Enhancing resilience for efficient disaster response

Masterclass: *Technologies defining the New Broadcast media approaches*

18th Asia Media Summit (AMS)

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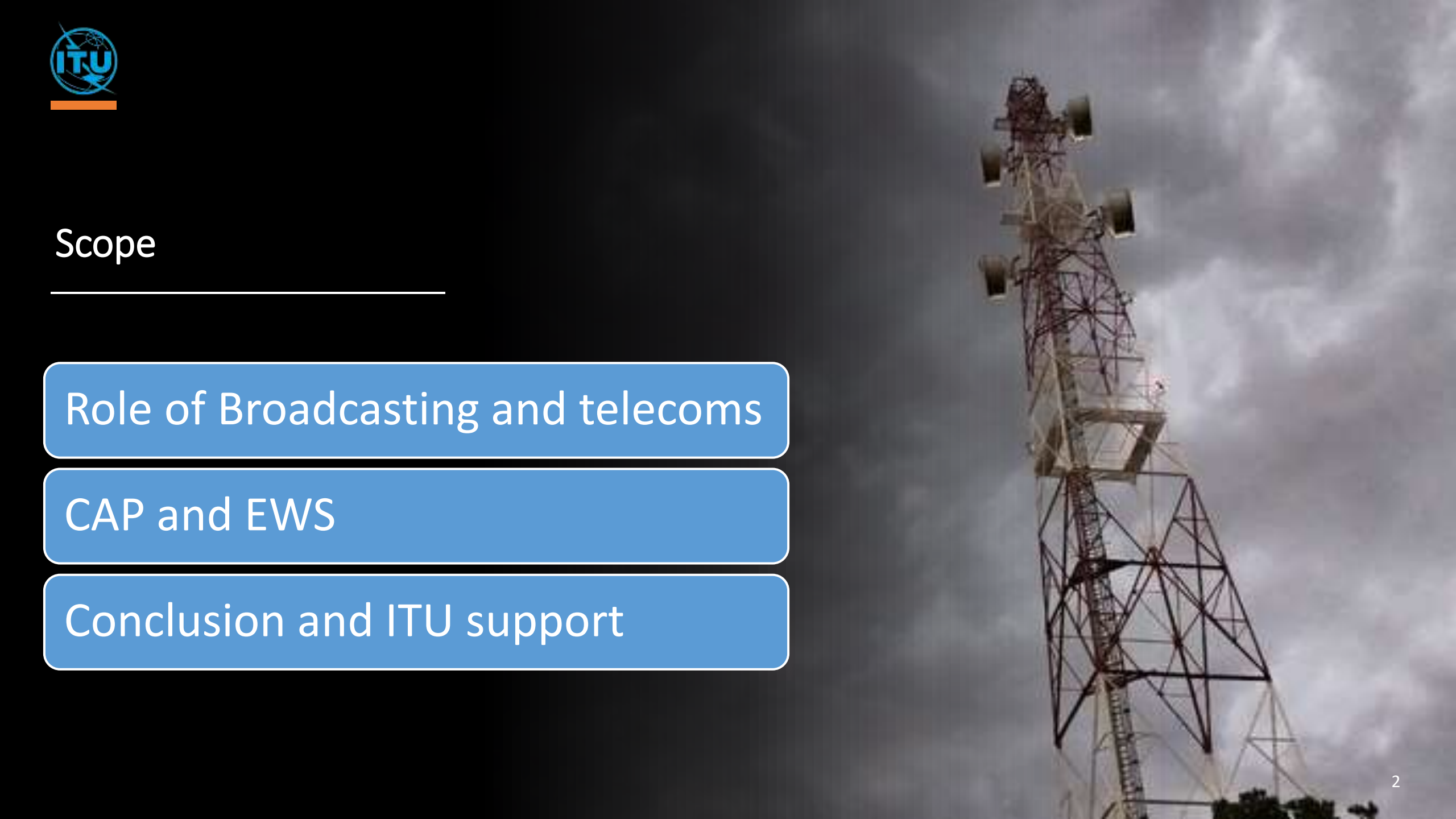
Aamir Riaz - International Telecommunication Union – Regional Office for Asia and the Pacific

Scope

- Role of Broadcasting and telecoms
- CAP and EWS
- Conclusion and ITU support



International Telecommunication Union (ITU)

Our mission: Connect the world

Specialized United Nations (UN) Agency for Telecommunications & Information and Communication Technologies (ICTs)

3

Sectors

- Standardization
- Radiocommunication
- Development

193

Member States

900

Companies, universities, and international and regional organizations.

Rich network of experts in the global ICT ecosystem

Broadcasting

1.38 *broadcasting service:* A *radiocommunication service* in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, *television* transmissions or other types of transmission (CS).

1.39 *broadcasting-satellite service:* A *radiocommunication service* in which signals transmitted or retransmitted by *space stations* are intended for direct reception by the general public. In the broadcasting-satellite service, the term "direct reception" shall encompass both *individual reception* and *community reception*.

1.85 *broadcasting station:* A *station* in the *broadcasting service*.

1.130 *community reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by receiving equipment, which in some cases may be complex and have antennas larger than those used for *individual reception*, and intended for use:
– by a group of the general public at one location; or
– through a distribution system covering a limited area.

Emergency Telecommunication and Disaster Risk Management

The disaster risk management process adopted by the United Nations Office for Disaster Risk Reduction (UNDRR) consists of four phases:

1. Mitigation
2. Preparedness
3. Response
4. Recovery

DRM - Principles

Multi-hazard

ICTs play a critical role in facilitating the flow of vital information in a timely manner.

