

EDITORIAL

Addressing Climate Resilience in the IAAM's W119 Side Event at UN 2023 Water Conference, New York

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Climate resilience refers to the ability of individuals, communities, ecosystems, and systems to anticipate, adapt to, and recover from the impacts of climate change. Effective water resource management must recognize the value of water and incorporate it into decision-making to align with the UN 2030 Sustainable Development Goals (SDGs). Due to rapid population growth, urbanization, and increasing water needs in livelihoods, agriculture, industry, and energy production, water demand has significantly increased. Thus, water conservation and clean water management are essential to protect human well-being. It was crucial that the IAAM's W119 Side Event at the United Nations 2023 Water Conference, New York focused on climate resilience to ensure the sustainable management of water uses and resources. The topics that were extensively discussed during the two-day side event included the effects of climate change on floods and droughts, integrated water management, nature-based solutions, the water-biodiversity nexus, technology and innovation, socioeconomics and natural disasters, international cooperation, gender and social inclusion, policy and governance, flood monitoring, and drought evaluation, among others.

People, communities, ecosystems, and systems can anticipate, adapt, and recover from climate change. To align with the Sustainable Development Goals (SDG) of the United Nations for 2030, effective management of water resources must recognise the value of water and incorporate this recognition into decision-making processes [1]. The demand for water resources has experienced a significant increase due to rapid population growth, urbanisation, and increasing water requirements in agriculture, industry, and the energy sector [2,3]. The risks of mismanagement of water can jeopardise lives and disrupt livelihoods, underscoring the urgency of addressing water-related disasters [4]. Sustainable water resource management required climate resilience, focussed on the IAAM's W119 Side Event at the UN 2023 Water Conference in New York. The two-day side event discussed climate change's effects on floods and droughts. In the current era, achieving climate neutrality through national diplomacy is crucial to achieving global sustainability. Unless progress quadruples, billions of people will still lack access to these basic services by 2030. The inadequate state of water treatment facilities, the emergence of new pollutants, and widespread water pollution all contribute to the exacerbation of this problem. Consequently, ensuring water security requires a concerted effort to mitigate the adverse consequences of floods and droughts. The United Nations decade of action on water and sanitation completes the

comprehensive review, at the United Nations 2023 Water Conference (2018-2028) [5]. **Fig. 1** shows a glimpse of the IAAM's W119 side event during midterm comprehensive review of the international decade of action, water for sustainable development, 2018-2028. During the UN 2023 Water Conference, the IAAM delegation engaged in exchanges and talks with ministers, political figures, committee members, directors, organisational heads, commissioners, and experts. Achieving sustainable practices in the medium and long term requires the implementation of intelligent strategies that encompass both natural and engineered solutions. By effectively storing water in environmentally friendly and resilient grey infrastructures, we can achieve a harmonious equilibrium between the demand for water and its supply, while considering reasonable economic, ecological, and social implications. Since civilisation began, water withdrawals from aquifers, lakes, streams, river diversions, and damming have altered the water cycle, which plays a crucial role in shaping life on Earth. The current state of flood and drought highlights the crucial importance of better water resource management. It involves building a sustainable water resource capacity and implementing strategies to minimise vulnerabilities, enhance adaptive capacity, and promote sustainable development in the face of a changing climate.



Fig. 1. IAAM's W119 side event at the UN 2023 Water Conference, New York. The water conference focused on the mid-term comprehensive review of the implementation of the objectives of the international decade of action, water for sustainable development, 2018-2028, #WaterAction.

WATER, BIODIVERSITY, AND CLIMATE ISSUES

Indeed, there is a growing global demand for resolutions in critical areas to address pressing environmental and social challenges. Resolutions aimed at addressing challenges related to three critical areas: water resources, biodiversity conservation, and mitigation and adaptation are the best initiative. Water scarcity is growing worldwide; therefore, to combat climate change and serve a growing population, this finite resource must be managed holistically [6]. Two-thirds of the world's freshwater is frozen or unavailable; as a result, 1.1 billion people do not have access to water and 2.7 billion have water shortages at least once a year [7]. Inadequate sanitation exposes 2.4 billion people to waterborne diseases such as cholera and typhoid fever, and diarrhoeal diseases kill two million people annually, mostly children [7].

