



# Community flood depth monitoring and forecasting in Cần Thơ City, Vietnam

## Overview

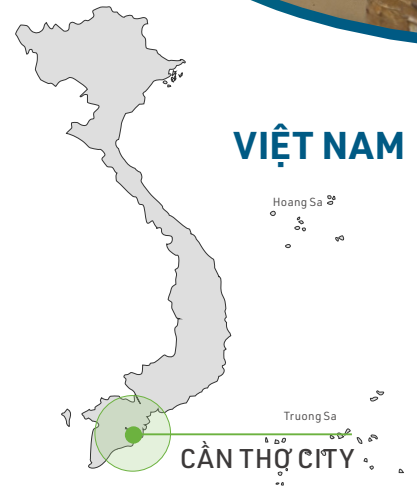
In collaboration with the Cần Thơ Department of Agriculture and Environment (DAE) and Cần Thơ University (CTU), ISET-International (ISET) supported the installation of flood depth markers along key roads and alleys in flood-prone communities to help residents and responders quickly assess flood severity and navigate tidal floods safely. Building on these markers, ISET also piloted a camera-based flood observation system that links real-time local flood depths with hydrological data to anticipate impacts, enhancing the timeliness and relevance of early warning messages and adding a new layer of responsiveness to community flood management.

## Our approach

Applying the Climate Resilience Measurement for Communities (CMRC) tool, ISET identified key strengths, weaknesses, and challenges faced by climate-vulnerable communities in Cần Thơ City. Consultations with residents, DAE, and CTU revealed that the lack of timely, localized flood warnings has caused significant disruptions to urban life and livelihoods, particularly among low-income groups in low-lying, unprotected areas. These findings inspired the development and testing of straightforward, practical measures that provide communities with both real-time and advance flood information.

## The gap

In Cần Thơ, the largest city in the Mekong delta, tidal flooding occurs almost daily during high-tide periods (early mornings and late evenings for several days



## Facts and figures



Cost of painted marker: US\$8

Cost of a smart camera (incl. installation): US \$350

Cost of data and data analysis per month: US\$400



Annual update/maintenance costs (including internet subscription for real-time data transmission): US\$300



Time to set up: 1 month



Easy to replicate?

Yes, these are straightforward measures and available technology.

around the beginning and middle of the 9<sup>th</sup> to 11<sup>th</sup> lunar months), regularly disrupting urban life and mobility, particularly in areas outside the city’s core and beyond the new flood protection infrastructure<sup>1</sup>. For residents in neighborhoods such as in Bình Thủy ward, including informal workers who rely on motorbikes for commuting and daily activities, frequent inundation makes it difficult to judge safe travel routes, increasing the risks of accidents, vehicle and property damage, and livelihood disruptions.

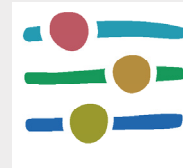
With climate change and rapid urban development, flooding is becoming more unpredictable. New construction has altered drainage patterns, changing which areas are inundated and how deep; while broader hydrological shifts have affected the timing of flood events. In the first quarter of 2025, tidal flooding occurred unexpectedly and repeatedly. Many communities rely solely on past experience with flooding to prepare; the unexpected flooding in early 2025 left them unprepared and exposed to losses.

Although city-level hydro-meteorological forecasts exist, they are often too generalized – providing only river-level and warning-stage information rather than expected flood depths in specific neighborhoods – and are frequently delayed, offering little practical guidance for community-level preparedness.

