

6th ASEM SEMINAR ON URBAN WATER MANAGEMENT

22-24 October, 2024

Changsha / Zhangjiajie Hunan, China



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6th ASEM SEMINAR ON URBAN WATER MANAGEMENT

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FOREWORD



Water is critical for sustainable development and the eradication of poverty and hunger, and is indispensable for human development, health and well-being. However, Over the past several decades, ever-growing demands for – and misuse of – water resources have increased the risks of pollution and severe water stress in many parts of the world. The frequency and intensity of local water crises have been increasing, with serious implications for public health, environmental sustainability, food and energy security, and economic development. Demographics continue changing and unsustainable economic practices are affecting the quantity and quality of the water at our disposal, making water an increasingly scarce and expensive resource — especially for the poor, the marginalized and the vulnerable. Now more than ever the world needs to transform the way it manages its water resources and delivers water and sanitation services for billions of people. Urgent action is needed to overcome this global crisis, as it is affecting all countries around the world, socially, economically and environmentally.

Water is at the heart of recent milestone agreements such as the UN 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030, and the 2015 Paris Agreement. The World Economic Forum ranks the water crisis in the top 3 of global risks for the third consecutive year. Failing to respond effectively to these challenges will have devastating global effects. To be successful, people need to respond in a coordinated and effective manner. In UN resolution 71/222, the General Assembly proclaims the period from 2018 to 2028 the International Decade for Action, “Water for Sustainable Development” (the “Decade”), to further improve cooperation, partnership and capacity development in response to the ambitious 2030 Agenda.

To ensure water security, water conservation is the priority with spatial equilibrium; and both the government and the market shall make efforts to achieve systemic governance. —H.E. Xi Jinping, President of China

Related to this, in the scope of the 6th ASEM Seminar on Urban Water Management (further referred to as “Seminar”) here, there is the theme of promoting sustainable development of water resources for shared prosperity as the focus. The Seminar aims at sustainable water development policies, sustainable water utility services and water management, examining the value of water in the circular economy, the role of cross-sectoral cooperation (science, profession, industry) in creating a water-conscious society, how the system of financing water solutions can become sustainable, and how investors and financial institutions can become stakeholders in the operation of a new system that considers the interests of the future. The goal of the Seminar is to show how water connects all of us, highlighting the water awareness that is essential for the actions of societal actors, and the potential to shift the scientific, industrial, business and individual responsibility at micro and macro levels towards sustainability.

In addition, the Seminar will develop recommendations and action plans designed to support collaborative efforts among the stakeholders who play a role in the path from sustainability concepts to the implementation of sustainable practices. Given its political, technical and institutional scope, one of the Seminar’s main features is the open, democratic participation of actors drawn from different sectors, contributing to the dialogue of the decision-making process on water at the regional and global levels, seeking to achieve the rational and sustainable use of this resource.

亚欧城市水管理研讨会

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2024年10月22-24日 长沙-张家界

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People's Government of Hunan Province

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供水保障研究和利用中心
Center for Research and Utilization of Water Security

张家界市人民政府
Zhangjiajie Municipal Government

水利水协
China Water Partnership (CWP)



第六届亚欧城市水管理研讨会
6th ASEM SEMINAR ON URBAN WATER MANAGEMENT

OPENING CEREMONY

Hosted by **ZHU Wan** Director General of Department of Science and Technology of Hunan Province



Addressed by **ZHANG Lei**

Deputy Executive Director of Asia-Europe Foundation

Today, we gather here not just to talk about the challenges, but more important, to seek solutions. This seminar underscores the urgency of the sustainable use and management of water resources. Our focus must be on sustainable policies, on building a water-conscious society, and on fostering cross-sectoral cooperation between science, industry, and government. Water is no longer just a resource. It must become a shared responsibility.

The UN' s 2030 Agenda for Sustainable Development and the Paris Agreement both place water at the heart of global action. To achieve these ambitious goals, we need to act decisively. With the theme of “Promoting sustainable development of water resources for shared prosperity” , this seminar aims to improve global cooperation, build partnerships, and enhance capacity to address the water challenges of today and tomorrow. It is a concrete step in support of the UN' s International Decade for Action on Water for Sustainable Development.

With the diversity of expertise present in this room—from policymakers to scientists, from industry leaders to experts, we have a unique opportunity to shape the future of water governance on regional and global scales. I hope, at the end of this seminar, we can make our due contribution to the forging of new pathways for collaborative action. **【partial excerpt】**

Addressed by **Minister JIANG Duan**

ASEM Senior Official for China

China has always been an advocate and promoter of practical cooperation between Asia and Europe. In 13 years since the establishment of ASEM Water Resources Research and Development Center, it has successfully held five ASEM Seminars on Urban Water Management and carried out various practical cooperation projects. China is determined to promote the building of a community with a shared future for mankind and is willing to work with the international community to strengthen experience exchanges, share development achievements, and contribute Chinese wisdom and solutions to promote stronger, greener and healthier global development. We will uphold the new development concept of "innovation, coordination, greenness, openness and sharing" on the road of Chinese modernization and work with all countries to implement the United Nations 2030 Agenda for Sustainable Development. I hope that all parties will take this Seminar as an opportunity to further strengthen exchanges in science and technology, culture, education, think tanks and other fields, form an all-round, multi-level and multi-channel cooperation framework, continuously enhance the development resilience of the Asia-Europe region, continuously stimulate the vitality of innovation in Asia and Europe, continuously enhance mutual understanding and friendship between the people of Asia and Europe, inject more certainty and positive energy into the development of Asia, Europe and even the world, and jointly create a better tomorrow for Asia-Europe cooperation, exchanges, development and prosperity. 【partial excerpt】





Addressed by **Károly Kovács**

President of the Hungarian Water Partnership/ Honorary Member and
Past-President of the European Water Association, Hungary

My experience is that when working with ASEMwater, they are always ready to cooperate, always ready to establish partnerships, ready to share expertise, and combine knowledge and capabilities. The most important thing is that partnership cooperation and stakeholder participation are important, that is, good governance is key. As mentioned before, we have available technology for technical solutions, but we need to build capacity and also need financing and financial support. It is important to involve all stakeholders, whether it is the public sector, industry, agriculture, and all stakeholders need to participate in the discussion. Discussing technical solutions is also important. But we need to share capabilities, share experiences, and share how to involve the public sector and the public. I hope this meeting will be a complete success and wish our cooperation fruitful and bring good experience back to my country. Thank you! **【partial excerpt】**

Addressed by **MIKAZUKI Taizo**

Governor of Shiga Prefecture, Japan (delivered by Nobuhiko Miwa)

Thanks to the connection between China's Lake Dongting and our Lake Biwa, Hunan Province and Shiga Prefecture formed a friendship alliance in 1983, and this year we welcome the 41st anniversary of its establishment.

During this period, both sides have interacted in various areas and have made accomplishments including water environment improvement.

Currently, among all the water on Earth, roughly .01% (point zero one percent) of that comes from rivers and lakes and is easily-accessible to us, and 90% of that water exists in our lakes. However, the earth's population is increasing, and it's predicted that we will have severe water shortages in the future. Under these circumstances, we believe that the roles and responsibilities of those areas with precious resources such as these lakes will become increasingly important.

Furthermore, in 2030 aiming for a sustainable society we have created our own "Mother Lake Goals," a shared objective for the conservation of Lake Biwa, which is focused on creating a healthy cycle including the environment, economy, and social activity.

These "Mother Lake Goals" are sustainable objectives based on SDGs, and were rooted in the community and created with local residents. These 13 objectives include "Restoring bountiful seafood resources" and "Creating a beautiful waterfront and lake bottom," making them truly Lake Biwa's version of the SDGs. **【partial excerpt】**





Addressed by **Jean-Yves ROUX**

Consul-General of French Consulate General in Wuhan, France

French business community has built up a wealth of knowledge around the world, including knowledge on water environment and water management. Well-known companies like Veolia and Suez have good cooperation projects in China, and have participated in cooperation projects with municipalities and industries in various places. In addition, there are many major projects between France and central China. We also have cooperation projects in Hunan Province. The Central Region of France has established friendly provincial relations with Hunan Province. The Central Region has had good scientific and technological cooperation with Hunan Province in the past few years, mainly to reduce the pollution of wastewater in mining areas. At the same time, the surface water, groundwater and sediments in the mining area are treated. We have established a good scientific alliance, and the French Geological Bureau and the University of Tours in central France have established good cooperative relations with Hunan's scientific research universities, such as Central South University and Hunan Agricultural University. These collaborations have enabled us to carry out extensive cooperation with central China on water resources, such as rivers, lakes, wetlands, etc. 【partial excerpt】

Addressed by **LEE Hee-sup**

Secretary General of Trilateral Cooperation Secretariat

In the United Nations' 2030 Agenda for Sustainable Development, water resources are prominently featured, especially through Sustainable Development Goal 6, which focuses specifically on "Clean Water and Sanitation". The goal recognizes water as essential to human health, environmental sustainability, and economic development. Aligned with this global agenda, the ASEM Seminar, convened by ASEMWater since 2014, has proven to be a highly impactful event, with five successful editions to date. Even in the face of the COVID-19 pandemic, the Seminar adapted swiftly by transitioning online, earning widespread praise for its effectiveness. It has consistently provided a valuable platform for in-depth exchanges, fostering business cooperation and the exploration of innovative solutions.

In the field of water resources, TCS maintains close communication with the water resources of the three countries, continues to participate in the China-Japan-ROK Trilateral Ministerial Meeting on Water Resources and actively supports activities aimed at implementing the outcomes of the meeting. China, Japan and the ROK are ready to make important contributions in the area of climate change impacts on water resources. On this occasion, TCS looks forward to strengthening our communication with relevant organizations and contributing more efforts in this area. TCS is willing to working closely with the ASEM Water Seminar to strengthen close exchanges and partnerships and build an ASEM family of win-win cooperation.

【partial excerpt】





Addressed by **CAO Zhiqiang**

Vice Governor of People's Government of Hunan Province, China

First, promote the partnership to a new level. It is hoped that all parties will further deepen Asia-Europe Water Technology Innovation Network, build consensus on cooperation, and develop more stable partnerships. Hunan will conscientiously perform the functions of the secretariat, provide conditions, support and service guarantees for member countries to carry out cooperative research, technology transfer, personnel exchange and training.

