LIRNEasia
Pro-poor. Pro-market.

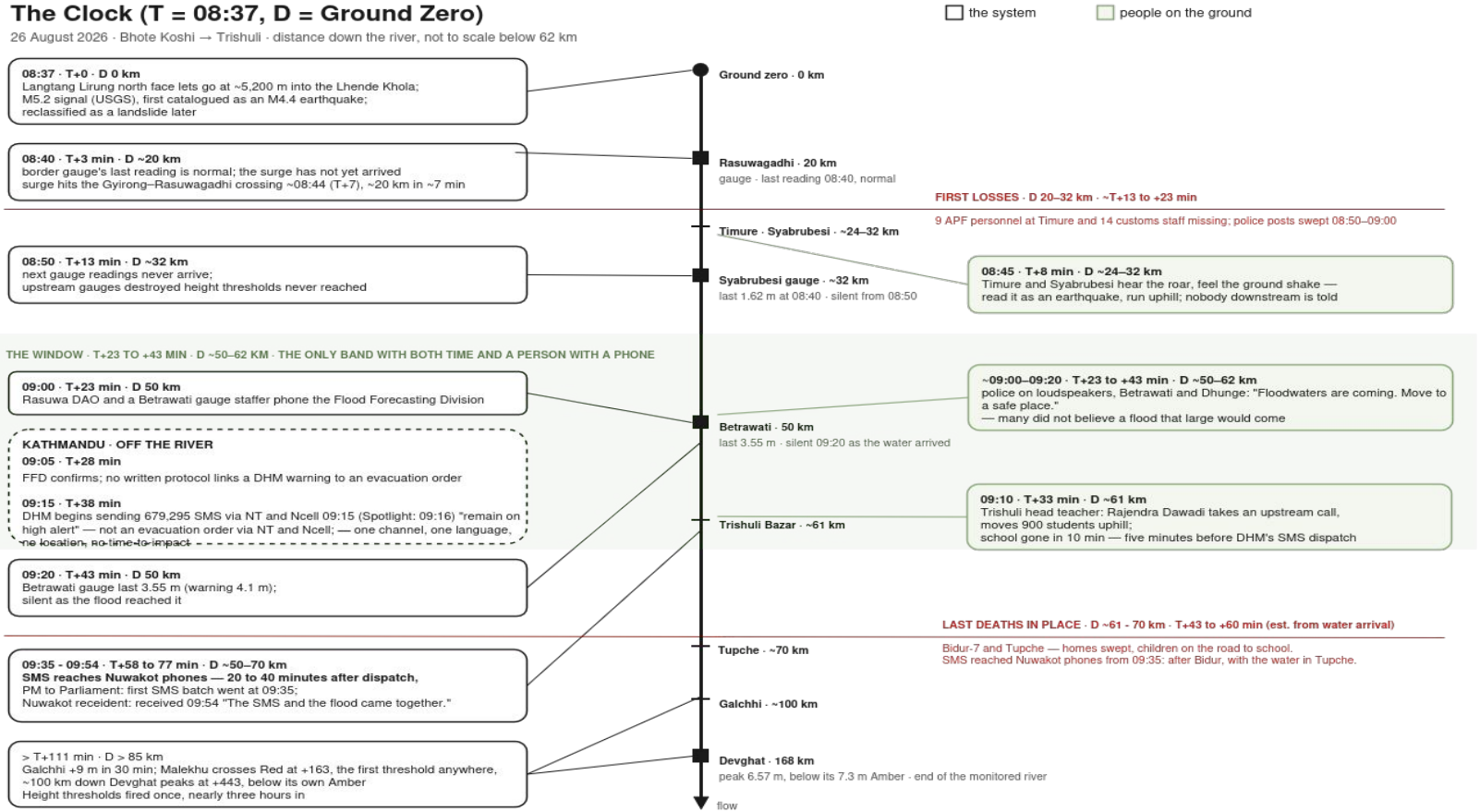
The Last-Mile is the First Priority

Safeguarding a Resilient Internet in Times of Crisis

Nepal Internet Forum

Nuwan Waidyanatha
Senior Research Fellow
Kunming, China

Early Warning



Sourced: DHM via National Herald; NepalNews; Daily Star; Nepali Times; Kathmandu Post; Mongabay; Khabarhub; NDRRMA SitRep #01; ICIMOD; Radio Nepal. ~ = estimated. Red = where people were killed; Chitwan/Nawalparasi tolls are recoveries carried downstream. USGS; OnlineKhabar (FFD technical report); Spotlight Nepal. Sources differ on which upstream gauge read 1.62 m vs 3.8 m; FFD technical report followed; CCTV; HiRISK. Mechanism per USGS; an 18–19 h dam theory (IRDR) is disputed and not shown.

