Messages from Japan at the 10th World Water Forum in Bali

Policy Brief by the Japan Water Forum

Key messages

To transform towards quality-oriented society:

1. Realizing "Water *Minfra* of all, by all and for all": Implement water infrastructure in an inclusive manner to maintain or recover a sound water cycle
2. Building resilience together: Create disaster resilient communities through sharing of responsibilities and resources among multiple stakeholders
3. Empowering innovation: Foster science and technology and youth-led initiatives to solve a wide range of water problems
4. Integrating culture in water management: Incorporate sociocultural aspects into water resources strategies to respond to socio-economic and climate challenges

Introduction

Participants from Japan to the 10th World Water Forum, which took place in Bali, Indonesia, from 18 to 25 May 2024 was large and diverse. The forum brought together multiple stakeholders under the unifying theme "Water for Shared Prosperity". Participants included the delegation led by Mr. Koyari, Parliamentary Vice-Minister of Ministry of Land, Infrastructure, Transport and Tourism (MLIT), government agencies, universities, research centers, local governments, including several governors and mayors, private companies and non-governmental organizations. The Keynote Lecture given by His Majesty the Emperor of Japan at the Bandung Spirit Water Summit was among the forum's most significant moments. The award ceremony of the Kyoto World Water Grand Prize was also a major highlight.

Common threads and key messages emerged from the Japanese interventions at the Forum. This policy brief aims at presenting key messages, future prospects, challenges, solutions, reflections on the overall conference and recommendations from Japan. The policy messages are introduced with a focus on Japan's viewpoints and contributions from Japanese activities. Japan has been active on the international water agenda for several decades. The hosting of the 3rd World Water

Forum in Kyoto, Shiga and Osaka and of two Asia-Pacific Water Summits in Beppu and Kumamoto, which brought together the leaders of the region to discuss water, are significant milestones[1].

1. Overall concept: water *minfra*

"Water *minfra* of all, by all, and for all" serves as the backbone of society. Water-related infrastructure or "water *minfra*" includes not only conventional centralized systems, but also green infrastructure (GI), as well as small, decentralized infrastructure, tailored for local communities, such as wells and rainwater-harvesting facilities. "By all" emphasizes the importance of co-designing water infrastructure with all its beneficiaries and other stakeholders. "For all" means that no one must be left behind, while conceiving water services.

First developed in Japan, the application of the concept of "water *minfra*" has the potential to improve the way water-related systems are designed, built, and operated in Asia and the Pacific, as well as in the rest of the world. Water *minfra* fosters water resources while respecting the natural water cycle. Too often, conventional approaches disrupt the water cycle. The concept of water *minfra* emerges as a solution to make water-related systems more sustainable. For example, many developed and developing countries face difficulties because of aging and malfunctioning water systems. To achieve sustainability, it is required to invest in proper pricing and full cost recovery, diversify through rainwater and recycled water, and develop capacity. The future of water *minfra* hinges on a collective effort to forge an integrated, long-term vision, balancing centralized and decentralized approaches to maintain or recover a sound water cycle.

Source : www.tkfd.or.jp/research/detail.php?id=4388

[1] This policy brief was prepared by the Japan Water Forum (JWF), a non-governmental organization bringing together Japanese stakeholders on water. At the international level, JWF plays a key role in supporting Japanese participants in the World Water Forum and in the organization of the Asia-Pacific Water Summit. JWF is also an elected governor of the World Water Council.

