to 2011.

To mitigate and adapt to climate change impacts, first, it is necessary to develop and implement national adaptation plans (NAP) for long-term adaptation and low-carbon development and integrate measures and actions to combat climate change within framework of sectoral development strategies and plans, as well as attracting significant technical and financial assistance from international funds and donors. All countries started to attract international climate funding only after 2016.

Preparation and implementation of effective, targeted, and funded projects requires a significant increase in capacity of experts for project preparation and increased international cooperation with UNFCCC financial institutions. There is a clear need to continue and develop research on assessing vulnerability and adaptability of ecosystems and sectors of economy to climate change, which will require collection and analysis of a large amount of information and, accordingly, improvement of system of governmental statistics, as well as strengthening cooperation and interaction with relevant ministries and departments.

5.2.2 Breakthroughs

As recommended by “The UN Climate Change Regime” adaptation capacity development includes:

- Improvement of hydrometeorological observation and expansion of network for real time observation of snow coverage and glaciers in zone of flow formation;
- Surveys in the runoff formation zones of the two main transboundary rivers;
- Improvement of drought early warning systems for selected basins; and,
- Development of plans aimed at educating public and governing bodies to act in the face of dangerous hydrometeorological phenomena.

Climate change affects all segments of the population. In this regard, task remains to regularly explain and widely publicize cases and consequences of climate change, measures, and activities to prevent its negative consequences, inform about energy-saving technologies, policies and measures that reduce GHG emissions and dangerous hydrometeorological phenomena.

There is a need to integrate climate change issues, as well as knowledge about environment, into educational programs and development plans for various sectors of economy. The most important is implementation of measures to integrate all sectors contributes to more effective adaptation to climate change.

It should be kept in mind that climate change also exacerbates other (always existing) pressure factors on all spheres of life and the economy:

- Following the political interests of the country
- Pressure from economic growth
- Social pressure – population growth and welfare needs
- Increasing risks of ecosystem degradation
- The importance of considering innovation and new technologies

Thus, we must focus on interconnection (nexus) - this is a tool for building connections (institutional, technical, and informational), as well as practical interaction of all sectors of the economy through water, which is the main indicator of the impacts of climate change.

An analysis of last versions of national determined contributions (NDCs) submitted by regional countries shows that countries indicated the amount of their financial needs to achieve climate change mitigation and adaptation goals. The financial resources needed for the only five countries of Central Asia alone to achieve their NDC targets are US\$18.9 billion for mitigation and US\$19.9 billion for climate change adaptation. It should be noted that these figures, based on the needs of these five countries alone, already exceed the current amount of climate finance available to the entire CACENA (Central Asia and Caucasus) region, indicating a serious resource gap. Resources need to be mobilized and expanded from domestic and international sources to enable countries to fully meet their climate change adaptation commitments.

To raise their climate ambitions and set the stage for successful implementation of NDC targets, countries must consider certain rules, which are critical to attracting climate finance from a variety of sources and to developing transformational projects that can support effective, efficient, and effective climate control measures with climate change in the region:

- **Scaling up impacts:** Projects that can be scaled up to reduce or prevent emissions and improve sustainability should be supported. Multilateral funds have a role to play in supporting the scaling up of climate finance by attracting greater financial flows from the private sector.
- **Country ownership:** Experience has shown that country ownership of implementation is so important that the success of a project can depend on it. Therefore, funding requests must be consistent with national priorities, which should be developed through a broad stakeholder engagement process.
- **Direct access to finance through national and subnational institutions** is a key element considered by climate finance providers. In this sense, countries that have made commitments and embarked on a coherent and participatory path to sustainable growth through consistent policies are better able to attract climate finance from a variety of sources.
- **Accountability:** Accountability requires adherence to operational policies that cover disclosure processes, safeguards, gender, indigenous peoples, and grievance processes. In addition, implementing agencies should facilitate stakeholder participation throughout the project cycle.
- **Collaboration between national institutions:** broad and systematic dialogue and collaborative processes between key partners and stakeholders, such as government agencies, subnational and non-state partners who could potentially act as national direct access actors (DOAs), should be a priority.

5.2.3 Objective and Outcome of the Session at WWF10

The CACENA sub-region faces severe and intensifying water security challenges, which are aggravated by climate change. To grapple with those challenges requires much scaled finance

and investment. And yet, inadequate of capacity and capability of project development and deployment limits mobilization of capital from international donors and funders. Together, the key stakeholders in the region aim to gather consensus and initiatives to scale water finance for climate resilience.

The session outcomes will help size the financial needs to achieve climate goals of both mitigation and adaptation. While gauging the gaps of capacity and skills, the session aims to shed light on sources of financing, both domestic and international, for countries in the sub-region to elevate capability to seize the opportunity of scaling deployment of finance to deliver climate goals and targets. The CACENA countries are going to use this session to consult each other and their key development partners to find mutual consensus on how to more effectively mobilize water finance for climate resilience.

Solutions and impacts - while continuing to strengthen domestic climate policy incentives, CACENA countries are expected to embed goals and targets in national plan and enhance accountability and transparency to not only attract finance but also assure outcomes and impacts.

The session outcomes have helped the CACENA countries to be better prepared for next COP-29 which will be held in November 2024 in Azerbaijan.



Figure 17 Impression of session RP7

5.3 Topic 2: Transboundary Water Cooperation in the Aral Sea Basin for a better Future (RP8)

5.3.1 Challenges and Opportunities

Particularly concerning are the accelerating melting of glaciers and snowfields, the sources of the Amu Darya and Syr Darya rivers, as well as the ecological disaster caused by the Aral Sea's drying up, which has left behind the 6-million-hectare Aralkum desert. The processes of land degradation and desertification are accelerating across Central Asia, which has a negative impact on ecosystems and public health.

In 1993, the heads of the five Central Asian states founded the International Fund for Saving the Aral Sea (IFAS) in an effort to collaboratively address the issues facing the Aral Sea basin in a comprehensive and organized manner. Throughout IFAS's thirty-year existence, countries have achieved a lot in order to jointly overcome the problems of the Aral Sea basin and strengthen cooperation at all levels.

Since 2018, the region's water and environmental issues have been actively considered and resolved within the Consultative meetings of the Heads of the Central Asian countries. In particular, the Regional Program "Green Agenda" for Central Asia was adopted in July 2022, following the results of the fourth Consultative Meeting of the Heads of the Central Asian countries.

Many UN General Assembly resolutions regarding collaboration between the UN and IFAS have been enacted. A special resolution was adopted at the 75th session of the UN General Assembly (May 18, 2021) on declaring the Aral Sea region a zone of environmental innovations and technologies, and measures to bring such technologies for practice are now being started.

The IFAS's voice was "heard" for the first time at a high level during the UN Water Conference in New York in 2023.

To overcome obstacles and problems against the background of the dynamic growth of the population and economies of the countries of the region, as well as accelerating climate change, which will lead to an increase in water scarcity, it will be necessary to activate multilateral and bilateral interstate cooperation and implement effective partnership mechanisms. On behalf of the Heads of Central Asian states, activities are being carried out to improve the organizational structure and legal framework of IFAS considering the interests of all countries in the region.

For Central Asia's security, stability, and sustainable development, it is important that all of the measures outlined in the regional documents, including the Aral Sea Basin Program and the Regional Environmental Protection Program for the Sustainable Development of Central Asia (REPPSD CA), be implemented in a qualitative manner. REPPSD CA covers priority areas of cooperation in the field of environmental protection until 2030 and offers a regional approach to implementing the SDGs and UN Conventions as well as strengthening the environmental component of the Aral Sea basin programmes.

5.3.2 Breakthroughs

One of the breakthrough solutions in the field of water resources at the global level was the United Nations Water Conference, which took place on March 22-24, 2023 and became the first major water related event since 1977. The Conference was held on the initiative of Tajikistan and the Netherlands as part of the midterm comprehensive review of the International Decade for Action "Water for Sustainable Development, 2018-2028" and is dedicated to progress in achieving objectives related to water and sanitation.

The International Science Council has identified four categories of water problems that require different scientific, political, and practical strategies to solve. These problems range from well-studied problems that lack proven solutions to new and emerging problems that require additional research and innovative thinking. Also needed a more systematic dialogue between policy makers and scientists on evidence-based policy options to support real action and predict future water-related risks.

All Central Asian countries have adopted governmental programs on water resources management, the regulatory framework in water sector is expanding, including for cooperation in the field of transboundary water resources, water-saving technologies are gradually being introduced, hydraulic structures are being reconstructed and repaired to reduce unjustified water losses.

Public administration in the field of water resources in the countries of the Aral Sea basin prioritizes and focuses on working with youth to build a culture of careful attitude to water and other natural resources, as well as and provides for the observance of social and gender equality, as urbanization processes are actively taking place due to the difference in income between rural and urban residents, men and women, working conditions. 81% of the population of Central Asia lives in the Aral Sea basin. Despite the trends towards urbanization, a high proportion of the rural population remains (56.2%). The high level of employment of the economically active population in agriculture is particularly noted within the Aral Sea basin (60% - Tajikistan, 26% - Kyrgyzstan, 26% - Uzbekistan, 14.3% - Kazakhstan). Therefore, the development of rural areas and the creation of favourable conditions for life in rural areas are among the priorities of all countries of the subregion.

It is crucial to ensure the nexus of water, food, and energy security by managing water resources sustainably, providing access to clean water and sanitation, supporting human health and livelihoods, mitigating the negative impacts of climate change and extreme weather, and protecting and restoring ecosystems and the important services they provide. In this regard, the countries of the region pay great attention to strengthening water management authorities and specialized institutions, including research institutes. Preventive measures and actions taken by the Governments of the Central Asian states will make it possible to find effective solutions to existing and emerging new problems in the water sector.

The States of the Aral Sea basin spend significant funds to solve water problems. International development partners have been providing significant assistance for 30 years. Despite this, there is a low efficiency of water use with an average of \$ 2.5 production value per cubic meter, which is 7 times less than the global average (\$ 19.01/m³).

There are two main reasons for inefficient use of resources in the region: weak investment in the industry and insufficient level of regional cooperation between countries, i.e. joint actions are needed to solve problems, which will increase the growth rate of regional GDP by 1.5% per year. Losses in agriculture are estimated at 0.6% of GDP while losses in the energy complex are about 0.9% of GDP; estimates of annual economic damage and unrealized economic benefits reach \$4.0 billion to \$4.5 billion. In case of resolving the issues in the sector, the growth of regional GDP might total 7% (\$ 22 billion) by 2026, and it might reach 20% by 2050. It is possible to achieve a 40% increase in water use efficiency by implementing contemporary irrigation technologies and modifying irrigation systems.

An average of 116 cubic kilometres of water are annually formed in the Aral Sea basin, of which 92% of the total water intake is consumed by agriculture. 66% of the gross agricultural output of Central Asia is provided by irrigated lands: about 100% in Turkmenistan, 87% in Uzbekistan, 85% in Kyrgyzstan, 82% in Tajikistan and 40% in Kazakhstan. Annually, about 43 cubic km of water is unproductively lost, which must be systematically reduced by the active introduction of water-saving technologies, digitalization of water metering, improvement of water infrastructure. It is necessary to stop land degradation and take other comprehensive measures to eliminate the problem of water scarcity, to develop an optimal, effective model of water-energy cooperation.

Irrigation water saving by smart-phone

To facilitate introduction of irrigation water saving technologies, rational water use and increased water productivity a Mobile Application «TOMCHI» has been developed within the framework of the National Water Resources Management Project financed by the Swiss Agency for Development and Cooperation and implemented in partnership with the Ministry of Water Resources of Uzbekistan and Agency of IFAS. Tomchi in Uzbek language is meaning “drop of water”.

The Mobile Application tool designed as a virtual Extension Service for Farmers providing the following tools: (i) access to comprehensive information on applicable in the local context water saving technologies, relevant legislation and best practices; (ii) estimation of respective costs of certain water saving technique implementation; (iii) feedback mechanism and (iv) platform linking water users with local producers and service providers of available water saving technologies.

Mobile Application «TOMCHI» is software available since 2021 to work using smartphones and other mobile devices. It works in smartphones running on Android and iOS platforms. For smartphones running on the Android platform, the application can be downloaded from the Google Play Market, and for smartphones running on the iOS platform from the Apple Store).



In this context, it is very prospective to foster collaboration between scientists in the cooperative study of the region's water problems and the search for solutions; to organize teaching staff and student advanced training based on the top specialized higher education institutions; and to establish an exchange of experiences among research institutes of Central Asian countries.

Transboundary water cooperation in the Aral Sea basin to ensure a sustainable, resilient, inclusive cycle of clean water from source to sea should be strengthened and, along with the improved IFAS, new models for interaction should be found.

Special attention will be paid to the caring attitude towards glaciers, which are important to both nature and humankind. Rivers get their start from glaciers, and without rivers, crop production cannot advance and feed humanity. In recent decades, an increase in the average temperature balance has been especially observed in the world and the region. In consequence of this, glacier volumes and areas are rapidly decreasing. According to forecasts, by 2100 half of the world's mountain glaciers will disappear, and the stress on water resources in some areas of Central Asia may increase up to 2.8 times by 2040. In this context, the initiatives of Kyrgyzstan and Tajikistan on the topics of glaciers, mountain ecosystems and the development of hydropower potential for electricity generation, as well as other countries' on the development of a “green” economy are very important.

It is planned for Central Asian countries to collaborate on the regional implementation of water- and resource-saving technologies, as well as modern information and communication technologies, in the water sector.

5.3.3 Objective and Outcome of the Session at WWF10

The objective of the session on this topic was to assist the Central Asian countries in building a common vision for sharing and protecting water resources in a changing climate. The session facilitated:

- A discussion on climate risks for the region's water sector, obstacles, and barriers to the implementation of joint measures.

- The identification of regional priorities for the Aral Sea basin and specific actions for their implementation.
- To intensify exchange of experience, knowledge, and ideas on improving water infrastructure resilience to negative climate impacts, introducing innovations and technologies, mobilizing financing for transboundary water cooperation, etc.

The main outcomes of the session were:

- The exchange of knowledge and experience among the participants for better understanding of the problems of increasing water resources resilience to climate change in Central Asia.
- The elaboration of concrete recommendations and measures to strengthen co-operation of the basin countries on shared use and protection of water resources.
- The promotion of a common vision on the use and protection of water resources and harmonized management of water resources in the basin.

By this the work within IFAS and other regional bodies, organizations and institutions, joint working groups and commissions was strengthened, with the aim to establishing closer cooperation and partnerships to achieve common goals, sustainable growth and prosperity in the region.

The Aral Sea Basin Assistance Program

The Aral Sea Basin Assistance Program (ASBP-4) was approved by the decision of the IFAS Board in 2021 with an implementation period till 2030. Since 1993, with the full support of international development partners, the founding states of the Fund have jointly implemented three Programs.

ASBP-4 is a regional program aimed at achieving an integrated approach to the use and protection of water resources, environmental rehabilitation, and socio-economic development of the Aral Sea basin, as well as improving the institutional and legal mechanisms of IFAS. The main objective of the Program is to implement joint actions and prospective programs to overcome the Aral Sea crisis and strengthen cooperation through targeted actions at the national, regional, and international levels to improve the water, environmental, and socio-economic situation, ensure the sustainable development and enhance the human well-being in the Aral Sea basin.

ASBP-4 is the main strategic document for the midterm perspective and consists of 34 project proposals covering areas such as integrated water resources management, environmental and socio-economic activities, and the improvement of institutional and legal mechanisms. The total required funding exceeds \$2 billion.

Joint implementation of ASBP-4 by Central Asian countries demonstrates unity and partnership in our region. Currently, under the initiative of Kazakhstan's chairmanship in IFAS, work is underway to update and expedite the implementation of the Program's projects.