Multi-technology

The use of different ICT technologies can help mitigate the impact of disasters

Multi-phase

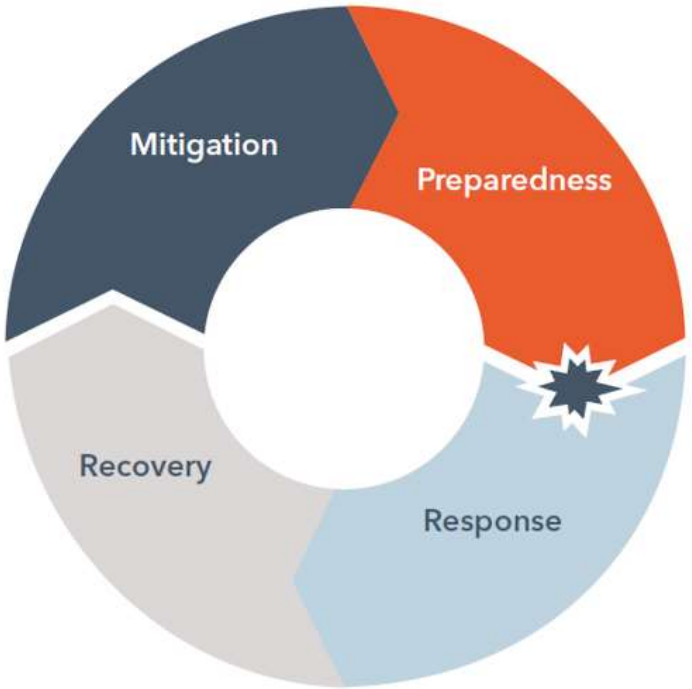
ICTs are critical in all stages of disaster management

