Webinar Summary — 8 JULY 2026

What communities already know: indigenous and first-mile knowledge

What people knowledge and practices people rely on when formal EWS is absent, delayed, or distrusted

About this session

The third of *four webinars* in Reaching the Last Mile, a series sharing findings from **15 community-level studies across 14 countries** supported through the *GDPC Research Grants Program*. The series carries one argument: coverage does not guarantee protection. A system can reach a geographic area on a map while the people inside it never receive, understand, or act on a warning.

Where *earlier sessions* examined who is excluded by how warnings are designed, delivered, and by whom they are seen, Session 3 turned to what communities themselves bring to the table: **what do people already know about their own risk — and how can formal early warning systems recognise, respect, and build on that knowledge?** Long before an SMS alert, a Facebook post, or an official bulletin arrives, communities are already reading their environment — weather signs, animal behaviour, water levels, and generations of lived experience — and acting on it.

Four researchers presented evidence from very different settings: last-mile mountain and coastal communities in the **Philippines**, traditional fishers in southwestern **India**, agro-pastoralist communities in **Ethiopia**'s South Omo, and flash-flood-affected communities in north-eastern **Bangladesh**. Across all four, a similar pattern surfaced: **indigenous, occupational, and place-based knowledge is not a folk alternative to science but an active, complementary layer that fills the gaps formal systems leave** — and often decides whether a warning becomes action.

▸ **Watch the full session:** *Webinar 03 recording*

1. What can we learn from communities about early warning? Lessons from last-mile communities in the Northern Philippines

Rhomir Yanquiling · University of Melbourne

The problem

The Philippines is one of the world's most disaster-prone countries, and after generations of living with typhoons, last-mile communities have accumulated deep local knowledge. Yet formal early warning is often treated as the starting point of protection, when for these communities it is only one input among several. Yanquiling's central argument is that communities are **active interpreters of risk, not passive recipients of alerts** — and that a warning only matters if it connects to what people already know and can act on.

The study

Drawing on fieldwork in two last-mile communities — a mountain village and a coastal fishing village in Pangasinan — the study documented how people gather, weave together, and act on different sources of information before, during, and after typhoons.

How communities make sense of risk

- **Trusted social networks.** Family, neighbours, community leaders, and fellow fishers or farmers are used to exchange and validate information before anyone decides how to respond.
- **Local ecological knowledge.** Learned environmental cues — restless house lizards, ants surfacing as if seeking shelter, birds flying in agitated groups, unusual waves and wind — are read as reliable signs of an approaching typhoon.
- **Memory of past disasters.** Lessons from earlier events shape present action. Participants repeatedly invoked Typhoon Haiyan (Yolanda, 2013) to explain why they prepared more thoroughly for Typhoon Mangkhut (2018) — harvesting crops early, stocking food, reinforcing roofs, trimming branches.
- **Formal warnings as one layer.** Official information from agencies such as PAGASA is integrated with local observation and social networks, especially when power or connectivity fails and people fall back on radio and word of mouth.

What turns a warning into action

A recurring theme was that receiving a warning is only part of the equation. A warning becomes actionable when four conditions come together: people **believe the risk is real**; they **trust the messenger**; they have **support from family and local leaders** (social capital); and they **feel capable of acting** — with the confidence, resources, and ability to respond. An effective system is not only about communicating risk, but about enabling action.

Recommendations

- **Integrate local, indigenous, and place-based knowledge** with scientific forecasting, treating it as complementary rather than separate.
- **Co-design early warning with communities** so they help shape how warnings are communicated, understood, and acted on.
- **Invest in trust long before disasters** occur — people act on warnings from sources they already know and trust.
- **Make warnings specific and actionable** — clear guidance on what to do, when to act, and where to go.
- **Strengthen community networks** as the channels through which warnings are shared, verified, and translated into early action.

▸ **Yanquiling — Predictors of risk reduction behavior: Evidence in last-mile communities:** *View the slides* / *Read the full paper*

2. What they know: Early warning early action with traditional fishers of southwestern India

Max Martin · Christ University · Bangalore, India

The problem

Along the coast of Thiruvananthapuram district, Kerala — home to more than **50,000 artisanal fishers** — the Eastern Arabian Sea is becoming markedly stormier. Swells generated by distant storms (one set travelled some 9,000 km from the South Indian Ocean in five days) now reach the coast and destroy homes, while intense post-monsoon cyclones have grown more frequent. Between 2016 and 2021, 345 fishers reportedly died fishing off the Kerala coast — not counting the roughly 365 lives lost close to its southern coast in the very severe 2017 cyclone. **Blanket forecasts, however, do not match this reality and the needs for fishers.**

The study

The research examined five fishing villages selected from an 80-km stretch, spanning shore-seine, raft, ring-seine and fibreglass-motor fishers who work anywhere from the surf line to 100 km offshore, asking how traditional knowledge and scientific forecasts combine in real fishing decisions.