Figure 18 Presenters session RP8

5.4 Synthesis session: Paths towards Water Security in Central Asia (RS4)

5.4.1 Challenges and Opportunities

The water sector in Central Asian region is characterized by the following fundamental challenges:

- Regional countries are facing increasing water deficit, which is due the impact of climate change, aging water infrastructure, application of low-efficiency water use technologies (especially in agriculture which consume about 85% of total available water resources), and weak organizational capacity of existing regional water authorities.
- Region observes increased demand for water because of population growth, as well as increasing needs of the economic sectors of the countries, including Afghanistan, which still is not directly covered by regional cooperation frameworks.
- At the same time, there is a large difference in water and land productivity among individual zones within the region, as well as irregular distribution of water shortages across transboundary river basins. There remains insufficient consideration of the ecosystems needs for water.
- Water use and irrigation regime for agricultural crops based on outdated water consumption standards. Countries in the region should make efforts to improve the efficiency of irrigation systems by introducing advanced technologies and water management practices. This may include upgrading irrigation systems, using different water saving technologies, and adopting modern agricultural practices that will reduce water loss and increase crop yields.
- Regional countries still have insufficient legal, economic, and inter-sectoral mechanisms for managing water resources and infrastructure - there is high share of governmental funding and low level of private sector participation.
- Central Asian countries must think about development of general principles, measures and indicators for the rational use and protection of water resources which are in transboundary rivers.
- There is huge gap in improvement and implementation of an automated systems for accounting and monitoring of quantitative and qualitative indicators of water, and also in improving the exchange of information on water resources.
- And, there is need for increasing the capacity of water management organizations and the qualifications of water management personnel, etc.

5.4.2 Breakthroughs

This session aims at bringing together high-level water related officials and stakeholders from Central Asia countries, key development partners (international organizations and international financial institutions), and other parties to find mutual consensus on how to move towards water security under stress from climate change impacts.

Water availability in a semi-arid region like Central Asia is a key to generate sustainable economic development for all regional countries. This can, however, only be reached through joint actions on ensuring effective cooperation between the regional countries and their development partners with main focus on the effective use of limited available water resources.

The second key session outcome will help size the financial needs to achieve climate goals of both mitigation and adaptation - as contribution to efforts towards water security.

The session outcomes are planned to be discussed at the global event “One Water Summit” within the framework of the high-level session of the 79th United Nations General Assembly on September 23, 2024, in New York, USA.

The session outcomes also will be useful for Central Asian countries to be better prepared for next COP-29 which will be held on November 11-22, 2024, in Baku, Republic of Azerbaijan.

The session aimed to shed light on sources of financing, both domestic and international, for countries in the sub-region to elevate capability and scaling of climate finance to deliver water security goals and targets.

5.4.3 Outcome of the Session at WWF10

Participants of the session agreed on the following statements:

- Express gratitude to the Government of Indonesia for organizing the 10th World Water Forum and the Secretariat of the Asia-Pacific Process of the Forum for supporting the organization of the sub-regional session.
- Note the relevance of studying best practices on water resources management in transboundary basins, the introduction of technologies and methods to combat the negative impact of climate change on water resources, as well as the need to use them in improving resource management in the Aral Sea basin.
- Emphasize the need to strengthen cooperation on joint management of the Aral Sea Basin’s water resources amid accelerating climate change processes.
- Highlight the need to intensify efforts to improve the organizational structure and legal framework of IFAS, considering the interests of all countries.
- Call on international organizations and partners to consolidate support for the implementation of the Action Program for Assistance to the Countries of the Aral Sea Basin (ASBP-4) and the Regional Environmental Program for Sustainable Development in Central Asia (REP4SD-CA).
- Stress that ineffective water resource management is one of the major development challenges in the region. In this regard, water resource ministries of all countries need to adopt a long-term investment program, the "Multi-Stage Approach," to enhance efficiency and conserve water resources, modernize dams, hydraulic infrastructure, sediment management, and dam safety.
- Recommend the IFAS to take appropriate measures on implementation of the projects of the Action Program for Assistance to the Countries of the Aral Sea Basin (ASBP-4), including through strengthening existing coordination mechanisms with the participation of international partners and on supporting implementation of projects aimed at ensuring effective interaction and mobilizing actions.
- Recommend the IFAS consolidate the actions and efforts of international partners with the creation of an appropriate platform to assist countries in building capacity to combat the negative impact of climate change on the water resources of the Aral Sea basin.
- Emphasize the importance of intensifying the efforts of countries to develop a joint mechanism for the use of water and energy resources in the Syrdarya and Amudarya river basins, as well as to present and agree on a draft regional strategy for the rational use of water resources of transboundary rivers in Central Asia.
- Draw the attention of the countries to the need to strengthen the implementation of water-saving technologies in the region and automation of gauging stations to achieve transparency in transboundary water resources management.
- Emphasize the need to improve the material and technical equipment and to consider strengthening the powers of the executive bodies of the BWO “Amu Darya” and BWO “Syr Darya”.

- Note the relevance of global and regional initiatives of the founding countries of IFAS in the field of water resources, including the International Decade for Action “Water for Sustainable Development,” 2018-2028, the International Year of Glaciers’ Preservation - 2025, as well as using the One Water Summit platform to promote projects in the Aral Sea Basin and the need to demonstrate successful cooperation experience of the basin countries in the joint use and protection of water resources at the Summit, launching a joint initiative aimed at fundraising for environmental projects and restoring ecosystems of the Amu Darya and Syr Darya river basins, reducing disaster risks, and improving medical services.
- And, welcome the activities of the International Water Assessment Centre (IWAC) for assisting in the development of cooperation on the use and protection of water resources in the Aral Sea basin and recommend strengthening assistance to the countries of the basin within the framework of the implementation of the IWAC Programme of Work for 2025-2027.

The results of the session were formalized in an outcome document with the title “Transboundary Water Cooperation in the Aral Sea basin for a better future”.

5.5 Policy recommendations

Water availability is a key factor for improving the well-being of the regional population and a key parameter for sustainable development, which can, however, only be reached through systemic transboundary cooperation. Urgent actions are needed as the sub-region faces severe and intensifying water security challenges, which are aggravated by climate change.

While continuing to strengthen domestic climate policy incentives, Central Asian countries are expected to embed goals and targets in national climate change adaptation plans and enhance accountability and transparency to not only attract finance but also assure outcomes and impacts.

Regional countries and their development partners are committed for increasing of capacity and capability of water project development and mobilization of capital from domestic and international donors and funders.



Figure 19 Presenters Synthesis session RS4

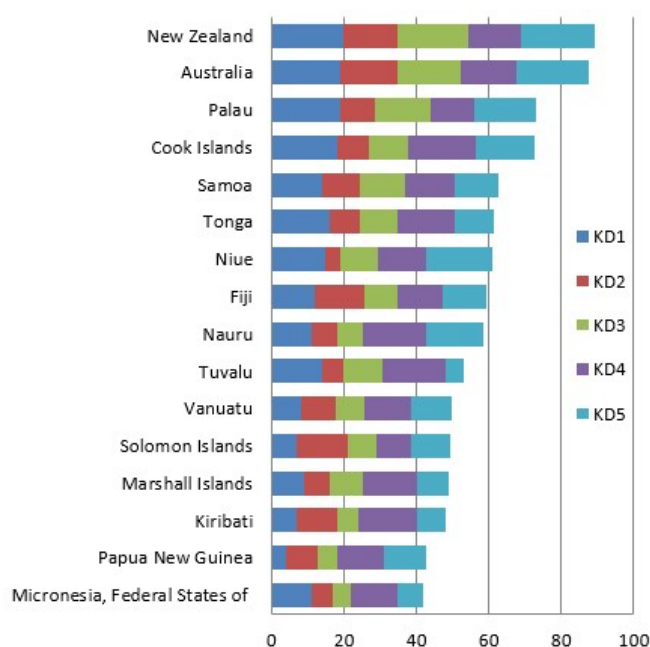
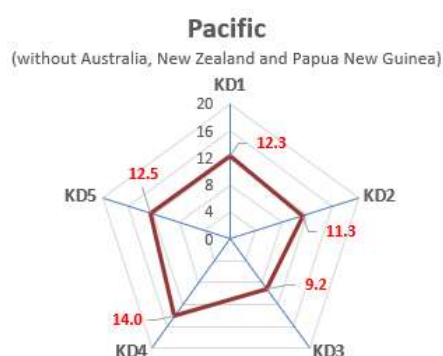
6 Sub-region Oceania and Pacific Islands Countries

Participating countries in the Oceania and Pacific Island Countries sub-region were:

- Australasia Sub-Region: Australia, New Zealand
- Pacific Island Countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

The focus of the discussions in the sub-regional process was on the specific issues of the Small Island Developing States (SIDS) in the sub-region.

	Population in '000	NWS score		
		2013	2016	2020
Australia	24,993	87.6	88.3	87.8
Cook Islands	19	66.3	70.4	72.5
Fiji	886	57.1	59.8	59.5
Kiribati	113	45.8	45.8	48.2
Marshall Islands	55	42.9	40.9	48.9
Micronesia, Federal States of	103	39.5	37.7	42.0
Nauru	11	55.9	62.0	58.6
New Zealand	4,886	88.7	88.9	89.1
Niue	1.7	55.5	59.9	61.0
Palau	18	62.8	69.4	73.0
Papua New Guinea	9,019	41.1	42.8	42.8
Samoa	198	57.2	62.9	62.8
Solomon Islands	667	51.9	49.6	49.3
Tonga	100	61.4	61.4	61.5
Tuvalu	12	47.1	48.3	53.0
Vanuatu	285	51.1	49.7	49.9
Aver. -pop weighted	41,363	75.6	76.4	76.2
Aver. w/o Australia, New Zealand and Papua N.G.	2,466	53.7	54.3	54.7



KD1: Rural Household Water Security
 KD2: Economic Water Security
 KD3: Urban Water Security
 KD4: Environmental Water Security
 KD5: Water-Related Disaster Security

NWS: National Water Security

Leads, Co-leads and Coordination supporting members Oceania and Pacific Island countries

Lead	Secretariat of Pacific Community (PICs)	Dave Hebblethwaite	Water Security and Governance Coordinator	DaveH@spc.int
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		Zoe Talsma	Communication Manager	zoe.talsma@waterpartnership.org.au
Coordination supporting member	International WaterCentre (Aus & NZ)	Regina Souter	Director, International WaterCentre, Griffith University, Australia	r.souter@griffith.edu.au

6.1 Characteristics of the sub-region and selected focus topics

There is an immense amount of diversity across the sub-region – spanning continental water systems in Australia and Papua New Guinea, through temperate New Zealand; large and small islands, coral atolls and volcanic islands. Pacific Island Countries face a unique set of threats including sea level rise, frequent tropical cyclones, coastal inundation, and droughts. Pacific leaders have repeatedly recognised the threat of climate change to the livelihoods, security and wellbeing of its people and Pacific Foreign Ministers declared a climate emergency in July 2022, calling on all development partners to prioritise climate action.

Climate change is already driving change to water systems across the Oceania sub-region; with worsening cycles of drought and flood and other weather-related disasters such as tropical cyclones, which have a devastating impact on Pacific Island Countries.

Water scarcity is an issue across the sub-region, but reflecting its diversity, causes and methods to address it vary widely. Australia is the driest inhabited continent on earth and has evolved an approach to manage water from an allocation perspective. In the face of a changing climate, national water reform continues in Australia to re-think and refine interjurisdictional governance, investment in technology and infrastructure, improve water efficiency and value water for all uses appropriately. New Zealand is blessed by relatively abundant water resources, however changing land use and associated water quality impacts present an increasingly complex challenge for the regional councils that are responsible for water resources management.

Conversely, the Pacific population is the world's least urbanised, and establishment and maintenance of safe sanitation services is challenged by long distances, limited resources and services, and complex supply chains. For many Pacific communities, the availability of freshwater resources is confined to small and fragile groundwater lenses, streams, and springs, and/or rainwater collected from roofs. These scarce resources are vulnerable to overexploitation and contamination, particularly in atoll environments, where limited potable groundwater sources can

be threatened by over-pumping, land use activities, inappropriate sanitation facilities, and the accelerating impacts of climate change. However, persisting low levels of engagement in water security compared to other sectoral issues, and inadequate consideration of water security issues in regional frameworks and decision-making for a—particularly with respect to consideration of water security as a critical component of disaster and climate resilience—are contributing to the challenges faced.

If current trajectories persist, millions of Pacific islanders will continue to endure water insecurity for generations to come, with profound implications for public health, socio-economic development, food and energy security, the environment, and human rights.

To give due regard to the diversity across the Oceania sub region and complexity of the issues faced, the co-convenors deliberately focussed on Pacific Islands issues for the regional sessions. This enabled the sessions to provide more depth of discussion on issues relating to small islands, which we would like to have more prominence across the World Water Forum Agenda.

Locally and culturally tailored solutions - selected focus of the sub-region

SIDS face unique challenges regarding water resources due to their small size, limited land area, vulnerability to climate change, and high population densities. Specific water resource issues they often encounter include limited freshwater availability and dependency on rainwater, saltwater intrusion, poor water quality, lack of adequate infrastructure, flooding, and coastal erosion. Discussion on these issues in the regional process resulted in the decision to focus on issues on water security and sanitation and to organize the following sessions at WWF10:

- As topic sessions:
 - RP9: Water security and Pacific SIDS
 - RP10: Strengthening engagement in water security to support Pacific resilience
 - RP11: Climate-resilient sanitation in Pacific Small Island Developing States
- As synthesis session:
 - RS5: Water security and resilience of small island communities.

6.2 Topic 1: Water security and Pacific SIDS (RP9)

Small Island Developing States (SIDS) of the Oceania Sub-Region continue to endure some of the lowest levels of access to safe water and sanitation of any region in the world and remain disproportionately affected by the water-related impacts of disasters and climate change - including floods and drought that continued to impact the Sub-Region throughout 2023. Latest data gathered by Pacific Island Countries and Territories²⁸ indicate that approximately half of the Pacific population lives without access to basic drinking water facilities, and more than two thirds live without access to basic sanitation.²⁹ These whole-of-Pacific numbers remain relatively stagnant compared to other global regions that have seen significant improvements in access over the past decade.

²⁸ Joint Monitoring Programme (JMP) data (2020) compiled by UNICEF and WHO (2021)

²⁹ JMP defines “basic” services as: drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing; and use of improved sanitation facilities that are not shared with other households.

While every country and territory in the region remains active in improving the water security of their vulnerable communities, in many cases these efforts are not keeping pace with the pressures of population growth and movement, disaster setbacks and the accelerating impacts of climate change. Access to basic water and sanitation facilities is far from the whole story in the Pacific, as PICTs are disproportionately affected by the intensifying water-related impacts of disasters and climate change, impacting significantly on the financial cost and sustainability of addressing water and sanitation issues. Climate change is increasing the risk of weather-related disasters in the Pacific, especially in combination with sea-level rise and associated flood, wave, tide, storm surge, wind intensity, coastal erosion, saltwater intrusion into coastal aquifers and the potential worsening of water scarcity and drought.

6.2.1 Challenges and Opportunities

Pacific nations, development partners, and civil society are progressing water security across multiple fronts. However, while many of these efforts are focused and effective, as a whole they are not making a significant impact on the persistently high percentage of Pacific islanders exposed to the serious health, social and environmental impacts of unsafe water and sanitation facilities. This applies particularly in rural and remote areas where water and sanitation is managed at a household or community level.

Already, five Pacific SIDS have been counted amongst the world's 15 most vulnerable³⁰, with climate change expected to significantly increase the likelihood of hydro-meteorological disasters that already account for over 75% of the region's reported natural disaster events. For many communities, access to safe water and sanitation is seriously constrained by local capacity to manage current water-related risks, such as those arising from floods and drought, let alone those intensified by the impacts of climate change. The impacts of disasters and climate change on the water sector are not yet well captured in government-led processes such as Post Disaster Needs Assessments (PDNA) and National Adaptation Plans. Increased effort is required to ensure that such processes properly factor in risks and future costs associated with water and wastewater services affected by disaster events and climate change.