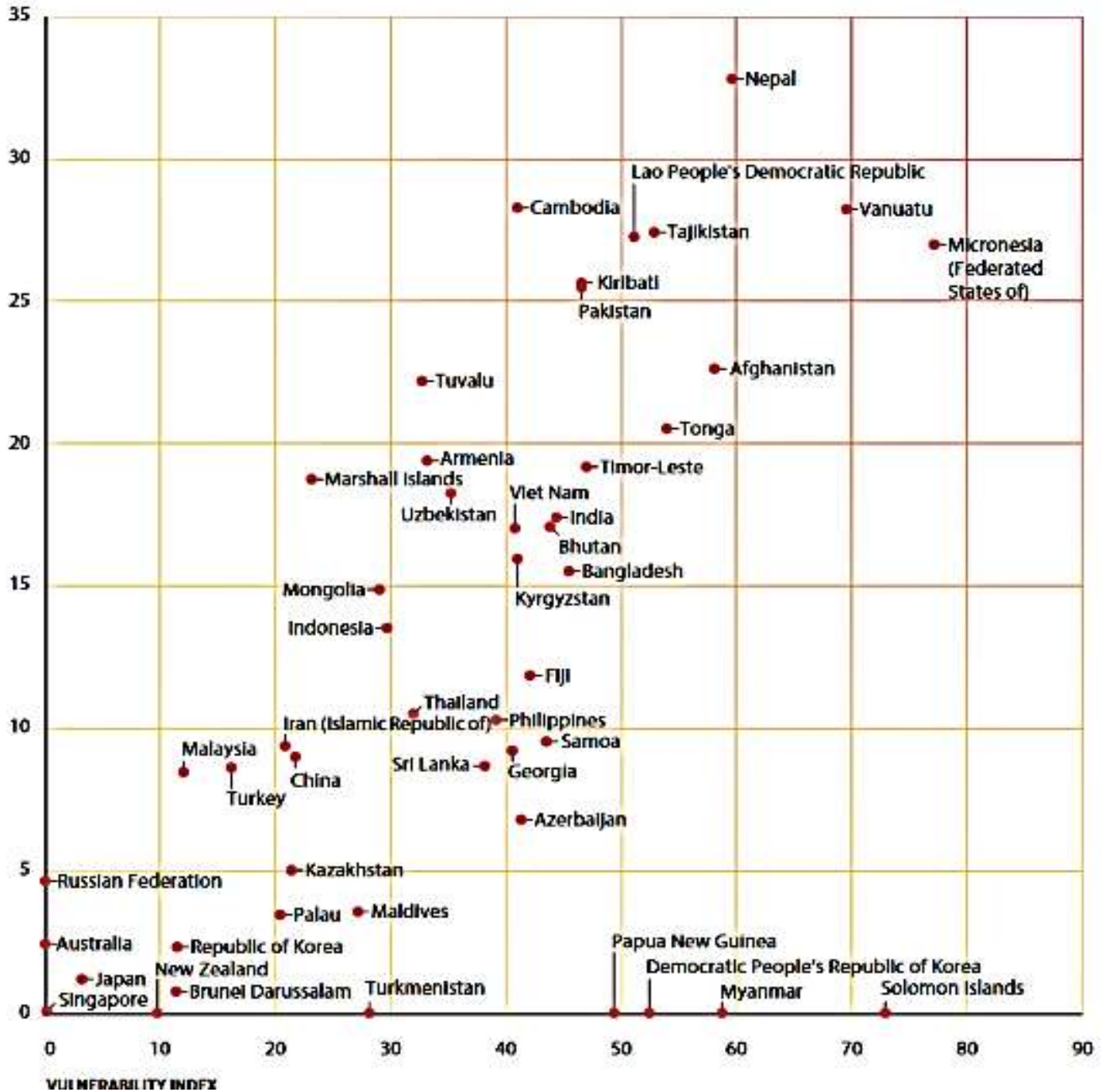
Multi-stakeholder

All stakeholders should ensure access to ICTs for better coordination

Source: ITU

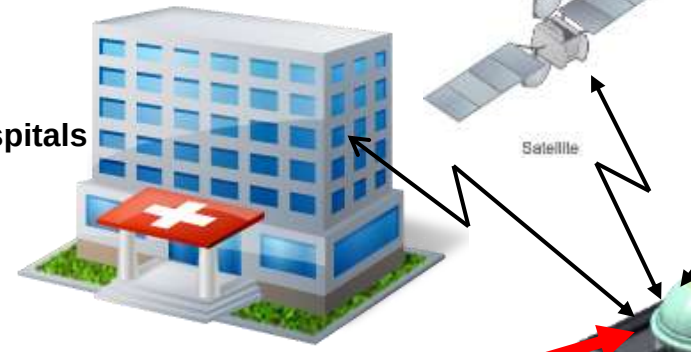
Vulnerability v/s Exposure





Source: ESCAP

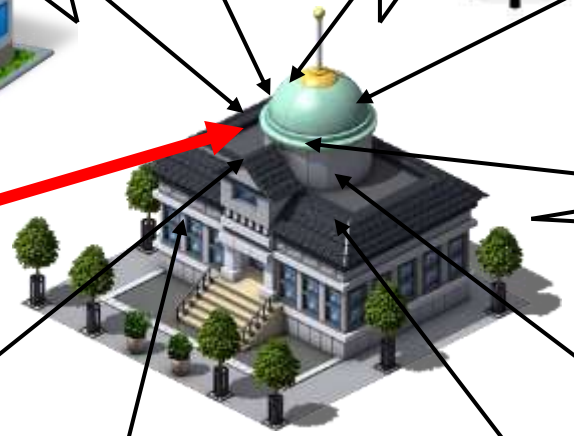
Multi-stakeholder engagement



Broadcasting

Beach public address system

Early Warning Centre



Disaster Management Headquarters

Public Announcing System

Government authority

Fire Division Headquarters

Indoor receivers Citizens

Public-Service Vehicles (Fire engines)

Public-Relations Vehicle (Official Vehicles)

Behavior - Need of Information

Information

In disaster situations, members of the public seek at first not to communicate, but to be informed, so that they may understand what is happening (or about to happen), and to assess whether and how they and their family and friends may be affected.

Personal Communication

Following the initial need for information, personal communication is then attempted as citizens seek rapid contact with family members and friends.

Communication infrastructure – Challenges during disaster

- **Infrastructure (BTS/Node B, Fiber cable) destroyed or not working**
  - Power issues
- **Network chocking**
- **Cyber security or DOS attacks**
- **Quality and reliability of conveyed information**
- **In most cases, commercial charges on services**

Broadcasting – Advantages during disaster 1/2

- **Architecture is simple and powerful**
  - If the main transmitter and the radio or television studios that feed it remain on the air, reception is available wherever there are working receivers
- **Robust**
  - geographical diversity of multiple radio and television services within a given country. If one or a few radio and television broadcasters are not able to remain in service, or suffer an outage, other broadcast signals are usually available.
  - Difficult to disrupt several or all sites of the DTT broadcasting network.
  - In addition, an attack on a DTT site can be brought only on the territory where the transmitter is located. Thus, a hostile action against DTT transmissions is less likely, because the source is more easily identifiable.

Broadcasting – Advantages during disaster 2/2

- **Easier comparative access for alternative power solutions**
  - Radio receivers can be AC-powered, battery, or hand crank-operated, and are present in virtually all motor vehicles
- **Professional quality of the compilation and analysis**
  - Expert ability to interpret information and impact for their viewers in the local broadcast coverage area
- **Emergency broadcast mandated to be free**

Broadcasting during disaster - *Operational methods for continued service 1/2*

- **Redundant capabilities and signal paths for over the air and feeds**
  - High risk stations have “case-hardened” facilities that include multiple power feeds from diverse power generation stations, full backup power generators at the studio and transmitter sites, multiple signal paths from studio to transmitter sites, redundant transmitters/antennas and direct feeds to cable and satellite operators.
- **Temporary set ups**
  - **Radio in a suitcase** :kits on standby, which are used to re establish FM radio services when these are destroyed or damaged. Used in conjunction with a small petrol-driven generator,
  - **BBC Media Action –** Use of emergency equipment like satellite telephones and Broadband Global Area Network (BGAN) satellite modems to support emergency broadcasting in locations where the local telecommunications infrastructure has collapsed. It also describes BBC Media Action’s use of other emergency equipment, including suitcase radios and solar/wind-up radios.

Broadcasting during disaster - *Operational methods for continued service 2/2*

- **Temporary Setups … continued**
  - **Emergency Transmission Vehicles:** NHK uses this special vehicle that has the capability to drive up to the transmitting site and back up the transmitter and antenna.

The television source signals are obtained by receiving the signal from a neighbouring transmitting site by Yagi antenna.

The source signal may be fed to the transmitter in the format of an MPEG-2 Transport Stream, Radio Frequency, or Intermediate Frequency.

In cases where it is difficult to obtain the signal from a neighbouring transmitting site, a temporary microwave video link may be used instead. In the worst case, satellite broadcasts may be used as the source signal.

Broadcasting and telecoms – *Increasing overall resilience through sharing infrastructure 1/2*

In addition to traditional ENS and satellite outside broadcast vehicles, broadcaster have increased dependence on new tech for news gathering and the dissemination of emergency information

- *live and recorded mobile phone videos can be placed on the air, making it possible to use non-traditional broadcasting equipment to share important information;*
- *broadcasters are adapting small aperture satellite dish technology that allows for a more easily deployed satellite news gathering tool in a local market;*
- *diversity microwave receive sites that make it possible to use small vehicles equipped with microwave transmitters to drive and report on road and other conditions;*
- *Aerial vehicles to give overall views of an area-wide emergency;*
- *computer mapping software to quickly document and display details of an emergency to the public.*

Broadcasting and telecoms – *Increasing overall resilience through sharing infrastructure 2/2*

- **Japan:** the “One-Seg” mobile digital TV service is available in a large majority of mobile phones.
  - Feature also included in several Electronic dictionary, Car navigation system, Handheld game console (PSP and Nintendo DS), Portable devices, Set top box, Mobile Phones
- **Europe:** FM radio reception capability in mobile phones is commonplace

Broadcasting during disaster in HF 1/2

- **Short Wave** a crucial asset when local infrastructure is damaged or completely gone.

- International Radio for Disaster Relief (IRDR) programme under the umbrella of the High Frequency Co-ordination Conference (HFCC), which supports informal co-ordination of frequency channels for short-wave radio broadcasts.