The core tension: forecasts vs. livelihoods

A single forecast is often issued for a 200-km stretch and may declare the sea too dangerous on up to **half of the monsoon's fishing days**. Staying ashore that often **is not economically viable** — and the blanket warning is frequently inaccurate for any given 50–100 km of coast. Fishers therefore interpret warnings against their own detailed, localised knowledge.

How fishers decide

- **A blend of forecast sources.** Fishers are avid consumers of apps (e.g. Windy), international sources (NOAA), specialist surfer forecasts, and national radio and TV bulletins.
- **Inherited traditional knowledge.** Cues taught across generations — a pencil-sharp line beneath a cloud, the feel of the wind, a colour change advancing across the sea, the arrival of certain flies, dragonflies, and beetles — signal specific, sometimes dangerous winds.
- **Community relay and consensus.** Knowledge is shared in near-real time via mobile phones and walkie-talkies across tens of nautical miles, and decisions are reached collectively — weighing experienced elders alongside younger fishers with access to technology.

Early actions

Actions are practical and constrained by craft type and distance offshore: whether to go out at all; taking fewer crew or stronger engines to move faster; changing course; or returning quickly — sometimes even cutting away nets full of fish to get back safely. Boats and gear are moved inland ahead of forecast storms.

Recommendations

- **Co-produce forecasts with fishers,** feeding their observations back to forecasters to localise warnings by harbour, reef, beach, and nearshore hazard zone.
- **Translate warnings into decisions** — not just "40 knots of wind," but what that means for a 15-foot craft versus a 50-foot vessel.
- **Use trusted local channels** — community loudspeaker and radio systems (including the local "Radio Monsoon" run by a woman) that people already rely on.
- **Anchor every product in whether it enables action,** the touchstone for all early warning and early action.

▸ **Martin — Early warning and early action with traditional fishers:** *View the slides* / *Read the full paper*

3. When warnings fall short: community knowledge and early action in the 2022 Bangladesh flash floods

Shampa · Institute of Water and Flood Management, Bangladesh University of Engineering and Technology (BUET)

The problem

Flash floods carry the highest fatality rates per event and leave very little time to act. In June 2022, **north-eastern Bangladesh experienced one of the most extreme flash floods in over a century**: the upstream catchment near Cherrapunji — one of the wettest places on Earth — received 972 mm of rain in 24 hours, and Sylhet and Sunamganj had to drain it, displacing 4.8 million people. The question the study asked: what actually turns a warning into early action when the formal forecast fails?

The study

A mixed-methods study in Tahirpur combined 425 household surveys, 22 focus groups, 21 key-informant interviews, and 10 case studies with satellite (Sentinel-1), rainfall, and flood-level analysis, across linear, clustered, and dispersed settlement types.

Why the forecast failed

- **Transboundary blind spot.** Models inside Bangladesh could not capture the volume of water arriving from the Indian side, where rainfall was far higher.
- **Wrong location, wrong lead time.** The gauging station sat far upstream on elevated land and missed the local picture; five-day warnings were inaccurate, and antecedent saturation from earlier rainfall went unaccounted for.

Who received warnings — and who acted

- **Reach was low.** Only about 25% of households received the official warning, and dispersed, more vulnerable households — including pregnant women and elderly people — were least likely to receive or interpret it. **Person-to-person communication remained the most effective channel.**
- **Indigenous indicators filled the gap.** More than half of households relied on local indicators — river water level for clustered and linear settlements, cloud patterns for dispersed households.
- **Communities acted anyway.** Over 60% took early action — evacuation, raising plinth levels, elevated 'Macha' shelters, reserving Boro crops, repairing embankments — driven by indigenous knowledge and informal networks rather than the official message.

Did early action reduce damage?

Early action **clearly reduced housing damage**. Results were **mixed for crops** (partly reflecting longer-term adaptive measures taken earlier in the year) and showed **little association for livestock** — pointing to the need for resources and guidance, not just warning.

Recommendations

- **Integrate indigenous indicators** into official systems, building on the local environmental cues people already read.
- **Make warning messages actionable** by including evacuation routes, shelter information, and guidance for vulnerable groups.
- **Establish trained volunteer groups** to reach the last mile and translate warnings into micro-level early actions.
- **Resource the people who act** — since communities are already the ones taking action, systems should strengthen and resource them.

▸ **Shampa — When warnings fall short: the 2022 Bangladesh flash floods:** *View the slides* / *Read the full paper*

4. Community-developed early warning and early action in South Omo, Ethiopia

Tirsit Sahledengle · Institute of Ethiopian Studies, Addis Ababa University

The problem

The hard-to-reach agro-pastoralist communities of South Omo — including the Karo, Daasanach, and Nyangatom — face recurrent, often deadly flooding from the Omo River and Lake Turkana, alongside drought and conflict. Formal early warning infrastructure is scarce and, where it exists, **frequently arrives after the flood has already struck**. In its place, communities rely on early warning systems they have developed themselves over generations.