Given the enormity of the task, coordinated, risk reduction approaches are needed to empower communities and households to establish, operate and maintain affordable and appropriate water and sanitation systems. This is to be done while also maintaining safe drinking water and hygiene practices in homes, schools and health care facilities, including incorporating resilience to the intensifying impacts disasters and climate change. This is particularly relevant for the region's rural, remote, and small island populations, including the significant and growing populations of rural Papua New Guinea.

Pacific rural populations without access to basic drinking water facilities outnumber urban populations without access by approximately 24 to 1, which is the highest disparity in the world. The majority of Pacific people living without access to safe water and sanitation live in remote rural, outer island and peri-urban communities with limited access to government and private-sector services, and increased support is required to better equip these communities and households to establish, operate and maintain appropriate water and sanitation facilities, while also fully

³⁰ World Risk Report 2021 – note that risks to island nations are less prominent in the 2022 WorldRiskReport, which changed its methodology to focus more on risks to larger population countries.

harnessing local and traditional knowledge to maintain safe drinking water and hygiene practices in homes and schools.

6.2.2 Breakthroughs

The Pacific is the least urbanised region of the world, and our urban water utilities reach less than a quarter of our total population, far less than other global regions. For these communities, drinking water, sanitation and hygiene are primarily managed at the household, village or settlement level. In this context, addressing SDG 6 requires innovative and locally appropriate solutions, acknowledging and incorporating the critical role of traditional governance structures, culture and traditional knowledge, including the important role of women and girls.

Efforts to achieve Pacific water and sanitation targets therefore need to consider the water cycle, and wherever possible use IWRM approaches to protect the sustainability of freshwater resources from “ridge to reef”. Innovation is key, but sustainability can only be achieved with robust, solutions that can withstand the impacts of extreme climate events and vast distances from materials and markets parts and service markets.

At their August 2023 meeting, Pacific water Ministers noted the special water security needs of small island communities without access to surface waters, and the need for urgent and increased partner support to assist communities to conserve “every raindrop falling from the sky”, including support to strengthen rainwater collection, sustainable groundwater management, water storage and delivery capacity. Further to this, Ministers recognised the importance of climate and disaster financing to the establishment of resilient water and sanitation infrastructure, capacities and systems, and the urgent need for development partners to support Pacific Island countries and territories to work together to more readily access climate and disaster financing to address the priority water and sanitation needs already articulated in national strategies, plans and road maps.



Figure 20 Pacific Water Ministers and high level officials meet to discuss common challenges and strategic directions at the 2023 PWWA Ministerial Forum in Koror, Palau

RP9 Showcase: Regional collaboration of Pacific water utilities

While the Pacific is the least urbanised region of the world, its water utilities play a significant role in supporting water security both within and outside of urban areas through their support to water, sanitation and hygiene services and the management of wastewater. Operating in a fragile high-risk environment such as the Pacific means developing strong partnerships amongst water utilities and strategic frameworks to ensure water infrastructure investments are climate resilient, innovative, and able to withstand the impacts of extreme climate events. The Pacific Water and Wastewater Association (PWWA) was established to support Pacific Water Utilities in addressing common operational issues and building capacity across water utilities. It is the regional umbrella organisation supporting utilities in their provision of clean safe drinking water and sanitation services, bringing utilities together annually through a regional conference and incorporating Ministerial dialogue through a forum that allows water ministers to engage and discuss water security issues and solutions of concern to the Pacific. These and other services, such as annual utility benchmarking and a young professionals development program, have greatly assisted water utilities to strengthen their institutional capacities and take a strategic approach to maintaining water and sanitation services throughout all conditions. For example, the Water Authority of Fiji has recently developed its Fiji Water Sector Strategy 2050 to identify key challenges and investments needed to ensure the provision of sustainable and resilient water and sanitation services for all its citizens. Both PWWA and the Water Authority of Fiji were active across multiple regional sessions of the 10th World Water Forum.

6.2.3 Objective and Outcome of the Session at WWF10

The **objectives** of the session of the session at WWF10 were to: provide a space for Pacific Island country and territory representatives to convey stories of Pacific resilience, including local water security solutions that harness traditional knowledge and governance systems; and highlight the importance of accelerated support to empower Pacific communities to establish, operate, and maintain safe and resilient water and sanitation systems throughout all conditions.

The **outcomes** of the session were: an improved understanding of the water security issues of SIDS and the role of innovative and climate-resilient solutions; and strengthened collaboration and partnerships between Pacific SIDS and development partners on water security actions.



Figure 21 Emergency repairs to water infrastructure undertaken by staff of the Water Authority of Fiji

(credit: Water Authority of Fiji)

6.3 Topic 2: Strengthening Engagement in Water Security to Support Pacific Resilience (RP10)

The resilience efforts of Pacific SIDS have historically been hampered by generally low levels of engagement in water security compared to other sectoral issues, and inadequate consideration of water security issues in regional frameworks and decision-making processes. While the significant economic, health and environmental benefits of improved water and sanitation have been well demonstrated, the issue often doesn't receive the levels of attention proportionate to both the scale of the challenge and its critical role in supporting Pacific resilience.

The scale of the challenge for the region requires a fundamental recalibration of government and partner priorities and investments, along with a meaningful shift in the scale and type of support provided by development partners. While these challenges are framed by the region's established high level regional policy frameworks, these are yet to realise their full potential in driving and monitoring the urgent water security action required across multiple sectors and stakeholders.

6.3.1 Challenges and Opportunities

Water security is a cross-cutting issue affecting multiple sectors, and many partnerships are active across the region in sharing knowledge and approaches and progressing action.

While the significant economic, health, environmental and resilience benefits of improved water and sanitation have been well demonstrated, the issue is yet to receive the levels of attention proportionate to both the scale of the challenge and its critical role in supporting Pacific resilience. The issue is framed by many established high level regional policy frameworks, including the 2050 Strategy for the Blue Pacific Continent, the Boe Declaration, and the Framework for Resilient Development in the Pacific (FRDP), however none of these frameworks are currently neither fully engaged in water security issues nor driving the coordinated efforts required across multiple sectors and stakeholders. There is significant scope to better connect the work of these partnerships to existing regional goals and reporting frameworks.

This session will showcase the key findings of the engagement strategy and present recommended actions to strengthen the integration of water security considerations as a critical component of Pacific disaster and climate resilience. The integration of water security approaches into the disaster risk reduction and climate adaptation efforts is a global challenge, and this session will explore Pacific case studies and experiences that will likely be relevant to other regions. Participants will have the opportunity to connect with water security actors and stakeholders from the Pacific and examine the potential of new and strengthened water security partnerships to support Pacific resilience.

6.3.2 Breakthroughs

The recent formation of a Technical Working Group on Water Security under the Pacific Resilience Partnership (PRP) is one mechanism to promote effective dialogue between the water and sanitation and resilience communities. While in its early stages, it is intended that the group provide a working platform for partners and stakeholders active in the fields of water security and resilience to come together to identify ways that the PRP can promote increased and meaningful engagement on water security as a resilience issue and strengthen coordinated action on water security to support progress towards FRDP Goals. Enhancing collaboration and inclusivity in this domain will not only bolster key vulnerable sectors but also have a far-reaching positive impact for the resilience of the Pacific region.

At their August 2023 meeting, Pacific water Ministers acknowledged that the achievement of water security objectives requires the efforts of multiple sectors and actors at all levels, confirmed their commitment to the establishment of national coordination mechanisms and collaborative partnerships, and encouraged the strengthening of regional coordination of water security issues to ensure that priority needs are recognised and actioned by leaders and decision makers at the highest levels.

RP10 showcase: Building a strategy to strengthen engagement in Pacific water security

Pacific efforts to strengthen engagement in water security to support Pacific resilience is anchored within the region's umbrella Framework for Resilient Development in the Pacific (FRDP) and the Pacific Resilience Partnership (PRP) mechanism established to oversee progress towards FRDP goals. The FRDP and the PRP were endorsed and established by Pacific Island Forum Leaders to guide integrated action in addressing climate change adaptation, disaster risk reduction, disaster risk management and climate change mitigation. A key initiative of the PRP is the establishment of Technical Working Groups to lead technical work on addressing key priority issues affecting the region. Under these arrangements, the PRP recently established a multi-Sectoral Water Security Technical Working Group to strengthened engagement in water security to support Pacific resilience. The Working Group is currently in developing a Water Security Engagement Strategy and Action Plan to strengthen engagement in water security as a key determinant of Pacific resilience. Strategy outcomes are aligned with the four FRDP Resilience Standards to better Inform, Include, Integrate and Sustain water security action for resilience across the region. The Working Group has been active in elevating water security as a key determinant of resilience across multiple platforms and forums such as the UN 2023 Water Conference, the 2023 World Water Week, regional and national dialogues, and at this 10th World Water Forum.



Figure 22 H.E. Ambassador Fatumanava-o-Upolu III Dr Pa'olelei Luteru, Chair of the Alliance of Small Island States (AOSIS), joins Pacific Ministers to advocate for water security as a key determinant of Pacific resilience at the UN 2023 Water Conference.

6.3.3 Objective and Outcome of the Session at WWF10

The objectives of the session at WWF10 were to: showcase key findings of the engagement strategy; share case studies on the integration of Pacific water security, disaster risk reduction and climate adaptation efforts; and provide an opportunity for participants to connect with water security

actors and stakeholders from Pacific SIDS and progress the potential of new partnerships for resilience.

The outcomes of the session are: increased engagement on water security as a key component of climate and disaster resilience in the Pacific; strengthened collaboration and partnerships between Pacific Island Countries and development partners on water security action for resilience; and strengthened understanding of the importance of water security engagement strategies to increase collaboration and partnership across multiple stakeholders and actors. A specific outcome of the session was a commitment to support the inclusion of dialogue on water security at the Asia-Pacific Ministerial Conference on Disaster Risk Reduction (October 2024 in Manila, Philippines).

6.4 Topic 3: Climate-resilient sanitation in Pacific Small Island Developing States (RP11)

Between 2000 and 2020, over half a million people in the Pacific gained access to basic sanitation, but these gains were outpaced by population growth. Today, about 70% of the population don't have access to basic sanitation – and open defecation rates in Papua New Guinea are increasing faster than any other country in the world.

The links between climate change and water are increasingly recognised. But the links between climate change and sanitation have not received the same attention, even as flooding, droughts and sea level rises are increasingly impacting sanitation services, causing:

- Widespread damage to critical sanitation infrastructure
- Contamination of drinking water sources from overflowing septic tanks and pit latrines
- Wastewater discharge into important aquatic ecosystems that provide livelihoods
- Exposure to pathogens from open defecation and unsafe hygiene practices.

Current efforts to improve sanitation in the Pacific are not sufficient to address these challenges, and so a step change is needed in both the level of investment and priority given to sanitation by the region's governments and the international development community.

6.4.1 Challenges and Opportunities

Challenges are outlined above, but also include broader impacts as the increasing impacts of climate change have a huge proportional impact on GDP in small island economies – for example, Tropical Cyclone Pam impacted Vanuatu in 2015 and caused an estimated 65% impact on GDP. This means that many Pacific Island nations are fighting to maintain their development gains, including provision of safe and sustainable water and sanitation.

Seeing water and sanitation within the framework of climate change sharpens the focus on what is needed to deliver on SDG 6 under changing climatic conditions through resilient infrastructure and working closely with communities to understand their needs, aspirations, and strengths. It also offers opportunities to ensure water and sanitation is included in critical adaptation planning, and to access climate finance to meet the needs of the region.

6.4.2 Breakthroughs

There are opportunities to support better coordination and exchange of learning, as well as political will and finance at the regional level in the Pacific. There are existing strong regional organisations

such as SPC (Pacific Community) and PWWA (Pacific Water & Wastewater Association) that have mandates and hold knowledge and authority in this space.

Decision-making regarding sanitation and conservation should consider the needs of different groups and utilise traditional knowledge and understanding of the natural environment. There are opportunities to include ecological restoration and preservation activities with sanitation programs to support better outcomes for communities and ecosystems.

Climate financing from donors is an increasingly important source of WASH financing and yet globally, only \$12 billion of \$681 billion in climate financing has gone to WASH, and only 0.1% of that has prioritised basic WASH (Water for Women). Including water and sanitation across climate adaptation planning and resilience, ensuring it is well integrated across multisector national plans and included in potential climate finance.

RP11 Showcase: Climate-proofing water, sanitation and hygiene in rural Vanuatu

Vanuatu is a Small Island Developing State comprising 83 islands in the Western Pacific and is extremely vulnerable to climate change and disaster risks such as those associated with extreme hydro-meteorological events. Climate predictions show that more intense extreme events will increase the incidence of damage to community-based water, sanitation and hygiene infrastructure, with impacts already dramatically demonstrated by the significant damage to WASH infrastructure caused by recent tropical storms affecting the nation. In response to these intensifying threats, Vanuatu is actively working to climate-proof its rural WASH systems, including through securing the Pacific's first significant climate financing to support rural WASH. The Enhancing Adaptation and Community Resilience by Improving Water Security in Vanuatu project aims to create safe, climate-resilient, and sustainable water and sanitation across a quarter of Vanuatu's population, achieved by improving and scaling up existing government-owned processes of water and sanitation management. The project will climate-proof rural water, sanitation and hygiene infrastructure, utilising and improving existing government-owned processes of water and sanitation management. Ultimately, the project aims to catalyse a paradigm shift towards safe, climate-resilient, and sustainable WASH services at the community level. The project is envisaged to be an important tool in implementing Vanuatu's climate change strategies and policies, while at the same time generating valuable lessons for other Pacific nations.



Figure 23 Presenters session RP11

6.4.3 Objective and Outcome of the Session at WWF10

While the links between climate change and water are increasingly recognised, the links between climate change and sanitation have not received the same attention. Sanitation is essential for poverty alleviation, human and ecosystem health and underpins sustainable development and climate resilience. Current efforts to improve sanitation in the Pacific are not sufficient to address these challenges, and a step change is needed in both the level of investment and priority given to sanitation by decision makers at all levels, and by our region's international partners in development and resilience. The session at WWF10 examined opportunities to place sanitation within the framework of climate change to better focus on what is needed to meet SDG6 targets

under changing climatic conditions. Participants of the session connected with Pacific representatives and hear local stories of resilient sanitation solutions and challenges, drawing on examples of community governance, traditional knowledge, adaptation planning, appropriate infrastructure, and sustainable financing (including access to climate financing).



Figure 24 News article showing destruction on Vanuatu's Pentecost Island, including extensive damage to critical WASH infrastructure, in the days after Tropical Cyclone Harold in 2020

(credit Dan McGarry / The Guardian)

6.5 Synthesis session: Water security and resilience of small island communities of Asia-Pacific (RS5)

6.5.1 Background of the session

SIDS face unique social, economic, and environmental vulnerabilities, and are at the front line of climate change impacts. SIDS already experience a disproportionately high exposure to disaster risk, with climate change affecting both the likelihood and impact of slow onset and sudden hydrometeorological events. The Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report (2022) affirms with at least medium confidence level that increased water security risk will be experienced in almost every small island on Earth.

The Asia-Pacific region is home to almost half the world's SIDS, as well as countries with significant populations living on small islands. More than a third (17) of ADB's member countries are SIDS, including the world's only four nations comprised exclusively of low-lying atolls (Kiribati, the Maldives, the Republic of the Marshall Islands, and Tuvalu). Over half the SIDS of the Asia-Pacific

region have no surface water at all or are home to significant populations living on islands with no surface water. For these communities, water resources are confined to shallow aquifers and rainwater collected from roofs, as well as supplementary sources such as desalination where available.

While the common water security challenges of SIDS are some of the world's most demanding, the Pacific region's island communities are at the forefront of implementing innovative local solutions, such as strengthening community resilience by drawing upon systems of traditional knowledge and governance together with cutting edge science.