2. Japanese approach to addressing climate and socioeconomic challenges

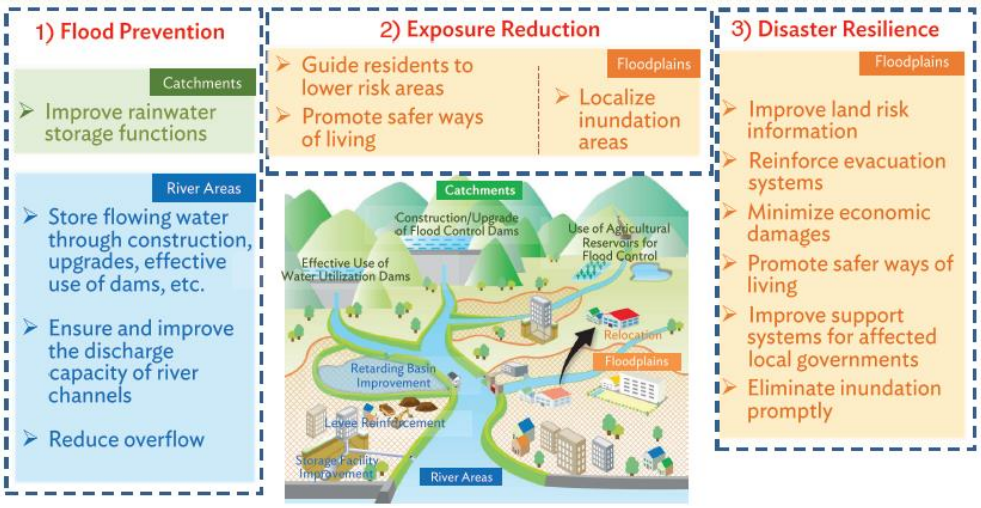
Japan is striving to build a resilient society to water-related crises through formulating new policies and plans and combining grey and green infrastructure. The new policy "River Basin Disaster Resilience and Sustainability by All" provides overall guidance for climate change adaptation (CCA) and is a concrete example of water *minfra*. Water resources management plans are shifting from water resources development to crisis management. GI is increasingly employed alongside grey one to leverage the power of nature.

River Basin Disaster Resilience and Sustainability by All

In the face of climate change, a comprehensive, multi-layered strategy for disaster risk reduction (DRR) is imperative. Business as usual is simply not possible in our rapidly changing world. Conventional structural measures alone cannot respond to increasing risks under a changing climate. The frequency and intensity of extreme events is increasing, weather patterns and climatic conditions are being modified, but also social and economic conditions are changing. The implementation of the new "River Basin Disaster Resilience and Sustainability by All" policy is a step towards the goal of a comprehensive, multi-layered strategy for water-related DRR. This policy has been guiding the latest water-related DRR efforts in Japan. It is the most advanced approach to water-related disasters Japan can offer.

This new policy revitalizes traditional river engineering methods for flood protection, which had been widely used in Japan before the introduction of Western technology. They include the strategic use of farmland and paddy fields as temporary flood reservoirs, through taking into consideration local specificities. The approach of preserving storage functions in specific areas is inspired by the traditional open levee method, the so-called "*Kasumi Tei*", which further reinforces the resilience of river basins. This holistic strategy not only adapts to the changing climate but also preserves the ecological balance and cultural heritage associated with traditional agricultural practices.

A wide range of countermeasures, when combined with state-of-the-art technology, create a robust defense against water-related disasters. Targeted flood volumes are estimated by climate and hydrological models. Also, projects like the revitalization of the Shin-Katsura and Shin-Maruyama Dams using existing structures and advanced technology have been introduced. To combat the reduced water storage due to sedimentation, initiatives at Sakuma, Changankou, and Saigo Dams are underway. Additionally, countermeasures against sediment-related disasters, such as the Sabo dam and sediment management, have proven to be effective in mitigating disaster damage.