Reports that emphasise the consequences of agricultural production on biodiversity and water resources identify crucial research areas that require further investigation [8]. The disruption has been further intensified by significant factors, including the Industrial Revolution, Green Revolution, and Socio-Economic. The global effects of water trade are a manifestation of the interconnectedness between agriculture and socio-environmental factors [9]. Spatial research supports optimisation that minimises threatened species, maximises carbon retention, and water quality regulation, to establish a global place to prioritise terrestrial conservation efforts [10]. Greenhouse gas fluxes from various sources, such as deforestation and agricultural practise, as well as sinks such

as reforestation and non-CO₂ agricultural emissions (eg, methane from livestock), highlight the insufficiency of relying solely on natural climate solutions [11]. In Europe, new technological solutions for development are promoted and implemented rapidly to maintain a stable water supply for humans and the ecosystem [12]. It is urgent to implement cutting-edge purification functionality using advanced materials technology in a sustainable and cost-effective manner [13].

In particular, significant advances in drinking water treatment technologies were made during the past century, including coagulation, sedimentation, and chlorine disinfection. However, the availability of fresh and sustainable water sources faces growing threats due to factors such as population growth, demographic changes, and the impacts of climate change. Effortless water action plans and resolutions are typically proposed by governments, international organisations or other relevant bodies to promote sustainable practices and protect the environment.

THE UN 2023 WATER CONFERENCE, NEW YORK

According to Resolution 73/226, the General Assembly convened the United Nations 2023 Water Conference, also known as the 'Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade of Action, Water for Sustainable Development, 2018-2028.' This conference took place at UN headquarters, New York, USA, from 22 to 24 March 2023. The conference was co-hosted by Tajikistan and the

Kingdom of the Netherlands. The conference ended with an opening ceremony, a closing ceremony, six plenary meetings, and five interactive dialogues [14,15]. These

dialogues were intended to foster collaboration and involve multiple stakeholders, ensuring a diverse representation in terms of gender and geographical balance.



Fig. 2. Opening of the United Nations 2023 Water Conference by Secretary General António Guterres on 22 March 2023 at UN headquarters, New York, USA.

The conference's primary focus was on sustainable development and the integrated management of water resources to advance societal, economic, and ecological goals [14]. The key features are as follows.

- More than 10,500 registered users signed up for the UN 2023 Water Conference mailing list. Between January 2022 and 27 March 2023, a total of 21 newsletters were sent out to this mailing list.
- The conference format organizes six plenaries where member states announce commitments, plans, actions, and best practices.

The conference also highlighted the promotion of collaboration and partnerships at all levels, in addition to the implementation and promotion of connected programs and projects. The UN 2023 Water Conference has five interactive dialogues covering the SDGs for water [14].

- Water for Health: SDGs 1, 3,4, 5, 17
- Water for Sustainable Development: SDGs 2, 8, 9, 11, 12
- Water for Climate, Resilience, and Environment: SDGs 7, 11.5, 13, 14, 15
- Water for Cooperation: SDGs 16, 17
- Water Action Decade: Accelerating the implementation

The meeting had a two-fold purpose: first, to evaluate the advances made in fulfilling the objectives of the International Decade, while reiterating the globally endorsed water-related goals and targets, including those outlined in the 2030 Agenda for Sustainable Development. Second, it sought to recognize the challenges faced, explore potential opportunities, and devise creative strategies to improve the implementation process. Additionally, the meeting aimed to encourage an open exchange of perspectives, generate actionable plans, and introduce new initiatives essential to accelerate progress toward the objectives in the latter half of the International Decade. **Fig. 2** present the inaugural session of the United Nations 2023 Water Conference on the “Midterm Comprehensive Review of Implementation of the Objectives of the International Decade of Action ‘Water for Sustainable Development,’ 2018-2028”. Furthermore, the objective was to facilitate the sharing of ongoing efforts, exemplary approaches, and valuable experiences gained thus far. Through the active participation of member states and stakeholders in the Conference, a consensus emerged, highlighting the inadequacy of the “Keep calm and carry on” approach in addressing the urgent global water crisis. It is abundantly clear that a transformative change is necessary. Water must be comprehensively comprehended, effectively governed, genuinely appreciated, and diligently safeguarded, with collective welfare in mind. The

achievement of these objectives is on the shoulders of all water users and governments, according to their respective capabilities. Water represents a crucial catalyst for achieving sustainable development in social, economic and environmental domains. The speakers stressed the critical importance of accelerating efforts to tackle the global water challenge and promoting profound changes to achieve the Sustainable Development Goals.