The Pacific Partnership for Atoll Water Security

The Pacific Partnership for Atoll Water Security is a collaboration of Pacific SIDS facing similar challenges in ensuring that remote island communities maintain access to safe drinking water throughout all conditions. Launched in 2014 at the 3rd International Conference on SIDS, the Partnership links the water security challenges, experiences and solutions of the region's low-lying atoll nations. Initially comprised of the five atoll nations of the Cook Islands, Kiribati, the Republic of the Marshall Islands, Tokelau and Tuvalu, the partnership has recently expanded to include the three raised limestone island countries of Nauru, Niue and Tonga. Supported by the Government of New Zealand and the Pacific Community (SPC), the Partnership is bringing together Pacific experience, lessons learned and technical assistance in order to assist its members to build the skills, systems and basic infrastructure to better anticipate, respond to, and withstand the impacts of drought. The Partnership is enabling regional collaboration on the design and demonstration of range of management tools tailored to local water security needs, including water resource monitoring and assessment, drought management planning, and the use of innovative technologies. In showcasing the work of the Partnership at the 10th World Water Forum, opportunities were identified to connect with other SIDS and international partners as part of a broader community of practice for water security issues facing low-lying island communities.



Figure 25 The Pacific Partnership for Atoll Water Security bringing together water practitioners to share practical lessons and approaches from across the region's many remote and low lying island communities.

6.5.2 Objective and Outcome of the Session at WWF10

The objective of the session was to explore the efforts of small island communities across the Asia-Pacific to achieve climate resilient water systems and demonstrate how investment in local water security solutions can and should play a critical role in addressing the existential threat of climate

change. Session dialogue was enriched by the experience of regional partners and stakeholders, including the Japan Water Forum, Pacific Islands Association of Non-governmental Organisations (PIANGO), the Pacific Water and Wastewater Association (PWWA), the Pacific Community (SPC) and water.org, as well as valuable island experience as from outside the region through high level representation from the Government of the Seychelles.

The outcomes of the session were:

- Identification of opportunities for new and strengthened partnership dialogues to support the water security of small island populations of the Asia Pacific region.
- Identification of opportunities to build upon and expand the reach and relevance of existing communities of practice for small island water security, such as the Pacific Partnership for Atoll Water Security.

6.6 Policy recommendations

The Asia-Pacific region is home to almost half the world's SIDS, including all the world's atoll nations, as well as numerous countries with significant populations living on small islands at the front line of climate change impacts. The WWF10 Oceania sub-regional process highlighted several core themes for policy makers to consider.

More needs to be done to support the development, implementation, sharing and upscaling of locally appropriate and locally owned solutions by the small island communities of the Asia-Pacific, including through strengthen knowledge partnerships and improved and accelerated access to investment mechanisms such as climate financing.

Tailored capacity building

The erosion of capacity in the water sector is becoming a critical issue in SIDS, and coordinated action is needed to support locally appropriate training and career development opportunities to arrest the loss of critical capacity.

Transboundary Partnerships

SIDS are already utilising sub-regional and regional partnerships to progress water security knowledge, capacity and action at multiple levels, from the local to the technical and political, and significant opportunities exist to strengthen, expand and replicate partnership approaches across the Asia-Pacific and beyond.

Catalysing climate financing opportunities through flexible mechanisms

Climate financing is an increasingly important mechanism to support the establishment of resilient water and sanitation infrastructure, capacities and systems in the region's SIDS and small island communities, and there is an urgent need for development partners to support countries to more readily access climate financing to address the needs already articulated in national strategies, plans, and road maps.

Support for locally driven localised solutions

The Pacific is the world's least urbanised sub-region, with significant populations located outside the reach of reticulated services and managing their water and sanitation at a household level. Tailored locally owned and appropriate solutions are necessary to address the persistently low access to safe water and sanitation. Increased and sustained support is required to empower local communities to protect and sustainably manage their water resources, while maintaining safe and resilient WASH systems and practices throughout all conditions.

Recommendation 1.

The Asia-Pacific region is home to almost half the world's SIDS, including all the world's atoll nations. Furthermore, numerous countries have significant populations living on small islands at the front line of climate change and disaster impacts. Increased and coordinated efforts are required at all levels to strengthen engagement in water security as a critical resilience issue for the region's small island communities, including through improved and accelerated access to climate and disaster financing.

Recommendation 2

The Pacific is the world's least urbanised sub-region, with significant populations located outside the reach of reticulated services and managing their water and sanitation at a household level. Increased and sustained support is required to empower local communities to protect and sustainably manage their water resources, while maintaining safe and resilient WASH systems and practices throughout all conditions.

7 Journey of Policy Development in Asia and the Pacific region and our Messages and Outcomes from WWF10

The Regional Process of WWF10 provided a platform for regional dialogues and cooperation on sub-regional and regional water-related challenges. Working at a sub-regional level enabled the identification of local and regional water priorities and developing solutions to these challenges. Experiences, ideas, lessons, and potential solutions were exchanged with other sub-regions and regions in 11 topic sessions and 5 sub-regional synthesis sessions. The selected topics reflected the importance that the sub-regions gave to the specific issues. The challenges and breakthroughs related to the topics and the results of the sessions in terms of messages, outcomes and policy recommendations were described in the previous chapters by sub-region. An important outcome of all session was an increased understanding and awareness of the issues and possible solutions, but also suggestions and commitments were made for follow-up actions.

This chapter goes one level up and integrates the water issues in the region at the level of overall water security in the Asia and the Pacific region and places the results of the sessions in a longer time perspective. Policy development on water management is an evolving long-term process and WWF10 should be seen as a step in the policy journey of the region to achieve water security. This is presented in Figure 26 which illustrates that the results of the WWF10 process is based on earlier events and that the region will continue to work on its policy development in next events. The elements of this policy roadmap will be explained in the next sub-sections at the global level (section 7.1) and at the regional level (section 7.2). Section 7.3 gives a short summary of the kind of messages from the regional sessions at WWF10. The overall messages of the Asia and Pacific regional process and outcomes in terms of pathways for the five Guiding Principles for development will be presented in section 7.4. Finally, section 7.5 calls for a revival of IWRM to implement these pathways.

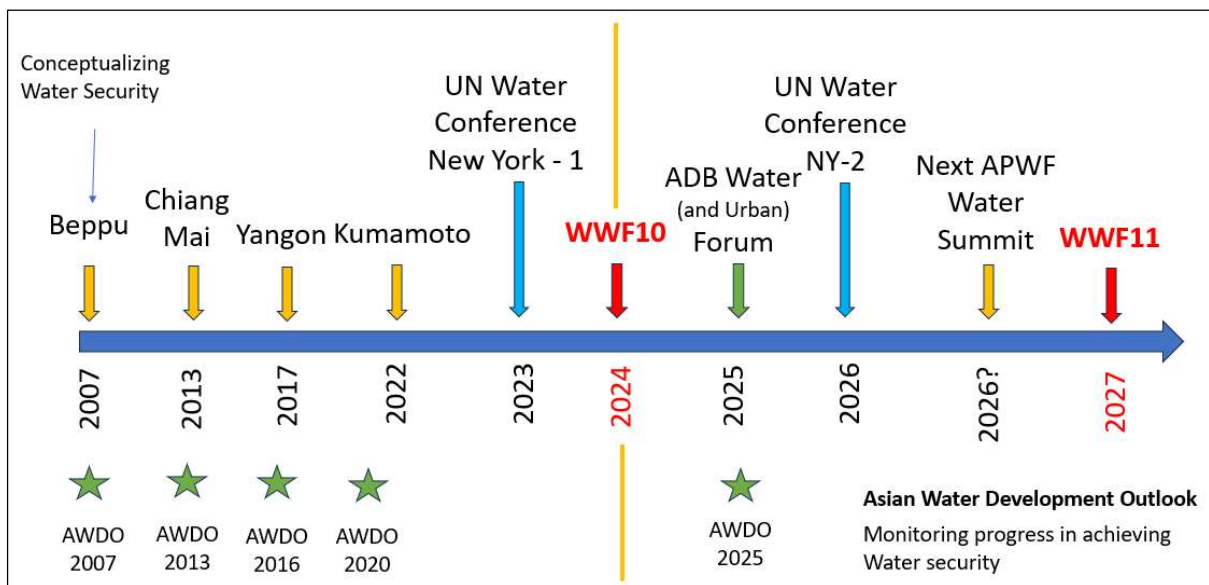


Figure 26 Asia and Pacific Roadmap for Policy Development towards achieving Water Security

7.1 Water management at the global level: UN Vision on Water

The United Nations (UN) plays a pivotal role in global water management by setting global agendas like the Sustainable Development Goals (SDG 6), facilitating international cooperation through frameworks like the UN Watercourses Convention, and organizing major conferences to address water issues. It provides technical and financial assistance via agencies such as UNDP and UNICEF, promotes research and data collection, and leads advocacy campaigns like the World Water Day to raise awareness and mobilize action. The UN also integrates water management into broader development and climate strategies to ensure sustainable and equitable water access globally. Two specific initiatives of the UN are highlighted here in this report as they provide guidance to our activities: the SDGs and the UN 2023 Water Conference.

7.1.1 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the UN in 2015 to address major global challenges. They aim to eradicate poverty, protect the planet, and ensure prosperity for all by 2030. Each goal has specific targets and indicators to measure progress. The SDGs cover a broad range of issues. The SDGs related to water are primarily encapsulated in SDG 6, which aims to ensure availability and sustainable management of water and sanitation for all. But some other SDGs have also important connections to water, such as SDG 3 (Good Health and Well-Being), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action, including flooding), highlighting the interdependent nature of water with broader sustainable development efforts.

The SDGs are critically important for water management as it provides a comprehensive framework for addressing various aspects of water management, including access, quality, efficiency, and ecosystem protection. They also provide guidance for policy and actions by setting specific targets and indicators that help governments and organizations set clear, measurable objectives for water management. This enables systematic tracking of progress and identification of areas needing improvement. By aligning water management practices with the SDGs, countries and organizations can achieve more sustainable, equitable, and effective outcomes, ensuring that water resources are managed in a way that supports broader development objectives and future generations.

7.1.2 UN 2023 Water conference – regional commitments

The UN 2023 Water Conference, held from March 22-24, 2023, in New York, resulted in the adoption of the Water Action Agenda, marking a significant step towards addressing global water challenges. The conference generated over 800 commitments from various stakeholders, including governments, civil society, and the private sector, aimed at ensuring water security and sustainable management. Key outcomes included reinforcing water as a fundamental human right, promoting the development of alternative food systems to reduce water use in agriculture, and launching a global water information system to guide SDG-related plans and priorities. The commitments made are seen as transformative steps that could unlock significant socioeconomic and ecosystem benefits, with the potential to propel global efforts towards sustainable water management and achieve SDG 6 by 2030.

At the UN 2023 Water Conference, Asia and the Pacific made several key commitments to address water security and sustainable management in the region. Notably, the Asian Development Bank (ADB) committed to investing \$11 billion in the water sector by 2030 to enhance water

infrastructure, promote efficient water use, and support climate resilience initiatives across the region. Key commitments from the region include:

- Investment in infrastructure: Significant investments in water infrastructure to improve access to clean water and sanitation, particularly in underserved areas.
- Climate resilience: Developing strategies to adapt to climate change impacts, such as building flood defences and improving water storage systems.
- Sustainable practices: Promoting sustainable agricultural practices to reduce water usage and enhance food security.
- Capacity building: Enhancing the capabilities of local water management institutions through training and technical support.
- Gender inclusivity: Addressing gender disparities in water management by promoting women's participation in decision-making processes and leadership roles.

These commitments reflect a comprehensive approach to addressing the region's water challenges, focusing on sustainability, resilience, and inclusivity to achieve long-term water security and support the SDGs.

7.2 Regional policy coordination

The Asia-Pacific region has several platforms where water management and policy development are discussed regularly. The two key platforms in this are the Asia-Pacific Water Forum (APWF) and the Asian Development Bank (ADB).

The **APWF** brings together governments, international organizations, research institutes, NGOs, and other stakeholders to address water-related challenges in the region. Established in 2006 by the ADB, UNESCAP and Japan Water Forum, the APWF aims to strengthen the political will of government leaders to enhance water security and promote sustainable water management in the Asia-Pacific region. It serves as a regional platform for dialogue, cooperation, and knowledge exchange on water-related issues. Often, APWF also takes the lead in presenting the regional views at international fora on water management such as the UN 2023 Water Conference, Stockholm World Water Week, and the World Water Forum, including WWF10.

The **ADB** plays a significant role in water management in the region through its financial support, technical assistance, policy advocacy, knowledge sharing, fostering regional cooperation, and stimulating private sector involvement. Through these initiatives, ADB significantly contributes to improving water security, access to clean water and sanitation, and overall water resource management in Asia and the Pacific. Its efforts help ensure sustainable and equitable water use, supporting economic growth and enhancing the quality of life for communities across the region.

7.2.1 Asia Pacific Water Forum Water Summits

A key activity of APWF is the organization of the Asia-Pacific Water Summit, a high-level event that brings together political leaders, water experts, and stakeholders to discuss and formulate strategies for addressing water challenges in the region. The summits aim to promote sustainable water management, enhance water security, and support regional cooperation on water issues. The summits attract a diverse range of participants, including heads of state and government, ministers, policymakers, water experts, representatives from international organizations, NGOs, academia, and the private sector. The following summits and their themes were organized (see the yellow arrows in Figure 26):

1. Beppu (Japan), 2007 – Water Security: Leadership and Commitment

2. Chiang Mai (Thailand), 2013 – Water Security and Water-related Disaster Challenges: Leadership and Commitment
3. Yangon (Myanmar), 2017 – Water Security for Sustainable Development
4. Kumamoto (Japan), 2022 – Water for Sustainable Development – Best Practices and the Next Generation

The first water summit at Beppu in 2007 introduced the concept of water security in the region. It is noted that this regional conceptualization coincided with the global introduction of the concept in the paper of Grey and Sadoff.³¹

Each summit concludes with a declaration or set of recommendations that outlines commitments and actions for improving water management in the region. The outcomes of the summits influenced national and regional water policies and strategies, promoting the adoption of sustainable water management practices. At the same time the summits contributed to capacity building by facilitating the exchange of knowledge, experiences, and best practices among participants.

The main message of the 2017 water summit in Yangon, encapsulated in the "Yangon Declaration: The Pathway Forward," was to promote water security for sustainable development in the Asia-Pacific region. Key strategies outlined in the declaration involved advancing research and innovation in water use efficiency, recycling, risk assessment, and policy governance. The declaration promotes IWRM, tailored to local conditions, and emphasizes the importance of transboundary cooperation and partnerships. Sound water cycle management is advocated, integrating various water sources and ecosystems into comprehensive policies at the river basin level. Efforts to conserve and restore water-related ecosystems, improve irrigation and drainage for food security, and incorporate water management into urban and regional planning are highlighted. Governance and inclusive development are pivotal themes, with calls for robust regulatory frameworks to ensure safe drinking water and improved sanitation. The declaration stresses the need to protect vulnerable groups from water-related disasters and involve them in decision-making processes. It advocates for capacity building among stakeholders, particularly women, youth, and marginalized communities, and aims to end open defecation by 2025. Financially, the declaration supports the development of innovative financing mechanisms, public-private partnerships, and sustainable investment strategies. It emphasizes the importance of ex-ante investments for disaster preparedness and risk reduction. These are all subjects that have been further discussed in the Asia and the Pacific regional process sessions at WWF10.

The last water summit in Kumamoto, which took place shortly after the COVID-19 pandemic, placed the water challenges amid the recovery of the pandemic and the vital role that the water sector has in this recovering. The "Kumamoto Declaration" described the collective understanding of the summit that recovery from the pandemic requires transformation into quality-oriented societies that are resilient, sustainable, and inclusive. To realize such quality-oriented society, it will be needed to strengthen the development of quality infrastructure for the water sector, integrating both hard and soft components, including knowledge, information and data management. Commitments were made to work towards improving governance, closing the

³¹ Grey, David and Claudia W. Sadoff (2007). Sink or Swim? Water security for growth and development. *Water Policy* 9 (2007) 545-571.

financial gap and appeal to the science and technology community to provide context-specific innovation for resolving water problems.