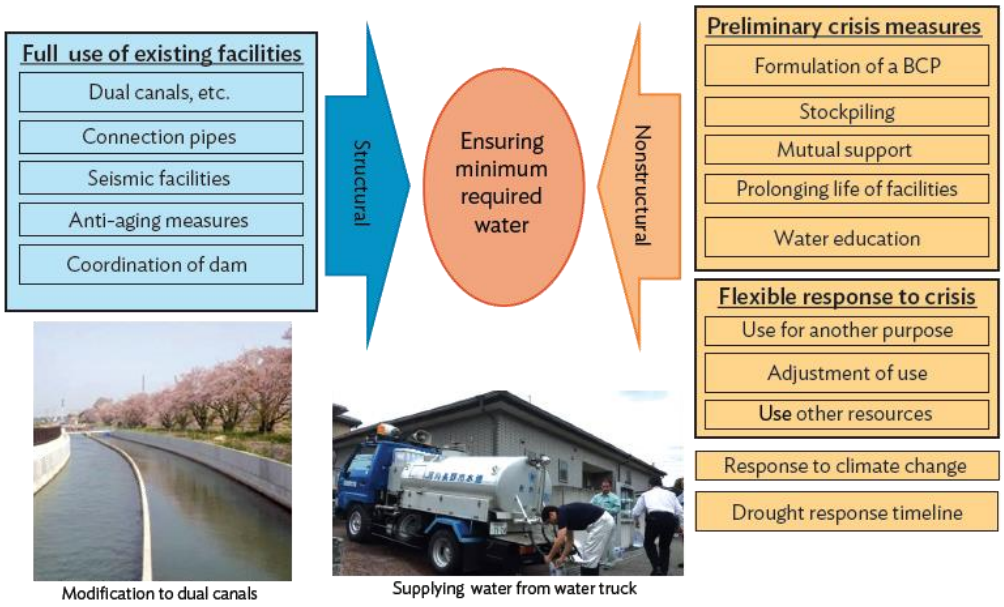
River Basin Disaster Resilience and Sustainability by All

Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Water resources management plans for crisis management

Japan's water resources planning is evolving from a focus on development to crisis management. While past infrastructure projects successfully met growing demand during periods of high economic growth, the current emphasis is on managing uncertainties. Modern water resources management plans must be based on thorough assessments of supply and demand under changing climate conditions. They should strategically utilize existing infrastructure while incorporating diverse non-structural measures involving public, private, and community stakeholders. These plans need to be founded on diligent preparation to effectively address potential uncertainties.

When a crisis does occur, organizations concerned must respond with composure and impartiality, guided by the established plan to ensure a balanced and effective solutions. Organizations concerned should diligently implement contingency plans, which are designed to reduce damage for the greater good of society, the economy, and the environment. Also, flexible response is crucial in managing unforeseen crisis. This approach underscores the importance of foresight and structured planning in managing water resources amidst unpredictable societal and environmental changes.



Source: Water Resources Development Committee, National Land Council. Edited

Green infrastructure

GI, which leverages for water *minfra*, is increasingly employed for river restoration. Its economic cost and impact on the environment are typically lower than conventional infrastructure. For example, ecological flood protection can be achieved through interventions such as wetland restoration and greenery sloping, including improvement projects at the Kamisaigo River. These actions also produce important co-benefits for climate change mitigation and adaptation, as well as biodiversity conservation. Landscaping plays a significant role, engaging local communities and providing the places of environment education for children. Intergenerational learning is essential to raise awareness about the importance of GI.

Kamisaigo River

Source: Fukutsu City

GI usually offers multiple benefits and often help simultaneously address water quantity, water quality and water-related risks. The combination of green and grey Infrastructure, such as dams and canals, is necessary to supply ecosystem services. Paddy fields produce rice, a staple food in many countries, and provide multiple benefits as GI. These benefits include groundwater recharge, flood protection and water purification. Little or no maintenance costs are required for the delivery of the related ecosystem services. Lake Biwa, the largest lake in Japan, had suffered from deteriorating water quality and ecosystem due to pollution and eutrophication. However, local government, citizens, and other stakeholders in Shiga Prefecture have been working to improve it.

The city of Shizuoka successfully reduced the risk of flood through a combination of green and grey infrastructure. After being devastated by massive floods in 1974, the city's river necessitated decisive action to mitigate flood damage. Initial efforts included the construction of a diversion channel as basic structure for flood protection. The subsequent step was to build retention basins in flood plains. A comprehensive catchment-wide flood risk management approach involving public-private partnerships was then adopted, utilizing 70% of the land from schools, parks, and the private sector for water retention. Additionally, households were equipped with tanks for temporary water storage and rainwater harvesting, supported by city subsidies. These collective measures bore fruit when, in 2022, Shizuoka withstood heavier rainfall than in 1974, without catastrophic outcomes. Cooperation between the public and private sectors is essential to install temporary storage everywhere possible. This is achieved through empathy and social co-creation.