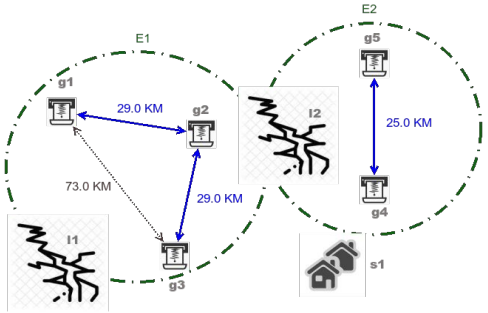
LIRNEasia
Pro-poor. Pro-market.

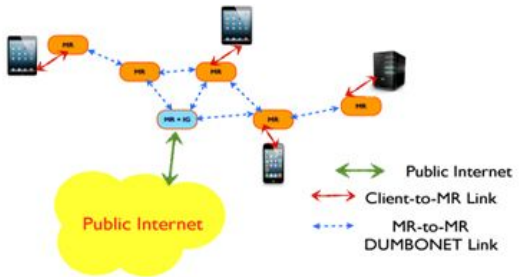
EW-1: Detect it where it starts — inclusively innovate sustainable sensor arrays

✦ Fit-for-purpose sensing built for a multi-hazards approach ✦ Instrument the worst slopes first - make the 2019 Nepal–China agreement real ✦ Report faster than the hazard moves ✦ Use dual-purpose low-cost sensors/detection whose data serves industry and research daily to stay powered, calibrated and trusted.

2026 Echo:
T+3: Rasuwagadhi destroyed before next 10-min sensor report.
T+13: Syabrubesi destroyed at 1.62 m < 6 m threshold.
T+23: first detection was a phone call.

2015 Report:
Landslides are "an inherent characteristic" of the range and must be built into every survivability and availability analysis.






RaspberryShake


P-alert


Grillo

Onsite detection and alerting Mini-arrays that eliminate False Positives and Missed Alarm

LIRNEasia
Pro-poor. Pro-market.

EW-2: Authority at the edge: register it, trace it

✦ Make DHM the multi-hazard warning centre, with a mandate to warn on any hazard, not just one. ✦ Keep a WMO-OID register of alerting authorities down to the ward, the police post and the school. ✦ Every message carries its originator's OID, date and sequence: one common operating picture, with an accountability trace.

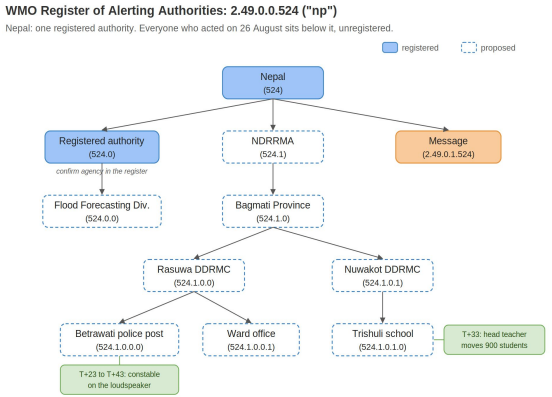
2026 Echo:

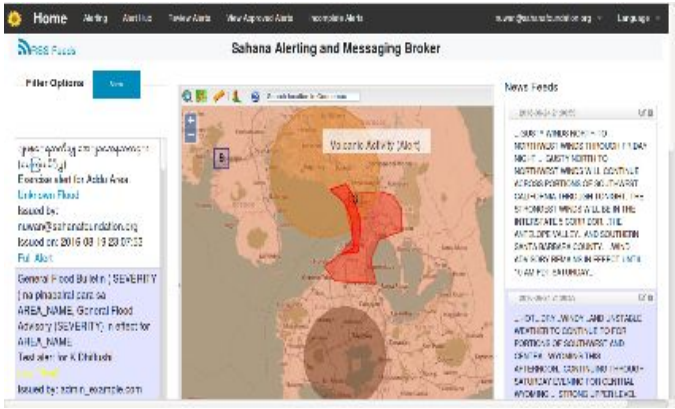
T+0: the seismic network registered it; didn't **look like an earthquake**; nobody's warn.