The study

A qualitative study (72 informants across interviews, focus groups, and key-informant interviews with community elders, and zonal and federal officials) documented these community-developed systems in three flood-affected woredas — Daasanach, Karo, and Nyangatom — and assessed their strengths, weaknesses, and relationship to the formal system.

Three interwoven knowledge systems

- **Spiritual knowledge and divination.** Respected elders and cultural leaders interpret dreams and premonitions as warnings of coming floods, prompting collective prayer, ritual, and — critically — preparation and evacuation.
- **Ecological indicators.** The rapid flowering of specific riverside plants, incremental rises in river level (including from distant, upstream rainfall), and the direction and character of the wind are read as reliable signs that waters will rise.
- **Technical and physical measures.** Communities build and annually rebuild check dams, terraces, and bunds tailored to local topography as landscape-based flood defences.

Emergency response and its gaps

Warnings are relayed through gunshots (ambiguous, since gunfire also signals raids and conflict), traditional loudspeakers, and dedicated “warning tellers” working through trusted social networks. But radio, TV, and

phones are undercut by no electricity, poor coverage, and the use of Amharic — a language many residents do not speak well. Evacuation sites often lack food, water, and sanitation, and women are frequently excluded from warnings issued in public spaces.

Strengths and weaknesses

- **Strengths:** cultural relevance, community ownership, a holistic approach, rapid response, and strong social cohesion.
- **Weaknesses:** subjectivity of spiritual forecasting, limited scalability, dependence on specific key individuals, lack of documentation, inadequate infrastructure, and a marked gender imbalance in who holds and acts on knowledge.

Recommendations

- **Build a hybrid system** that integrates indigenous knowledge with scientific meteorological data to improve reliability and shared credibility.
- **Document and preserve** indigenous knowledge to prevent its loss and enable integration with formal frameworks.
- **Decentralise** early warning so it is less dependent on specific individuals, through training and community-wide participation.
- **Address gender disparity and infrastructure gaps,** and embed these systems within formal government structures with dedicated institutional and legal backing.

▸ **Sahledengle— Community-developed EWEA systems in South Omo:** *Read the full paper*

From the Q&A

1) **Could I ask for an example of how local organizations can support the integration of indigenous ecological knowledge into EWS?**

Shampa: I think they need to train the community to connect scientific estimation with local cues. For example, linking forecast rainfall to the water level at a known place, such as the market in the community.

Max Martin: In Thiruvananthapuram, local organizations could partner with traditional fishers to document and validate Indigenous weather indicators alongside formal forecasts. They could also facilitate a feedback loop, where fishers report how local conditions compared with forecasts, helping forecasters refine warnings while making early warning systems more locally relevant and trusted. Local groups have tested these measures with significant social impacts.

2) **Thanks, Shampa. Could I ask how many people were interviewed in total for the Early Action vs. no Early Action analysis?**

Shampa: The 425 Households were interviewed along with FGD and KIIs

3) **Max, this is fascinating. Have you done any work with local indigenous forecasters to identify which combination of their triggers and signs is most powerful for identifying risk? Has much research been done on this?**

Max Martin: From what the fishers shared, their reading of the sky and the signs of imminent high winds seems like a remarkably powerful traditional forecasting system. There is a growing body of research documenting the weather knowledge of traditional and Indigenous fishing communities, but comparatively little work has systematically evaluated which combinations of indicators are the most predictive or how these can be integrated into marine weather forecasting. That strikes me as a particularly worthwhile direction for future research.

Cross-cutting takeaways

- **Communities read their environment before any alert arrives.** Across the Philippines, India, Ethiopia, and Bangladesh, people anticipate hazards through ecological cues, water levels, animal behaviour, and memory of past events — often earlier and more locally than formal forecasts.
- **Indigenous knowledge frequently out-reaches formal warnings.** In Bangladesh only a quarter of households received an official message, yet more than 60% took early action, driven by local indicators and informal networks.
- **Forecasts fail at the last mile when they are not localised.** Warnings issued for large areas, from distant stations, across borders, or in the wrong language do not match the specific place, livelihood, or timeframe within which people must decide.
- **A warning only becomes action when it is trusted, specific, and resourced.** People act when they believe the risk, trust the messenger, understand what to do — and have the means to do it. Communicating risk is not the same as enabling a response.
- **Design with communities, not just for them.** Every presenter converged on co-production: integrating indigenous and scientific knowledge, translating forecasts into decisions, delivering them through trusted local channels, and treating last-mile populations as first-mile partners.

Resources & additional links

- **Series landing page:** Reaching the Last Mile
- **Meta-synthesis report (full report, executive summary, infographic):** GDPC cross-study meta-synthesis
- **All 15 research projects:** Meet the Researchers