7.2.2 Water Sector Development at ADB

The goal of the Asian Development Bank (ADB) in water management is to ensure water security and sustainable management of water resources in Asia and the Pacific. This involves enhancing access to safe water and sanitation, improving water governance, promoting integrated water resources management, increasing resilience to climate change, and supporting sustainable agricultural and urban water management. ADB aims to provide financial and technical assistance, foster regional cooperation, and implement innovative solutions to address water-related challenges and improve the quality of life for communities across the region.

A specific knowledge program of ADB related to water security is the periodically publishing of the Asian Water Development Outlook (AWDO) which assesses the water security in the region and provide policy recommendations for improving water management in the region. The concept behind AWDO was described in section 1.5 and the results for all countries were presented at the start of each sub-regional chapter. The relation between AWDO and regional policy development was illustrated in Figure 26.

Based on its long-term experience with collaborating with their Developing Member Countries (DMCs), ADB has developed a guidance strategy for the water sector in which they identify priorities for achieving water security in the region. These priorities are different for each country and are made specific for each DMC in the ADB-DMC's Country Partnership Strategy (CPS) document, which are produced every three years.

The water related operational activities of ADB are integrated in two main sector teams: (i) Agriculture, Food, Nature and Rural Development, and (ii) Water and Urban Development. These water operational activities are closely coordinated with ADB's other sector teams (mainly Energy, Transport, and Finance) and thematic teams (mainly Climate Change and Environment). The priorities for action to achieve water security in the region depend on the sub-regions and within these sub-regions sometimes differ at the level of development of the individual DMCs .

In the Agriculture, Food, Nature and Rural Development sector team, the water-related priorities are on integrating the actions to achieve food security, restoration and conservation of eco-systems, IWRM, integrated river basin management, and integrated flood risk management. This includes “climate smart net zero” and environmentally sustainable agriculture development (reducing ecological footprint of agriculture, regenerative agriculture to minimize environmental impacts) and mainstreaming green financing and ecological protection for land, water, and natural resources management. Innovative financing includes eco-compensation schemes between upstream and downstream regions and setting up good national resource accounting systems.

The Water and Urban Development sector team identifies as main points of attention for the region the need for adaptation to climate change and the potential of private sector involvement in urban water services. The liveability in cities in times of climate change requires integrated solutions (spatial/landscape planning, mobility, WASH, etc.) and, where possible, urban-rural integration. Special attention is given to countries with aging water service infrastructure. At the same time the creditworthiness of municipalities and municipal resource mobilisation in the whole region need to be enhanced to ensure the sustainability of these services. This might be realised by involving the private sector in developing and the operation and maintenance of water service facilities. In nearly

all sub-regions, but particularly in the Pacific Islands, there is a need to develop local solutions which fit the local physical, economic and socio-cultural conditions.

Activities to address these regional priorities include attention to be given to enhance water governance and capacity building.

7.3 Summarizing the messages and outcomes of the sub-regional sessions at WWF10

The 11 topic sessions and 5 synthesis sessions at WWF10 resulted in a great number of key messages, policy recommendations, and specific outcomes. These messages and outcomes of all sessions were described in the sub-regional chapters. The outcomes of the sessions included initiatives for follow-up actions. Some of these messages and outcomes were very specific for the topic or the sub-region, others were more generic at the Asia and the Pacific region level or are even addressing water management at the global level.

7.3.1 Messages of A&P WWF10 sessions of the sub-regions

A summary of the main messages from the sub-regions is as follows:

- Sub-region Northeast Asia on science and technology: Open science and data sharing is important for effectively managing river basins under climate change challenges. On socio-cultural aspects: WRM needs to integrate socio-cultural aspects into its approaches and policies by incorporating local knowledge, traditions, and customs. On youths: Youth-led initiatives and intergenerational collaboration offer refined approaches to attaining a sound water cycle.
- Sub-region Southeast Asia on scarcity: Effective management and strategic allocation of water resources, including the implementation of robust water accounting systems, are crucial to addressing the challenges of water scarcity, especially to support agriculture and ensure sustainable water use amidst competing demands from various sectors.
- Sub-region South Asia on vulnerability of WASH to climate change: Those most impacted by inadequate WASH services are marginalized groups, and especially women, girls, people with disability and socio-economically disadvantaged groups. In South Asia, ensuring equitable access to water security, safely managed sanitation, and other critical aspects of water, sanitation, and hygiene (WASH) through Gender Equality, Disability, and Social Inclusion (GEDSI) is crucial. South Asia's acute climate vulnerability calls for exponentially increasing investments, particularly for women and youth, through advocacy and capacity building related to disaster risk resilience. Gender-responsive policies, inclusive institutions, and enhanced modes of community engagement need to be rapidly strengthened through both short-term and long-term initiatives leading up to 2030.
- Sub-region Central Asia on water security and climate resilience: Water availability is a key factor for improving the socio-economic conditions. This can only be reached through systemic transboundary cooperation and implement needed urgent actions. For this the Central Asian countries are expected to embed goals and targets in National climate change adaptation plans and enhance the accountability and transparency to not only attract finance but also assure outcomes and impacts. The countries in the region and their development partners are committed for increasing of capacity and capability of water project development and mobilization of capital from domestic and international donors and funders.
- Sub-region Pacific Islands and Oceania on the specific situations of the Small Island Developing States (SIDS), being at the front line of climate impacts. More needs to be done

to support the development, implementation, sharing and upscaling of locally appropriate and locally owned solutions by the small island communities of the Asia-Pacific, including through strengthened knowledge partnerships and improved and accelerated access to investment mechanisms such as climate financing.

7.3.2 Outcomes from A&P WWF10 sessions

The outcomes of the sessions included the increase of awareness and exchange of knowledge but also the formulation of follow-up activities and taking new initiatives. The increased awareness was mentioned in all sessions as an important outcome on the subjects addressed, together with the value of exchanging knowledge on challenges and successes. Reference is made to the sub-regional chapters in which this is further described.

The outcomes of the sessions also included the formulation of follow-up activities, in many cases as a next step in a sequence of events related to a specific subject. This included among others:

- The preparation of youth related initiatives for the next Youth Water Forum Asia in 2024 (RS1).
- To continue the discussions on smart water management in Southeast Asia in the framework of GWP SEA and KOMECA programs (RP3).
- Preparing to highlight mobilizing water finance for climate resilience in Central Asia for the COP-29 (November 2024 in Azerbaijan).
- Supporting the activities of the International Water Assessment Center (IWAC) for assisting in the development of cooperation on the use and protection of water resources of the Aral Sea basin and recommend strengthening assistance to the basin countries within the framework of the implementation of the IWAC Program of Work for 2025-2027.
- Supporting and expanding the reach and relevance of the region's existing small island partnerships, such as the Pacific Partnership for Atoll Water Security.
- Supporting the inclusion of dialogue on water security at the Asia-Pacific Ministerial Conference on Disaster Risk Reduction (October 2024 in Manila, Philippines).

Other outcomes were formulated as proposals to create (sub-) regional platforms to share practices and knowledge, encourage financing and establishing governmental policies, stakeholder involvement and promotion of continuous development. This included:

- To establish a Southeast Asia facility for Smart Water Management (RP3)
- To create a South-East Asia Water Portfolio Fund Coalition for inclusive and green climate resilience financing (supported by existing donors such as GCF, Adaptation Fund, GEF, Climate Fund, etc.) to synchronize and synergize existing fundings of agencies (RP3).

7.4 Pathways beyond Bali – implementing the Guiding Principles

Building on the work of APWF and the results of the Asia-Pacific Water Summits, the experience of ADB in working with the countries in the region, the pathways for implementing the Guiding Principles (GPs) can be developed, based on the messages and outcomes of the regional sessions. The underlying collective understanding is that the region needs to transform into quality-oriented societies that are resilient, sustainable, and inclusive. At the WWF10's concluding session of the Regional Process the results of the sessions were presented along the five Guiding Principles for actions to achieve water security.



Figure 27 Presenting the A&P results at the Concluding Session of the Regional Process

7.4.1 Pathways to build resilience and adaptive capacity (GP 1)

Asia and the Pacific is recognized as one of the most vulnerable regions to climate change risks. Hence, it is not surprising that this Guiding Principle was addressed in most sessions at WWF10, often in combination with other GPs such as on inclusiveness (GP 2) and finance (GP 4). The words ‘resilience’, ‘climate change’ and ‘water security’ appear in 11 of the 16 sessions. Building resilience and adaptive capacity to climate-induced disasters is fundamental for the further development of the region.

The need to build resilience was mentioned in all sub-regions. Specific challenges related to climate change for Asia and Pacific were the following:

- Glacier and snow melt of the Hindu Kush Himalaya ranges, impacting more than 2 billion people and one third of the globe’s food production (RS3).
- Scarcity in Central Asia with a focus on transboundary water cooperation in the Aral Sea basin (RS2).
- The challenges the Small Island Development States (SIDS) have in coping with climate change, asking for locally driven localised solutions (RS5).

Several sub-regions mentioned the issue of scarcity as a major driver to develop resilient systems. The sub-region South-East Asia dedicated their synthesis session to the scarcity issues (RS2). The main messages were:

- The Asia-Pacific region is experiencing significant water scarcity due to factors like population growth, rapid industrialization, urbanization, and climate change, which is impacting its agricultural productivity and posing risks to economic growth and development.
- Effective management and strategic allocation of water resources, including the implementation of robust water accounting systems, are crucial to addressing the challenges of water scarcity in Southeast Asia, especially to support agriculture and ensure sustainable water use amidst competing demands from various sectors.

Discussions in the sessions that addressed this GP often included links with other GPs as conditions to build resilience, e.g.:

- GP2 - The need to better integrate socio-cultural aspects in water management by incorporating local knowledge, traditions, and customs (RP2)
- GP2 - Strengthening resilience: capacity building for gender-inclusive proactive DRR (RP5)
- GP3 – Climate-resilient sanitation in Pacific SIDS (RP11)
- GP4 - Mobilizing innovative financing for inclusive/green and climate resilience for all (RP4)
- GP4 – Mobilizing water finance for climate resilience in Central Asia and Caucasus (RP7)
- GP5 – River basin management under changing climate (RP1)

7.4.2 Pathways to promote inclusiveness and gender equality (GP 2)

The angle taken at WWF10 on this Guiding Principle is to consider inclusiveness and gender equality not only in terms of beneficiaries of water management actions and ensuring their involvement in planning and decision making in general, but also to take this in account in disaster planning which calls for gender-inclusive integration of multiple sectors, such as health, sanitation, and public works. Sanitation must be an integral part of disaster infrastructure planning. South Asia and Pacific Island Countries (PICs) are falling behind in meeting sanitation targets, needing more than triple the current efforts to achieve SDG goals for universal access to safely managed water supply and sanitation services.

The following three **main challenges** related to this GP were identified:

- Ineffective centralized and sectoral approaches
 - Limited resources and political misalignment hinder investment in gender-inclusive, locally adapted disaster risk reduction and WASH integration (RP5).
 - Sanitation is often taboo, leading to environmental contamination and health hazards for marginalized communities (RP6).
- Gender inequality and social inclusion (RP5, RP6, RP10)
 - Women and marginalized groups in South Asia and PICs face significant challenges due to underrepresentation and limited access to resources and early warning systems.
 - Inadequate sanitation services disproportionately harm women, worsening health disparities.
- Insufficient community engagement and local adaptation (RP5)
 - Disaster Risk Reduction and Management (DRRM) efforts suffer from a lack of community engagement and locally adapted solutions, resulting in ineffective and unsustainable WASH services.
 - Inclusive, climate-resilient WASH systems are necessary for protecting vulnerable communities.

Breakthroughs and key pathways

Achieving effective gender mainstreaming in disaster risk reduction and WASH requires an investment in capacity building through skill development and education. This effort should be complemented by the creation of an enabling societal environment, advocating for gender-responsive policies, inclusive institutions, and community engagement to empower women in disaster risk reduction efforts.

- Empowering marginalized communities (RP5, RP6)
 - There is a need to move beyond considering women as mere beneficiaries and ensure their involvement in planning and decision-making at every level.

Empowering women is key to solving the issues on the ground and strengthening the disaster resilience of communities. This should be done by involving them and marginalized groups in DRRM & WASH planning and implementation and invest in gender-responsive and socially inclusive capacity building and education initiatives. This effort should be complemented by the creation of an enabling societal environment, advocating for gender-responsive policies, inclusive institutions, and community engagement to empower women in disaster risk reduction efforts.

- Pathway: Enable grassroots participation proactive disaster risk reduction & WASH efforts, ensuring policies and programs reflect the needs of women and marginalized communities. Conduct capacity-building activities for local authorities and communities to equip them with the necessary skills and knowledge to implement and maintain inclusive and climate-resilient WASH systems.
- Gender mainstreaming in proactive DRR and planning (RP5, RP6)
 - A breakthrough to be mentioned is the Sri Lankan Minister recently issues a legislative agenda for enhanced gender-inclusive policy development and planning.
 - Another breakthrough is to integrate gender perspectives into all proactive disaster risk reduction and WASH policies and practices, addressing women's vulnerabilities and capacities.
 - A pathway to empower women is capacity building through skill development, education, and community engagement.
 - Another pathway is to develop inclusive and climate-resilient WASH systems. Therefore, governments need to prioritize the development of inclusive and climate-resilient WASH systems to ensure they can withstand the impact of climate change and continue service delivery. For this is needed to develop guidelines for local authorities and communities on maintaining service delivery of inclusive and climate-resilient WASH.
- Evidence-based policy and practice (RP5, RP6)
 - The breakthrough is to use local evidence and robust monitoring to guide policy and practice, emphasizing gender equality, social inclusion, and climate impacts.
 - The pathway is to develop indicators to measure progress in gender equality and social inclusion in DRRM and WASH programs. Collaboration among researchers, practitioners, and policymakers should be encouraged to share knowledge and best practices. Multi-sectoral collaboration among DRRM and WASH specialists, climate scientists, and policymakers should be promoted to create integrated strategies for climate resilience and social inclusion.

The most effective way to assess gender inclusiveness is to have science, data, and new knowledge built on local and indigenous expertise.

7.4.3 Pathways to embrace environmental sustainability and the circular economy (GP 3)

At WWF10, this GP was particularly addressed in relation to integrated river basin management (RP1) and the required transboundary cooperation to achieve sustainable water security systems (RP8 and RS3). Specific attention was given to the issue of glacial melt in the Hindu Kush Himalaya range (RS3). Glacial melt is a reality that will impact more than 2 billion people in the river basins of South Asia, Central Asia, Northeast Asia and Southeast Asia. More frequent and severe droughts, floods, and declining water flows are starting to impact water security, human security,

food security and trade, energy production, transportation, and a broad range of economic activity. Specific attention was given to the issues around the Aral Sea (RP8 and RS4), emphasizing the need for multi-stakeholder (transboundary) cooperation and collaboration. The need for cooperation was also addressed in RP2 (Socio-cultural dimensions of water resource management) and in RS1 (Youth and inter-generation cooperation).

At the 2017 Asia-Pacific Water Summit (APWS) in Yangon (see section 7.2.1), government leaders emphasized the need for tailored local solutions and regional knowledge management, advocating for integrated water resources management (IWRM) through transboundary cooperation and partnerships. Government leaders in the 4th APWS in Kumamoto then also voluntarily pledged to achieve quality-oriented growth, which would satisfy sustainability, resilience, and inclusiveness. Political commitment to transboundary collaboration and governance and scientific cooperation that meets evolving needs is urgent. Progress is being made in some subregions, but not quickly enough.