On 22 March 2023, the International Association of Advanced Materials (IAAM, www.iaamonline.org) organised Water Dialogues at the United Nations Headquarters, New York. IAAM works in line with the Sustainable Development Goals of the United Nations for the new decade with the motto 'Advancement of Materials to a Sustainable and Green World' [16]. The purpose of this gathering was to engage in in-depth discussions on water resilience and to foster the integration of diverse knowledge related to water security and water technology. Representatives from various nations, international organisations, academia, and industry converged at the meeting to share their expertise, experiences, and best practices in addressing the challenges associated with water security.

The delegation aimed to explore innovative solutions and strategies that promote the resilience of water systems in the face of increasing global pressures such as population growth, climate change, and urbanisation. This meeting was conducted under the Chairmanship of Dr. Rajendra Singh (People's World Commission on Drought and Flood, PWCDF, www.pwcdf.org), and Dr. Ashutosh Tiwari, Secretary General of the International Association of Advanced Materials, who emphasised sustainable growth through water rejuvenation, mitigation, and adaptation measures. The People's World Commission on Drought and Floods was founded at World Water Week 2022 in Stockholm with the purpose of lowering risks to lives, livelihoods, and ecosystems through community-driven environmental rejuvenation in the face of catastrophic weather events like droughts and floods [17]. The IAAM aims to leverage proven experiences through indigenous communities' decentralized water resources management, adopting a comprehensive approach to water rejuvenation, action, and innovation. The goal is to rejuvenate the hydrologic water cycle using natural mechanisms. The meeting featured a discussion programme, four book releases, among the delegates. The 13th Annual Book of the IAAM (ISBN 987-91-88252-39-5) was also published, detailing the association's work in line with the UN SDGs for the new decade. The IAAM-PWCDF meeting facilitated discussions on comprehensive drought and flood solutions through expert meetings and panel discussions. During the meeting, participants focused on exchanging information on emerging water technologies, efficient management practices, and effective policies aimed at ensuring the availability and sustainable use of water resources. Sustainability, cooperation, and water security

were lauded by Indian government officials Gajendra Singh Shekhawat, a member of parliament and Minister of Jal Shakti, and G. Asok Kumar, Director General of Namami Gange. Dr. Rajendra Singh, the Waterman of India, was honoured by the IAAM Secretary General for his enduring efforts to conserve water and he was urged to work even harder to combat the global water crisis. The interactive dialogue yielded significant insights and recommendations. It highlighted the urgent need for the collective protection of water and the global water cycle to serve the best interests of all. Currently, the global water cycle is in disarray, intertwining with the critical issues of climate change and loss of biodiversity. This complex interplay exacerbates the challenges posed by the water crisis, which requires comprehensive solutions. One such solution is to accurately assess the value of water, align the pricing with its true value, and implement targeted subsidies where necessary. By adopting these measures, we can strive for more efficient, equitable, and sustainable water use. The results of this high-level meeting will contribute to the shaping of future policies, strategies, and initiatives aimed at improving water security worldwide.

The UN 2023 WATER CONFERENCE SIDE EVENTS

The open call for side events in connection with the UN 2023 Water Conference yielded 1300 applications. Priority was given to side events organised by Member States and those organised in partnership by several networks/organisations. More than 500 side events took place in connection with the UN 2023 Water Conference, including 200 side events held inside UN Headquarters, more than 180 side events in New York City, and 160 virtual side events. More than 230 summaries of side events have been uploaded to the Conference website and more than 140 commitments have been added to the Water Action Agenda by side event organisers.