Second, cultivate new momentum for sustainable development. Continue to deepen practical cooperation in water resources, actively promote the transfer and transformation of water resources achievements, and promote joint research on major issues. Hunan will provide relevant conditions and services for research institutions in Asia and Europe to observe and understand the policies, mechanisms and models of water environment protection in Dongting Lake and Xiangjiang River Basin at close range.

Third, create a new chapter of win-win cooperation. Strengthen policy sharing among ASEM members, establish an efficient and pragmatic internal coordination mechanism, and respond to complex and changing water security challenges with a win-win mindset. Hunan is willing to deepen all-round cooperation in economic and social fields such as infrastructure, trade and investment, and cultural tourism with Asian and European cities, and jointly create a benchmark for high-quality development. **【partial excerpt】**



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PRESENTATIONS



Digital Tools in Urban Water Management

—by Harsha Ratnaweera

Vice President of European Water Association/ Professor of Norwegian University of Life Sciences, Norway

Summary

The presentation explores the growing role of digitalization in managing urban water systems, focusing on how advanced technologies can address critical challenges such as droughts, floods, pollution, and system vulnerabilities. Urban water management faces significant pressures from climate change, population growth, urbanization, and aging infrastructure. Climate change exacerbates water scarcity and leads to more frequent extreme weather events, causing severe water shortages and flood risks, which strain water utilities and result in user conflicts. Digital tools offer promising solutions for enhancing water management, ranging from early warning systems for droughts and floods to real-time water quality monitoring, automated equipment, and predictive maintenance. These digital systems enable water utilities to be more proactive, efficient, and resilient by providing timely insights and allowing for remote, cost-effective management of resources.

One of the key applications is the integration of sensors for monitoring water quality and infrastructure conditions. Sensors and algorithms can track variables like temperature, pH, and turbidity, optimizing treatment processes and reducing operational costs. Digital tools also support stormwater and flood management by enabling real-time analytics and intelligent equipment that can self-adjust to reduce the impact of heavy rainfall and prevent system overflows. In addition, digital twin technology simulates water networks, allowing operators to test responses to different scenarios, predict equipment failures, and improve resilience. These tools are essential for managing water resources effectively in an increasingly complex and dynamic environment.

However, digitalization also introduces new vulnerabilities, especially in terms of cybersecurity. The presentation highlights the risks associated with cyber-attacks, which could disrupt operations by altering water pressure, causing overflow events, or interfering with treatment dosages. Attacks

could compromise data integrity or disable critical alarms, posing risks to public safety and water quality. Therefore, the presentation emphasizes the need for comprehensive cybersecurity measures, including preventive strategies, continuous monitoring, and incident response protocols to safeguard critical water infrastructure.

The presentation concludes that digitalization is transforming the water sector by enhancing service quality, operational efficiency, and sustainability. Nevertheless, it is stressed that as digital tools become integral to water management, awareness of the associated cyber risks is crucial. By embracing digitalization and simultaneously building robust cybersecurity defenses, water utilities can better adapt to the demands of modern urban water management, ensuring the reliability of water supply, wastewater treatment, and flood control in the face of evolving environmental and technological challenges.



Strategies for Urban Flood Control Under Global Change

—by CHEN Ji

Secretary General of Asia Oceania Geosciences Society /Professor of The University of Hong Kong, China (Hong Kong SAR)

Summary

The presentation discusses urban flood control strategies in the context of global climate change, focusing on intensifying flood risks in urban areas due to rising global temperatures and increased greenhouse gas concentrations. Since 1850, the global temperature has increased by 1.1°C, triggering extreme weather events like heavy precipitation, heatwaves, and droughts. Urban areas are particularly vulnerable to these changes, with rapid urbanization amplifying flood risk as cities expand and more buildings and infrastructure are developed without adequate flood mitigation measures.

China exemplifies the urgent need for flood control strategies, having seen accelerated urban population growth and unprecedented urbanization, with nearly half of the world's new urban areas developed there in the past two decades. Recent catastrophic floods, such as those in Zhengzhou in July 2021 and Hong Kong in September 2023, demonstrate

the devastating impact of extreme rainfall events, causing significant human and economic losses. In Zhengzhou, a single hour saw rainfall levels reaching 201.9 mm, contributing to nearly 400 deaths and billions in economic damage. Similar intense rainfall in Hong Kong led to record-breaking flooding, underscoring the urgent need for disaster readiness in highly urbanized, vulnerable areas.

The presentation stresses the importance of forecasting improvements, advocating for advances in meteorological research and technology to enhance the precision of rainfall predictions at finer temporal and spatial scales. The current challenges include limitations in short-term forecasting accuracy, the complexity of urban landscapes, and the inability of existing models to meet growing urban needs. For example, the unpredictability and small spatial scale of heavy rainfall make accurate forecasting difficult, with available models often failing to meet the precision required for effective di-

saster management.

To address these challenges, an AI-based urban flood warning platform capable of real-time, high-accuracy flood forecasting and early warnings is proposed. By analyzing heavy rainfall forecasts and using AI to simulate flooding patterns, this platform could provide timely alerts up to six hours before potential flood events. Such a system would enhance urban resilience by enabling more efficient responses to impending disasters, thereby reducing the impacts on human lives and infrastructure.

Ultimately, the presentation calls for a comprehensive urban disaster management system that includes innovative forecasting tools, intelligent emergency equipment, and improved community preparedness. These measures aim to build resilient urban flood defense systems that can better withstand extreme weather events, contributing to public safety and sustainable urban development amidst accelerating global climate change.



The EU Partnership Water4All and the Multistakeholder Approach to Achieve Sustainable Solutions in An Urban Water Context

—by Bjørn Kaare Jensen

Chairman of Water4All, Denmark

Summary

The Water4All Partnership is an extensive, co-funded initiative under Horizon Europe running from 2022 to 2032, aimed at advancing water research and innovation across Europe and beyond. As the most significant water-focused research partnership in the EU, Water4All unifies funding and research efforts to address complex water-related challenges. It is structured around ambitious objectives, such as achieving long-term water security by fostering systemic transformations throughout the water research and innovation pipeline. The partnership encourages a cross-sectoral approach that integrates policy, environmental, economic, technological, and societal dimensions, while promoting collaborations between problem owners and solution providers.

Comprising 90 partners from 23 EU member states and 10 non-EU countries, the consortium's activities are funded in two main phases, with an overall budget expectation of €420

million over the decade, of which €130 million is supported by the EU. Water4All operates through five strategic pillars, offering an integrated framework from knowledge development to practical application. Key activities include six annual Joint Transnational Calls, which fund projects focused on urban water management, climate resilience, and circular water economy themes, among others. These projects address critical topics like urban flood design, hydroclimatic event management, biodegradable water purification filters, and innovative wastewater treatment technologies.

The initiative also emphasizes international cooperation, aiming to tailor solutions for global water challenges, enhance European research excellence, and expose EU expertise to global markets. Water4All actively seeks partnerships with nations outside Europe, ensuring its solutions remain globally relevant. Financial participation is accessible to public institutions, research organizations, and public-private

networks within Horizon Europe's framework, with opportunities to join as observing or full partners. Ultimately, Water4All seeks to drive transformative and sustainable innovations in water management, reflecting broader goals like the UN Water 2030 Strategy and the European Green Deal's emphasis on sustainable and innovative technologies.



Integrated Governance of Islamabad Water Resources and Supply Chain

—by Ghulam RASUL

Advisor of China-Pakistan Joint Research Center on Earth, Pakistan

Summary

Islamabad is the capital city of Pakistan established in 1962 on the semi-arid Potohar Plateau along the foot hills of Himalayas commonly known as Margalla Hills with an average elevation of 500m above the mean sea level. The plateau provides good relief for drainage and sanitation but the least natural capture to recharge the ground water aquifers. The city was originally planned to accommodate 8 million people but due to migration from other cities and urbanization its population is now exceeding more than 12 million. Water supply is provided from three small dams named Khanpur, Simli and Rawal situated in the radius of 35km. Average ground water table ranges between 60m and 100m with the lowest level down to 200m in peak summer. Watersheds are environmentally degraded producing massive soil erosion providing loads of sediments transported to the water supply lakes polluting water and reducing their water storage capacity.

There are two distinct dry seasons; one immediately after spring in May and June which is extremely hot and dry when water demand increases sharply and supply falls short leaving a big deficit putting pressure on ground water extraction to meet the water requirements of crops, animals, human-beings and industry. Summer Monsoon (July-September) contributes about 60% of total annual precipitation gathering about 800mm recharging the ground water reserves and filling the reservoirs. Another well marked dry period is October to December but due to low temperatures, the gap between demand and supply remains minimal which is compensated by supplementing ground water supply. Intense heating during summer gives rise to the formation of towering cumulonimbus clouds due to orography and convective instability producing heavy downpours bringing heavy loads of sediments to lakes. In a weak summer monsoon, a cloud burst event produced 620mm rainfall in only 10 hours. The frequency and intensity of extreme precipitation events >100mm/day have increased significantly enhancing the runoff and soil erosion due to climate change.

A mountain high challenge is to fulfill the water demand of the capital city in the presence of all odds therefore water governance comes as the first priority. For Islamabad Capital Territory (ICT) urban and rural management is the responsibility of Capital Development Authority (CDA). They have made it mandatory for every house owner to make rain water harvesting an integral part of their house; the certificate of completion of the house will be only issued when rain water harvesting mechanism is confirmed. Such water will be used for gardening, car washing and toilets. Water was not the taxed commodity in the past but now under a bold legislative step, water metering, pricing and restriction on ground water extraction have been imposed. Emphasis has been given to the watershed management improving the environmental conditions in the catchment areas. Afforestation, reforestation, slope stabilization, bush pools and check dams have been added to the watersheds to improve their natural characteristics. There is a large scale project named as Recharge Pakistan which covers most of the watershed areas including Islamabad water supply chain which focuses on resilience to climate change and maximize the recharge through boreholes on the water ways, recharge wells in residential areas, retarding the runoff speed including nature based solutions. In addition, advanced technologies such as water saving, recycling, purification and closed-loop systems have been introduced to reduce the water consumption and boost the water use efficiency.

Climate change assessment based on observed meteorological parameters of air temperature and precipitation in the ICT over the last 60 years show a significant increase. The number of rainy days have decreased but amount of precipitation per day has increased pushing the accelerated runoff and hence soil erosion and transport of sediments. Future climate change projections are likely to further exaggerate the present situation with an increase in the frequency and intensity of extreme precipitation events, less rain in winter and more in summer, occurrence of the extended heat waves and prolonged dry spells in early summer season from April to June.