T+23: district officer + gauge staffer phoned Kathmandu.

T+28: DHM confirms + alerts, **cannot order evacuation**.

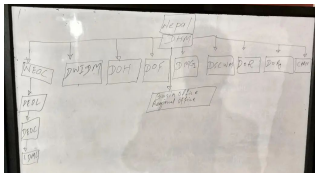
T+23 to T+43: constable's **loudspeaker** was the authority.





2015 Report:

Manage a register and CAP integrating all Authorities at all layers
A common operating picture at the national and local institutional layers - all-hazard all-media alerting





"Every message has a name: who is allowed to issue it, traced back to the source."

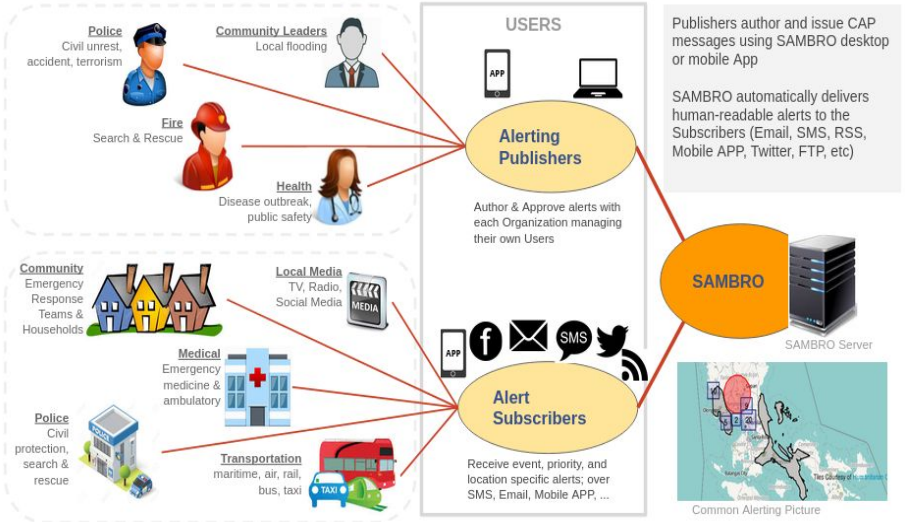
LIRNEasia
Pro-poor. Pro-market.

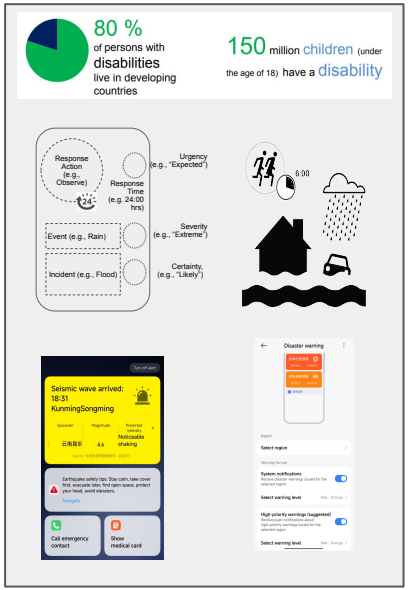
EW-3: Deliver the right message through every channel

✦ all-hazard, all-media, interoperable, complementary redundancy ✦ cell broadcast, sirens along the corridor, loudspeakers, community radio ✦ one message, every language and every ability, with location and time-to-impact; ✦ ITU-T X.1303 Common Alerting Protocol as the common format.

2026 Echo:
T+38: SMS to 679,295 phones; **one channel, Nepali only**, No location, no time-to-impact.
T+58 to T+77: reached Nuwakot with the water.

2015 Report:
Cell broadcast recommended, yet to be implemented.
Community radio: no BC-DRP or SOPs; an Emergency Band recommended.
CAP all-hazard, all-media platform recommended.