- In 2022, updated **Recommendation ITU-R BS.2107 which lists 10 frequencies between 6 megahertz (MHz) and 26 MHz** that should be reserved globally for 24 hours a day, 365 days a year, for emergency broadcasts.

Broadcasting during disaster in HF 2/2

IRDR frequencies for emergency broadcasts in the High Frequency (HF) bands

Band (MHz)	IRDR frequency (kHz)
6	5 910
7	7 400
9	9 430
11	11 840
13	13 620
15	15 650
17	17 500
19	18 950
21	21 840
26	26 010

The frequency channel adjacent to these frequencies should also be clear (±5 kHz).

In emergencies, frequencies are available for use in accordance with the Radio Regulations, the treaty maintained by ITU.

Recommendation ITU-R BS.2107-1 (12/2022)

Scope

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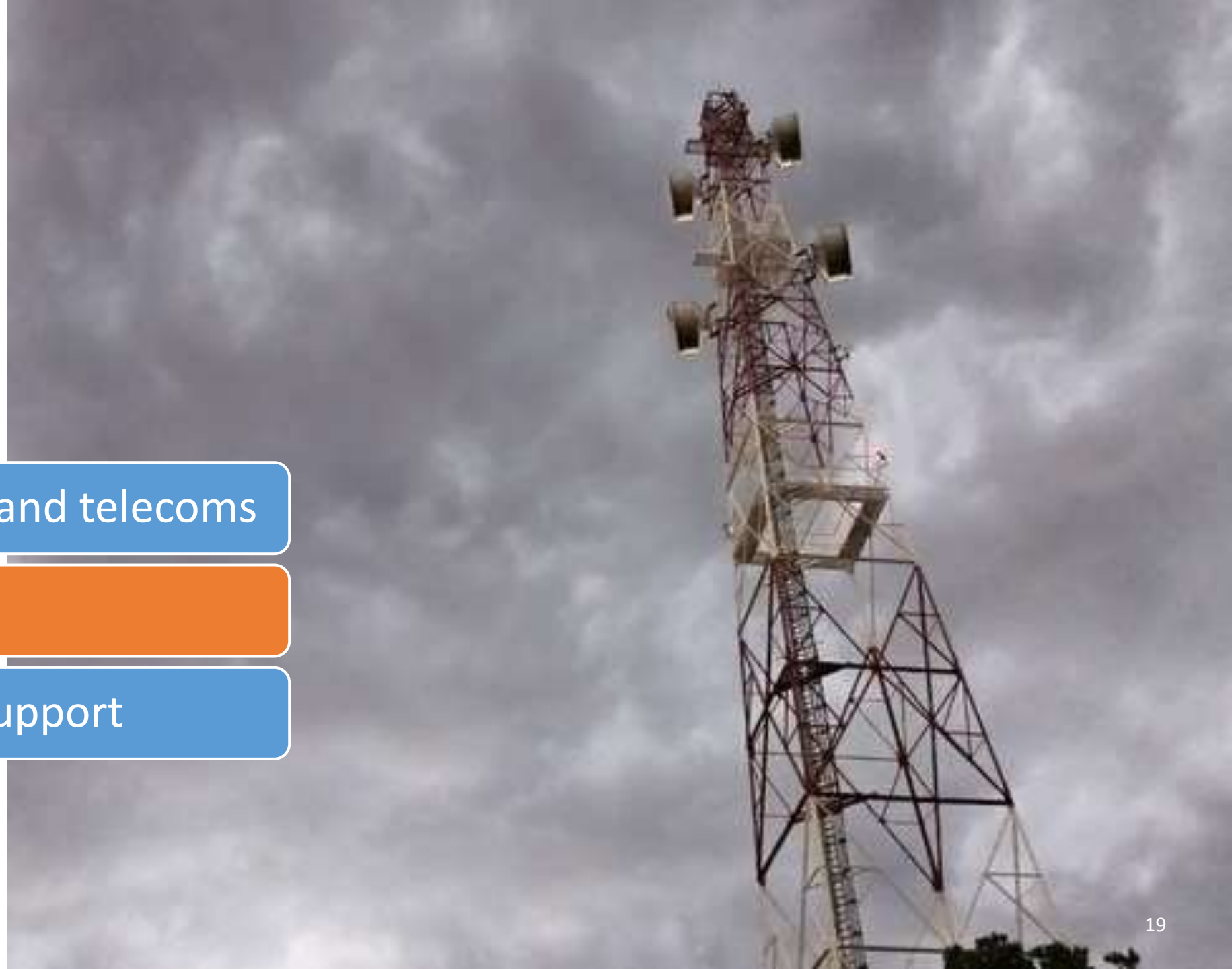