Recommendations

Observed and projected climate change scenarios indicate the challenges associated with the sustainable water supply to the inhabitants of ICT therefore concerted efforts are required ranging from watershed management, town planning, implementation of new water technologies coupled with good governance. Some tangible recommendations are given below reflecting an integrated approach to meet the future sustainable water supply challenges under the changing climate.

- More robust water supply management is required to address the growing threat of water scarcity.
- Shifts in winter and summer weather patterns may pose the greater challenges to balance the demand and supply.
- Employing water smart technology, water saving, recycling, reuse, restoration and conservation of watershed ecosystems
- Expansion of the city and new housing schemes must be regulated bound to the scientific town planning focusing on drainage, sanitation and rain water harvesting.
- Increasing water demand emphasizes the urgency for sustainable water management to meet the future needs.
- Drastic measures on managing flood water, reducing the speed of runoff and pounding through closed loop system have to be taken

It is concluded with the following message: Secure Water Availability to All, No one left behind by.

Investing in water saving Technologies and Sustainable management which will help to tackle twin crisis of climate change and water scarcity bringing ecological balance and restoration of watershed ecosystems.



Bankable and Sustainable WASH Solutions – Having Integrated Approach and Life Cycle Aspect in the Focus

—by Károly Kovács

President of the Hungarian Water Partnership/ Honorary Member and Past-President of the European Water Association, Hungary

Summary

The presentation "Bankable and Sustainable WASH Solutions" highlights critical challenges and strategies in water, sanitation, and hygiene (WASH) infrastructure development, with a focus on affordability, sustainability, and practical implementation near consumers. It emphasizes water's central role in the United Nations Sustainable Development Goals (SDGs) and highlights growing water crises, worsened by increasing global demand projected to rise by 20–25% by 2050. Despite the pressing need, current infrastructure investment remains insufficient, particularly in Europe, where aging water systems are underfinanced, with a minimal reconstruction rate of just 0.01%–1% annually. Financing mechanisms often overlook full cost recovery, making it difficult to sustain improvements over time.

The global water infrastructure situation is dire, with projections showing that investment needs will amount to

\$3,500–4,000 per capita, an unachievable figure given global economic constraints. Full-scale urban water and sanitation systems, ensuring 100 liters per person per day of treated water and comprehensive wastewater management, require significant financial commitments, estimated at €1,500–7,500 per capita. These investments also come with substantial annual operational costs. Given these barriers, the presentation advocates for "near consumer" solutions, which are more economically viable and address basic needs efficiently.

These solutions, designed to provide at least three liters of safe drinking water per person per day and proper wastewater management, are highlighted as bankable alternatives that cost less than €70 per capita in infrastructure investments and €15 annually in service costs. Technologies like Septopure® for faecal sludge treatment are promoted as effective, scalable interventions, even in regions without existing sewage networks. This biological treatment technology

can be implemented rapidly to protect groundwater quality and can be expanded when necessary. Recognized by the UN as SDG acceleration technologies, these innovations offer practical pathways to enhance sanitation and environmental protection.

The presentation underscores the urgency of supporting adaptable and localized WASH investments rather than unattainable large-scale infrastructure projects. Emphasizing near-consumer models is crucial to achieving long-term, sustainable solutions that address both current deficiencies and future demands. The overarching message is to prioritize these practical, scalable solutions to meet global water challenges effectively.



Concepts for Sustainability Assessment for Wastewater Management Options

—by Markus Starkl

Senior Scientist of BOKU University, Austria

Summary

The presentation addresses concepts for sustainability assessment within the realm of wastewater management, emphasizing the importance of considering non-technical factors that often lead to project failures, especially in developing countries. It notes, These failures are frequently rooted in sustainability issues rather than technical inadequacies. Historically, cost considerations dominated decision-making processes, particularly in regions like India, where economic evaluations have been a primary criterion. However, the early 2000s marked a shift towards incorporating environmental and social factors into these assessments. The introduction of life cycle analysis (LCA) underscored environmental impacts, but this often clashed with social concerns, such as community acceptance of new technologies.

The presentation highlights the multidimensional nature of sustainability, encompassing economic, environmental, and social dimensions. Despite the abundance of sustainability criteria identified in surveys, there remains a significant chal-

lenge in achieving consensus on appropriate indicators and assessment methods. Common approaches include simple methods (SM), economic evaluations (EV), and life cycle analysis (LCA). However, advanced techniques like multi-attribute utility analysis (MAM) and outranking methods (ORa) are less frequently applied. The overarching weakness of multi-criteria approaches lies in the lack of standardized indicators, which often relegates these methods to supporting consensus-building rather than offering definitive solutions. Nonetheless, frameworks like Analytic Hierarchy Process (AHP) have proven useful in facilitating stakeholder agreement.

The presentation introduces the Planning Oriented Sustainability Assessment Framework (POSAF), a comprehensive and adaptable tool designed to assess sustainability in a structured manner. POSAF emphasizes stakeholder engagement to identify preferences and resolve conflicts, fostering legitimate and consensus-driven decisions. Another framework discussed is the Social-Ecological System (SES) model, which views sanitation systems as human-derived resources,

balancing trade-offs across sustainability dimensions. The SES framework aids in scenario planning and engages stakeholders at critical decision points to evaluate options and build consensus.

Standardization of sustainability in wastewater systems remains a complex topic. The presentation refers ISO standards 30500 and 31800, which outline sustainability criteria, such as cost estimations, cultural considerations, environmental compliance, and stakeholder participation. These standards emphasize location-specific considerations and voluntary product requirements but underscore that relevance and weightage of indicators must be tailored to local contexts and stakeholder needs. Overall, The presentation concludes that while criteria and indicators can be standardized, decision frameworks should remain adaptable to specific scenarios, ensuring effective and context-sensitive sustainability assessments. The presentation calls for a balance between standardized methods and flexible, stakeholder-driven frameworks to achieve robust and sustainable wastewater management solutions.



The Opportunity of Investment in Water Supply in Cambodia

—by Minh Lim

Executive Director of Cambodian Water Supply Association, Cambodia

Summary

1. Overview of Water Supply in Cambodia. Cambodia is committed to achieving the United Nations' Sustainable Development Goal (SDG) 6, aiming for universal and equitable access to safe and affordable drinking water by 2030. As of recent reports, approximately 40% of households in Cambodia have access to piped water, and a more significant proportion, 82.6%, has access to improved water sources, reflecting steady progress. However, challenges remain in terms of access equity and water quality, particularly in rural and underserved areas. This keynote will explore the current state of water supply infrastructure, ongoing efforts to expand access, and the key policies driving the sector towards the 2030 target.

2. Challenges of Water Supply Sector. The Cambodian water supply sector faces several pressing challenges that hinder the full achievement of SDG 6. These include limited human, financial, and technological resources, compounded by increasing water pollution, damage to pipelines due to construction activities (often without compensation), and the adverse effects of climate change on water sources. Furthermore, sub-national authorities often lack sufficient knowledge and regulatory capacity to manage water supply effectively, while public

awareness about the importance of using clean water remains limited. Coordination between relevant ministries and local authorities is also weak, creating inefficiencies in the sector. Despite improvements, the low access to piped water (40% of households in 2023) underscores the urgency of overcoming these systemic challenges.

3. Challenges for Private Water Operators (PWOs). Private Water Operators (PWOs) are integral to Cambodia's water supply sector but face multiple challenges that hinder their growth and effectiveness. Infrastructure development and construction often lead to damage of existing water pipelines, with little to no compensation or support for repair. There is also a significant lack of investment in water infrastructure, including improvements in the water distribution network and water source development. PWOs also struggle to meet the financial requirements imposed by Microfinance Institutions (MFIs) and banks, which complicates their ability to expand services. Additionally, there is a gap in knowledge regarding business management, technical operations, and compliance with water supply regulations. The limited application of new technologies, the impact of climate change on water sources, and inadequate government support further exacerbate these challenges. Another key issue is the difficulty PWOs face in managing Non-Revenue Water (NRW), which affects financial sustainability.

4. Opportunities for Private Water Operators. Despite these challenges, there are several opportunities for Private Water Operators in Cambodia's water supply sector. As a monopoly business, water supply operators benefit from long-term, renewable licenses, offering stability and the potential for consistent income. There is also a growing opportunity for development partners to provide both funding and technical support, which could aid in infrastructure development and the adoption of new technologies. One promising avenue is bulk water supply, which allows for economies of scale and increased access to clean water. Furthermore, merging smaller PWOs could create more sustainable, efficient operations, improving service delivery and reducing costs. Additionally, the legal framework allows PWOs to purchase existing water supply utilities, further promoting growth and expansion in the sector. Through strategic partnerships and innovations, PWOs have the potential to significantly contribute to Cambodia's water supply goals.

This presentation provides an in-depth look at both the challenges and opportunities facing Cambodia's water supply sector, with a focus on the roles and prospects of private operators in the ongoing efforts to ensure equitable and sustainable access to clean water for all.



Global Level Groundwater Resources Storage and Protection

—by João Paulo Lobo-Ferreira

Dr.-Ing. Counselor at the Portuguese National Water Council/Emeritus Principal Research Officer at National Civil Engineering Laboratory, Portugal

Summary

Groundwater constitutes water bodies below the surface, saturating the interstitial spaces in geological formations. Depending on the characteristics of geological formations where they occur, groundwater may constitute aquifers if these formations can store and provide water in economically usable conditions. Groundwater volumes, globally, are significantly higher than surface resources, makes them an excellent source of freshwater. Concerning the aspects of quantity, great progresses have been taken and the current state of knowledge is vast. In terms of quality, only a little more than four decades ago, detailed studies were initiated to understand the phenomena in question.

Besides the increase in the rates of groundwater exploitation worldwide, the main variation in regional groundwater availability comes from the decrease in aquifer recharge, in most regions due to climate change precipitation patterns. This causes changes in the piezometric level and the interfaces between surface and groundwater with changes in the discharge rates from aquifers to rivers, dependent ecosystems,

to groundwater and at the interfaces between fresh and saltwater in coastal aquifers and estuarine areas. The increase in extreme precipitation phenomena, even with identical average annual volumes, can also cause a decrease in groundwater recharge because the soil's infiltration capacity is more frequently exceeded, favouring surface runoff instead of recharge.