## Our solution

ISET worked with CTU to support the installation of flood depth markers along key roads and alleys in some of the most flooded neighborhoods in urban Cần Thơ. Made with durable, water-resistant paint on existing structures such as electricity poles or walls, the markers are positioned for clear visibility from different directions of travel. They clearly indicate water levels with markings such as Alarm (at 40cm) and Dangerous (at 80cm), enabling commuters and local emergency responders to quickly assess flood severity and make safer,

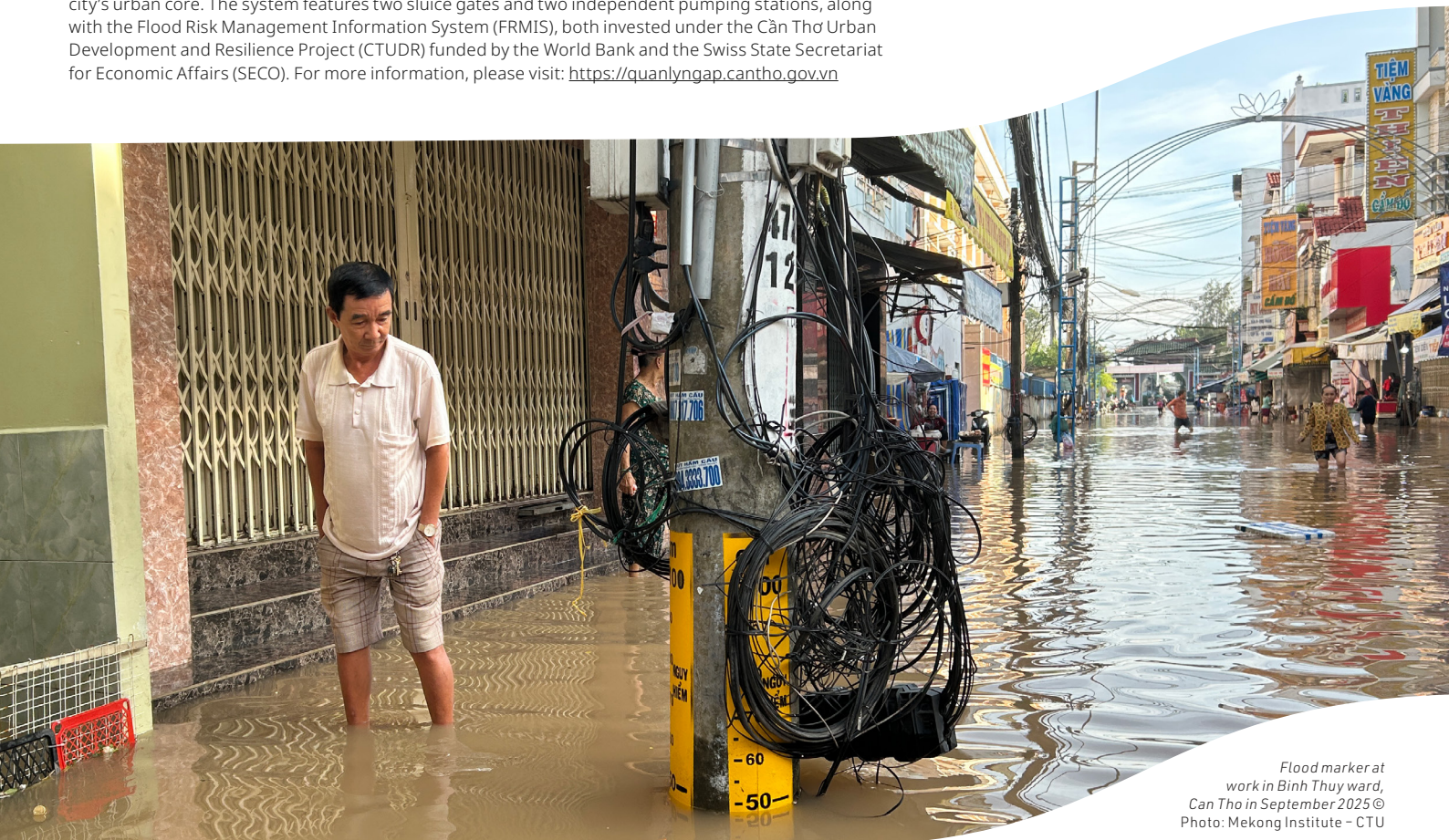
<sup>1</sup> A new double-ring flood protection system, which became operational in early 2025, shields the city’s urban core. The system features two sluice gates and two independent pumping stations, along with the Flood Risk Management Information System (FRMIS), both invested under the Cần Thơ Urban Development and Resilience Project (CTUDR) funded by the World Bank and the Swiss State Secretariat for Economic Affairs (SECO). For more information, please visit: <https://quanlyngap.cantho.gov.vn>



## Climate Resilience Measurement for Communities (CRMC)

The Climate Resilience Measurement for Communities (CRMC) is a data-driven process, complemented by a web-based tool and mobile app, which helps communities to evaluate and measure how resilient they are to climate hazards. Using the results, they can identify and implement resilience-building interventions and run additional measurements to track improvements.