The **key challenge** is that across Asian countries, the management mechanisms of water resources have evolved in response to changes in historical contexts, socioeconomic structures, and cultural influences. The present situation is that there are:

- Conflicting national interests (e.g. hydropower versus irrigation) which put additional constraints to effective transboundary water management.
- Uncoordinated policies, weak enforcement, and lack of shared management plans.
- Environmental and climatic variability, such as glacial melt and seasonal fluctuations, exacerbate water management issues.

Identified **pathways** to promote environmental sustainability were:

- Scientific collaboration and strong science-policy-social interface:
 - Open science fosters innovation and accelerates progress in river basin management, emphasizing stakeholder collaboration, integration of local knowledge with scientific research, and promotion of nature-based solutions (RP1).
 - Enhanced early warning systems and adaptive responses approaches based on indigenous knowledge, traditional techniques, and cultural history, coupled with the support of modern technology, can address evolving issues (RP2)
 - Youth-led initiatives and intergenerational collaboration offer refined approaches to attaining a sound water cycle (RS1).
- Integrated river basin management and effective governance:
 - Strengthened regional cooperation and governance are essential for managing hydrological changes and disaster risks (RS3, RP8).
 - Water resources management needs to integrate sociocultural aspects (RS2) into its approaches and policies by incorporating local knowledge, traditions, and customs. Technical and economic considerations alone are not sufficient for effective management.
 - Stakeholder engagement ensures coordinated and sustainable use of shared water resources.
 - Pollution is increasingly important because of seasonal scarcity and drought.
 - In sanitation session on the Pacific (RS11), we discussed that climate resilience will not be realized unless Asia and Pacific Islands countries address the sanitation and Pollution.
 - In general, it was concluded that better environmental monitoring networks are needed.

- It was also agreement on the need for partnerships to strengthen investment in circular economy because of rising economic activities and need for more secure water availability.

Examples of regional cooperation mentioned were:

- The Mekong River Commission facilitates dialogue and collaborative action on shared water resources management (RS3).
- The International Fund for Saving the Aral Sea (IFAS) which promotes transboundary water management, environmental protection, and climate adaptation through comprehensive support of water and energy program and implementation of 4th Aral Sea Basin Program (RS2).

A specific issue related to this GP is the Aral Sea in Central Asia. The sub-region emphasized the following:

- A call on international organizations to support the implementation of the Action Program for Assistance to the Aral Sea Basin Countries (ASBP-4) and the Regional Environmental Program for Sustainable Development in Central Asia (REP4SD-CA).
- Strengthen efforts to develop a joint mechanism for water-energy resource use in the Syr Darya river basin. Also increase joint efforts for mobilizing water finance for climate resilience in Central Asia and Caucasus
- The 2025 Year for the Preservation of Glaciers calls attention to these needs and will be a critical milestone for action.

Overall conclusion on the need for transboundary cooperation

Strengthened transboundary cooperation, supported by scientific evidence and collaboration, integrated river basin management from upstream to downstream, and locally tailored sustainable practices, are essential for addressing the challenges in the region. By pooling resources, fostering dialogue, and engaging multiple stakeholders, Asia and the Pacific can embrace environmental sustainability and the circular economy, ensuring the long-term security of their shared water resources.

7.4.4 Pathways to improve governance and to catalyse finance (GP 4)

Good governance is critical for the delivery of effective services and sustainable management of the water resources, to address political and socio-economic risk, and to provide the enabling environment for financing of the developments. To enhance the financing particular attention is given to private sector involvement, such as through public-private partnerships, and to develop innovative financing arrangements such as eco-compression mechanisms, green finance, green bonds, debt-for-nature swaps, credit enhancement measures, blended finance, etc.

In nearly all sessions good governance and financing were mentioned as important boundary conditions to achieve water security. Subjects discussed related to this GP were:

- The use of eco-compensation between upstream and downstream regions in a river basin and the related set-up good national resource accounting systems (RP1)
- The need to develop effective financing strategy and mechanism to ensure achievement of expected results (performance-based financing), capacity to mitigate the risks associated with frequent natural disasters (Disaster Risk Financing), and maximization of the social, economic, and environmental value of infrastructure investments (value-based infrastructure financing).

- The need for transboundary cooperation to address the challenges posed by glacial melt in Asia (RS3)
- Countries are expected to embed goals and targets in their national climate change adaptation plans and enhance their accountability and transparency to not only attract finance but also assure outcomes and impacts (RS4).
- Pacific: asked for support of the development, implementation, sharing and upscaling of locally appropriate and locally owned solutions by the small island communities including through strengthen knowledge partnerships and improved and accelerated access to investment mechanisms such as climate financing (RS5).
- High-level country agreement on the water security key performance indicators as the anchor to re-align the trillions of public and private financial flows and investment with adaptation and resilience goals (RP4).
- Development of effective financing strategy and mechanism to ensure achievement of expected results (performance-based financing), capacity to mitigate the risks associated with frequent natural disasters (Disaster Risk Financing), and maximization of the social, economic, and environmental value of infrastructure investments (value-based infrastructure financing) (RP4).
- Enhance the capacity of public sector and other key stakeholders to ensure effective programs delivery in realizing resilient and sustainable development on the ground (RP4).

Specific outcomes related to this GP were:

- Northeast Asia proposed the creation of a NEA regional platform for key stakeholders to share practises and knowledge, encourage financing and establishing governmental policies, stakeholder awareness and promotion of continuous technology development (RP1)
- Southeast Asia proposed to create a SEA Water Portfolio Fund Coalition (supported by existing donors such as GCF, Adaptation Fund, GEF, Climate Fund, etc.) to synchronize and synergize existing fundings of agencies (RP3)

7.4.5 Pathways to foster innovation and technological advancement (GP 5)

Technological advancement is rapidly changing the way to carry out operational water management and service delivery. Innovative technologies and digital solutions such as remote sensing and geographical information systems also enable to make better plans and to improve the communication with stakeholders and decision makers. The transformation of the region into quality-oriented societies requires quality infrastructure and the integration of hard and soft components, including knowledge, information, and data management.

In the Asia-Pacific regional process specific discussions on this GP took place in RP1 "River Basin Management under Changing Climate" and RP3 "Smart Water Management: Opportunity and Challenges". But other sessions also discussed the need for innovation. Depending on the local conditions, innovation does not always have to be at a high level of technology. Instead, innovation can also be found in appropriate local solutions.

RP1 explored how changing climate patterns affect river basins in Northeast Asia, stressing the need for adaptive strategies and technological innovation to achieve integrated basin management. Examples were given on digital solutions to explore such adaptive strategies. Key messages highlighted the importance of improved communication and cooperation among stakeholders to address climate change challenges effectively. Additionally, the session emphasized investing in advanced technologies like digital twin systems and enhancing research on basin reservoirs. A

call was made by UNESCO for an Open Science approach with data sharing platforms and initiatives. This included an open dialogue for adaptive management with IWRM. Reference is made to section 7.4.6 on 'Reviving IWRM'.

The focus of RP3 was on addressing the significant water scarcity issues in the Asia-Pacific region driven by population growth and rapid industrialization. Policy recommendations emphasized robust water resource management, strategic water allocation, and the implementation of advanced water accounting systems.

Messages, recommendations, and pathways from other sessions included:

- To deal with the specific situations of the SIDS, locally appropriate and locally owned solutions should be developed, implemented, shared and upscaled, including through strengthened knowledge partnerships (RP9, RP10, RP11, RS5)
- High-level country agreement on the establishment of a Smart Water Management Centre of Excellence should be established to allow easier access to best practice and lessons learned from countries in implementing smart water management (RP3).
- Improved communication and cooperation among stakeholders to address climate change challenges effectively
- Robust water resource management, strategic water allocation, and the implementation of advanced water accounting systems to tackle water scarcity
- Collaborative efforts and strategic technology and management investments

A specific outcome related to this GP was the proposed establishing of a Smart Water Management Support Facility in Southeast Asia to tackle water scarcity challenges sustainably across various sectors (RP3).

In conclusion, the discussions highlighted the urgency for innovative solutions in navigating complex water challenges. Through collaborative efforts and strategic technology and management investments, we aim to pave the way for a more sustainable and resilient water future, shaping a positive and transformative impact on water management practices.

The role of knowledge, innovation and research was also acknowledged in the political process of WWF10. In their final declaration the ministers and head of delegations committed to establishing a center of excellence in this for the Asia-Pacific region (see box).

Ministerial Declaration on “Water for shared prosperity” at WWF-10

Commitment 13: Exploring the establishment of a center of excellence on water in the Asia-Pacific region as a regional hub of water-related knowledge, initiatives and activities, especially research activities, to enhance knowledge generation, promote exchange of information and data, and strengthen research and innovation through capacity building, while taking into account existing mechanisms.

7.4.6 Specific recommendations on mainstreaming activities and priority areas for Asia and the Pacific

The Asia and Pacific region experiences the same water management issues as the rest of the world, dealing with scarcity, pollution, water-related disasters under a changing climate and

population pressure. These are addressed above. However, there are some water management issues that are specific for the region. Recommendations made at WWF10 on these issues are:

1. Saving the Aral Sea. Requiring mainstreaming Open Science, integrated river basin management / IWRM, and transboundary cooperation to save the Aral Sea are among the top intervention opportunities to deliver transformative impact. This might be led by UNESCO and partner organizations.
2. Atolls and SIDS for which climate resilience finance has to be mainstreamed. They all presented the urgent need to scale-up financial flow towards water security and sustainability, led by ADB, and other international donors and investors.
3. Mainstream robust water accounting systems: At all levels, both public and private sectors, as well as at the household level, led by GWP Southeast Asia, with a particular focus on agriculture and food security. It includes the call for the Smart Water Management Support Facility in Southeast Asia to tackle water scarcity challenges sustainably across various sectors.

In the regional process consensus emerged on six priorities:

1. Risk assessment and management in financing mountain glaciers preservation: The ADB President positioned this challenge as a Global Public Good and presented on ADB's action agenda to supporting riparian states with enhancing their resilience to climate change and the glacier melt crisis. This was initiated at COP28 under the Building Adaptation and Resilience in the Hindu Kush Himalaya initiative, which is well aligned with the UN International Year 2025 of Glaciers Preservation.
2. Accelerating the deployment of EW4ALL (Early Warning for All) in the region. It provides the opportunity to enhance water security and climate resilience, in terms of both infrastructure, knowledge and data, and capacity to prevent hazardous impacts, protect lives and livelihoods, led by WMO and all other partners.
3. Mapping climate change impact on women health: South Asia is now championing this agenda, led by SasiWater and other partners. It calls for partnership and collaboration from around the world.
4. Reshaping the metrics and standards for smart adaptive and resilient water management system and technological solutions: That are inclusive, culturally, socially, and inter-generationally, built upon solid indigenous knowledge and expertise, led by South Korea, China and Japan, Southeast Asia
5. Reinforce partnerships and collaboration: In inter-generational talent development, capacity building, and innovation, in particular, by enriching the cultural and indigenous knowledge and heritage.
6. And, advancing data- and evidence-based transparency and accountability: Riding the trend of converging priorities of water security and climate resilience between the public and private sector, it has become urgent to ring private sector leaders on board and join the Blue Deal with investment, expertise, knowledge, and experience to accelerate the transition.

At the closing session, the region highlighted four regionally unique contributions to the emerging global blue deal:

1. Contributing to the global 2025 year of glaciers preservation - through the Central Asia Aral Sea partnership and the Hindu Kush Himalayas initiative. it's a regional opportunity to forging reinforced collaboration for solutions, which will contribute to the global endeavour.
2. Accelerating deployment of Early Warning Systems (EWS) and Contributing to the UN EW4ALL by 2027: AP has been showcasing the way forward in terms of deployment of

EWS, compared to other regions, and yet hurdles remain to be removed to achieve the goal of 100 percent coverage by 2027.

3. Mainstreaming robust water accounting system and driving water-security-cored transparency and accountability of corporations: contributing to global alignment: from transparency and accountability to unleashing the digital and smart technological potentials, robust water accounting, data sharing, and disclosure become key part of the solution and mobilize private financing to enhance our capability to build the shared prosperity that is centered around water security climate resilience, inter-generational, cultural and social inclusivity.
4. Reinforcing commitment to expanding existing community-specific practices and actions, such as those enabled through the Pacific Partnership for Atoll Water Security.



Figure 28 Presentation of the A&P Regional Process at the Plenary Synthesis Session

7.5 Reviving IWRM / Integrated River Basin Management and Coastal Resilience

In many sessions at WWF10 the need for an integrated approach to address the issues in the region was emphasized. Integration involves solving the issues at the appropriate spatial scale (preferably river basin), considering all interests (economic, social, environmental), involving all stakeholders, and addressing the issues in combination with each other (too much, too little, too dirty). The need for integration also shows from the fact that most Asia and the Pacific regional process sessions at WWF10 addressed several of the five Guiding Principles in their discussions.

The conclusion that can be drawn from this that there is a need to 'revive' Integrated Water Resources Management (IWRM) as the basic approach of water related activities in the Asia and the Pacific region. IWRM was already conceptualized in the early 1990s but the concept apparently stays very relevant. It provides the needed comprehensive, adaptive, and inclusive framework for addressing the complex and evolving challenges of water management the region is facing. Its principles and practices remain essential for achieving sustainable water security, enhancing resilience to climate change, and supporting equitable development in the face of growing regional water demands.

Since the conceptualization of IWRM 35 years ago the approach has been applied in the Asia and the Pacific. Most countries in the region have IWRM national plans and also for many river basins integrated plans have been developed. However, most of these plans are rather general in scope and lack the analytical depth to balance the interests involved and are insufficient for investment decisions. Moreover, institutional constraints hampered the implementation of the plans. Applying IWRM is complex and requires a well-developed institutional system with capable staff at all levels (technical, economic, social).

The reason to revive IWRM is not only that it remains needed given the increased complexity and urgency of the water resources issues in the Asia and Pacific because of socio-economic developments and climate change. The region has run out of easy sector-based solutions. The other important reason for a revival of IWRM in the countries in the region is that the countries are now much better equipped to apply IWRM. They have now much better developed governmental and research institutes with capable local staff and experts to deal with the complexity of an integrated approach. Moreover, technological developments have enhanced the availability of data and tools to prepare these integrated plans.

The need to revive IWRM is also recognized in the Ministerial Meeting that was held from 20-21 May 2024 during WWF-10. In their Ministerial declaration on “Water for Shared Prosperity” they present an urgent call and declare their political will to translate their commitments by stating (action 4) ‘To encourage the establishment or strengthening of IWRM policies, plans, and actions in a systemic manner that, among others, include facilitating access to safe and affordable drinking water and sanitation for all’. In other actions they refer to IWRM related subjects such as: (i) the interlinkage between water, energy, food security, nutrition, poverty and hunger eradication, and migration, (ii) the need for developing and strengthening disaster prevention and risk reduction, (iii) encouraging transboundary cooperation, (iv) empowering stakeholders, including women, youth, indigenous peoples and local communities, and (v) advocating innovative and sustainable financing from all sources. All these subjects are part of the framework of IWRM.

Reviving IWRM will not be business-as-usual. IWRM has developed over the years, learned from applications and mistakes, what has worked well and what not and under which conditions. The concept has also been extended by giving more attention to preparation for implementation (financing, institutional arrangements) and, as mentioned above, with more tools and data to carry out the supporting analytical work. IWRM as concept is developing but also the level of application and the progress of implementation. IWRM as a spiral process is illustrated in Figure 29.