The United Nations World Water Development Report 2022 (Groundwater: making the invisible visible) mentions that the total global groundwater withdrawal during 2017 is estimated at 959 km³. Groundwater withdrawal rates have more or less stabilized in the United States of America, most European countries and China. Nevertheless, unsustainable water abstraction is a primary concern in the Asia-Pacific region, as some countries draw unsustainable proportions of their freshwater supply – exceeding half of the total water availability – and 7 of the top 15 groundwater extractors in the world are in Asia and the Pacific.

In Southern Europe, groundwater level declines have also been registered, eventually due to precipitation pattern

changes. This will also strongly affect natural groundwater recharge rates. European Union Watershed Management Plans have shown for Southern Europe that for some aquifers, the relationship between current and expected annual average recharge for 2071-2100 is expected to be less than 50% of today's natural recharge values. A relevant solution may be Managed Aquifer Recharge (MAR), which refers to the intentional infiltration of excess water into the subsurface through engineered systems for temporal storage or to influence gradients. Water can be recovered in times of high demand. In principle, large storage capacity is available in shallow aquifers, either due to thick unsaturated zones or due to already depleted water resources in extensively exploited aquifers. In addition, water quality can be improved due to chemical and biological reactions during flow of the infiltrated water through the unsaturated and saturated zone. Therefore, MAR can be a key Water Resources Management tool for tackling water scarcity in Europe, and in water scarce regions worldwide by linking water reclamation, water reuse and integrated water resources management in a long - term strategy.



Integrated Governance of Urban Water Environment in Vientiane Capital Lao PDR

— by Soutvilay DOUANGPHACHAN

Technical Officer, Natural Resource and Environment Research Institute,
Ministry Of Natural Resources and Environment, Lao PDR

Summary

The presentation outlines a strategic framework for enhancing wastewater management and water quality in Vientiane. The project, conducted by the Natural Resource and Environment Research Institute (NRERI) under the Ministry of Natural Resources and Environment (MoNRE), aligns with Laos' green and sustainable policies and addresses the critical environmental challenges identified in the city's drainage and sewer systems. The background emphasizes the 5-year strategic plan, which began in 2017 and expanded in 2018 to monitor 30 water quality points using seven environmental indicators. The study involved collaboration across departments such as the Environmental Research Department and the Long Distance Monitoring Department, emphasizing gender inclusivity and close supervision by SSC leadership.

The project's main objective is to re-evaluate and expand water sampling points along drainage systems in five urban

areas to assess wastewater management practices and their impacts on the environment and society. The research methods combined field surveys and laboratory analysis following standardized protocols, such as the APHA/AWWA/WEF Manual for water and wastewater examination. The analysis involved assessing parameters like pH, dissolved oxygen (DO), total phosphorus (TP), total nitrogen (TN), and total dissolved solids (TDS). Results revealed multiple water quality issues: low dissolved oxygen levels that threaten aquatic ecosystems, high phosphorus concentrations that accelerate plant and algae growth, and elevated nitrogen levels linked to poor decomposition of organic waste. Specific areas, like Nong Chan Bridge and the brewery and Sai SETHA development areas, were identified as critical points where water quality significantly deteriorated.

The findings indicate a widespread problem of untreated wastewater from households, businesses, and restaurants entering public sewers, impacting the urban water environ-

ment. The degradation stems from inadequate oxygen levels for microorganisms to process organic waste and excessive nutrient loading that exacerbates pollution. The research provides actionable recommendations, including creating a comprehensive water quality monitoring database and developing plans for effective wastewater management.

Looking ahead, the future plan emphasizes building international partnerships to enhance sustainable water governance, continuing skill development for environmental professionals, and securing additional funding for urban water management projects. The aim is to foster knowledge sharing and apply best practices to ensure clean and sustainable water resources for Vientiane's residents. The presentation concludes that ongoing efforts and collaboration are essential to address the water quality challenges, making Vientiane's urban water governance more robust and responsive to environmental pressures.



Protecting and Restoring the Health of Our Ocean and Waters Through Research and Innovation, Citizen Engagement and Blue Investments. European Best Practice Model for EU Mission “Restore our Ocean and Waters” in Romania

—by Nicoleta Brisăn

President of Eco-Innovation Cluster for Sustainable Environment, Romania

Summary

Missions of the Horizon Europe research and innovation program address the today's greatest challenges of the world to finding concrete solutions by 2030. Research and innovation combined with new forms of governance, collaboration and engaging citizens are the instruments for the Missions.

There are 5 global issues addressed by Missions: Adaptation to Climate Change; Cancer; Climate-Neutral and Smart Cities; Soil and Food Health; Restore our Ocean and Waters.

Romania, through five research development and innovation (RDI) projects, is implementing EU Missions by creating, operationalization and development of five Competence Centers at national level, funded through the National Recovery and Resilience Plan. The concept of the Competence Centers starts from the establishment of public-private partnerships to create the critical mass, interdisciplinarity and skills necessary to address the societal challenges associated with EU missions within Horizon Europe.

Restore our Ocean and Water Mission supports regional engagement and cooperation through "lighthouses", sites to pilot, demonstrate, develop and deploy the Mission activities in major EU sea/river basins: Atlantic-Arctic, Mediterranean Sea, Baltic-North Sea, and Danube-Black Sea.

The research, development and innovation (RDI) project carried out

for the establishment and operationalization of the National Center of Competence for the EU Mission Restore our Ocean and Waters address the integrated research and sustainable solutions to protect and restore Lower Danube Basin and coastal Black Sea ecosystems (Re-SPonSE). Four universities from Romania and one national research institute beside 5 companies work together to create and lead to the achievement of specific objectives: (1) sustainable development of the Danube River and Black Sea basins, (2) ecological restoration of degraded systems, (3) industrial research and engineering for water treatment, (4) nanotechnology for molecular biology and immunology, (5) blue-oriented socio-economic growth and better protection of biodiversity and ecosystems. In order to reach these objectives, the Center will implement the following specific projects: SP1. Model-driven decision support solutions (MDSS) for complex ecological systems; SP2. Integrated analysis of ecosystems for conservation and ecological restoration; SP3. Community development through sustainable blue tourism entrepreneurship and ecological restoration of coastal and marine areas; SP4. Sustainable bio-products added-value products and energy from marine macro algal: a step toward circular economy; SP5. Integrated solutions for water pollution abatement – towards zero pollution. There will be a transversal feasibility study, which summarizes how each specific project responds to the EU Mission.

SP2 is coordinated by Babes-Bolyai University and follows the assessment of ecosystems quality based on chemical and biological indicators, development of predictive models as decision support tool for

ecosystem conservation and restoration and societal validation of the alternatives for conservation and restoration of aquatic ecosystems from Lower Danube Basin.

SP5, coordinated by University of Bucharest, is aimed to develop and demonstrate innovative integrated technological solutions for wastewater treatment, enabling a faster transition towards zero pollution by preventing, in an economically and environmentally effective manner, a complex pollution with emerging organic contaminants, nutrients and heavy metals by dealing with the emissions directly at the source.

Implementing by 2025 of all these specific RDI projects will operationalize the Competence Center of Restore our Ocean and Waters Mission in Romania with many opportunities like: (1) collaboration with regional and local authorities that joined the EU Missions; (2) new submissions to Horizon EU Missions calls; (3) participation in national programs correlated with EU missions and (4) participation in co-creation activities with local and regional stakeholders.

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Embedding Water and Energy Sustainability Through Government Policy and Procedures – Case Study from Sydney

—by Jaya Kandasamy

Associate Prof at the University of Technology Sydney, Australia

Summary

The Building Sustainability Index (BASIX) is an environmental assessment framework designed to ensure that residential buildings in New South Wales (NSW), Australia, meet sustainability targets. Established in 2004 by the NSW Government, BASIX applies to new homes, renovations, and additions to improve energy and water efficiency while reducing greenhouse gas emissions.

BASIX sets specific sustainability targets in three key areas: Energy, Water, and Thermal Comfort, and, more recently in 2023, Embedded Carbon in construction materials. These targets vary depending on the building type, location, and climate zone within NSW.

Energy Target

Objective: Reduce greenhouse gas emissions by improving energy efficiency.

Key Targets: New dwellings must achieve a reduction in energy use and emissions compared to a standard benchmark.

The specific percentage reduction depends on the dwelling type and location but generally ranges between 10% and 50% for new homes.

Strategies: Use of energy-efficient appliances, lighting, and heating/cooling systems.

Incorporation of renewable energy systems, such as solar panels.

Optimized building orientation and insulation.

Water Target

Objective: Reduce potable (drinkable) water consumption.

Key Targets: New homes must typically achieve at least a 40% reduction in potable water use compared to the average NSW benchmark.

Strategies: Use of water-efficient fixtures (e.g., taps, toilets, showers).

Installation of rainwater tanks or recycled water systems.

Landscaping with drought-tolerant plants to reduce outdoor water use.

Thermal Comfort Target

Objective: Ensure homes maintain comfortable indoor temperatures with minimal reliance on heating or cooling systems.

Key Targets: Homes must meet specific thermal performance standards based on their climate zone.

Assessment: Tools such as NatHERS (Nationwide House Energy Rating Scheme) rate a building's ability to stay cool in summer and warm in winter.

Strategies: Optimized building orientation and window placement.

High-performance insulation and glazing.

Use of shading devices and natural ventilation.

Embedded Carbon Target (2023)

Objective: Reduce the carbon footprint of construction materials.

Key Targets: Construction materials must meet benchmarks for embedded carbon.

Strategies: Selection of low-carbon materials from an approved list.

How BASIX Works

The BASIX online tool calculates whether a proposed development meets the required energy, water, and thermal comfort targets based on the inputs provided (e.g., building materials, system types, and design choices).

BASIX Certificate: A certificate is issued only if the design meets all sustainability targets.

This certificate must be included in the development application submitted to local councils.

Compliance: BASIX ensures buildings contribute to NSW's sustainability goals.

It reduces environmental impact and lowers operational costs for residents.

Key Benefits of BASIX

Environmental: Helps reduce water and energy usage, contributing to a more sustainable environment.

Economic: Reduces utility bills for residents over time.

Regulatory: Ensures that developments meet mandatory sustainability requirements.

Administrative Efficiency: The self-assessment online tool minimizes compliance costs for the government and simplifies administration.