Find out more: [ZCRAlliance.org/crmc](https://ZCRAlliance.org/crmc)



Flood marker at work in Binh Thuy ward, Can Tho in September 2025 © Photo: Mekong Institute - CTU

more informed decisions, such as choosing an alternative route or turning around, in real time. 260 flood markers have been installed in Tân An and Bình Thủy ward, and more will be added in the coming months as local Governments seek to replicate the model in other severely flooded areas.

Building on this success, ISET and the partners are expanding the system by complementing the markers with smart cameras that automatically capture and transmit time-stamped flood images every 30 minutes during high-tide periods, including nighttime data through infrared technology, to the project data analyst at CTU. Combined with household observations, river-level data from the city Hydro-Meteorological Station, and rainfall data from the real-time rainfall monitoring app V-rain, these images help establish and validate correlations between river water levels, rainfall and actual inundation depth in urban neighborhoods, thereby improving the accuracy and usefulness of early warning messages for communities and first responders.

Community engagement and collaboration are central to the initiative. Local households support the system by providing power for camera operation and sending the images they captured for cross reference.

**NHẬN ĐỊNH ĐỘ SÂU NGẬP PHƯƠNG BÌNH THỦY, TP.CẦN THƠ**

**ĐỘ SÂU NGẬP - BUỔI CHIỀU 25.10.2025**

ⓘ Lưu ý: TÀI KHU VỰC 3  
Bắt đầu - kết thúc: 18:00 – 23:00 (khuyến cáo người dân hạn chế di chuyển vào thời điểm trên)  
Độ ngập sâu trung bình tại thời điểm đỉnh triều 2,15m lúc 20:00:  
**~ 49 cm**

**KHUYẾN CAO**

⚠️ **ĐIỂM NÓNG CẦN CHU Ý:** Lập kế hoạch di chuyển an toàn, tránh các tuyến đường: Cách Mạng Tháng 8 (CMT8), đường Lê Hồng Phong, đường Bùi Hữu Nghĩa (đoạn chợ Bình Thủy) và hẻm Xóm Lười...

• **KHUYẾN CAO PHÒNG TRÁNH:**

- Di chuyển tài sản: Kê cao hoặc di chuyển các vật dụng: đồ điện tử, giấy tờ quan trọng lên cao ít nhất 90-100 cm để tránh hư hại.
- Lập kế hoạch di chuyển: Hạn chế đi lại qua đường Bùi Hữu Nghĩa và các khu vực trũng thấp trong thời gian triều cường theo thời gian cảnh báo bão.
- An toàn điện: Rút phích cắm, ngắt nguồn điện ở những vị trí thấp để đảm bảo an toàn.
- Đi lạc: Hạn chế di chuyển bằng ô tô và xe máy trong thời gian ngập như thông báo trên. Nếu buộc phải di chuyển, đi chậm, quan sát kỹ và tránh xa chỗ có dòng nước chảy mạnh.

• **Khuyến nghị:** Hãy chia sẻ thông tin này đến người thân, bạn bè, nhất là các hộ dân tại khu vực trũng thấp để chủ động phòng tránh.

(Lưu ý: Đây là kết quả đánh giá nhanh phục vụ nghiên cứu trong khuôn khổ Chương trình CBMC)

**CHỦ ĐỘNG PHÒNG TRÁNH - AN TOÀN LÀ TRÊN HẾT!**

Warning message issued to the community in Binh Thuy ward during the October 2025 flood event

## Conditions for success

**Q:** Is this intervention appropriate for other communities?

**A:** Yes, it is well-suited for other flood-prone communities, especially urban or areas prone to tidal floods where regular, repetitive flood information is needed but localized flood data is limited.