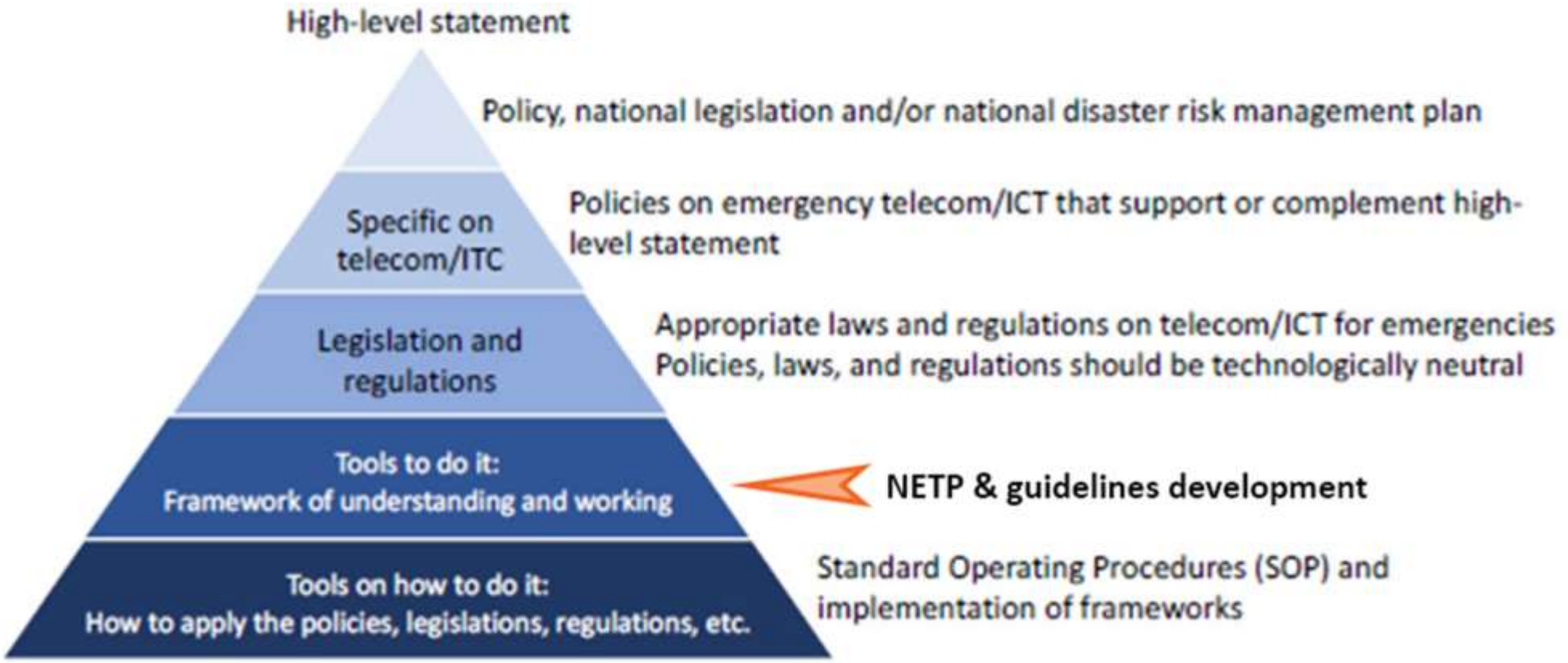
Emergency Broadcast Example

What did you Notice?

- **Need of comprehensive national approach to EW?**

- **What if someone is not listening/viewing the regular broadcast?**

ITU ET products and Services - NETPs

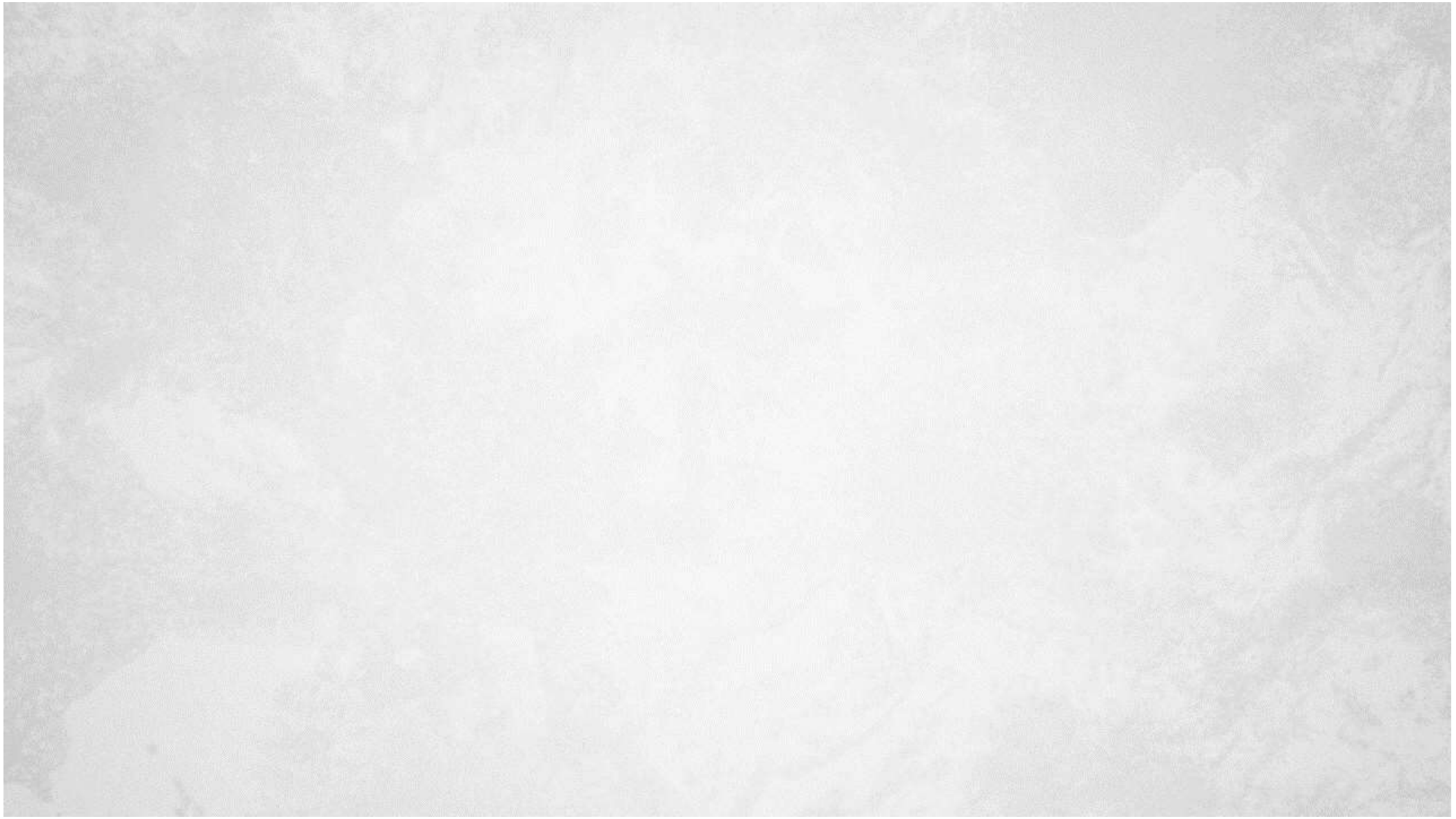


A National Emergency Telecommunication Plan (NETP) sets out a strategy to enable and ensure communications availability during the disaster mitigation, preparedness, response and recovery phases, by promoting coordination across all levels of government, between public and private organizations, and within communities at risk.

