ISET International

SOLUTIONS BRIEF

# Community-based flood monitoring in Gia Lai province


## Overview

ISET-International (ISET) has collaborated with the Climate Change Coordination Office (CCCO) and the Division of Water Resources in charge of Disaster Risk Management (DRM) of the Gia Lai Department of Agriculture and Environment (DAE) develop a community-based flood monitoring system. The project aims to establish a network of flood trace monitoring points in frequently inundated areas in the downstream sections of the Kon and Ha Thanh River basins, and to develop a mechanism for collecting flood water level data based on observed flood marks with the participation of commune authorities and local communities. Flood trace data are collected after each major flood event and integrated into the provincial disaster risk database in order to: (i) establish correlations between rainfall, river water levels, and location-specific inundation depths to support impact-based forecasting and early warning; (ii) inform disaster preparedness planning, evacuation, and asset protection; (iii) assess flooding trends, changes in flow dynamics, and the impacts of urbanization to support urban planning and drainage infrastructure development; and (iv) raise community awareness of flood risks. The project supported a pilot to collect and mark flood traces from the major flood events of November 2020 and November 2021.

## The gap

Flooding in the Kon and Ha Thanh basins occur annually, with severe floods events every few years, most recently in November 2020 and 2021, causing widespread inundation and damages. In addition, rapid changes in land use, urbanization, and infrastructure development have been, and will continue to, reshaping flood behavior and shifting the level of flood risk across different areas. However, apart

## Facts and figures

**Cost of data collection per flood monitoring point (pilot phase):** US$25

**WebGIS database integration, analysis & reporting:** ~US$1500 per flood event

**Annual update/maintenance costs:** 20 staff days/year

**Time to implement**
1-2 month per flood event

**Easy to replicate?**
Yes, based on existing DRM system and data platform

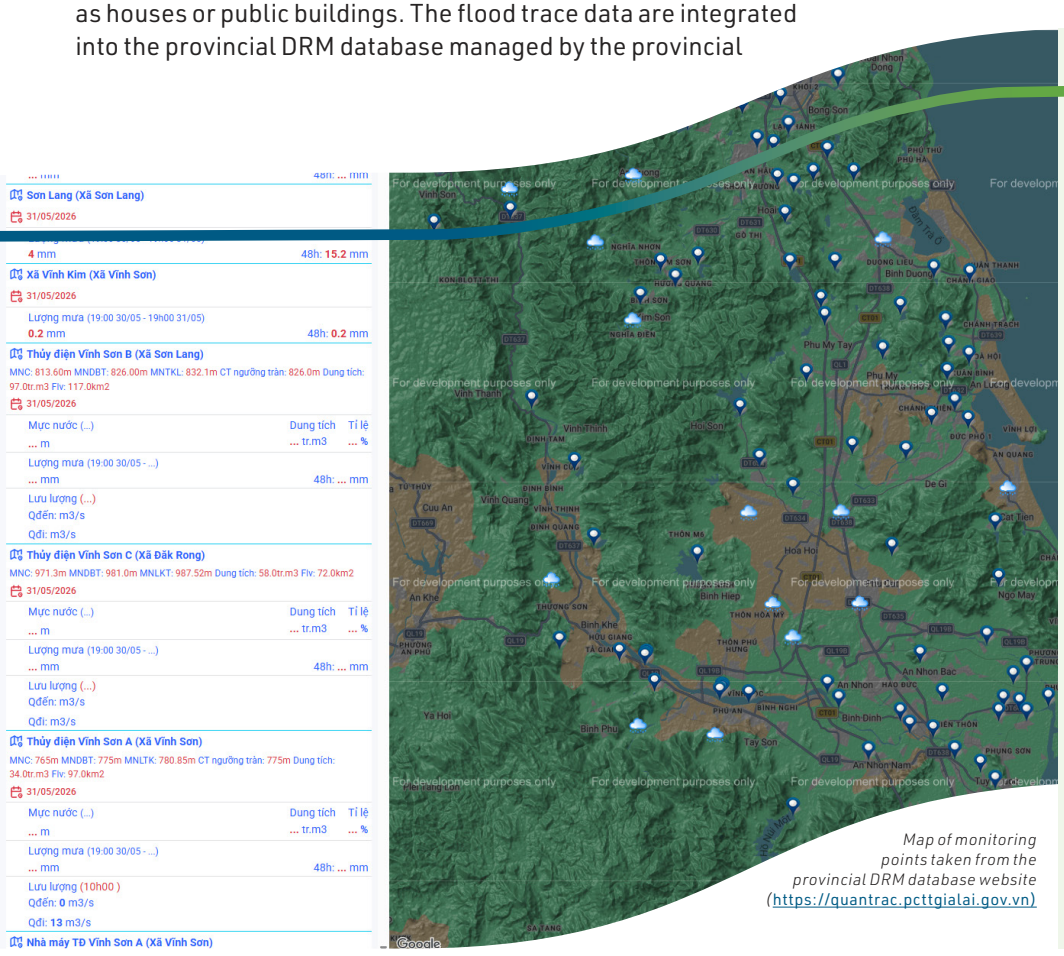
Photo: *November 18, 2025 flood in Quy Nhơn Bắc ward*
© Hoang Loi Facebook

from a small number of automatic gauges, localized consistent, geo-referenced flood trace records are rarely available, leading to significant data gaps that in turns has major implication for:

- **Risk understanding:** Limited understanding of how flood risk involves over times in general and where and how such development is exacerbating and/or transfer flood risks. This makes risk-formed decision and planning more challenging.
- **Flood preparedness, response, and early warning:** Without flood trace data, it is more difficult to determine where flooding will occur and how deep it would be, limiting accurate preparedness planning and response. In addition, current early warnings mainly provide river level or rainfall forecasts, but do not translate them into community-level impacts such as which roads may flood or how deep the water may get.
- **Awareness raising:** As much of the historical flood information is not available as physical evidence disappears and community memories fade over time. As a result, local community, especially younger generations, may have limited understanding of flood risks and tend to underestimate their potential impacts.