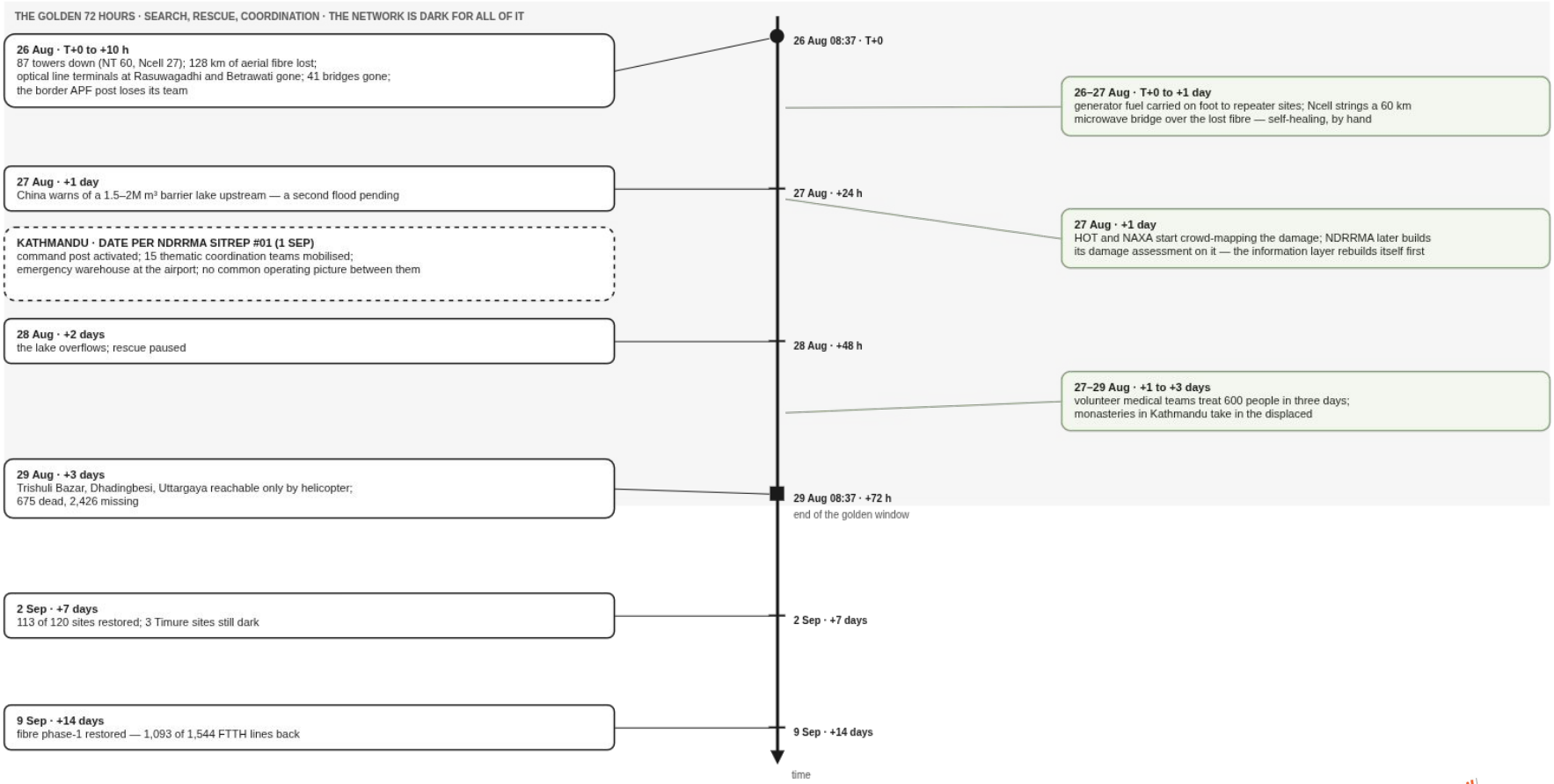
"One message, every channel: with the CAP fields the SMS didn't carry."

LIRNEasia
Pro-poor. Pro-market.