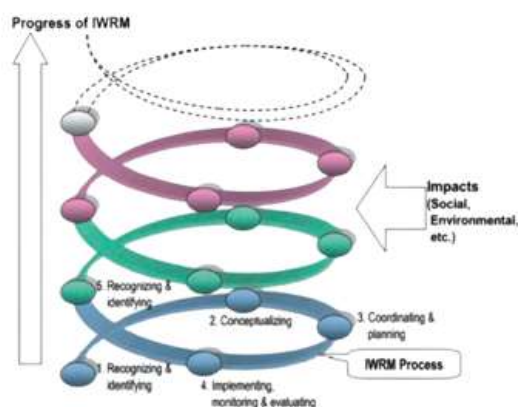


Figure 29 IWRM spiral and process

Source: <https://unesdoc.unesco.org/ark:/48223/pf0000186417>

Annex A. Regional Process (RP) Sessions Plans

RP1 River Basin Management under Changing Climate

Session Coordinators

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- Ms. Liu Yuan Program Officer, Changjiang Water Resources Commission, 751122878@qq.com, +86 15391555086

Session Plan

Title	Speakers / Panellists
Introduction statements	Dr. Wu Daoxi, Vice Commissioner of CWRC, China Dr. Kyulho Kwak, President Korea Water Forum, Republic of Korea Dr. Taikan Oki, Vice President of Japan Water Forum, Japan
Keynote: Digital Empowerment in Management and Protection of Hanjiang River Basin	Mr. Ma Shuishan, General Manager of South-to-North Water Diversion Middle Route Water Resources Co., Ltd, CWRC, China
Diversifying the role of dams for green growth to adapt climate change in Republic of Korea	Dr. Kyung-taek Yum, Professor of Graduate School of Water Resources in SUNGYUNKWAN University, Korea
River basin disaster resilience and sustainability by all through risk communication	Mr. Takaya TANAKA, Director of JICE, Japan
Assessment and warning of bank collapse risk for the middle and lower river channel of the Yangtze river	Dr. Zhu Yonghui, Division Chief, Changjiang River Scientific Research Institute of CWRC, China
Open science for river basin management under climate change	Professor Shahbaz Khan, Director UNESCO Multi-sectorial Regional Office for East Asia
Advanced River Management to Adapt to Climate Change with Digital Twin Platform	Mr. Seongyeol Park, Senior manager Korea Water Resources Corporation, Korea
Dam upgrading and reservoir sedimentation management for flood mitigation, and reservoir and river sustainability	Mr. Tetsuya SUMI, Professor of Kyoto University, Vice President of ICOLD, Japan
Panel Discussion – Moderated by Ms. Zhou Zhulin, Division chief of bureau of international cooperation, CWRC, China	Mr. Tetwsuya Sumi, Kyoto University Mr. Seongyeoi Park, Korea Water Resources Corporation Professor Shabaz Khan, UNESCO Mr. Xu Chi, Changjiang Institute of Survey, Planning, Design and Research, CWRC
Closing	

RP2 Incorporating Sociocultural Dimensions in Water Resources Management: Policies, Practices, and Challenges

Session Coordinators

- Japan Water Forum, Mikio Ishiwatari, ishiwatari.mikio@jica.go.jp
- Asian Development Bank Institute, K E See Tharam, kseetharam@adbi.org
- UNESCO Beijing, Ai Sugiura, sugiura@unesco.org

Session Plan

Title	Speakers / Panellists
Welcome and Opening Remarks	ADBI Deputy Dean Seungju Baek
Keynote speech	Taikan Oki, Vice-President, Japan Water Forum, University of Tokyo
Panel discussion with key policy messages from the book	
1. Sustainable Water Resources Management in Asia: A Sociocultural Perspective	Mikio Ishiwatari (Governor, Japan Water Forum) and KE Seetha Ram (Senior Consulting Specialist ADBI)
2. Integrating Safety, Security and Cultural values for Integrated Water Resources Management – a UNESCO World Heritage Case Study from China	Shahbaz Khan (Director, UNESCO Beijing)
3. A review of public awareness to water regulation and river management in Korea	Dr. Eun Namkung / Dr. Ik Jae Kim
4. Novel approaches in flood management policies in Japan: Integrating socio-cultural wisdom in climate change adaptation in Japan	Hiroaki Ikeuchi, MLIT, Japan
5. The Sociocultural Perspective on Water Resources Management in Bali, Indonesia	Firdaus Ali, Special Advisor, MoPWH Indonesia
Q&A Session	Moderator: Ms. Prita Laura, Office of the President of Indonesia
Concluding remarks	ADB Senior Staff
Closing remarks and acknowledgments	Dr. Riznaldi Akbar, Senior Capacity Building and Training Economist at ADBI

RP3 Smart Water Management: Opportunity and Challenges

Session Coordinators

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- Ms. Minkyeng Park, Manager KOMEC, min58@kwater.or.kr
- Mr. Muhammad Irfan Saleh, Director BAPPENAS, mirfans@bappenas.go.id, +6281220251032
- Mr. Isnaeni. Deputy Director MPWH, +6281226360969

Session Plan

Title	Speakers / Panellists
Opening remarks	Chairman of GWP SEA
Keynote speech	Vice Chair of APWF (Prof. Eduardo Araral, Jr.)
Experience of <u>Korea</u> : K-water's Water Loss Management	K-Water (Dr. Eunher Shin – Principal Researcher)
Experience of <u>Japan</u> . Topic: Wastewater management	Mr. Makoto KUDO (Director for Overseas Projects of Water Supply and Sewerage; Ministry of Land, Infrastructure, Transport and Tourism, Japan)
Experience of <u>Malaysia</u> . Topic: National Water Balance System -DSS for water resource managers	Dato' Ir Rozman bin Mohamad Director, Division of Water Resources Management and Hydrology Department of Irrigation and Drainage (DID), Malaysia
Experience of <u>Thailand</u> . Topic: Automation system for Irrigation Project	Sucharit Koontanakulvong – Executive Director, National Research Council of Thailand (NRCT)
Experience of <u>Indonesia</u> . Topic: Irrigation Modernization	Dr. Ismail Widadi, S.T., M.Sc. - Director of Irrigation and Wetland - Ministry of Public Works and Housing of Indonesia
Experience of <u>Vietnam</u> (Danang City). Topic: Domestic water management	Dr. Pham Ngoc Bao, Deputy Director, Adaptation and Water Area, Institute for Global Environment Strategies (IGES)
Moderated Q&A	KOMEC (Dr. Sangyoung Park – Executive Director)
Summary & Closing	Mr. Muhammad Irfan Saleh, Director of Water Resources, BAPPENAS

RP4 Mobilizing Innovative Financing for Inclusive / Green and climate resilience for all

Session Coordinators

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- Mr. Isnaeni. Deputy Director MPWH, +6281226360969

Session Plan

Title	Speakers / Panellists
Welcoming remarks	MC (Mrs. Louise Desrainy – GWP SEA)
Opening remarks	Mr. Christopher Matthew Ilagan, Chairman of GWP SEA
Keynote speech 1: Water Financing schemes and its challenges in Southeast Asia countries	Prof. Eduardo Araral, Jr. - Vice Chair of Asia Pacific Water Forum
Keynote Speech 2 : Mandatory disclosure that leads to increased financial flows towards water security	Ms. Patricia Calderon, Global Head of Water, CDP
Financing Water: Public, private and Climate Finance	Mrs. Sumila Gulyani, Water Practice Manager, for the South Asia region, the World Bank
Performance Based Grants Program	Mr. Gerard Cheong, First Secretary – Australia Embassy - DFAT
Value-based Infrastructure Financing	Mr. Alex Nash, Senior Urban Development Specialist, ADB
Water Resilience Coalition investment Portfolio	Mr. Gary White - Co-Founder, Board Chairman, and CEO of Water Equity
Southeast Asia Partnership for Adaptation through Water (SEAPAW)	Mrs. Corinna Chan - CEO of Singapore International Foundation (SIF)
Moderated Q&A session on Innovative Financing and Mobilization platforms	Mr. Fany Wedahuditama - GWP SEA
Summary & Closing	Dr. Mohammad Irfan Saleh, Director of Water Resources, Ministry of Planning of Republic of Indonesia/ BAPPENAS
Welcoming remarks	MC (Mrs. Louise Desrainy – GWP SEA)

RP5 Strengthening Resilience: Capacity Building for Gender-Inclusive Proactive Disaster Risk Reduction

Session Coordinators

- Ms Kusum Athukorala Steering Committee Member Women for Water Partnership/Regional Chair Global Water Partnership South Asia , Colombo, Sri Lanka, mkusumathukorala@gmail.com, 94722442426,
- Dr Jayati Chourey , Executive Director, SACIWaters, Hyderabad, India, jayati@saciwaters.org, 919769537098

Session Plan

ITEM DESCRIPTION / ROLE	SPEAKERS
Welcome and Opening Remarks: Women and Youth Collaborating for Change	Ms. Kusum Athukorala, Steering Committee Member, Women for Water Partnership, Sri Lanka
Keynote Address	Hon Jeevan Thondaman, Minister of Water Supply and Estate Infrastructure Development, Sri Lanka
Presentation of Findings from the South Asian Sub-Regional Consultation on Disaster Risk Reduction and Gender	Dr. Jayati Chourey, Executive Director – The South Asia Consortium for Interdisciplinary Water Resources Studies (SaciWATERs), India
Bridging Science and Community for Gender-Sensitive Disaster Risk Reduction: A Theatrical Presentation	Dr. Younghyun Cho, Principal Researcher- K-water Research Institute, Korea ; Mr. Dhruv Mittar-Manager, Dasra,India ; Dr. Jayati Chourey ; and Ms. Kusum Athukorala
Panel Discussion and Audience Questions	Professor Srinivas Chary Vedala, the Centre Director, the Administrative Staff College of India (ASCI). Dasra- NFSSM Alliance, India
“Empowering Resilience: Exploring Gender-Inclusive Approaches to Disaster Risk Reduction Across Diverse Landscapes” Moderator: Dr. Santosh Nepal, Researcher, International Water Management Institute, Nepal	Mr. Amar Gunatilleke, Executive Vice-Chairman, Marga Institute- Centre for Development Studies, Sri Lanka
	Mr. Sugath Dharmakeerthi, Senior Secretary, Ministry for Water Supply and Estate Infrastructure, Sri Lanka
	Ms. Nazmun Naher, Country Coordinator, Bangladesh Water Partnership (BWP), Bangladesh
Documentary Premiere	'The Bleeding Tides'- Impact of climate change on women's menstrual and reproductive health in the Sundarbans, India by SaciWATERs & Réel Nomads, India
Wrap-Up and Closing Remarks	Ms. Changhua Wu, Asia Pacific Water Forum

RP6 Inclusive sanitation management and service delivery with a particular focus on marginalized groups

Session Coordinators

- Dr Manohara Khadka, Country Representative, IWMI Nepal
- Dr Santosh Nepal, International Researcher, IWMI Nepal, s.nepal@cgiar.org

Session Plan

Title	Speakers / Panellists
Welcome	Ms Kusum Athukorala, Women for Water Partnership
Opening remarks	Dr. Eduardo Araral, Vice Chair, APWF Governing Council
Special Remarks	Hon Shakti Bahadur Basnet - Minister of Energy, Water Resources and Irrigation, Nepal
Outcomes from the South Asia Regional Session	Arinita Maskey, UNICEF
<p><u>Panel discussion: Way forward for inclusive and climate-resilient WASH</u></p> <ul style="list-style-type: none"> • What are South Asia's major challenges and barriers to inclusive and climate-resilient WASH services and systems? • How could we address the challenges of resource gap, political commitment and funding priorities for addressing inequality and marginalisation in the climate-resilient WASH, especially sanitation services and systems in the region? • What does South Asia need to do differently in research, policy, and practices to promote inclusive and climate-resilient WASH? 	<p><u>Moderator:</u> Dr Santosh Nepal, IWMI (Nepal)</p> <p><u>Panellists:</u></p> <ul style="list-style-type: none"> • Dr Alison Baker, Water for Women, Australia • Dr Mahreen Matto, National Institute of Urban Affairs (Dasra- NFSSM Alliance), India • Dr Darshan Karki, IWMI (Nepal) • Mr Amar Gunathilleke, MARGA Institute Sri Lanka
Concluding remarks with main takeaways	Dr Inga Jacobs-Mata, Director of Water-Growth and Inclusion, IWMI

RP7 Mobilizing Water Finance for Climate Resilience in Central Asia and Caucasus

Session Coordinators

- Dr. Vadim Sokolov, Chair of TAC GWP CACENA, Vice-President of ICID, Head of Agency of IFAS, Uzbekistan, e-mail : vadim_sokol@mail.ru; info@aral.uz, Mob.: +998 90 9605706
- Mrs. Guljamal Nurmukhamedova, Regional Coordinator of GWP CACENA, Director of NGO "Ynanch-Bepa" - Analytical Agency, Turkmenistan, e-mail : nurmuhag@mail.ru
- Mrs. Hasmik Barseghyan, President of European Youth Parliament for Water (EYPW), Armenia, e-mail : hasmik.official@gmail.com

Session Plan

Title	Speakers / Panellists
Opening - session brief description (Moderator)	Session moderator Dr. Vadim Sokolov, Chair of TAC GWP CACENA
Welcome address 1	Mr. Alan Attkisson, Executive Secretary of GWPO, Stockholm, Sweden
Role of Youth in preparation and implementation of national climate change adaptation plans in the region	Ms. Isabela Gasoyan, European Youth Parliament for Water (EYPW), Armenia
Azerbaijan's experience in attracting climate finance and the country's actions in improving the water and rural sectors	Mr. Riad Akhundzada, Head of department in JSC "Amelioration and Water Resources of Azerbaijan"
Program for the development of drinking water supply and sanitation - as part of the national plan for adaptation to climate change in Uzbekistan	Mr. Gairat Rakhimov, Ministry of Construction and Housing and Communal Services of the Republic of Uzbekistan Mr. Rustam Muradov, expert of the National project on water resources management in Uzbekistan
Questions and Discussions	Dr. Vadim Sokolov
Finalization and session closing	Dr. Vadim Sokolov

RP8 Transboundary Water Cooperation in the Aral Sea basin for a better future

Session Coordinators

- Mr. Serik Bekmaganbetov, Representative of the Republic of Kazakhstan to the International Fund for Saving the Aral Sea, serik.ifas@gmail.com, +7-776-183-06-84
- Ms. Zhanar Mautanova, Director of the International Water Assessment Center, zh.mautanova@iwac.kz, +7 7022155757

Moderator

- HE Mr. Askhat Orazbay, Chairman of the Executive Committee of the International Fund for Saving the Aral Sea.
- Mr. IJsbrand de Jong, Lead Water Specialist, World Bank

Session Plan

Title	Speakers / Panellists
Opening Welcome speeches	Mr. Serzhan Abdykarimov, HE Ambassador Extraordinary and Plenipotentiary of the Republic of Kazakhstan to the Republic of Indonesia Mr. Saroj Kumar Jha, World Bank Group Global Practice Director for Water
Overview of actions of countries to strengthen regional cooperation	<ul style="list-style-type: none"> • Mr. Bolat Bekniyaz, First Deputy Minister of Irrigation and Water Resources of Kazakhstan • Mr. Shoimzoda Jamshed Shodi, First Deputy Minister of Energy and Water Resources of Tajikistan, • Mr. Durdy Gendzhiev, Chairman of the Water Resources Agency of Turkmenistan • Mr. Shavkat Khamraev, Minister of Water Resources of Uzbekistan
Overview of assistance of international partners to the countries of the region	<ul style="list-style-type: none"> • Mr. IJsbrand de Jong, Lead Water Specialist, World Bank • Mr. Marco Kainer, Director of the UNECE Environment Division • Ms. Yasmin Siddiki, Director of Agriculture, Food, Nature and Rural Development Sector Group, ADB • Mr. Kevin Adkin, Regional Environment Specialist, USAID • Mr. Fabrice Frets, Deputy Head of the Water Division, Federal Department of Foreign Affairs, Swiss Agency for Development and Cooperation • Ms. Zhanar Mautanova, Director of the International Water Resources Assessment Center
Presentation of Outcome document “Transboundary Water Cooperation in the Aral Sea basin for a better future”, Wrap up and closure	Mr. Askhat Orazbay, Chairman of the Executive Committee of the International Fund for Saving the Aral Sea

RP9 Water security and Pacific SIDS

Session Coordinators

- Dave Hebblethwaite, Water Security and Governance Coordinator, Secretariat of the Pacific Community (SPC). Email: daveh@spc.int, Mobile: +679 9983059.
- Mary Alalo, Water Security Engagement Lead, Secretariat of the Pacific Community (SPC). Email: marya@spc.int. Mobile: +679 2350385.