## Our solution

The project addresses the above mentioned challenges by establishing a network of flood trace monitoring points in high-risk inundation areas and developing an official standardized mechanism to manage and collect flood depth data after each major flood event, with the participation of commune authorities, and community members. Monitoring sites were selected based on historical flood data, local knowledge, and field surveys. Each site's flood depth is geo-referenced, calibrated to national elevation standards, and permanently marked with stainless-steel plates fixed on solid structures such as houses or public buildings. The flood trace data are integrated into the provincial DRM database managed by the provincial




*Map of monitoring points taken from the provincial DRM database website (https://quantrac.pcttgialai.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

## SOLUTIONS IN ACTION

An official coordination mechanism on flood data collection and management is being developed and will soon to be signed by the Gia Lai Division of Water Resources (responsible for DRM) and commune-level authorities. This document defines clear roles and responsibilities of each actor in collecting, verifying, and managing the flood trace data, which are then integrated into the provincial DRM data base and openly shared with other local agencies and the public.

This marks an important step toward institutionalization, ensuring that community flood monitoring becomes a sustained, systematic practice for disaster-risk management in Gia Lai.

DRM agency and made freely accessible to government agencies and local communities (https://quantrac.pcttgialai.gov.vn).

As of now, the network consists of 117 monitoring points distributed across wards and communes in the downstream areas of the Kon and Ha Thanh rivers. Flood trace data from the November 2020 (Ha Thanh River) and November 2021 (Kon River) flood events have already been collected.

The database is used to: (i) establish correlations between rainfall, river water levels, and location-specific inundation depths to support impact-based forecasting and early warning; (ii) inform disaster preparedness planning, evacuation, and asset protection; (iii) assess flooding trends, changes in flow dynamics, and the impacts of urbanization to support urban planning and drainage infrastructure development; and (iv) raise community awareness of flood risks.

## How it increases resilience

Physical flood marks provide visible and lasting reminders of past flood severity, serving as practical reference for es timating future flood levels and helping raise community awareness of flood risks. They enable households and local authorities to make informed decisions on building elevation and protect assets, and to better interpret early warnings by comparing predicted river levels with these marks, allowing timely and appropriate preparedness actions.

Community flood trace data also provide a foundation for impact-based early warnings by linking forecasted rainfall and river levels to expected flood depths at specific localities. This transforms warnings from generic messages to actionable information that indicates which areas are likely to flood, how deep the water may be, and who will be most affected.

At the provincial level, the data support evidence-based and risk-informed planning, including land-use planning and the planning and design of infrastructure systems such as drainage and road. For instance, comparing flood depth and duration across years helps reveal how new development

## Conditions for success

**Q: Is this intervention appropriate for other communities?**
**A:** Yes. it is a simple and inexpensive approach suitable for other flood-prone communes and wards in the province and beyond.

**Q: What conditions are needed for the interventions?**
**A:** Strong local government buy-in (DRM agency and commune authorities), trained officers, and active community participation under a standardized flood trace update process.

**Q: Was there anything special about the communities where interventions were effective?**
**A:** Strong local knowledge of flood patterns and active cooperation with local authorities in verifying data and maintaining flood makers.

## LIVED EXPERIENCE

The community flood trace system provides the Gia Lai's DRM agency with reliable field evidence to verify flood levels and monitor how floods evolve over time, supporting faster and more coordinated response.

*"With these flood trace data, we can see exactly how high the water reached in each area and compare it with previous floods. This helps us understand how flood patterns are changing, prepare more effectively for extreme flood events, better tailor our early warning messages, and raise community awareness of flood risks in a clear, practical and easy way".*

– **Mr. Nguyễn Tường Vĩ**, *Division of Water Resources, Gia Lai Department of Agriculture and Environment*


*ISET staff pointing at the November 2021 flood level*
© Photo: Hoa Truong, ISET Vietnam Office


*November 2021 flood trace sign on a house near the Community Shelter in Area 3, Nhon Phu Ward* © Photo: Hoa Truong, ISET Vietnam Office

or incomplete drainage have altered local flood behavior, enabling adjustments to urban planning and preparedness measures, ultimately reducing losses and strengthening resilience.

The official protocol ensuring consistent and standardized flood monitoring across wards and communes. It clarifies technical procedures and responsibilities, maintains data accuracy over time, and strengthens coordination between communities and provincial agencies. This turns a one-off effort into sustainable, province-wide mechanism/system that directly inform forecasting, early warning, and planning.

## Co-benefits

The approach provides a standardized and low-cost model that can be easily applied in other river basins and provinces. The visible flood marks also serve as educational tools for schools and local communities, helping raise awareness about flood history and preparedness. Annual updates further strengthen collaboration between residents and local authorities in maintaining community-based disaster data.

## Get in touch

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**For more resilience 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.