Water Quality Management of Lakes – Practical Examples of Successful Projects

—by Jens Meisel

General Manager of Water Hanover/Institute for Applied Freshwater Ecology Corp., Germany

Summary

The presentation describes lake water quality management, presenting practical examples and strategies primarily from German-based expertise, particularly the Institute for Applied Freshwater Ecology. Lakes play a crucial role in ecosystems and local economies, supporting recreation, water supply, and conservation. However, water quality has often degraded due to urbanization and agriculture, prompting a need for improved management. Successful water quality management hinges on understanding nutrient balances, specifically phosphorus and nitrogen, which drive lake ecosystem dynamics. To develop effective interventions, managers must assess nutrient sources, flows, and seasonal variations.

The presentation outlines essential steps in lake management, starting with investigation and data gathering. This includes creating nutrient and water balances by monitoring

factors like precipitation, inflows, and outflows, which are critical to designing informed interventions. Various techniques are used to reduce nutrient loads in lakes, including retention soil filters to treat stormwater and improve water quality. Additionally, enhancing the nutrient-binding capacity of lake sediments is vital. Techniques like nutrient precipitation, using compounds such as aluminum salts, are widely applied to limit phosphorus availability, which directly impacts algal growth and water clarity.

Case studies highlight these methods in action. For instance, Berlin successfully uses soil filters to manage stormwater nutrient loads, achieving significant reductions. Similarly, the Seddiner See lake restoration in Germany illustrates the application of nutrient precipitation, where aluminum chloride treatment decreased phosphorus concentrations, improving water quality and ecosystem health. This intervention led to a shift in the phytoplankton community from harmful blue-green algae to more desirable species and supported

the return of submerged plants, marking a substantial ecological improvement.

The presentation emphasizes the need for experienced professionals and institutions, adequate budgets, and continuous monitoring to ensure the long-term success of lake management projects. By applying scientific knowledge to real-world projects, these strategies offer valuable lessons for lake restoration, promoting sustainable water quality management through informed, data-driven approaches that protect aquatic ecosystems and enhance their resilience against environmental pressures.



ASEAN Cooperation on Water Resources Management

—by Vong Sok

Head of Environment Division of ASEAN Secretariat, Cambodia

Summary

The presentation highlights ASEAN's collaborative efforts and strategies for managing water resources, with a particular focus on urban water challenges, environmental sustainability, and climate resilience. It outlines the ASEAN Community Vision 2025, aiming for a united, sustainable, and inclusive socio-economic and political framework. Central to this vision is the conservation and sustainable management of natural resources, including water. The blueprint addresses various strategic priorities like biodiversity conservation, climate adaptation, and environmentally sustainable urban development.

ASEAN's water resource management strategies respond to pressing concerns such as rapid urbanization, climate change, and increasing water demand. Freshwater resources are essential, with ASEAN nations withdrawing substantial amounts primarily for agriculture, while countries like Singa-

pore and Malaysia prioritize domestic and industrial use. Water quality is deteriorating across ASEAN, with rising pollution levels impacting ecosystems, public health, and economic growth. Urban water management issues include limited access to safe drinking water, stormwater management, water scarcity, and pollution. The challenges extend to loss of urban biodiversity, ecological services, and aesthetic value in city planning, which reduce resilience and quality of life for urban residents.

The ASEAN Environmentally Sustainable Cities (ESC) Awards recognize cities that exemplify clean, green, and liveable urban planning, fostering a model for sustainable urban water management. ASEAN has also established various working groups, each focusing on specific environmental aspects, from climate change to biodiversity and water resources. These groups aim to improve cross-sectoral coordination, build local leadership, and drive urban planning that

prioritizes green public spaces and clean water access.

International cooperation forms a crucial part of ASEAN's strategy. Partnerships with the Mekong River Commission and China are highlighted, focusing on flood and drought management, climate adaptation, and resource management. Similarly, ASEAN collaborates with the EU on urban water management, technology exchange, and research, fostering shared learning and investment in innovative urban water solutions.

Finally, the presentation underscores ASEAN's emphasis on digital and green technologies, nature-based solutions, and a circular economy to address urban water challenges effectively. The regional cooperation initiatives reflect ASEAN's commitment to developing resilient and adaptive communities through strategic partnerships, shared resources, and sustainable policies.



Integrated Water and Environment Management: Example of the Rhône River (France)

—by Franck PRESSIAT

Head of the Environment Department of Engineering Department–Maintenance–Projects (DIMP) of National Rhone Company, France

Summary

The Rhône River has its source in the Furka glacier (Swiss Alps), feeds the Geneva Lake and joins the Mediterranean Sea through its delta in the Camargue after 812 km through Switzerland and France.

The Compagnie Nationale du Rhône – now better known as CNR, was founded by a French law in 1933 and entrusted with the concession of the Rhone River in 1934. CNR is in charge of the Rhône River concession until 2041.

CNR was born from a visionary idea: entrusting a single operator to perform three indissociable missions for the community in managing the river:

- producing electricity,
- developing river transport,
- providing irrigation for agriculture.

For the past 3 decades, environmental issues are also a major focus for CNR.

This model is unique in the world: Energy production finances the development of the river, the harmonization of uses and the preservation of ecosystems. Local authorities have a stake in the company's capital to its governance and value, and ensure that a significant share of energy and investments return to the territories along the river.

This industrial and redistributive model has given rise to a unique status in France: a public limited company of general interest.

CNR's model, which combines industry with the general interest, relies on its legitimacy as an actor in the world of energy, close ties with the territories and its capacity to redistribute the value generated. The concessionary of the River Rhone and the producer of 100% renewable electricity in France, from water, wind, and sun, CNR is positioned as a major actor in territorial development, adaptation to climate change and ecological transition.

Together with the other stakeholders along the river, including the Water Agency of the Rhône–Mediterranean–Corsica basin, CNR contributes to the integrated management of water resources and environment along the Rhône River.

The European Water Framework Directive (WFD) translated into French law by the Master Plans for Water Development and Management (SDAGE) at the scale of the major French river basins, constitute planning tools aimed at ensuring the balanced management of the water's resources, its uses, and the aquatic ecosystems.

In this context, reinforced by the effects of climate change, the erosion of biodiversity as well as the imperatives of reducing carbon energies and increasing the production of renewable energies, CNR must reconcile integrated management of water resources, energy transition

and ecological transition.

CNR holds an Engineering Department and an hydraulics and materials testing laboratory that have been working for more than 50 years for a wide variety of private and public clients, both in France and abroad. CNR Engineering conducts studies and projects for design, implementation and monitoring of river developments, hydroelectric developments, river navigation, ecological restoration, or management plans for hydraulic, sediments and biodiversity. CNR Engineering also brings its skills as an operator of river structures for Operation & Maintenance projects in hydroelectricity, dams, waterways and shiplocks.

The presentation highlights concrete actions implemented by CNR on the following themes:

- CNR's Roles in Governance and Management of the Rhône River,
- Centralized management of the Rhône River by CNR for flows forecasting, hydropower production and inland waterway,
- Sediment management, including sedimentary continuity between Switzerland and France,
- Reconciling the challenges of ecological and energy transitions with a great ecological management & restoration program,
- CNR's actions to climate change adaptation.



Quantitative Method System of Horizontal Water Ecological Compensation in Watershed and Its Application: A Case Study of Xiangjiang River Basin

— by MAO Dehua

Professor of the School of Geographical Sciences, Hunan Normal University, China

Summary

This presentation outlines a quantitative methodology for implementing horizontal water ecological compensation in river basins, specifically using the Xiangjiang River Basin as a case study. The research aims to address the externalities of water ecological services and promote harmonious interactions among humans, rivers, and the environment. To establish a compensation framework, the presentation identifies key issues, including inadequate compensation standards and limited operational feasibility.

A multi-faceted evaluation approach was developed, involving models that assess water quantity, quality, and the overall ecological status of the river basin. These models evaluate water needs, predict future water demand, and consider water quality by integrating multiple indicators like pollution ratios and ecological flow requirements. For instance, both water supply and pollution levels are analyzed across various

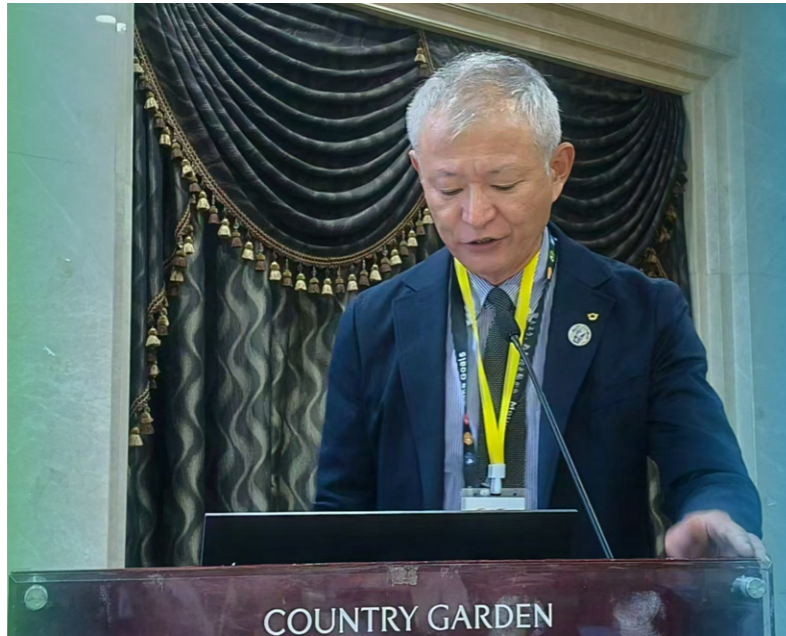
administrative regions, revealing areas that meet or fail to meet ecological standards.

The economic valuation of the river's ecological functions is performed using diverse models, such as market valuation, shadow pricing, and willingness-to-pay methods. This approach enables a comprehensive assessment of the ecological, social, and economic benefits provided by the river's ecosystem. Findings highlight the ecological value in terms of biodiversity conservation, climate regulation, and soil protection.

The presentation also explores compensation mechanisms based on ecological benefits and social investment. The upper and lower compensation limits are set at 179.75 and 68.06 billion yuan per year, respectively. Considering the varying economic capabilities and willingness to pay among downstream beneficiaries, the suggested compensation standard prioritizes maximizing ecological protection at

68.06 billion yuan per year.

Finally, the presentation establishes a cost-sharing model, suggesting that upper and lower basin regions share costs in a 3:7 ratio, with additional proportional investments from both government and water users. This framework offers a scalable approach for enhancing ecological sustainability in river basins. The study was supported by key scientific projects, including those from the Hunan Province Water Conservancy and the National Natural Science Foundation.



