

Mind the gaps in disaster warning systems – and fix them

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1. CONTEXT

- Early-warning actions are plagued by structural gaps. We need a determined effort from the global community to identify some of them — and to help bridge them.
- National and local governments, international organizations, researchers, the private sector, operational staff, community workers and the public all have an essential part to play in the efficient running of early-warning systems.
- All actors need to note each others' contributions and be intentional about forming a collective effort. Key lessons have been identified from the volcanological communities that can assist in creating effective warnings for all.

2. ADDRESSING BARRIERS

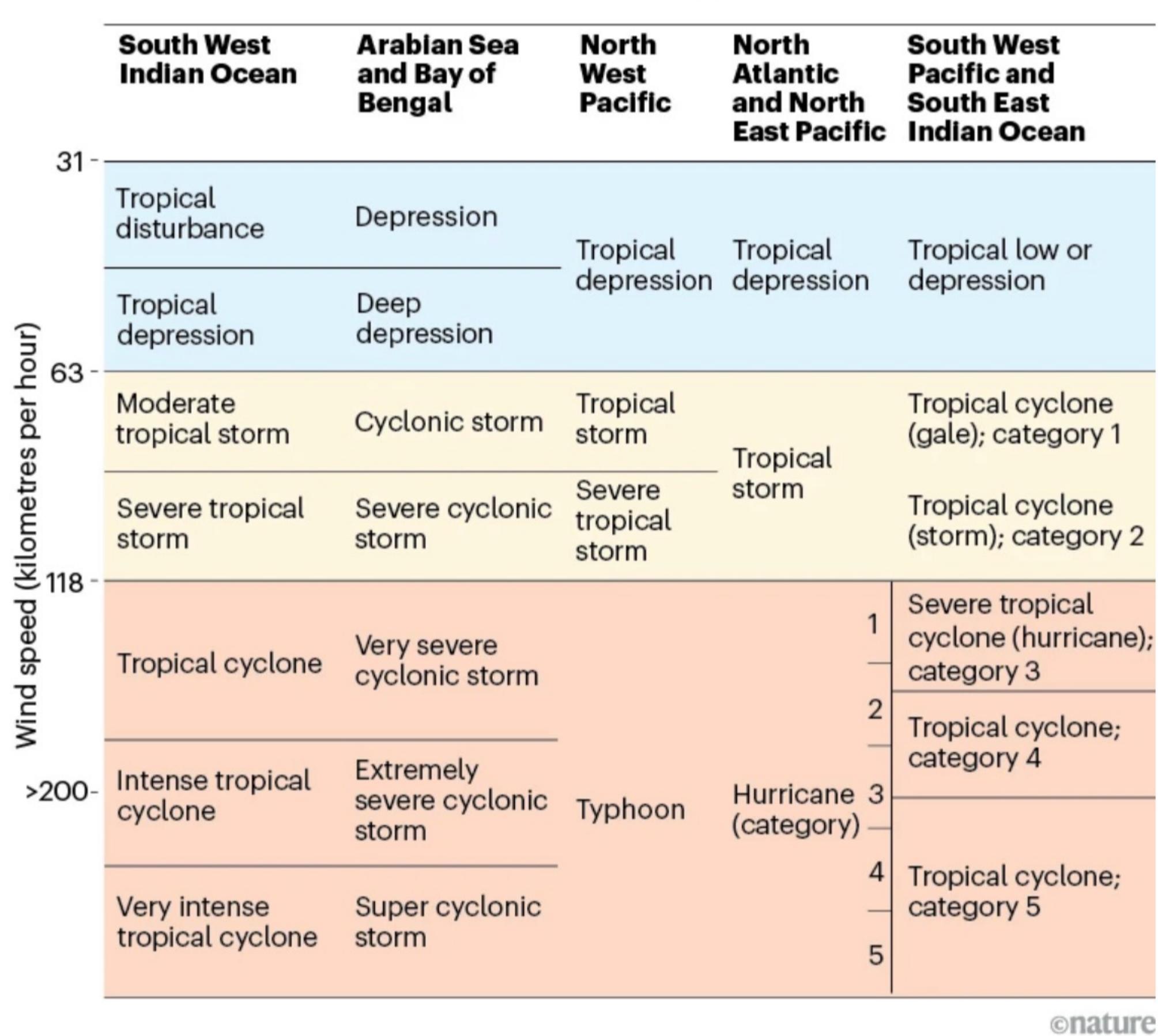
- Part of the difficulty in establishing multi-hazard early-warning systems arises from the widely differing risks posed by various hazards.
- To reach people efficiently, early warning systems should also be consistent, highly accessible and as easy to act on as possible.

Volcanic hazards are complex and challenging in both areas, and considerable directed effort is needed.

In meteorology, there are regional inconsistencies with terminology despite decades of consistent effort. Volcanology has similar challenges but no coordination mechanism to make progress.

LANGUAGE BARRIER

Different regions use varying methods for measuring and naming the same tropical weather phenomenon — a rapidly rotating system of clouds and storms with a low-pressure centre.