3. Policy recommendations

Five recommendations for policymakers emerged from the interventions of Japanese participants in the Forum. The Asia-Pacific region faces mounting challenges related to climate change and maintaining or recovering a sound water cycle. The recommendations can strengthen the development of "water *minfra"* and to resolve issues in the region. First of all, the Kumamoto Declaration was identified as a key document whose guidance to follow. Second, finance for resilience and recovery must be enhanced. Third, it is important to leverage science and technology. Fourthly, innovation and youth must be fostered, as many solutions remain to be found. Finally sociocultural aspects need to be incorporated in management.

3.1 Follow the guidance of the Kumamoto Declaration

The Kumamoto Declaration guides the Asia and Pacific region to transform toward a quality-oriented society and achieve the SDGs. The declaration was adopted by the Heads of State and Government at the 4th Asia-Pacific Water Summit, held in Kumamoto, Japan, in April 2022. Asia and the Pacific suffer from chronic underinvestment in water. The Kumamoto Declaration set the goal of doubling investment to address water-related disasters. In the aftermath, several countries and partners have increased their investment. However, most countries have not yet been able to meet the goal set by the region's leaders. It is important to reflect on how to mobilize funding sources. Multistakeholder efforts to invest in DRR and CCA are promising and may produce good results. The level of effort must be kept up and even increased to meet the ambitious goal of doubling investment.

The concept of Kumamoto Declaration

The Kumamoto Initiative for Water announced by the Japanese Prime Minister at the Summit is providing financial assistance worth about 500 billion yen over five years. This funding is specifically dedicated to the development of "Quality Infrastructure", capitalizing on Japan's advanced technologies and based on a "A New Form of Capitalism". These could promote public-private partnership and foster digitalization and innovation as a growth engine for sustainable development and the formation of a resilient society and economy. Poor quality infrastructure and planning is in fact often behind failures that can turn even relatively minor events into major disasters. The Kumamoto Initiative for Water is meant as a contribution to the implementation of the Kumamoto Declaration. This underscores Japan's commitment for contributing the solution of water-related social issues faced by the Asia-Pacific region.

3.2 Enhance financing for resilience

Water *minfra* requires innovative funding. This needs to address uncertainties and evaluate multifaceted benefits, including for poverty alleviation and ecosystem restoration. In Asian developing countries, the current level of investment in flood protection is estimated at USD 33.6 billion per year, which is projected to increase to USD 94.5 billion per year before 2030. This reaches USD 98.4 billion per year when adaptation to climate change is included. Investment in resilience is not only business of the national government, but local governments, communities, and the private sector should share costs based on their common responsibilities. Private enterprises play an increasingly important role in water disaster countermeasures. The financial market and society are requesting private companies to disclose the sustainability of their business in a context of climate change, contribute to SDGs and enhance their corporate social responsibility.

Contribution to quality-oriented growth, including addressing poverty and inequality, should be valued and understood. Research institutes need to develop new approaches to evaluate the multiple benefits of reducing the risk of water-related disasters and create a reliable method for cost-benefit analysis. These benefits include poverty alleviation and ecosystem restoration. DRR should help protect the most vulnerable from disproportionate impacts. To make robust financing under deep uncertainties, it is important to establish scientific understanding, scenario-based economic analysis and a decision support framework.

3.3 Leverage science and technology

Effective decision-making requires more accurate climate change predictions, which involve global modeling and subsequent downscaling. These data are then integrated into hydrological models to estimate potential change. The goal is to conduct a holistic impact assessment that identifies adaptation options, such as early warning systems, technological innovations, land use change, and contingency planning. It is crucial to quantify uncertainties to assess risks. When managed effectively, this approach allows for increased post-flood water utilization for hydropower generation. In Japan, observation data and climate change predictions are driving the development of new river improvement plans, leading to a transformation in river basin management. The disconnection between climate and water sectors often leads to compartmentalized responses. By integrating strategies across various sectors and disciplines, we can create a more resilient and sustainable water management framework. Also, targeted early warning is crucial to bridge the gap between information dissemination, people and action that saves lives and property.