Our Comprehensive Conservation Initiatives for Lake Biwa —Lessons Learned from the Mother Lake in Japan

—by Nobuhiko Miwa

Director General of Shiga Prefecture, Japan

Summary

The presentation gives an in-depth look at conservation initiatives for Lake Biwa, Japan's largest freshwater lake, which has been an essential water source for millions and home to unique biodiversity for over 4 million years. Despite its historical significance and ecological value, Lake Biwa faced severe water pollution in the 1960s due to rapid industrialization, which led to a notorious red tide caused by phosphorus contamination. This ecological crisis catalyzed the "Soap Movement", a citizen-led campaign against synthetic detergents, resulting in the Lake Biwa Eutrophication Prevention Ordinance in 1979 and the establishment of wastewater treatment facilities. Conservation efforts have since expanded, with over 100,000 volunteers participating annually in cleanup activities, now commemorated as "World Lake Day" .

Shiga Prefecture's initiatives underscore the interconnectedness of human lifestyles and environmental health, em-

phasizing that lake conservation requires holistic lifestyle changes rather than isolated cleanups. This approach has evolved into a localized adaptation of the United Nations Sustainable Development Goals (SDGs), known as the Mother Lake Goals (MLGs). Developed in collaboration with over 2,000 citizens, the MLGs set 13 objectives to be achieved by 2030, focusing on water clarity, biodiversity, sustainable seafood resources, and climate resilience, among others. These goals integrate environmental preservation with social wellbeing, promoting local engagement and individual responsibility.

The MLGs also address climate change, aiming to reduce greenhouse gas emissions and build resilient communities. They stress the importance of the forest-lake-sea continuum, advocating for forest conservation as a means to protect water resources. Each goal is academically monitored for both current status and trend evaluation, fostering transparency and accountability in environmental stewardship. The

MLGs also serve as a bridge between local actions and the broader SDGs, embodying the principle of "think globally, act locally" .

The presentation highlights Lake Biwa as a microcosm of global environmental issues, suggesting that effective management of Lake Biwa could inform global water conservation efforts. In Shiga, conservation extends beyond policy, including educational programs and media outreach, such as a dedicated TV show to increase public awareness and participation. Ultimately, the Shiga Prefecture's approach to conserving Lake Biwa provides valuable insights into sustainable water management, community involvement, and the global relevance of local environmental actions.



Efficient Sewage Management in Urban Areas and its Commercialization by Developing Gyeongju City's Home-Grown Sewerage Technology

—by Lee Kwang Hee

Deputy Director of Gyeongju City Clean Water Office of Clean Water Management Division, Republic of Korea

Summary

The presentation details advancements in urban wastewater treatment in Gyeongju City, South Korea, focusing on innovative high-efficiency wastewater treatment technologies. Gyeongju's existing wastewater treatment infrastructure includes several large facilities, but the city has faced challenges from aging systems and increasing influent loads, which threaten to exceed legal discharge standards. In response, Gyeongju initiated research into advanced treatment methods, developing a proprietary system known as the GK-SBR (Sequencing Batch Reactor) technology. This technology aims to improve nitrogen and phosphorus removal, both crucial to meeting stricter environmental standards and enhancing water quality.

The GK-SBR system uses a single-tank process that allows for time and spatial partitioning, enabling distinct anaerobic and anoxic phases within the same reactor. This setup optimizes the environment for different microorganisms that

compete for substrates, increasing nutrient removal efficiency. By maintaining high removal rates for nitrogen and phosphorus—often over 90%—the GK-SBR system enhances treatment effectiveness, minimizes sludge production, and achieves compliance with discharge standards. Additionally, its modular design allows for retrofitting into existing facilities, providing a cost-effective solution for modernizing older plants without extensive reconstruction.

As Gyeongju seeks to commercialize GK-SBR technology, they have established collaborative research partnerships, including with private companies like Kumho Construction, and secured green technology certifications. The city has applied GK-SBR across several treatment facilities and exported the technology to international markets, such as Vietnam and Indonesia, showcasing its effectiveness and adaptability. Expansion plans include a mix of domestic and international projects, where Gyeongju aims to leverage its proprietary

technology as part of a broader effort to modernize wastewater treatment and align with global environmental goals.

Ultimately, the GK-SBR system highlights Gyeongju's commitment to sustainable urban wastewater management, prioritizing advanced treatment efficiency and reduced environmental impact. The city's efforts serve as a model for scalable wastewater solutions that meet the evolving demands of urban water management in South Korea and beyond.



“Blue Ribbon” Protecting Water Resources and River Basins in Khovd Province

—by **BATJARGAL DAVAASUREN**

Director of the Black Lake–Khovd River Basin Management Bureau of Khovd Province, Mongolia

Summary

The presentation addresses the efforts to protect and manage the water resources within the Khovd River Basin in Mongolia, emphasizing conservation amid environmental challenges. The Khovd River Basin, situated in Mongolia’s western region, includes diverse ecosystems such as glaciers, steppes, and deserts, as well as essential water bodies like lakes and rivers. This basin is home to a variety of ethnic groups who depend on its resources, yet it faces increasing threats from climate change, which has led to rising temperatures and reduced precipitation over recent decades. This warming trend has exacerbated the shrinkage of glaciers, a key source of freshwater, impacting the availability and quality of water in the region.

Human activities further strain the basin’s resources. Unsustainable agricultural practices, deforestation near river sources, and artisanal mining have altered river flows and

damaged water quality. Livestock grazing also degrades riverbanks, contributing to erosion and water pollution. In response, regional authorities have undertaken initiatives to safeguard the basin’s water resources. Nearly 60% of Khovd Province has been designated as a protected area to conserve natural and cultural heritage, while strict water usage regulations are being enforced. These measures aim to preserve the basin’s unique ecology and prevent overexploitation.

Among the conservation projects is the “One Sum–One Lake” initiative, which seeks to create artificial reservoirs in each district to improve water availability, support agriculture, mitigate flood risks, and counteract climate change impacts. This project involves collaboration between local authorities, private entities, and international donors. Additionally, there are efforts to restore springs and other water sources by fencing them off from livestock, allowing them to recover naturally. Authorities are also encouraging environ-

mentally responsible tourism and educating the community about sustainable water use to reduce human impact.

Through these strategies, the Khovd River Basin administration aims to protect water resources for future generations, mitigate the effects of climate change, and support the sustainable use of water in one of Mongolia’s most vulnerable yet culturally rich regions.



Multi-objective Optimization of Pumps and Gates at Coastal Cities

—by XU Min

General Manager of the Hunan Oriental Water Valley Environmental Science & Technology Co., Ltd, China

Summary

The presentation discusses multi-objective optimization in managing pumps and gates for urban water systems in coastal cities, focusing on flood control, energy efficiency, and adapting to climate challenges. Extreme weather events linked to climate change, such as typhoons and intense rainfall, increasingly affect coastal urban areas in China, causing frequent flooding. Traditional urban water management relies heavily on rule-based or experience-driven decisions, which often lack precision. Addressing these challenges, modern urban water management incorporates smart water systems integrating meteorological, hydrological, and control processes to enhance predictive accuracy and operational responsiveness.

Key components of smart water management include dynamic risk assessment, data assimilation, and control systems like Model Predictive Control (MPC). These systems use

real-time data from weather and hydrological forecasts, enabling precise flood predictions and responses tailored to individual city needs. For example, in Shajing and Pailao districts, the optimization of five gates and three pumps demonstrated effective flood control while minimizing energy consumption by only using pumps during high tides. By adjusting gate operations to low tides and releasing excess water strategically, the system maintained water levels within safe constraints, conserving energy and protecting infrastructure.

The smart management systems also prioritize energy conservation, aiming to reduce emissions by optimizing pump usage and avoiding unnecessary energy expenditure. Feedback and rule-based controls are also used, but MPC offers advanced functionality by forecasting and optimizing actions in real-time based on predictive models. This system allows coastal cities to conserve energy by operating pumps only

when needed, thereby supporting energy-efficient flood management. However, implementing such complex control systems requires expert knowledge and substantial data, as predictive accuracy depends on high-quality, real-time inputs.

Overall, the presentation highlights the importance of integrating technology and data in urban water systems to manage flood risks and conserve energy effectively. Advanced control models and data-driven operations are essential for cities to adapt to the increased climate risks posed by urban flooding, enabling sustainable and resilient water management in coastal urban areas.



SUMMARY

6th ASEM Seminar on Urban Water Management in Changsha, Hunan

On October 22, 6th ASEM Seminar on Urban Water Management (hereinafter referred to as “the Seminar”) was held in Changsha, Hunan. In conjunction with the Seminar, the 8th Meeting of the Chinese Coordinating and Guiding Committee of ASEMWater, the 7th Meeting of the ASEMWater Academic and Development Committee, and the NEAR “Innovation+ Water Resources” Seminar Parallel Session were convened.

The Seminar’ s opening ceremony featured speeches from CAO Zhiqiang, Vice Governor of People’ s Government of Hunan Province; Jiang Duan, ASEM Senior Official for China; Zhang Lei, Deputy Executive Director of the Asia-Europe Foundation; Lee Hee-sup, Secretary General of Trilateral Cooperation Secretariat; Mr. Jean-Yves ROUX, Consul-General of French Consulate General in Wuhan, France; Nobuhiko Miwa, Senior Advisor of Lake Biwa Policy and MLGs Promotion of Shiga Prefecture of Japan; and Károly Kovács, President of the Hungarian Water Partnership. ZHU Wan, Director General of Department of Science and Technology of Hunan Province, chaired the ceremony.

The Seminar is guided by the Ministry of Foreign Affairs of the PRC and the People’ s Government of Hunan Province, sponsored by the Department of Science and Technology of Hunan Province, Asia-Europe Foundation (ASEF), and the Foreign Affairs Office of People’ s Government of Hunan Province, and organized by ASEM Water Resources Research and Development Center (ASEMWater), the People’ s Government of Zhangjiajie Municipality, and Hungarian Water Partnership (HWP). With a theme of “Promoting Sustainable Development of Water Resources for Shared Prosperity,” the Seminar aimed to establish an influential international platform and network for Asia-Europe members to exchange solutions, share outcomes, and promote dialogue across governments, private sectors, academia, and civil society in integrated and sustainable water management.