CAP – Common Alerting Protocol

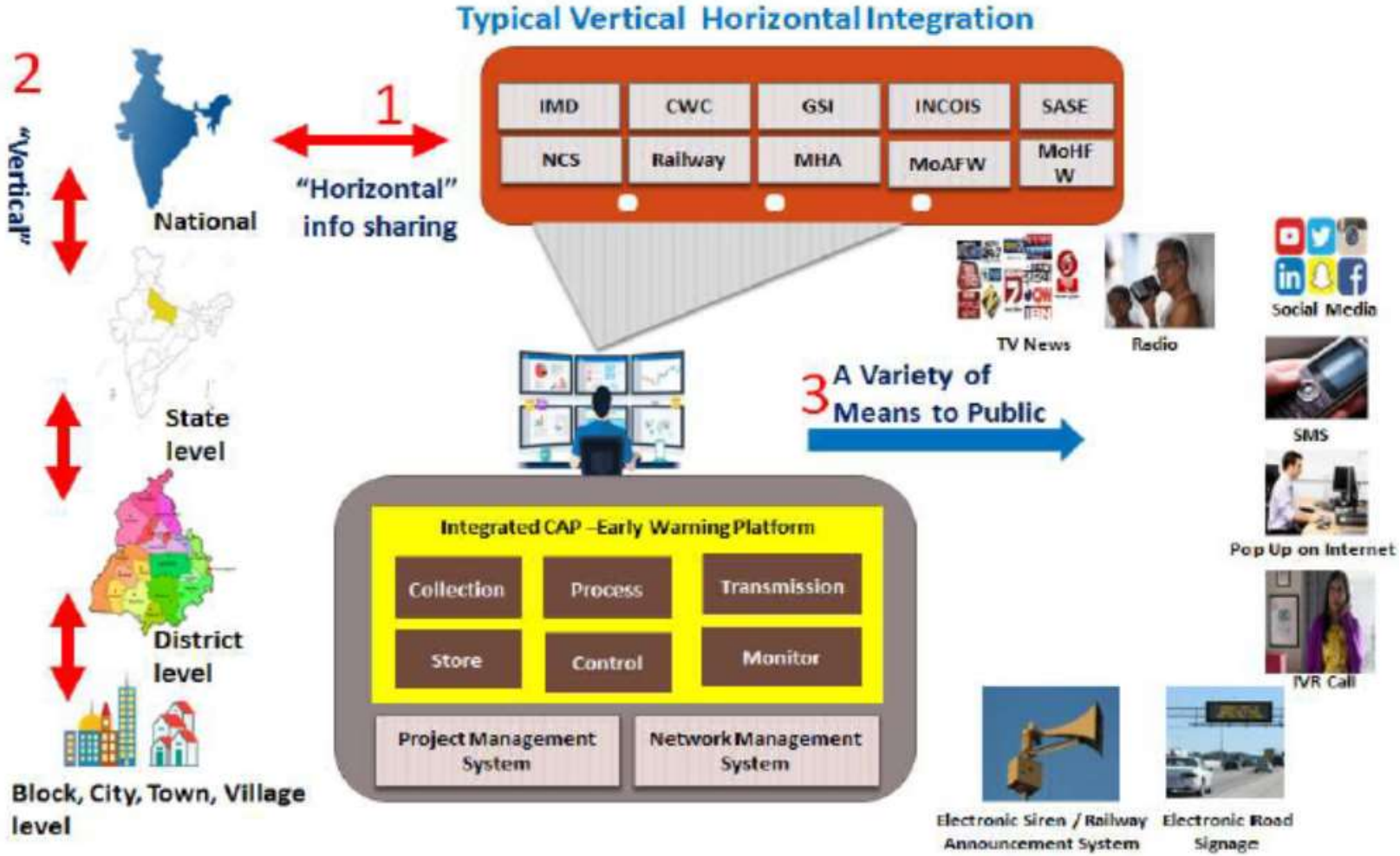
- Simple and general Format for exchanging all-hazard emergency alerts and public warnings over all kinds of ICT networks
- Already been adopted **as ITU-T Recommendation X.1303.**

CAP – Common Alerting Protocol



CAP

Enables authorities to deliver early warnings and alerts to all people and communities at risk, and up to global scale through the use of different technologies.



Picture source:
Eliot Christian presentation on CAP

Technologies to be used: mobile and landline telephones, Internet (e-mail, Google, Facebook, Twitter, WhatsApp, smartphone apps, online advertising, Internet of Things (IoT) devices, in-home smart speakers, etc.), sirens (in-building or outdoor), broadcast radio and television, cable television, emergency radio, amateur radio, satellite direct broadcast, and digital signage networks (highway signs, billboards, automobile and rail traffic control), among others.