Session Plan

Title	Speakers / Panellists
Introduction of session objectives and keynote speakers.	Dr. Chris Vehe, Permanent Secretary, Solomon Islands Ministry of Mines, Energy, Rural Electrification, Water Resources Management and Geohazards.
Water security and Pacific resilience	Dave Hebblethwaite, Water Security Coordinator and Governance Lead, Pacific Community (SPC)
Progress on Access to Household access to Water, Sanitation, and Hygiene services in the Pacific Island Countries and territories – Joint Monitoring Program Report 2000 -2022.	Kencho Namgyal – Chief WASH Officer, UNICEF Pacific & Co-chair of the Pacific Resilience Partnership Water Security Technical Working Group
Water Security from a Pacific water utility perspective.	Ms Misileti Masoe Satuala, Project Development Coordinator, Pacific Water and Wastewater Association (PWWA)
Supporting the water security of remote rural island communities: The Importance of Local and Cultural Knowledge to Support Planning for Climate-Resilient Water in Solomon Islands	Sheilla Funubo- Researcher and Lecturer, Solomon Islands National University (SINU) Dr Regina Souter, International WaterCentre, Griffith University
Interactive Session on Q & A	Moderator – Mary Alalo, Water Security Engagement Lead, Pacific Community
Session Outcomes, Policy Recommendations, and Conclusions	Dr. Chris Vehe, Permanent Secretary, Solomon Islands Ministry of Mines, Energy, Rural Electrification, Water Resources Management and Geohazards.

RP10 Strengthening engagement in water security to support Pacific resilience

Session Coordinators

- Dave Hebblethwaite, Water Security and Governance Coordinator, Secretariat of the Pacific Community (SPC). Email: daveh@spc.int, Mobile: +679 9983059.
- Mary Alalo, Water Security Engagement Lead, Secretariat of the Pacific Community (SPC). Email: marya@spc.int. Mobile: +679 2350385.

Session Plan

Title	Speakers / Panellists
Introduction of session objectives and keynote speakers.	Akmal Ali, Co-Chair Pacific Resilience Partnership Water Security Technical Working Group and Project Coordinator of the Facility Aiding Locally Led-Engagement (FALE) of the Pacific Islands Alliance for Non-Government Organization (PIANGO).
Water security engagement and Pacific frameworks for climate and disaster resilience	Mary Alalo, Water Security Engagement Lead, Pacific Community (SPC) & Secretariat to the Pacific Water Security Technical Working Group
Strengthening multi-sectoral engagement in water security: Lessons from the Pacific Resilience Partnership (PRP)	Kencho Namgyal, Chief WASH Officer, UNICEF Pacific and Co-chair of the PRP Water Security Technical Working Group.
Lessons from the Pacific Regional Water Security Engagement Strategy: From Strategy to Action.	Regina Souter, Director, International WaterCentre, Griffith University
Interactive Session on Q & A	Moderator – Misileti Masoe-Satuala, Project Development Coordinator, Pacific Water and Waste Water Utilities.
Session Outcomes and Policy Recommendations	Shirlee Rovou – WASH Adviser, Water Aid Papua New Guinea, and alternate Co-Chair of the PRP Water Security Technical Working Group.
Conclusions and closure	Akmal Ali, Co-Chair Pacific Resilience Partnership Water Security Technical Working Group and Project Coordinator of the Facility Aiding Locally Led-Engagement (FALE) of the Pacific Islands Alliance for Non-Government Organisation (PIANGO).

RP11 Climate-resilient sanitation in Pacific Small Island Developing States

Session Coordinator

- Anita Walters, Strategy and Partnerships Lead, Australian Water Partnership, Anita.Walters@waterpartnership.org.au, +61 458 045 524xxxx

Session Plan

Title	Speakers / Panellists
Introduction / Facilitator	Shreya Gyawali, Australian Water Partnership
Successfully and sustainably implementing WASH through strengthening of subnational government.	Ms Shirlee Rovou, WaterAid PNG
Exploring the water and sanitation financing gap across the Pacific region	Dr Tim Foster, University of Technology Sydney
Sanitation in the Pacific	Neeta Pokhrel, Asian Development Bank
Facilitated discussion linking session topics. Guided questions – interview style.	Alex Nash, Asian Development Bank
Q&A	Alex Nash, Asian Development Bank
Closing remarks	Shreya Gyawali, Australian Water Partnership

Annex B. Regional Synthesis (RS) Sessions Plans

RS1 Youth session: Promoting intergenerational initiatives for achieving sound water cycle

Session Coordinators

- Mikio Ishiwatari, Japan Water Forum, ishiwatari.mikio@jica.go.jp
- Yoon Jeong Kwon, Korea Water Forum, yjkwon@koreawaterforum.org
- Ai Sugiura, UNESCO Beijing, a.sugiura@unesco.orgxxxx

Moderators of the session were:

- Ms. Yoon Jeong Kwon, Korea Water Forum, yjkwon@koreawaterforum.org
- Mr Rizki Maulana, UNESCO Jakarta office, m.rizki@unesco.org

Session Plan

Title	Speakers / Panellists
Opening	Dr. Mikio Ishiwatari, Japan Water Forum, ishiwatari.mikio@jica.go.jp
Research on improving the quality of drinking water /making an ash filter with animal bones	Mr. A. Darkhan-Erdene, MONGOLIA, ddarhanerdene@gmail.com
Cultural inter-generational dialogue for water management	Ms En Lin, China, linen2021@whu.edu.cn
Water science popularization to younger generation	Mr Yin Jianqi, China, yjq_yinjianqi@163.com
Introduction of Cooperation between youth and government in the water system in ROK	Ms. Hayoung Park, Project Manager at TurnTable, hayoungpark77@gmail.com
Disability Youth Group and Sustainable Water Management: a case sample in Toi village – Timor Tengah Selatan, NTT	Mr. Dino Satria, CWS, dinosatria@cwsglobal.org
Protecting Wajiro Tidal Flat: The Struggle to Save an Urban Tidal Oasis	Ms. Hinako Ogisawa and Ms. Fumina Ishimaru, Fukuoka Institute of Technology Jyoto High School, Japan
Challenges to co-work with local water management by youth	Ms. Honoka Mombetsu and Mr. Yuya Yamaguchi, Tomikawa High School, Japan
Digital Transformation and Nature-based Solution by Youth in Africa	Ms. Eri Noda, Global Environment Department, JICA, Noda.Eri@jica.go.jp
Engaging the Youth in Asia and the Pacific's Water and Sanitation Management	Ms. Tanya Huizer, Senior Water Resilience Specialist, Water and Urban Development Sector Office, Sectors Group, ADB thuizer@adb.org
Tzu Chi Foundation: Water Conservation Education Campaign	Mr. Kuanysh Uzbekov, World Youth Parliament for Water, uzzzbekov@gmail.com
Q&A – chaired by the moderators	Panelist: Ms. Tanya Huizer Mr Yin Jianqi Ms. Eri Noda
Closing	Prof. Eun Namkung, Vice President, Korea Water Forum, enamkung@snu.ac.kr

RS2 Resilient and sustainable water scarcity management in Southeast Asia

Session Coordinators

- Fany Wedahuditama, Regional, Coordinator/GWPSEA, fany.wedahuditama@gwpsea.org +6281808279066
- Ms. Minkyeng Park, Manager, KOMEC, min58@kwater.or.kr
- Mr. Muhammad Irfan Saleh, Director BAPPENAS, mirfans@bappenas.go.id +6281220251032
- Mr. Isnaeni, Deputy Director, MPWH, +6281226360969

Co-organizers

- Caroline Amy Turner, Water Scarcity Programme Manager FAO, caroline.turner@fao.org, +61422270489
- Lance Gore, Principal Portfolio Management Specialist and Principal Water Resources Specialist for ADB's South Asia Regional Department's agriculture and natural resources division ADB, lgore@adb.org
- Thanapon Piman, Senior Research Fellow, SEI, thanapon.piman@sei.org

Session Plan

Title	Speakers / Panellists
Introduction	<i>Master of Ceremony:</i> Mr. Fany Wedahuditama Regional Program Coordinator, Global Water Partnership Southeast Asia
Opening Remark	Mr. Tim Goodes Executive Director (Basin Plan), Murray Darling Basin Authority, Australia
Setting the scene: Water scarcity in Southeast Asia	Ms. Caroline Turner Water Scarcity Programme Manager, Food and Agricultural Organization of the United Nations
Introduction to the High-Level Panel	<i>Moderator:</i> Mr. Thanapon Piman Senior Research Fellow, Stockholm Environment Institute (SEI)
Experience of Indonesia	Mr. Muhammad Irfan Saleh Director of Water Resources, BAPPENAS, Indonesia
Experience of Lao PDR	Ms. Sengphasouk Xayavong Deputy Director of the Policy Division, DWR, MONRE, Lao PDR
Experience of Thailand	Mr. Nitidate Makkate Civil Engineer, Senior Professional Level, ONWR, Thailand
Reflections on the Panel Discussion from Cambodia	Dr. An Pich Hatda Secretary of State, MoWRaM, Cambodia
Moderated Q&A	<i>Moderator:</i> Mr. Fany Wedahuditama Regional Program Coordinator, Global Water Partnership Southeast Asia
Summary & Closing	Lance Gore Principal Water Resources Specialist Agriculture, Food, Nature, and Rural Development Sector Office, Asian Development Bank

RS3 Towards the International Year of Glaciers' Preservation 2025: Cooperation, Governance, and Priority Setting for Climate Action and Resilience Building to Glacier Melt

Session Coordinators

- Mr. Anshuman Varma, Economic Affairs Officer, Environment and Development Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), Email: varmaa@un.org
- Ms. Hitomi Rankine, Chief, Environment and Development Policy Section, Environment and Development Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), Email: rankine.unescap@un.org
- Ms. Yumiko Asayama, Asia-Pacific Water Forum (APWF) Secretariat, Email: asayama@waterforum.jp
- Mr. Manohara Khadka, Country Representative, Nepal, International Water Management Institute (IWMI), Email: m.khadka@cgiar.org

Session Plan

Title	Speakers / Panellists
Opening remarks	Ms. Hitomi Rankine, Chief, Environment and Development Policy Section, Environment and Development Division, ESCAP
Keynote address	H.E. Mr. Shoimzoda Jamshed Shodi, First Deputy Minister of Energy and Water Resources, Republic of Tajikistan
<p><u>Panel: State of knowledge and scientific cooperation</u></p> <ul style="list-style-type: none"> • What does the science tell us about glacial melt and its implications? • What is the state of scientific cooperation (progress, gaps and opportunities)? 	<p><u>Moderator:</u> Ms. Changhua Wu, Chair of the Governing Council, Asia-Pacific Water Forum</p> <p><u>Panelists:</u></p> <ul style="list-style-type: none"> • Dr. Abou Amani, Director, Water Sciences Division and Secretary, Intergovernmental Hydrological Programme, United Nations Educational, Scientific and Cultural Organization • Dr. Mohsin Hafeez, Director, Water, Food and Ecosystems, International Water Management Institute
<p><u>Panel: Sub-regional perspectives on transboundary collaboration</u></p> <ul style="list-style-type: none"> • What are the three most important areas of progress on transboundary collaboration on water resources management in different sub-regions? • What are some lessons learned? • What are the top priorities for strengthening transboundary governance and collaboration in Asia? 	<p><u>Moderator:</u> Ms. Hitomi Rankine, Chief, Environment and Development Policy Section, Environment and Development Division, ESCAP</p> <p><u>Panelists:</u></p> <ul style="list-style-type: none"> • Central Asia: Mr. Gamzat Khairov, Deputy Chairman, Executive Committee of the International Fund for Saving the Aral Sea • Hindu-Kush-Himalaya region: Dr. Senaka Basnayake, Director, Asian Disaster Preparedness Center • South-East Asia: Dr. Truong Hong Tien, Deputy Director General, Viet Nam National Mekong Committee Secretariat
Commentary and Discussion	
Closing	

RS4 Paths towards Water Security in Central Asia

Session Coordinators

- Mr. Serik Bekmaganbetov, Representative of the Republic of Kazakhstan to the International Fund for Saving the Aral Sea, Deputy Chairman of EC IFAS, serik.ifas@gmail.com, +7-776-183-06-84
- Dr. Vadim Sokolov, Chair of TAC GWP CACENA, Vice-President of ICID, Head of Agency of IFAS in Uzbekistan e-mail : vadim_sokol@mail.ru ; info@aral.uz Mob. : +998 90 9605706
- Ms. Zhanar Mautanova, Director of the International Water Assessment Center, zh.mautanova@iwac.kz , +7 7022155757

Session Plan

Title	Speakers / Panellists
Opening - session brief description	Session moderator Dr. Vadim Sokolov, Chair of TAC GWP CACENA
Welcome address and outcomes from Regional session RP8, Transboundary Water Cooperation in the Aral Sea basin for a better Future	Chair of Executive Committee of IFAS, Mr. Askhat Orazbay
Outcomes from Regional session RP7 "Mobilizing Water Finance for Climate Resilience in Central Asia and Caucasus"	Dr. Vadim Sokolov, Chair of TAC GWP CACENA
Contribution from National Water Resources Management Project in Uzbekistan, Phase III (NWRM) to Water reforms towards water security	Dr. Omina Islamova, International Project manager SDC, Switzerland and Mr. Zokir Ishpulatov, Head of Department in Cabinet of Ministers of Uzbekistan
Agreement to converging vision, strategy and partnerships (three to five synergy priorities) as a solid foundation for the pathway forward, to get all partners and countries in the region to act together by pulling resources, expertise and projects together	Session moderators Ms. Zhanar Mautanova, Director of the International Water Assessment Center and Dr. Vadim Sokolov, Chair of TAC GWP CACENA
Finalization and session closing	Chair of Executive Committee of IFAS, Mr. Askhat Orazbay

RS5 Water security and resilience of small island communities

Session Coordinators

- Dave Hebblethwaite, Water Security and Governance Coordinator, Secretariat of the Pacific Community (SPC). Email: daveh@spc.int. Mobile: +679 9983059.
- Mary Alalo, Water Security Engagement Lead, Secretariat of the Pacific Community (SPC). Email: marya@spc.int. Mobile: +679 2350385.

Session Plan

Title	Speakers / Panellists
Introduction of session objectives and keynote speakers.	Moderator – Dr Milika Naqasima Sobey, Senior Technical Adviser - Coastal Ecosystems, GIZ
Water security challenges and opportunities in an Indian Ocean Small Island Developing State	Hon. Waven William, Elected Member for Grand Anse Mahe District, Republic of Seychelles
Civil society organizing for island resilience: Lessons from the Pacific FALE (Facility Aiding Locally-led Engagement)	Akmal Ali, Pacific Islands Alliance of Non-Governmental Organisations (PIANGO)
Opportunities for regional dialogue and cooperation through the Asia-Pacific Water Forum	Yumiko Asayama, Manager, Japan Water Forum (JWF)
Regional partnerships for capacity: lessons from the Pacific Water and Wastewater Association	Misileti Masoe-Satuala, Pacific Water and Wastewater Association
Opportunities to strengthen the application of Integrated Water Resources Management solutions in small islands	Griselda (Gay) G. Santos, Regional Director for Southeast Asia, Water.org
Regional partnerships for action: lessons from the <i>Pacific Partnership for Atoll Water Security</i>	Dave Hebblethwaite, Water Security and Governance Coordinator, the Pacific Community (SPC)
Interactive Session with Panel Members and Q & A	Dr Milika Naqasima Sobey
Summary – outcomes and conclusions	