The Seminar was attended by more than 100 government officials, experts, scholars, business representatives, diplomats from embassies in China, and representatives from international organizations from 22 ASEM members. Covering the themes of Integrated Governance of Urban Water, Ecological and Environmental Governance of Rivers and Lakes, and Case Sharing of Technology Innovation Practice, 19 experts from water-related agencies and international organizations from 17 countries delivered insightful academic reports, sharing successful practices in sustainable urban water management and exploring research trends, new technologies, and ideas.

During the Seminar, experts focused on key issues in water environment, water ecology, water-related disasters, and water management and proposed practical solutions. Looking ahead, ASEM members plan to prioritize regional issues, deepen cooperation, and put forth constructive solutions to realize the vision of “Innovation and Cooperation for a Sustainable Future for Water Resources,” advancing the global goal of building a community with a shared future for humankind.

CAO Zhiqiang emphasized in his address that Hunan would continue to strengthen exchanges and cooperation with Asia-Europe members to jointly address water resource and environmental challenges and promote sustainable development. He encouraged leveraging the Seminar as a platform to foster dialogue and collaboration, develop innovative partnerships, and deepen international scientific and technological cooperation to fuel new momentum in sustainable development. Hunan will intensify collaboration in key technologies, future advancements in sustainable water management, scientific innovation platforms, high-level talent development, and the application of scientific achievements, working toward a framework of shared growth and mutual benefit.

Jiang Duan underscored China’ s role as a consistent promoter of Asia-Europe practical cooperation and its commitment to building a community with a shared future. China is prepared to collaborate with the international community to enhance experience sharing and development outcomes, contributing Chinese insights and solutions for stronger, greener, and healthier global development. He expressed hope that the Seminar would serve as a platform for further exchanges in science, culture, education, and think tanks, establishing a multi-level, multi-channel cooperation framework that strengthens resilience across Asia and Europe, injecting stability and positive energy into global development.

ASEM Seminar on Urban Water Management, organized by the ASEM Water Resources Research and Development Center, is a key platform for fostering collaboration and dialogue on sustainable water resource management between Asia and Europe. Since its debut in Changsha in 2014, this biennial seminar has become a vital link, bringing the two regions together to advance integrated and sustainable water management, with five successful sessions held to date.

NEWS REPORT



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Asia-Europe Meeting



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6th ASEM Seminar on Urban Water Management

Promoting Sustainable Development of Water Resources for Shared Prosperity

Date: 22 October - 24 October 2024

Location: Changsa, China

Organiser: China

Event Type: ASEM Initiatives & Other Activities



6th ASEM Seminar on Urban Water Management – ASEM InfoBoard

https://aseminfoboard.org/asem_events/6th-asem-seminar-on-urban-water-management/

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6th ASEM Seminar on Urban Water Management Opens in Changsha

2024-10-24

The 6th ASEM (Asia-Europe Meeting) Seminar on Urban Water Management was held in Changsha on October 22. The attendees included more than 100 government officials, experts, scholars, enterprise representatives, foreign diplomats, and representatives of international organizations from 22 ASEM members.

enghunan.gov.cn
http://www.enghunan.gov.cn/hneng/News/Localnews/202410/t20241024_33483320.html

湖南省人民政府
The People's Government of Hunan Province

曹志强：促进创新合作 共创水资源可持续未来

湖南省人民政府门户网站 www.hunan.gov.cn 发布日期：2024-10-24 07:28 【字号：大 中 小】

曹志强在第六届亚欧城市水管理研讨会上指出
促进创新合作 共创水资源可持续未来

10月22日，第六届亚欧城市水管理研讨会在长沙举行，副省长曹志强出席开幕式并致辞。

曹志强指出，亚欧城市水管理研讨会是各方全方位深化交流与合作，为推动实现联合国2030年可持续发展目标作出了积极贡献。湖南将持续加强与各方交流合作，共同应对水资源和环境问题。高规格研讨会是契机，将进一步落实和深化各方合作对话平台作用，构建创新伙伴关系，深化国际科技交流合作，培育可持续发展新动能。在水资源可持续利用与智慧水务关键技术领域，将依托创新平台建设、高层次人才引进、科技成果转化等方面持续加强合作，努力整合各方创新资源，建立高效的内部协调机制，以高质量应对复杂多变的水安全挑战，构建共建共享共赢的新格局。

本次会议以“推动水资源可持续发展与智慧、共享”为主题，旨在打造亚欧城市水管理智慧管理新模式，多方参与、具有影响力的论坛和工作网络，为亚欧成员寻求解决方案、共享成果、交流经验提供平台。来自22个亚欧会议成员的100余名政府官员、专家学者、企业代表、驻华大使馆外交官、国际组织代表参会。

（文/王静波 全程铂）

hunan.gov.cn
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第六届亚欧城市水管理研讨会在湖南长沙举行

2024-10-22 19:00:57 来源：科技日报

科技日报记者 俞慧友 通讯员 全程铂

10月22日，第六届亚欧城市水管理研讨会在湖南长沙举行。来自22个亚欧会议成员的100余名政府官员、专家学者、企业代表、驻华大使馆外交官、国际组织代表参会。

Science and Technology Daily
https://www.stdaily.com/web/gdxw/2024-10/22/content_246618.html

中国新闻网
WWW.CHINANEWS.COM

第六届亚欧城市水管理研讨会在长沙举行

中国新闻网 2024-10-22 18:20:40 29万

中新网长沙10月22日电(向一鹏 全程铂)第六届亚欧城市水管理研讨会22日在长沙举行，来自22个亚欧会议成员的100余名政府官员、专家学者、企业代表、驻华大使馆外交官、国际组织代表参会。

Chinanews.com
https://m.chinanews.com/wap/detail/chs/zw/10305972.shtml

中国日报网 > 本网专稿 >

第六届亚欧城市水管理研讨会在湖南长沙举行

来源：中国日报网 2024-10-23 16:27

中国日报10月23日长沙讯 10月22日，第六届亚欧城市水管理研讨会在湖南长沙举行。亚欧水资源研究和利用中心中方协调指导委员会第八次会议、亚欧水资源研究和利用中心学术与发展委员会第七次会议、东北亚地区地方政府联合会（NEAR）“创新+水资源”研讨会同期召开。来自22个亚欧会议成员的100余名政府官员、专家学者、企业代表、驻华大使馆外交官、国际组织代表参会。

Chinadaily.com
https://cn.chinadaily.com.cn/a/202410/23/WS6718b357a310b59111d9f7c4.html

共创水资源可持续未来 第六届亚欧城市水管理研讨会在长沙举行

2024-10-22 21:55:33 红网时刻 浏览量: 26.5万



10月22日，第六届亚欧城市水管理研讨会在湖南长沙举行。

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<https://moment.rednet.cn/pc/nograb/646854/66/14383180.html>



第六届亞歐城市水管理研討會在湖南長沙舉行

來源：香港商報網
2024-10-22 20:58

10月22日，第六屆亞歐城市水管理研討會在湖南長沙舉行。亞歐水資源研究和利用中心中方協
議指導委員會第八次會議、亞歐水資源研究和利用中心學術與發展委員會第七次會議、東北亞地

hkcd.com.hk

https://www.hkcd.com.hk/content_app/2024-10/22/content_8663337.html

促进创新与合作，共创水资源可持续未来 第六届亚欧城市水管理研讨会在湖南长沙举行

科技湖南 2024年10月22日 19:27 湖南

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http://kjt.hunan.gov.cn/kjt/xxgk/gzdt/mtgz/202410/t20241023_33483553.html

曹志强：促进创新合作 共创水资源可持续未来

湖南日报 2024-10-23 21:29

湖南日报10月23日讯(全媒体记者 王铭俊 通讯员 全程铂)10月22日，第六届亚欧城市水管理研讨会在长沙举行。副省长曹志强出席开幕式并致辞。

曹志强指出，亚欧城市水管理研讨会有关各方全方位深化交流与合作，为推动实现联合国2030年可持续发展议程涉水目标作出了积极贡献。湖南将持续加强与各方交流合作，共同应对水资源和环境问题，共同应对可持续发展挑战。要以本次研讨会为契机，进一步发挥亚欧各方合作对话平台作用，构建创新伙伴关系；深化国际科技交流合作，培育可持续发展新动能，在水资源可持续利用与管理领域关键核心技术和未来技术攻关、科技创新平台建设、高端人才引进、科技成果转化等方面持续加强合作；努力整合各方创新资源，建立高效务实的内部协调机制，以共赢思维应对复杂多变的水安全挑战，构建共建共享共赢的新格局。

本次会议以“推动水资源可持续发展与创新，共享繁荣”为主题，旨在打造亚欧区域水资源

Hunan Daily

<https://baijiahao.baidu.com/s?id=1813711616497804850&wfr=spider&for=pc>

曹志强在第六届亚欧城市水管理研讨会上指出 促进创新合作 共创水资源可持续未来

华声在线 2024-10-24 07:02

华声在线10月23日讯(全媒体记者 王铭俊 通讯员 全程铂)10月22日,第六届亚欧城市水管理研讨会在长沙举行。副省长曹志强出席开幕式并致辞。

曹志强指出,亚欧城市水管理研讨会有关各方全方位深化交流与合作,为推动实现联合国2030年可持续发展议程涉水目标作出了积极贡献。湖南将持续加强与各方交流合作,共同应对水资源和环境问题,共同应对可持续发展挑战。要以本次研讨会为契机,进一步发挥亚欧各方合作对话平台作用,构建创新伙伴关系;深化国际科技交流合作,培育可持续发展新动能,在水资源可持续利用与管理领域关键核心技术和未来技术攻关、科技创新平台建设、高端人才引进、科技成果转化等方面持续加强合作,努力整合各方创新资源,建立高效务实的内部协调机制,以共赢思维应对复杂多变的水安全挑战,构建共建共享共赢的新格局。

本次会议以“推动水资源可持续发展与创新,共享繁荣”为主题,旨在打造亚欧区域水资源

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第六届亚欧城市水管理研讨会在长沙举行

来源:国际网 作者:编辑 人气:2186 发布时间:2024-10-22



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第六届亚欧城市水管理研讨会技术创新实践案例分...

zjmedia.zjrtv.com



10月23日下午,第六届亚欧城市水管理研讨会技术创新实践案例分享会议在张家界举行。来自亚欧多个国家的专家学者共同探讨城市水管理的科技创新与实践经验。

会议分享了多项城市水管理技术创新实践案例,展示多项具有前瞻性和实用性的水管理项目。湖南师范大学地理科学学院教授毛德华分享《流域横向水生态补偿定量方法体系及其应用:以湘江流域为例》;日本滋贺县理事长三和伸彦分享《琵琶湖综合保护倡议:来自日本母亲湖的经验与启示》;韩国庆州市清洁水事业本部生态-水中心水质研究组组长李光照分享《利用庆州市自主研发的污水处理技术来实现的城市污水有效管理事例以及商业化》;