**Q:** What conditions are needed for the interventions?

**A:** It requires community participation, local leadership support, access to hydrological data, and stable power and internet for camera operation.

**Q:** Was there anything special about the communities where interventions were effective?

**A:** Local households are highly supportive, which enabled effective implementation and sustained use of the system.

## SOLUTIONS IN ACTION

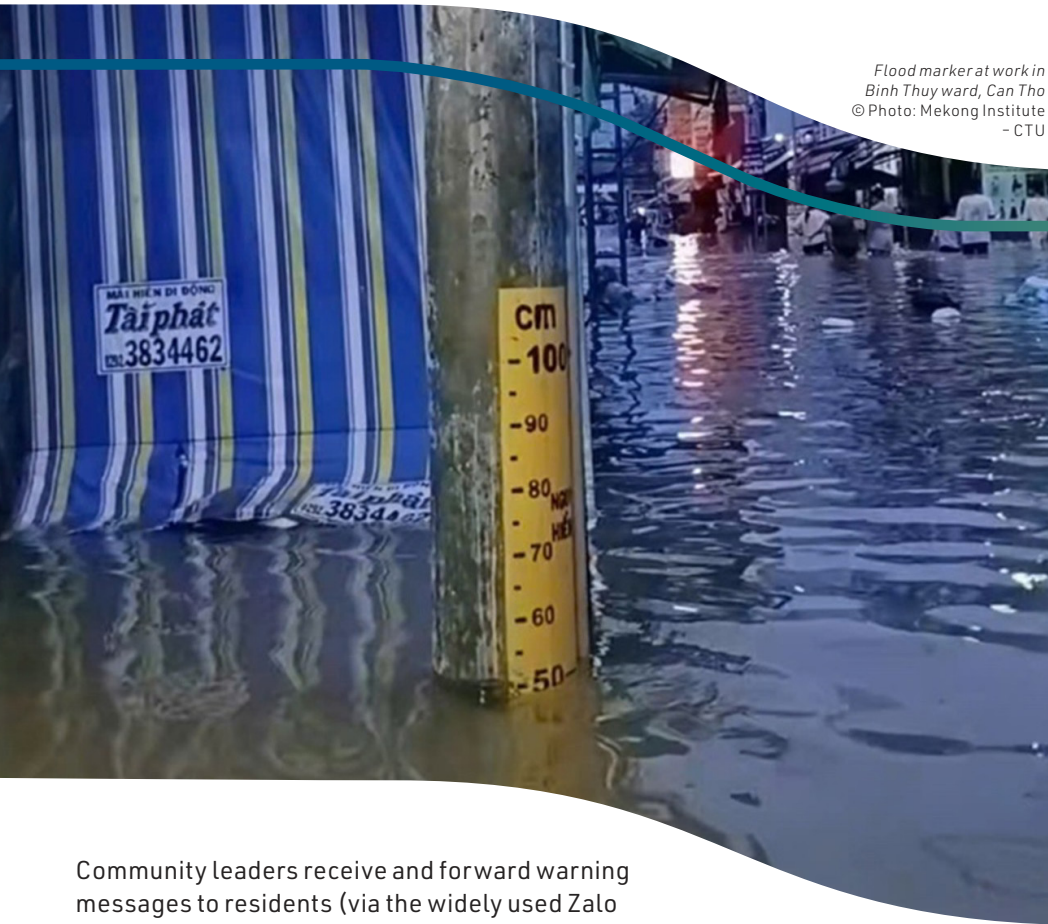
The presence of the flood markers has increased community interest and awareness about local flooding. Residents often refer to the markers when discussing flood conditions, and many share updates on social media using the markers as reference points.

“ These flood markers have been really helpful for us. I often hear my neighbors talking about the water levels they see on them. Early this month when the tide was rising, we received warning messages from our community leader for the first time, and the forecast turned out very accurate.”