CAP

Sample CAP template

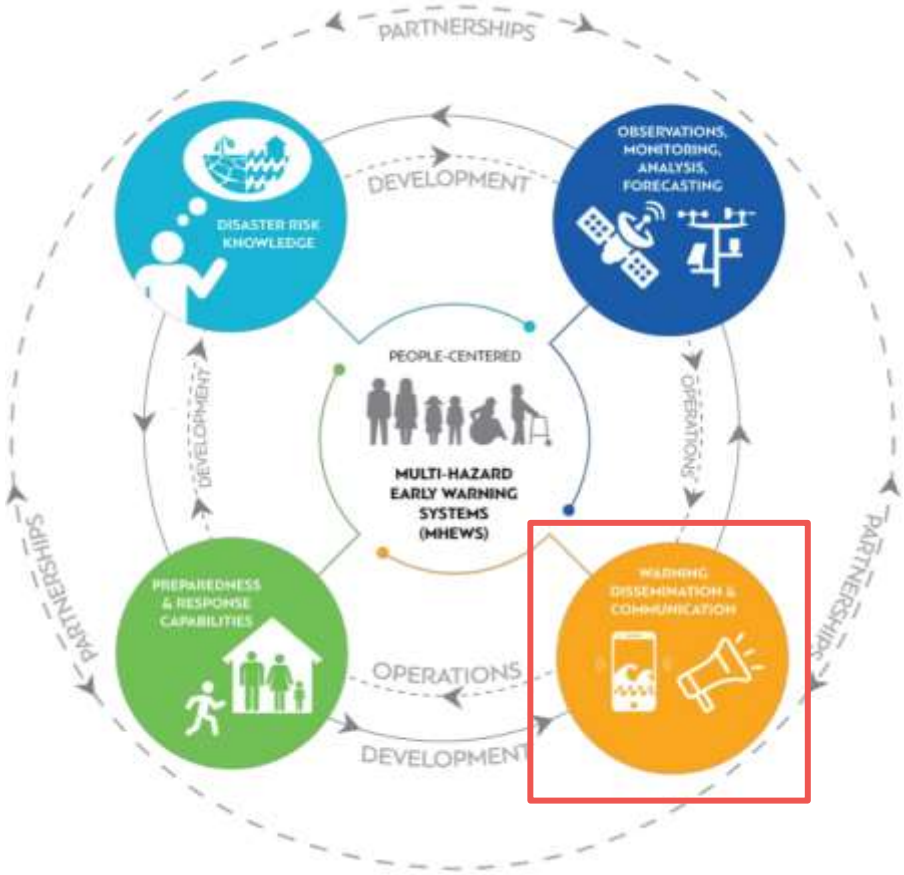
https://www.undp.org/latin-america/publications/common-alerting-protocol-cap-sample-alert-message-templates

SEVERE THUNDERSTORM WARNING

Identifier:	KSTO1055887203
Sender:	KSTO@NWS.NOAA.GOV
Sent:	2003-06-17T14:57:00-07:00
Status:	Actual
Message Type:	Alert
Scope:	Public
Category:	Met
Event:	SEVERE THUNDERSTORM
Urgency:	Immediate
Severity:	Severe
Certainty:	Likely
Expires:	2003-06-17T16:00:00-07:00
Sender Name:	NATIONAL WEATHER SERVICE SACRAMENTO CA
Headline:	SEVERE THUNDERSTORM WARNING
Description:	AT 254 PM PDT... NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM OVER SOUTH CENTRAL ALPINE COUNTY... OR ABOUT 18 MILES SOUTHEAST OF KIRKWOOD... MOVING SOUTHWEST AT 5 MPH. HAIL... INTENSE RAIN AND STRONG DAMAGING WINDS ARE LIKELY WITH THIS STORM.
Instruction:	TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM PASSES.
Contact:	BARUFFALDI/JUSKIE
Area:	
Description:	EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN CALIFORNIA, EXTREME NORTHEASTERN CALAVERAS COUNTY IN CALIFORNIA, SOUTHWESTERN ALPINE COUNTY IN CALIFORNIA
Polygon:	38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89

UN Initiative on Early Warning Systems for All

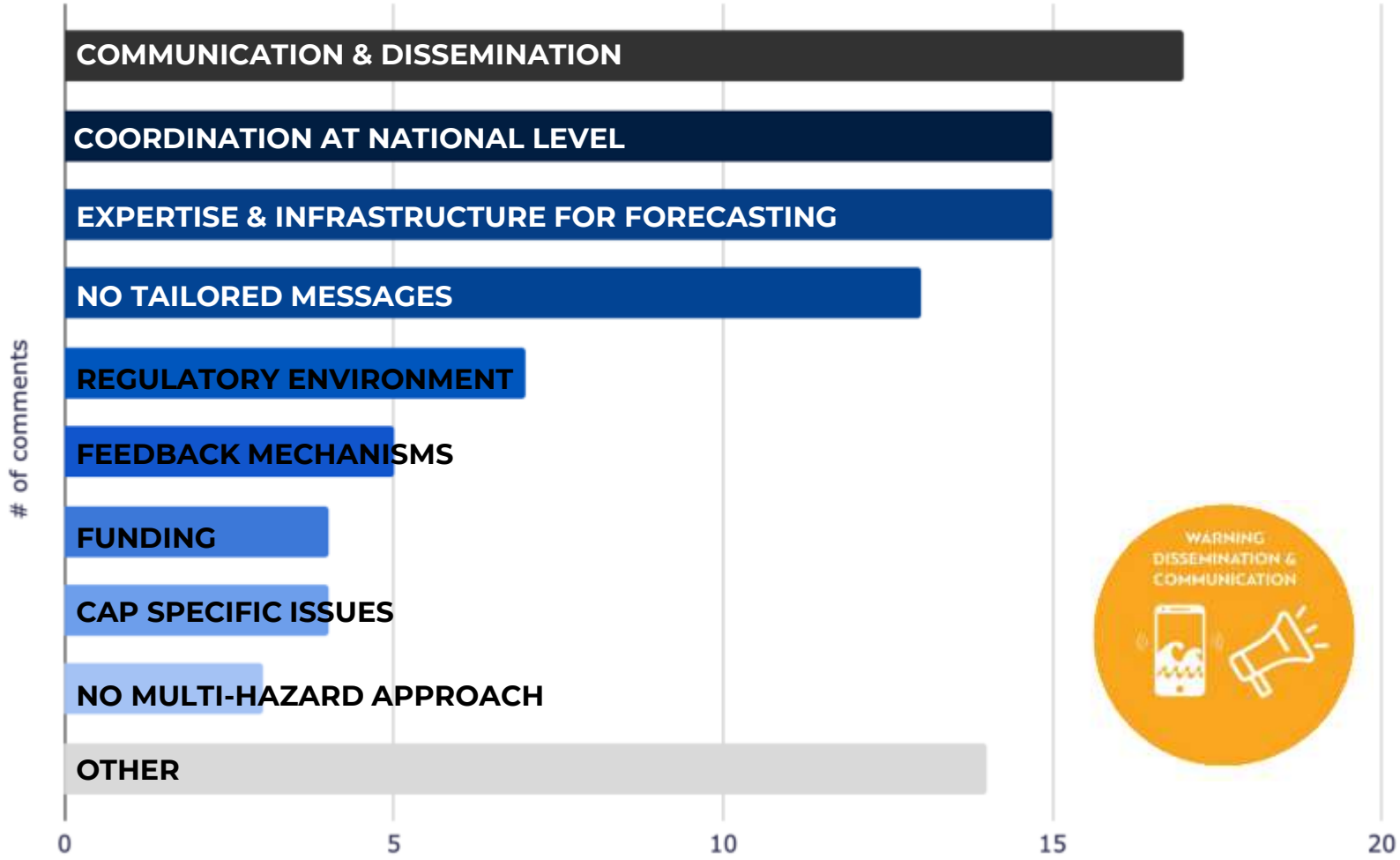
In March 2022, the UN set a new target to **ensure that everyone on Earth should be protected by early warning systems by 2027**.