The side event provided an additional significant opportunity for stakeholders to participate in the UN 2023 Water Conference. Side events could be organised either in person inside the UN Headquarters, in person across New York City, or virtually by Member States, the UN system, intergovernmental organisations, and accredited nongovernmental stakeholders. The International Association of Advanced Materials was appointed to organise side events at the UN 2023 Water Conference. The IAAM Sustainable Development Agenda prioritizes access to clean water and sanitation facilities, a goal that is in line with the Sustainable Development Goals of the United Nations [16]. Activities for the UN 2023 Water Conference and the release of the IAAM's 13th Annual Book during the conference are shown in **Fig. 3**. With this objective in mind, the IAAM took the initiative by organising a series of additional events aimed at exploring innovative approaches to address the challenges posed by droughts and floods.



Fig. 3. IAAM delegation at the UN 2023 Water Conference. The release of the 13th Annual Book of the IAAM (ISBN: 987-91-88252-39-5) provided a detailed account of the association's work and activities in line with the UN Sustainable Development Goals for the next decade.

Advanced materials research has sparked innovative approaches to tackle water contamination and improve disinfection methods. This dynamic field holds great promise for addressing the pressing need for clean water on a global scale. In particular, nanofibrous membranes have revolutionised water purification by significantly improving efficiency. Spearheading these advancements through the IAAM consortium and R&D World Link is useful in the development of cutting-edge membranes and pioneering water purification technologies [16,18]. Additionally, the IAAM conferences provide a platform for showcasing state-of-the-art clean water technologies symposia. Their commitment to knowledge dissemination is evident through the publication of comprehensive issues dedicated to advanced materials specifically designed for water decontamination. Recognising the utmost importance of securing a sustainable future for humanity, the association acknowledges that it must prioritise this pursuit above all else. The primary focus was to assess the risks associated with climate change and formulate forward-thinking strategies to improve climate resilience, with special attention paid to water management and preservation techniques. Taking advantage of their

extensive experience over four decades, the IAAM adopted an inclusive approach, empowering indigenous communities to actively manage decentralised water resources. Through this comprehensive framework, they aimed to rejuvenate the hydrological water cycle using natural mechanisms. During the side event program, expert talks and panel discussions foster meaningful conversations and explore comprehensive solutions to combat droughts and floods [19,20].

The International Association of Advanced Materials has launched various initiatives to actively contribute to the achievement of the Sustainable Development Goals. IAAM is dedicated to promoting materials research and Innovations that effectively address the pressing needs of sustainable development. By mobilising resources and advanced technologies, IAAM is committed to facilitating this objective. On 23 March 2023, a significant side event took place at Bronx Community College (BCC), City University of New York (CUNY), featuring esteemed speakers such as Dr. Rajendra Singh, Chairman of PWCDF, and Dr. Ashutosh Tiwari, Secretary General of IAAM. The event was focused on the theme of sustainable growth, focusing on water rejuvenation, mitigation, and adaptation

measures. Opening with warm introductions, welcome remarks, and appreciation from Dr. Thomas A. Isekenegbe, President of BCC-CUNY, Dr. Ashutosh Tiwari, and Prof. Paramita Sen, the event proceeded with a captivating keynote address by Dr. Singh. The first session focused on the crucial role of science and society in assessing climate resilience, particularly with regard to droughts and floods. Subsequently, the second session explored the profound

wisdom embedded in indigenous knowledge through a panel discussion and a series of enlightening case studies. **Fig. 4** illustrates the Side Event, day one, which took place at Bronx Community College (BCC), which is part of the City University of New York (CUNY). Lastly, the third session dived into the realms of science and technology, highlighting the importance of global cooperation in achieving water security.



Fig. 4. IAAM organised the W119 side event, UN 2023 Water Conference at Bronx Community College (BCC), City University of New York (CUNY), USA. The side event programme featured, published books, and water-themed films were premiered among the delegates.

