



ASEAN  
AUSTRALIA  
SMART CITIES  
TRUST FUND  
Asian Development Bank



Australian Government  
Department of Foreign Affairs and Trade



DIGITAL SOLUTIONS:

# IOT FOR REAL-TIME FLOOD EARLY WARNING SYSTEMS

MITIGATING FLOOD IMPACT WITH IOT EARLY WARNING  
TECHNOLOGIES

## OPPORTUNITY

With climate change, flood-related disasters are likely to increase in frequency and have the potential for large-scale impacts. Flood early warning systems (FEWS) are key to strengthen community resilience and reduce the risk of adverse human and economic effects of flooding.

Recent advances in hydrodynamic modeling, smart data-collection technologies, remote sensing and artificial intelligence combined with crowd-sourced information from social media, are leading to significant changes in the mechanisms of FEWS. Linked with real-time flood alerts through websites, SMS, and mobile apps, FEWS can help cities warn citizens of an imminent flooding event and facilitate a swift and efficient emergency management response.

## BENEFITS

- Enhance disaster management with an effective and rapid response
- Improve community disaster preparedness
- Inform long-term mitigation measures on responses to disasters
- Support the development of holistic adaptation solutions

## PRECONDITIONS

- Local authorities must be able to disseminate warnings to all citizens, in particular vulnerable communities, in the event of a disaster
- An integrated operation platform must be set up to process data (e.g. forecasted meteorological phenomena), undertake risk assessments (e.g. estimated areas at high risk), visualize results to ease a faster response, and communicate warnings and guidelines to the responsible agencies and emergency teams on the ground



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## KEY TAKEAWAYS ON IOT EARLY WARNING SYSTEMS

*From the ASEAN Australia Smart Cities  
Webinar Series Part 2: Mitigating Flood  
Impact with IoT Early Warning Technologies*

- Digital technologies can support cities in evaluating effects of current and planned flood adaptation measures. Combining data from IoT sensors, satellites and online platforms gives more reliable information for planning and early warning systems.
- Crowdsourced reports from social media are important data sources to validate EWS modelling, and at the same time encouraging active community engagement. Reports can easily be georeferenced to provide a accurate location of reported incidents,
- There is a specific need to empower vulnerable communities and marginalized groups in all elements of EWS to ensure that no one is left behind in disaster events.

SCAN  
CODE FOR  
DIGITAL  
VERSION



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## USE CASES



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### Flood early warning systems around catchment basins

AUSTRALIA



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### Real-time, crowd-sourced flood information using social media

INDONESIA

#### AGENCIES INVOLVED

- [Bureau of Meteorology \(BOM\)](#)
- [South East Queensland Water Corporation \(SEQWater\)](#)
- [Brisbane City Council \(BCC\)](#)
- [Ipswich City Council \(ICC\)](#)

The flood warning system for the Brisbane River basin comprises manual rainfall, river height observers, and automated telemetry equipment installed around the Brisbane Valley and Brisbane and Ipswich metropolitan areas. Field stations use very high frequency (VHF) radio to report back to base stations, sending an alert for every 1 millimeter of rainfall and every 30-millimeter change in river height. Data collected from field stations are converted into a more visual and tabular format, as well as fed into hydrologic models used to issue river height predictions, bulletins, and flood warnings that are disseminated online and sent to broadcast stations, city councils, emergency services, and local response organizations.

#### AGENCIES INVOLVED

- [Badan Nasional Penanggulangan Bencana \(BNPB\)](#)
- [Urban Risk Lab, Massachusetts Institute of Technology \(MIT\)](#)

A free, web-based open-source platform is providing several cities in Indonesia with visual and real-time flood information which helps with time-critical decisions concerning flood warning and response. The platform collects reports provided by citizens from instant messaging apps and social media platforms such as Twitter, YouTube, and Facebook, which are then verified before being integrated into an open-source map. Verified data from government agencies are also integrated into the map to support a more holistic view of the flood situation. The platform has since been adopted by first responders and the national emergency management agency and is being further developed to cover additional cities and hazard types.

#### ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital solutions and systems. Digital solutions address vital cross-cutting themes such as social inclusiveness, gender equity & women's empowerment, climate change & environmental sustainability, and public-private partnerships. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best practices to be replicated across cities in Asia and the Pacific.



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