3. INTEGRATE INCLUSIVE INFORMATION FLOWS

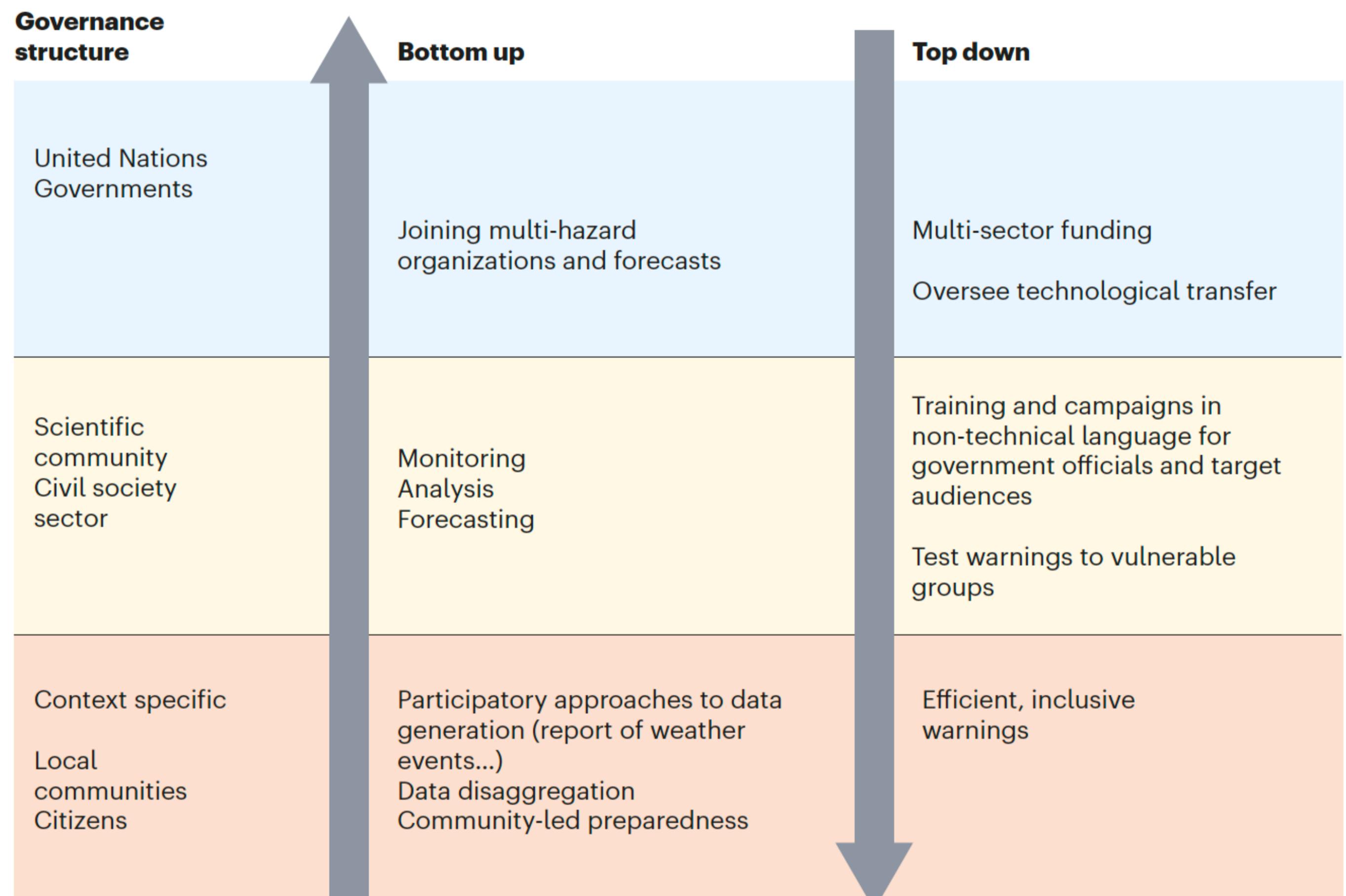
The 'First Mile' is essential to effective action:

'The key is that the people who need EWS information can assist in providing that information and they should be involved as the first, not last, step of setting up and operationalising an EWS' (Kelman and Glantz, 2014 pp.105-106)

'Warnings are part of a social process means that it should be ongoing, engrained in the day-to-day and decade-to-decade functioning of society - even while recognising that this ideal is rarely met in practice' (Kelman and Glantz, 2014, p.100)