The side event held during the 2023 UN Water Conference showcased a diverse lineup of distinguished speakers who brought their expertise and knowledge to the forefront. Among the notable speakers were Dr. Paramita Sen, Dr. Neal Phillip, and Dr. Naresh Devineni from the CUNY CREST Institute, V. Prakash Rao, Chairman of IPRBC, Zachary Weiss, Founder of Water Storeys, and Ethan Hirsch-Tauber, Founder of The Water Folk. The event also featured prominent individuals such as Dr. Martin Schoonen from Brookhaven National Laboratory, Dr. Dimitri Katehis from NYC Dept of Environmental Protection, and Dr. Dipak Gyawali, Commissioner of Himalayan Hindukush, Nepal. Sweta Jhunjunwala, founder of Tulsipatra Foundation, Jalbiradari National Convener Satyanarayana Bolisetty, and Jalbiradari member Nagamani Bolisetty were also present, along with Dr.

Christopher Boxe from Howard University and Dr. Snehal Donde, Chairperson of SKECT. Shrikant Paygavhane from Mission 500, India, Rajesh Sundaresan from PWCDF, Sweden, and Nicholas Salazar Sutil, Director of Guardians Worldwide, added their valuable perspectives. Frederick Kincheloe of Savin Engineers, White Plains, USA, also brought his expertise to the event. The closing remarks were made by Dr. Reza Khanbilvardi, Executive Director of the CUNY CREST Institute. Gajendra Singh Shekhawat, MP, and Minister of Jal Shakti, India, and G. Asok Kumar, Director General of Namami Gange, India, commended the importance of sustainability, cooperation, and water security. The Namami Gange initiative, which aims to restore India's sacred River Ganga, has been named one of the top 10 World Restoration Flagships by the UN [21]. Furthermore, four significant books were launched during

the event, namely “River Rejuvenation Drought and Flood Mitigation Community”, “Drying River of Civilisation,” “Exploration Journey (Khoj Yatra), World Pledge to Rejuvenate the Water Cycle” and “Voyage of the Water Man”. The side event gathered around 20 scientific experts who provided credible testimony and engaged in discussions on water cycle mitigation, adaptation, and innovation. **Fig. 5** depicts the Book launch in the side event on day one that took place at Bronx Community College (BCC), which is part of the City

University of New York (CUNY). With a diverse range of participants, including both on-site and online attendees, the event emphasised the need for advanced water technologies that would contribute to the development of a climate-neutral society. They discussed the world’s leading researchers working to better develop methods to manage rain, and their efforts for water security and global utilisation [22]. Interestingly, the event attracted registrations from 300+ participants representing more than 25 countries and featured experts from all continents.



Fig. 5. Four books were published during the UN 2023 Water Conference, New York.

On the second day, the side event took place at **Columbia University on 24 March 2023**, showcasing the growing importance of advanced materials in vital areas such as water cycle rejuvenation, energy, and the environment. These materials have become essential for the achievement of the Sustainable Development Goals set by the United Nations. The event featured a distinguished lineup of speakers, including Dr. Rajendra Singh, Chairman of PWCDF; Dr. Ashutosh Tiwari, Secretary General of IAAM; Prof. Mukand Singh Babel from the Asian Institute of Technology in Thailand; Jayesh Joshi, Founder of Vaaghdhara; Narendra Chugh, Convener of Maharashtra Jalbiradari; Ana Cristina Merino and Abhimanyu Tyagi, Presidents of SUMASA Board 2023, along other esteemed delegates. The session attracted more than 50 students and 100 external participants. Moderated by Sweta Jhunhunwala, a SUMASA alumni and PWCDF advisor,

the event began with an introduction followed by a public lecture by Dr. Rajendra Singh, focussing on water risks due to climate change. A Q&A session followed, and the event ended with UN delegates engaging in discussions with students and faculty from Columbia University. **Fig. 6** depicts the side event on day 2 that took place at Columbia University. The delegations emphasised the importance of revitalising ecosystems and rejuvenating water cycles through global cooperation, including scientific collaboration, and aligning with the 2030 #SDGs Agenda. They highlighted the importance of transboundary water initiatives, recognising water as the primary resource for human survival. Encouraged individuals to contribute to a sustainable future, they stressed the collective responsibility of each person. The event marked the release of three notable water-themed movies, namely Reviving River, Water is Peace and Resilience.