The Golden 72 Hours (T = 08:37, 26 August)

Incident Management

distance no longer matters — time does · Rasuwa, Nuwakot, Dhading · not to scale after 72 h



Sourced: OnlineKhabar; Clickmandu; Radio Nepal; NepalNews; Kathmandu Post; Al Jazeera; NDRRMA SitRep #01; OpenStreetMap organised-editing record; New York Times (medical teams, monasteries — single source).

LIRNEasia
Pro-poor. Pro-market.

G72-1: Formalize the informal — self-organizing communities

- ✦ Write the community layer into the national plan as a designed layer: registered, trained, equipped, two-way.
- ✦ Community radio, ham operators, village relays, CERTs, school heads.
- ✦ Funded and drilled like infrastructure; Safety-II as the principle: robustness, self-organization, learning.

2026 Echo:
+0 to +72 h: the network was dark for all of it.
+1 to +3 days: volunteer medical teams treated 600 people.
+1 to +3 days: monasteries in Kathmandu took in the displaced. Nobody had given them a radio.

2015 Report:
Chautara's tower back in 2 days on bamboo hoists.
500+ community radios; 75 silent for 3 days, still the most trusted channel.
QuakeMap took 2,000+ citizen reports in a day.





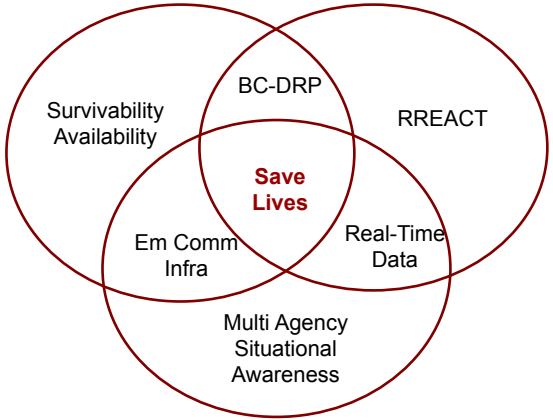
"The informal layer is always there. The choice is whether we design it in."

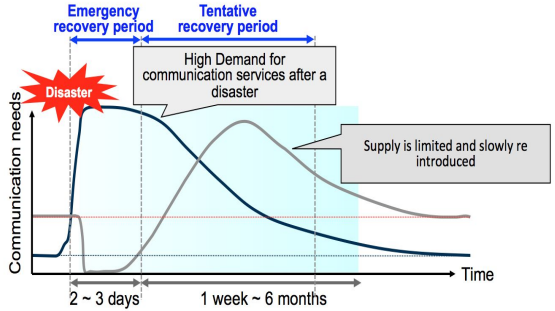
LIRNEasia
Pro-poor. Pro-market.

G72-2: Restore access in hours, not weeks — self-healing networks

- ✦ A national RREACT programme: turnkey kits pre-positioned in the districts, and a restoration benchmark in hours.
- ✦ Mandated infrastructure sharing in a declared disaster; ✦ VHF/HF as the guaranteed floor.
- ✦ Survivability and availability assessed and written into every operator's BC-DRP.

2026 Echo:
+0 to +10 h: 87 towers down; 128 km of aerial fibre lost.
+0 to +1 day: fuel carried on foot; Ncell bridged 60 km by microwave.
+7 days: 113 of 120 sites back; 3 Timure sites still dark.
+14 days: 1,093 of 1,544 fibre-to-the-home lines back.





2015 Report:
40% restored by day 2,
70% by day 5,
100% by day 7.
VHF/HF the only reliable mode for the first 7 days.
Recommended RREACT, by name







"Self-healing by design, not by hand."

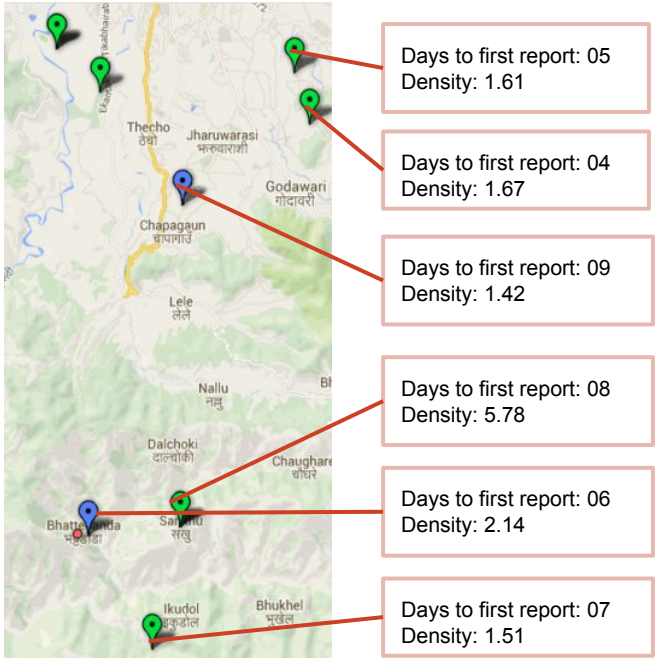
LIRNEasia
Pro-poor. Pro-market.