– Mrs. Lâm Thanh Thủy  
Resident in Area 3, Bình Thủy ward, Cần Thơ City



Tidal flood in Binh Thuy ward, Can Tho city in September 2025 © Photo: Mekong Institute - CTU



Flood marker at work in Binh Thuy ward, Can Tho  
© Photo: Mekong Institute - CTU

## LIVED EXPERIENCE

“ We analyzed the relationships between river levels, rainfall, and flood depths in each location using simple statistical methods like linear and polynomial regression. This allowed us to develop a formula to estimate expected flood depths for local communities. Unlike complex hydrological models, our approach uses simpler input data, is quick and low-cost, yet still highly reliable. We also share the calculation results with the City Hydro-Meteorological Station to support their forecasting and warning efforts, and they are keen to collaborate further with us on this approach.”

– Mr. Đinh Diệp Anh Tuấn  
Mekong Institute, Cần Thơ University

Community leaders receive and forward warning messages to residents (via the widely used Zalo messaging app), while the local government is informed and actively supports the process. The City Hydro-Meteorological Station shares river-level forecasts and, in turn, receives localized flood data and warnings from CTU.

### How it increases resilience

This intervention combines low-tech solutions, such as painted flood markers, with high-tech innovations like camera-based monitoring to enhance both the accessibility and accuracy of flood warnings. Together, the flood depth markers and monitoring system strengthen community awareness, decision-making, and early action.

The markers provide residents with immediate, visual information on flood severity; this has quickly proven useful for residents navigating frequent tidal floods. The visibility of the markers has raised awareness of flood risks and fostered a culture of preparedness in daily life. As a low-cost, scalable, easy-to-maintain measure, the flood markers demonstrate how simple physical infrastructure significantly strengthens resilience by reducing uncertainty and enabling safer, faster responses during tidal events.

The camera-based monitoring system translate river-level forecasts into neighborhood-specific flood information, making early warnings more timely, useful, and actionable. The cameras generate and deliver locally relevant insights (such as expected timing, peak flood depth, locations, and recommended actions) that help residents and local authorities to understand what forecasted river levels mean for their streets and homes, turning abstract data into clear, actionable guidance that supports faster and better-targeted preparedness and response.

This advance knowledge is especially valuable as climate change and rapid urban development make flood timing and patterns increasingly unpredictable, evident in recent years when communities have been caught off guard by unseasonal and unexpectedly floods.



For vulnerable groups such as informal workers, small traders, and others whose livelihoods depend on daily mobility, timely and localized flood information helps prevent income loss (whether from damaged goods/equipment, missed work hours or reduced sales), property damage, and safety risks, supporting greater security and resilience in their everyday lives.

Tidal flood in Binh Thuy ward, Can Tho city in September 2025 © Photo: Mekong Institute - CTU

## Co-benefits

The initiative not only improved safety but also strengthened community engagement, and built trust in local flood information while fostering collaboration among residents, authorities, and researchers in flood management. With potential to evolve into a large-scale community flood monitoring network, it lays the groundwork for a smart, adaptive, and sustainable urban flood warning system in Cần Thơ and other flood-prone cities.

## Lessons learned

- Addressing local issues requires close collaboration with local communities. Their firsthand knowledge, lived experience, and active participation are crucial for designing practical, accepted, and sustainable solutions.
- As climate and urban conditions evolve, flood management approaches must remain adaptive. Rigid technical models might quickly become outdated, while flexible and scalable solutions will sustain effectiveness over time

### Get in touch

For questions, contact:  
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For more resilience solutions:  
[i-s-e-t.org/category/solutions](https://i-s-e-t.org/category/solutions)

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**The Institute for Social and Environmental Transition - International (ISET)** is a non-governmental organization committed to building inclusive and transformative resilience in the face of natural resource, environmental, and social challenges, especially related to climate change, natural hazards, and urbanization. Officially operating in Vietnam since 2010, ISET has an intimate understanding of Vietnam's institutional landscape and its strengths and challenges, and has proven expertise in working effectively across levels to bridge the still significant divide between science, policy, and implementation. ISET is working in Huế City and Gia Lai Province, both coastal areas in central Vietnam and Cần Thơ city in the Mekong Delta.