Navigating the dual challenges of flooding and water scarcity in the climate change era

In Asia's diverse landscapes, water's abundance and scarcity have shaped centuries of progress, tradition, and innovation. Today, as the world grapples with climate change, urbanisation, and population booms, Asia faces a critical juncture in water management.

In South East Asia, the disparity is stark. Nations like Singapore, with its advanced water reclamation systems, stand in contrast to the water-insecure villages of Indonesia or the drought-stricken fields of Thailand. Here, water scarcity bites hard, not because of its absence but due to its mismanagement and the challenges of ensuring clean, accessible water for all.

The irony is sharpened by the prevalence of floods. Cities like Jakarta and Kuala Lumpur — despite their burgeoning economies — are annually besieged by floods that displace thousands and erode urban life. In these regions, floods are not just an inconvenience; they are a chronic affliction that hampers development, destroys infrastructure, and saps economic vitality.

Historical data shows that sea levels have reached higher marks in the past, yet it is the unprecedented rate of rise in the last 30 years that sets this era apart. Should carbon emissions continue unabated, the swift rise in sea levels may surpass our abilities for



effective adaptation and mitigation. By the turn of the century, the financial ramifications of sea-level related flooding are projected to soar, potentially costing the global economy up to US\$27tn each year. For Singapore, the anticipated loss in land value due to such flooding could total around \$2bn by 2100.

The equatorial Pacific region, home to over 20 nations — more than half of which have lower middle-income economies and collectively house 700 million people — finds itself vulnerable to the detrimental impacts of rising sea levels. In response to these challenges, the global market and policy landscape are increasingly centring on climate change countermeasures. By 2030, urban resilience-building initiatives present an economic opportunity estimated between \$90bn and \$155bn annually.

JAPAN: A SUDDEN SHIFT IN THE LANDSCAPE

The recent 7.5 Richter scale earthquake in Japan reminds how natural disasters can instantaneously alter the landscape and exacerbate existing water management challenges. Japan's sophisticated earthquake preparedness systems - lauded globally - were put to the test as the quake disrupted supply lines, including those for water. The tremors underscore the need for robust, adaptable systems capable of withstanding such sudden shifts - a call to action for innovations that ensure not just the presence but the resilience of essential resources.

IN PURSUIT OF BETTER DATA FOR FLOOD MANAGEMENT

In the quest for improved flood management, smarter data through technological innovation is crucial.

- Areas affected by flooding
 Sensor networks
- 2 Sensor networks in action within urban drainage systems



Tack's EVO series introduces the Floodfinder, a flood monitoring system equipped with artificial intelligence (AI)-powered smart data analytics in water crisis management. Equipped with AI-powered analytics, the Floodfinder provides city planners — in densely populated regions like Singapore — with data to develop and improve flood mitigation strategies. In Indonesia's topography, this technology becomes more critical, potentially transforming response and recovery actions in the wake of disasters. For city planners, Floodfinder offers a level of insight that informs resilient infrastructure development and efficient emergency response planning.

For countries like Japan — already well-versed in disaster response the integration of Tack's technology could enhance earthquake recovery efforts by facilitating the rapid restoration of water management systems. The Floodfinder could serve as a tool for earthquake-prone regions, where the balance between water surplus and shortage can be disrupted in moments, ensuring that when the earth shakes, the flow of water continues unabated.

For architects and developers, Tack's Floodfinder system lays the groundwork for smart building planning. By harnessing accurate elevation and hydrological data, structures can be designed with water disaster resilience in mind, ensuring safety and sustainability in construction practices.

METEOROLOGICAL SERVICES

At a national scale, meteorological services benefit from the granularity of data provided by Tack's Floodfinder. With AI at the helm, forecasting becomes more precise, enabling countries to pre-emptively strategise against the adverse effects of flooding, safeguarding communities and bolstering disaster readiness.

THE LANDSCAPE OF WATER INNOVATION IN ASIA

Asia's water technology sector reflects the continent's complexities. From the rice paddies of Indonesia, Vietnam to the bustling metropolises like Tokyo, solutions must be as dynamic as the environments they serve. Startups across Asia are rising to the challenge, blending wisdom with technology. Innovations like Al-driven water quality monitoring systems, Internet of Things (IoT)-enabled irrigation, and wastewater treatment processes are the beginning. These solutions not only target efficiency and conservation but also empower communities, ensuring equitable access to this precious resource.

The future of water technology in Asia is not a linear path but a burgeoning ecosystem of solutions, each tailored to meet the region's



myriad needs. As organisations improve their operations, we will see a ripple effect of sustainability and resilience. The integration of green infrastructure, smart cities, and community engagement will transform water management into a proactive - rather than reactive - endeavour. Local startups are driving progress with each sensor deployed, each byte of data analysed, and each community engaged. In the face of our water world's challenges, these next generation of pioneers in new technology is a testament to the power of human ingenuity in harmony with nature.

Images: Tack One