COMBINE TOP-DOWN AND BOTTOM-UP PROCESSES

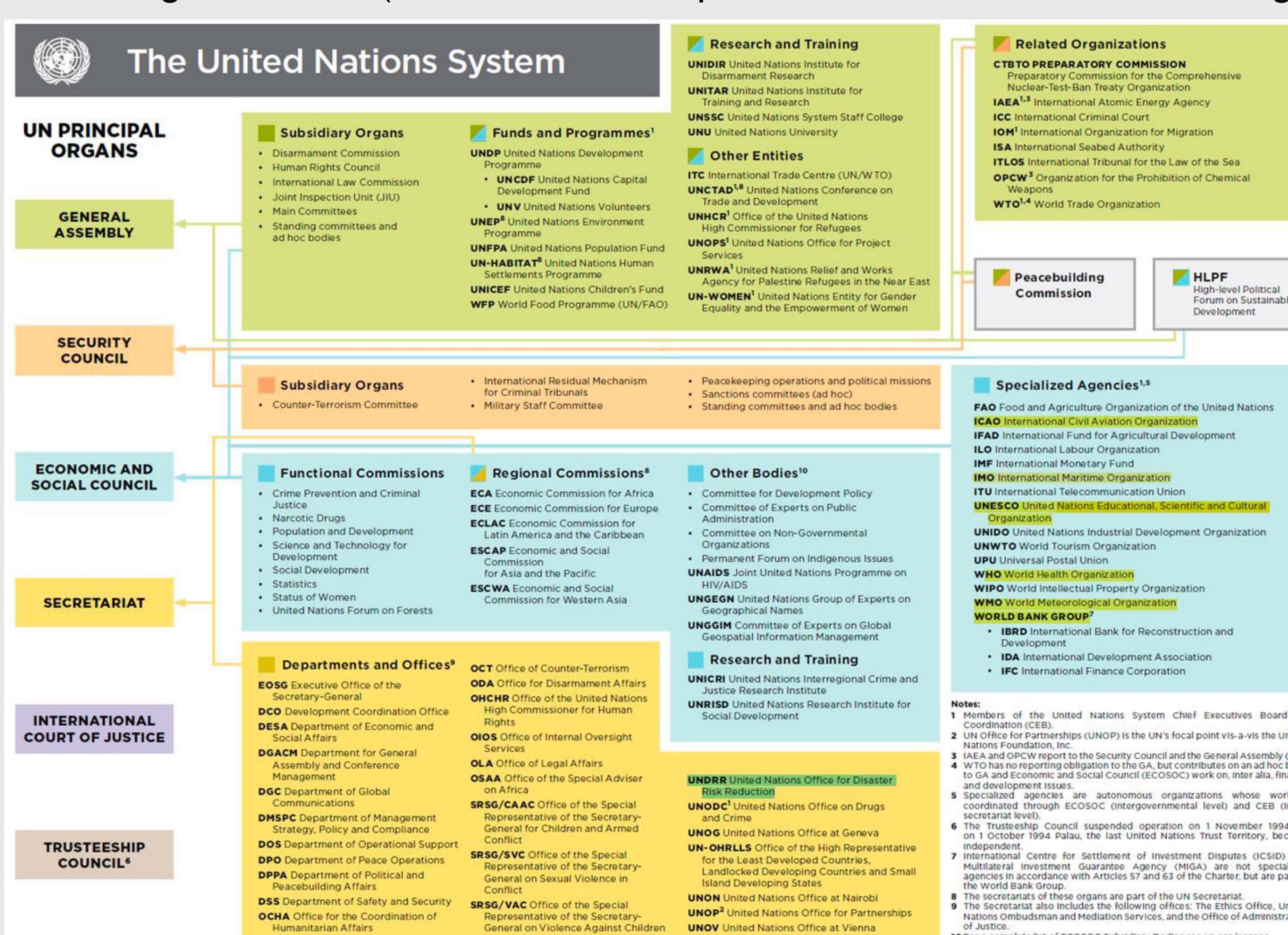
To run efficiently, early-warning processes need joined-up thinking and actions across silos, spanning hazards, risks, vulnerability, regions and institutions.



4. SILOED COORDINATION

Organizational patchwork + Differences between countries and regions = Barriers to the smooth running of multi-hazard early-warning systems across the world (Tupper & Bear-Crozier 2022)

How do we ensure geohazards (volcanoes, earthquakes, landslides) don't fall through the gaps?



5. KEY TAKE AWAYS

- Progress has often been driven by dedicated individuals working with each other, with local communities and with UN-backed organizations.
- Many organisations have developed good practices and learnt lessons, but these remain in silos. The volcanological community has a wealth of experience in managing anticipatory action.

Much more work is needed:

- **The technology to forecast most hazards and alert populations exists.** It is now up to people at all organizational levels — including the scientific community — to engage in a bottom-up and top-down process that has feedbacks and loops
- **Invest in warnings.** Without directed effort and investment in monitoring facilities and trained staff through sustained resources, many nations lack the ability to generate warnings at all
- **Risks are accelerating and warning systems have lagged behind.** Inclusive warnings are vital, and a change in attitude towards warnings is urgently needed.

References:

Kelman, I., & Glantz, M. H. (2014). Early warning systems defined. In *Reducing disaster: Early warning systems for climate change* (pp. 89-108). Dordrecht: Springer Netherlands.

Tupper, A., & Fearnley, C. (2023). Disaster early-warning systems can succeed—but collective action is needed. *Nature*, 623, 478-482.

Tupper, A. C., & Bear-Crozier, A. N. (2022). Improving global coordination of volcanic hazard warnings in support of the Sendai Framework for Disaster Risk Reduction: a four-step plan for aligning with international hydrometeorological arrangements. *Bulletin of Volcanology*, 84(5), 50.