Fig. 6. Three water-themed films were premiered at Bronx Community College (BCC), City University of New York on 23 March 2023 and Columbia University on 24 March 2023 during the IAAM's side event.

WATER ACTION AGENDA: INTERNATIONAL ASSOCIATION OF ADVANCED MATERIALS, #SDGAction50056

The IAAM and PWCDF have taken a global approach to address the challenges of the water system by collaborating with academia, industry, policymakers, governance, and civil society in the field of materials science, engineering, and technology. Their shared goal is to create a sustainable and environmentally friendly world. Using impactful knowledge and practices, they aim to develop effective policies for drought and flood management, which are crucial not only to achieving SDG 6 but also to promoting overall health and food security.

KEY ISSUES DISCUSSED

Key factors to diminish threats to human life, economic stability, and ecological systems.

- Response to drought and floods, resilience, and mitigation.
- Water research on climate resilience, challenges, and best practices adopted through case studies.
- Importance of government, industry, and public society in combating.
- Climate-neutral R&D and green technologies for the Sustainable Development Agenda.
- Revitalise the ecosystem and rejuvenate water cycles through global scientific cooperation.

- Education and training for the community to adopt environmentally friendly practise and promote the pledge of water.

KEY RECOMMENDATIONS FOR ACTION

Restoring ecological health can help communities better withstand the effects of natural disasters like floods and droughts, protecting people, property, and the environment. Following the proposed implementation:

- Community-led nature rejuvenation. Implement clean and safe water management.
- Prepare an annual report to provide a summary of the state of floods and droughts.
- Train students to adopt and implement sustainable ecological practices.
- Develop health management practices for waterborne diseases to achieve the SDGs agenda.
- Climate-neutral R&D and green technologies for water.
- Pratique of involving government, industry, and public society in combating droughts and floods.

The final session of the conference marked an important moment, as it featured closing remarks from distinguished individuals, including the Secretary-General of the United Nations, the President of the General Assembly, the Chair of UN-Water, the Director-General of the International Labour Organisation (ILO) and the President of Tajikistan.

‘As the most precious global common good, water unites us all. That is why water needs to be at the centre of the global political agenda. ‘

- António Guterres, United Nations Secretary General

‘Today’s conference should go down in history not only in terms of promoting a correct understanding of challenges and problems, but also in finding effective and efficient solutions.’

– H.E. Emomali Rahmon, President of Tajikistan

‘We will not rest until water has the place it deserves in global agendas and policy programmes. We will create a fluid connection between water and the broader work of the United Nations up to 2030 and beyond. ‘

– King Willem-Alexander of the Netherlands

‘Our decades of experience and local knowledge of decentralised community-water management systems will be used to mitigate drought and floods. We envision a world free from droughts and floods. In this sense, our opinions about drought and flood-free world will be expressed through the World Water Council. ‘

– Rajendra Singh-Waterman of India

KEY OUTCOME OF THE CONFERENCE

Resolution 75/212 of the General Assembly outlines the results of the UN 2023 Water Conference. The conference proceedings are summarised in the mandated outcome document. We need clear commitments, promises, and actions across all sectors, industries, and interests to unite nations, stakeholders, and professionals on water actions in the 2030 Agenda for Sustainable Development that can be scaled and replicated. SDG 6 and other water-related goals and objectives should be implemented faster and with greater impact, considering content, process, and structure. Water problems require creative solutions and a "beyond business as usual" approach. The United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade of Action "Water for Sustainable Development", 2018-2028, came to a close with the ceremony depicted in **Fig. 7**. IAAM suggests that nature restoration be led by the community. Take care of clean water, write an annual report on floods and droughts, and change your habits to be more eco-friendly [20]. Droughts and floods are hard to deal with, but research, government policy, process improvements in industry, and public awareness can help.



Fig. 7. Closing ceremony of the United Nations 2023 Water Conference on 24 March 2023 at General Assembly, United Nations Headquarters, New York.