Cutting-edge technologies are used for water resources management, DRR and CCA with the support of facilitators. In Japan, three-dimensional modeling is essential for understanding floodplains, which constitute only 10% of the land where densely populated and heavily developed infrastructure. This and other innovative technologies are revolutionizing river restoration: Airborne Laser Bathymetry enables detailed river basin modeling; game engines offer powerful visualization tools; also, Environmental DNA, set to be adopted after 2026, will serve as a useful indicator of

freshwater biodiversity. These approaches represent the forefront of ecological innovation. To implement technologies on the ground, facilitators should be trained to connect science, society, and local needs. Regarding applications, the city of Kumamoto collects data from 33 observation wells across 20 locations. These data are crucial in understanding groundwater movement and identifying optimal sites for projects like infiltration forests for groundwater recharge. As a result, the city provides such good water to its users that it can be considered as mineral water directly from the tap.

Smart water technology can create circular economy in urban areas. It showcases integrated flood protection through sewerage, blending hardware with software and inter-departmental collaboration, including storm storage and pump systems, rainwater information systems, and flood hazard maps. Key technologies from Japan include sewerage pipe-jacking methods and pump gate equipment. The circular economy of wastewater management is also important. Sewage water and sludge should be regarded as resources in urban areas. In Saga City, the sludge generated from wastewater treatment plants is used as fertilizer to grow vegetables; recycling treated wastewater is also used for households, supported by artificial intelligence for operation guidance and energy-efficient wastewater monitoring.

3.4 Foster innovation and youth

Youth engagement leads to a societal transformation from hierarchical structures to a more inclusive approach. Acknowledging our awareness of both the problems and solutions, it is time to take decisive action. For instance, the award of the Kyoto World Water Grand Prize to the Youth Sanitation Concern of Indonesia reflects its efforts, which include the construction of public toilets and a public awareness campaign to instill hygiene habits among residents. After the project's completion, facilities are managed with community members. This was done during the challenging times of the COVID-19 pandemic, showing how youth can turn difficulties into innovation.

Youth engagement is increasingly crucial to resolve water issues in the dynamic landscape of water management. There are several cases where youth participate actively in research and development activities to better manage water and biodiversity. Japan promotes intergenerational initiatives to achieve a sound water cycle. For instance, there is an initiative by the Japan International Cooperation Agency that champions youth-led initiatives and promotes intergenerational collaboration, providing innovative solutions for a sustainable water cycle. The program has garnered significant interest from participants who are eager to contribute more actively to the water sector, primarily through volunteering opportunities. This engagement reflects a collective desire to address water-related challenges and ensure clean water access for all.

Automated charge collection system with mobile mony for handpump
Source: Sunda Technogy Global

3.5 Incorporate sociocultural aspects in water resources management

Flood risk management systems must be developed in collaboration with local communities, considering the historical context that shaped society over time. The insights gained from such evaluations can be used to build consensus in the community. The quest for human prosperity and

happiness has also been pursued through developing *minfra* by the construction of water facilities, the formation of water cultures, and the conservation of the water environment and natural ecosystems. The case of traditional Anpachi levees constructed in the early modern period in current Gifu Prefecture, Japan, serves as a compelling example. With their distinctive circular design, these levees demonstrated superior protection for communities during the devastating floods of 1976. The effectiveness of these traditional structures highlights the importance of considering local knowledge and practices in the development of flood defenses. Moreover, the integration of modern engineering with time-tested techniques can lead to the creation of innovative solutions that are both effective and culturally sensitive.

A cooperative and adaptive approach that integrates sociocultural aspects is essential for effective governance under socioeconomic transformation and climate change, this approach involves incorporating local knowledge, traditions, and customs into decision-making processes, ensuring that traditional wisdom is not only preserved but also utilized to inform adaptive responses. Community participation is crucial, as it facilitates the transfer of this valuable traditional knowledge to the next generation. Moreover, the synergy between traditional knowledge and state-of-the-art technology can lead to more resilient and culturally informed climate change strategies. To further enhance this integration, research to understand how cultural values can be incorporated into governance structures should be encouraged.

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