G72-3: One common operating picture — multi-agency situational awareness

✦ An always-on interoperable multi-agency situational-awareness platform, used daily by police, ambulance and fire so it works on the day. ✦ One verified picture; every action carrying its originator, time and place: the accountability trace. ✦ Forecast-to-action triggers written into law.

2026 Echo:
+1 day: China warns of a barrier lake upstream; a second flood pending.
+1 day: HOT and NAXA crowd-map the damage; NDRRMA builds its assessment on it.
+2 days: the lake overflows; rescue paused.
+ 15 days thematic teams, no common picture between them.

2015 Report:
All emergency services were working independently, improvising.
Recommended mode was multi-agency situational awareness,
Systems that are always on and always operational.



Days to first report: 05
Density: 1.61

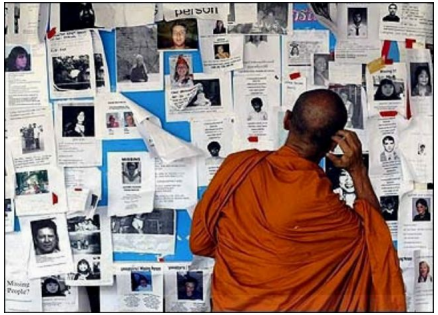
Days to first report: 04
Density: 1.67

Days to first report: 09
Density: 1.42

Days to first report: 08
Density: 5.78

Days to first report: 06
Density: 2.14

Days to first report: 07
Density: 1.51

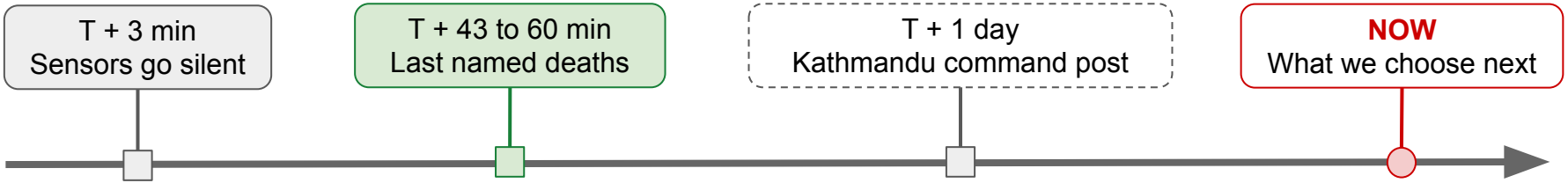




"Every link existed. Nothing joined them."

LIRNEasia
Pro-poor. Pro-market.

Same Clock, One Choice - What we choose next



Three moves

SEE IT

EW: sense at its source, report faster than it moves and give the last mile authority to act on its own sensors — not just receive someone else's alert.

G72: one common operating picture, with communities reporting in.

NAME IT

EW: register who may alert, down to the police post and school. — an alert always has a name and a timestamp attached.

G72: register the self-organizing community layer that responds.

CARRY IT

EW: one message through every channel, in every language.

G72: access restored in hours, not weeks with a shared common operating picture across all stakeholders

"That's not an engineering gap. That's a governance gap — and governance is a choice."



LIRNEasia
Pro-poor. Pro-market.

"The last mile isn't where the network's obligation ends. It's where it starts — the first place a warning has to reach, and the first place a response actually begins. Build for that, and the network doesn't collapse next time. It degrades, and it holds."

THANK YOU

nuwan@lirneasia.net

LIRNEasia
Pro-poor. Pro-market.