TRANSFORMATIVE WATER ACTION AGENDA

The Water Action Agenda has consolidated more than 700 voluntary commitments, serving as a crucial framework to achieve Sustainable Development Goal 6 of ensuring clean water and sanitation by 2030. The financial implications of the pledges made during the Conference are substantial, exceeding \$330 billion, and capable of leveraging nearly \$1 trillion in valuable services for both humanity and the environment [14]. In particular, most of these commitments originate from civil society, highlighting the pivotal role that nongovernmental actors must play in accomplishing SDG 6 and creating a water-secure world for all. The Water Action Agenda established commitments, pledges, and actions, in all sectors, industries, nations, stakeholders, and professionals, that contribute to the achievement of the 2030 Agenda for Sustainable Development, actions that can be scaled and replicated over time [23]. The importance of cooperative and inclusive action is emphasised, bringing together multistakeholder coalitions that rally local communities, indigenous peoples, civil society organisations, governments at local and national levels, as well as international organisations.

MEMBER STATES

The US pledged \$49 billion to water and sanitation. Japan will develop a 'quality infrastructure' and provide 500 billion yen (\$3.65 billion) over five years to address Asia-Pacific water-related social issues [15]. Vietnam promised to manage the main river basins by 2025 and provide clean water to all households by 2030. Switzerland made five commitments to the UN, including the Water Convention and transboundary cooperation. The Niger Basin Authority (NBA) and the German Federal Ministry of Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) pledged \$21.2 million to strengthen the NBA and its member countries. Mozambique pledged to invest \$9.5 billion to accelerate SDG 6 by 2030. The Continental Africa Investment Programme (AIP) of the African Union Commission aims to mobilise at least \$30 billion / year by 2030 to close Africa's water investment gap. By 2030, the EU wants to help 70 million people get better water and sanitation. The EU will give Member States €20 million to accelerate COVID-19 wastewater surveillance. More than 50 leading global companies are committed to SDG 6. All the above information was disclosed during the conference [15].

MULTILATERAL BANKS

By 2030, the Asian Development Bank will invest \$11 billion in Asia-Pacific water issues and \$100 billion worldwide [15]. Starbucks, Ecolab, Gap Inc., Reckitt, and DuPont invested nearly \$140 million in water issues with

the U.S. government to reach 5 million people. DANONE's water issues fund will provide 30 million people with safe daily water. Xylem and 16 others invest \$11 billion in R&D. The World Benchmarking Alliance will evaluate 1,000 global companies in 22 industries on their water issues. NGOs World Vision pledged to raise and invest \$2 billion by 2030 in water issues in 50 countries in six regions. All of the data above were released at the conference [15].

OVERVIEW OF ISSUES AND ORGANISATIONAL RESOLUTION

The main focus of this article is to explore water resources, scarcity, United Nations Sustainable Development Goals, and advanced materials technology through the lens of climate neutrality [1,16,23]. Climate resilience is a multidimensional concept that encompasses a variety of strategies, actions, and approaches to address the impacts of climate change [24,25]. It recognises the importance of proactive measures to reduce vulnerabilities, improve adaptive capacity, and promote sustainable development in the face of an uncertain and changing climate. Several advances in water technology, novel materials, and the management of emerging issues through control are crucial and leading initiatives in the current situation [7-13,24,25]. A further important outcome of the Conference was the establishment of the Water Action Agenda, which included commitments that will contribute to the achievement of the 2030 Agenda for Sustainable Development Agenda [23]. Both IAAM and the UN need to improve their scientific understanding of advanced innovations and embrace new technological trends in the water sector to meet the commitments they have made [4, 10-12, 16]. Experts in the side event of the UN 2023 Water Conference delved into discussions and suggested improving water governance, strengthening international cooperation, and promoting capacity-building efforts in the field of water security [19,20]. In understanding regional water crises, both IAAM and the UN need to improve their scientific understanding of advanced innovations and embrace new technological trends in the water sector to live up to the commitments they have made. Biodiversity, climate, and technology availability are key elements in the green transition. It is unlikely that global net zero or neutrality will be achieved in the coming decades, despite the partial efforts outlined in the UN-IAAM agenda. The UN 2023 Water Conference, which took place in New York, made a significant contribution to the advancement of climate resilience in water management and promoted sustainable development in the face of climate change by addressing key points.

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