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10月23日下午,第六届亚欧城市水管理研讨会技术创新实践案例分享会议在张家界举行。来自亚欧多个城市的专家学者共同探讨城市水管理的科技创新与实践经验。(记者 廖奕真/海报)

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共创水资源可持续未来 第六届亚欧城市水管理研讨会在长沙举行

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湖南学习平台

2024-10-23

作者: 曹志新 全程铂



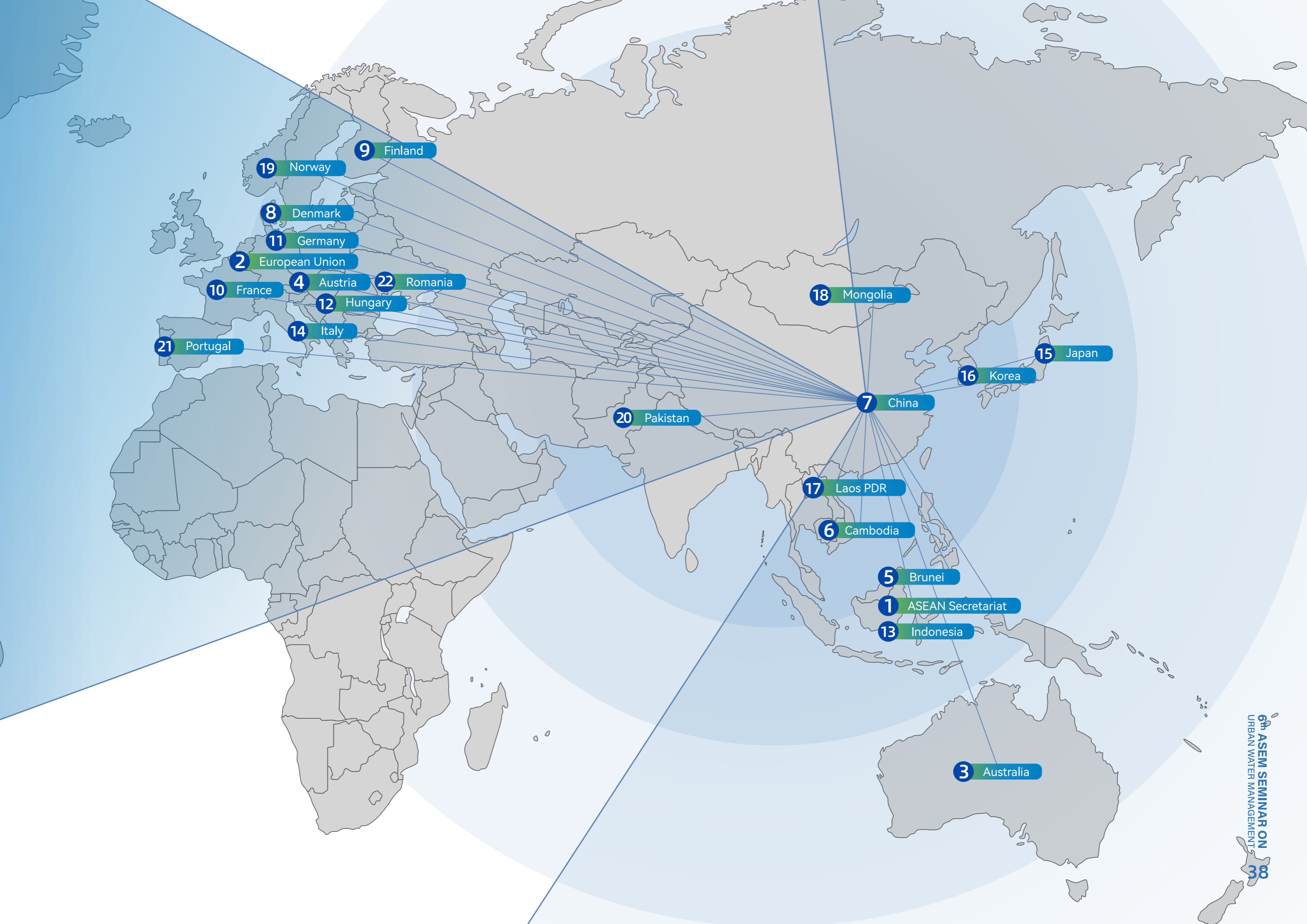
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- 3 Australia The University of Technology Sydney
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- 6 Cambodia Cambodian Water Supply Association
- 7 China The University of Hong Kong
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- 8 Denmark EU Partnership Water4All
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- 11 Germany Water Hanover / Institute for Applied Freshwater Ecology Corp.
- 12 Hungary Hungarian Consulate General in Chongqing
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- 13 Indonesia WaterSpeaks Working Group
- 14 Italy EU Partnership Water4All
- 15 Japan Shiga Prefecture
Shiga (Japan) Representative Office in Hunan
- 16 Korea Trilateral Cooperation Secretariat
Gyeongju City Clean Water Office of Clean Water Management Division

- 17 Laos PDR Natural Resources and Environment Research Institute
Black Lake-Khovd River Basin Management Bureau
- 18 Mongolia Khyargas Lake Zavkhan River Basin Administration
- 19 Norway European Water Association
- 20 Pakistan China-Pakistan Joint Research Center on Earth
- 21 Portugal Portuguese National Water Council/ National Civil Engineering Laboratory
- 22 Romania Eco-Innovation Cluster for Sustainable Environment
SC ICPE BISTRITA SA

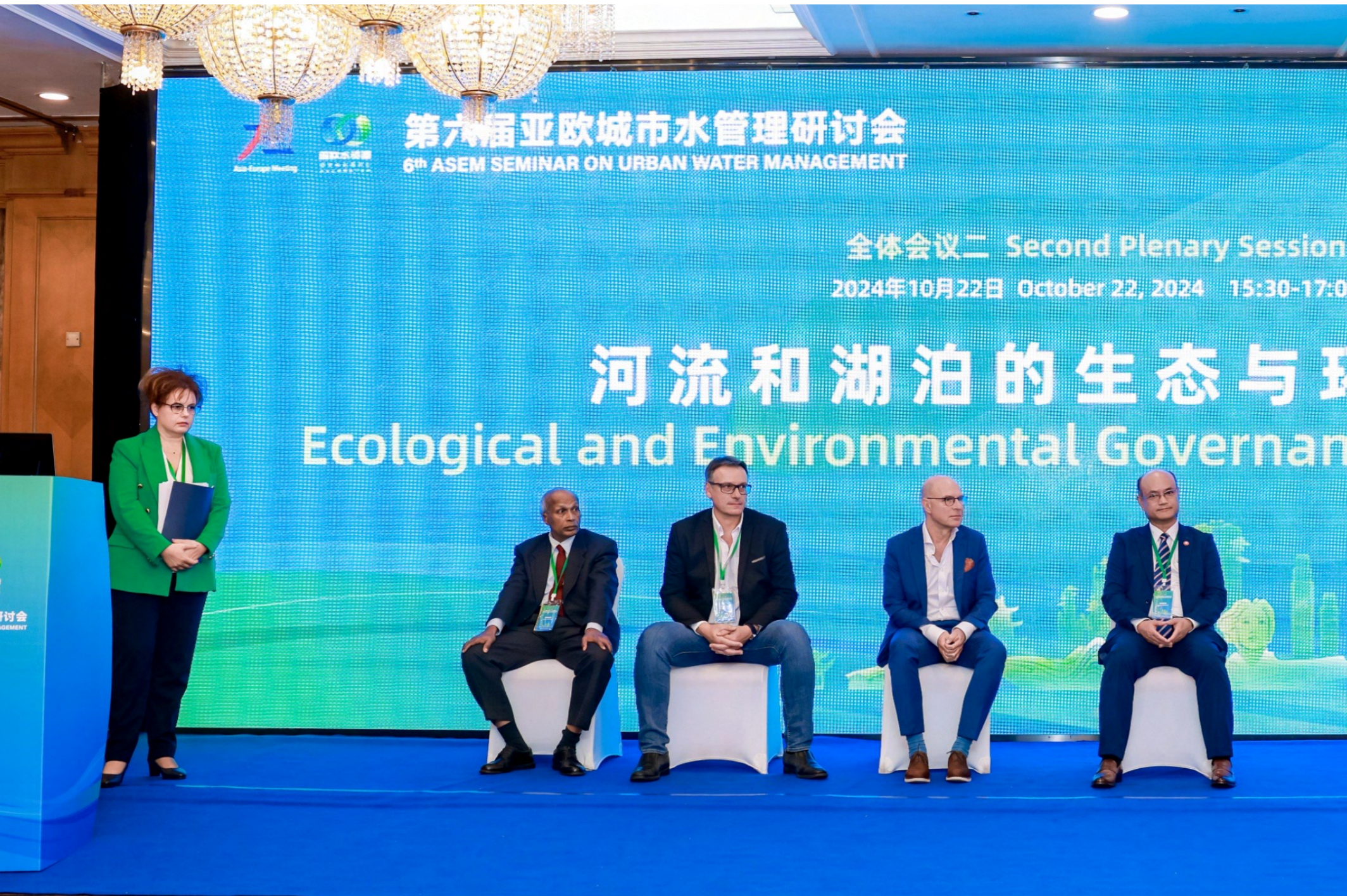
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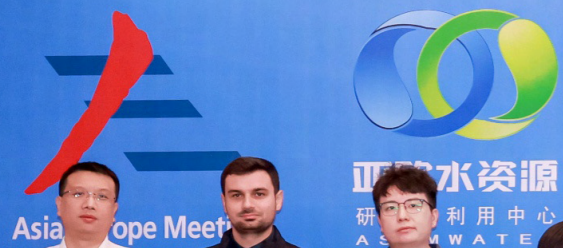
SIDELIGHTS











第六届亚欧城市水管理研讨会

6th ASEM SEMINAR ON URBAN WATER MANAGEMENT

2023年11月15-17日 北京/张江家·中国



INNOVATION AND COOPERATION FOR A SUSTAINABLE FUTURE OF WATER RESOURCES



ASEM Water Resources Research and Development Center

E-mail Address: asemwater@asemwater.org

Tel: +86-731-88988865