Multi-Hazard Early Warning System(MHEWS)
Value Cycle – 4 pillars

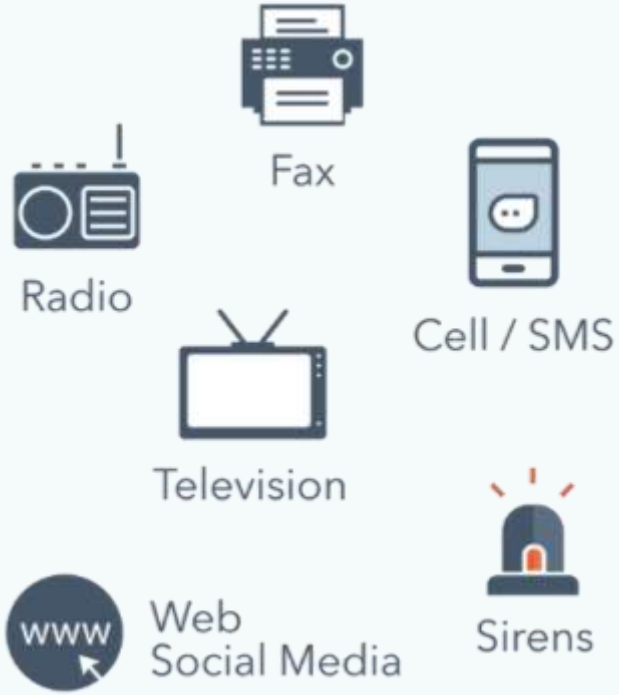
Warning Dissemination & Communication

-- **is the biggest challenge for EWS,** according to a research conducted in 13 countries in Africa& Caribbean shows that this pillar



Multi-channel Approach for Warning Dissemination and Communication

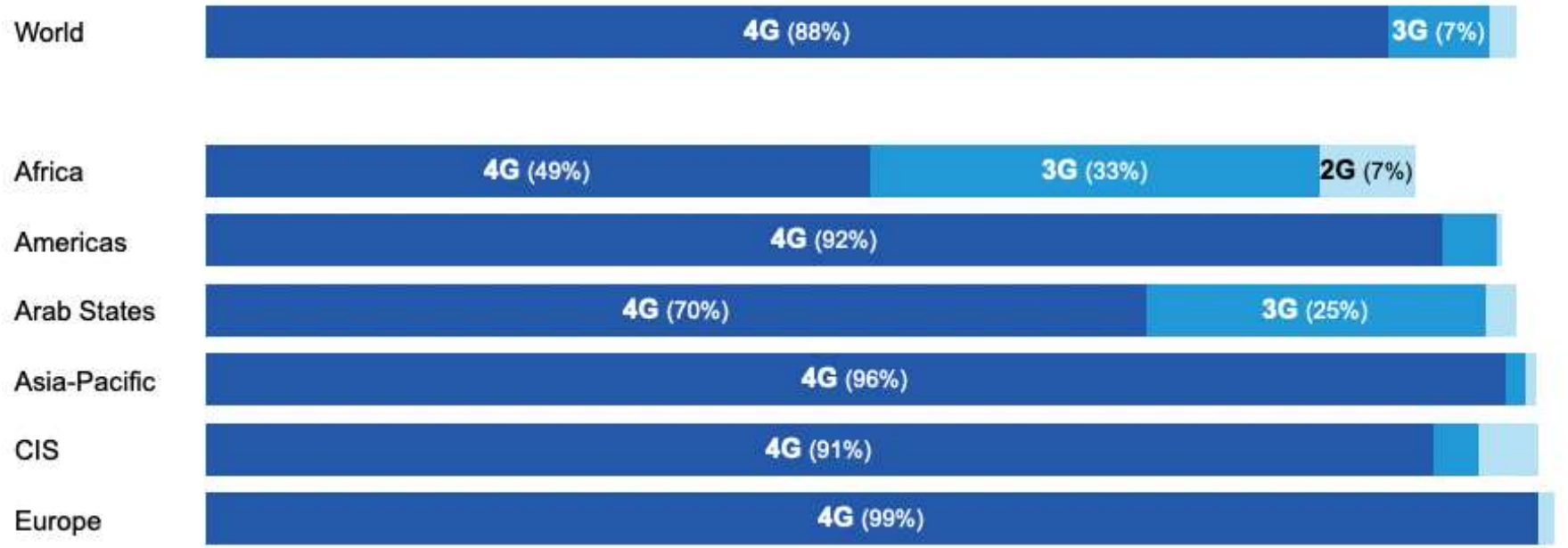
- In warning dissemination and communication, a **multi-channel approach** increases the effectiveness of an alert and help address the diversity of communities at risk.
- Digital transformation is bringing huge opportunities in strengthen this pillar and allows us to reach more people through information and communication technologies (ICTs) --such as sending alerts to the phone.



95% of the world population is covered by mobile network

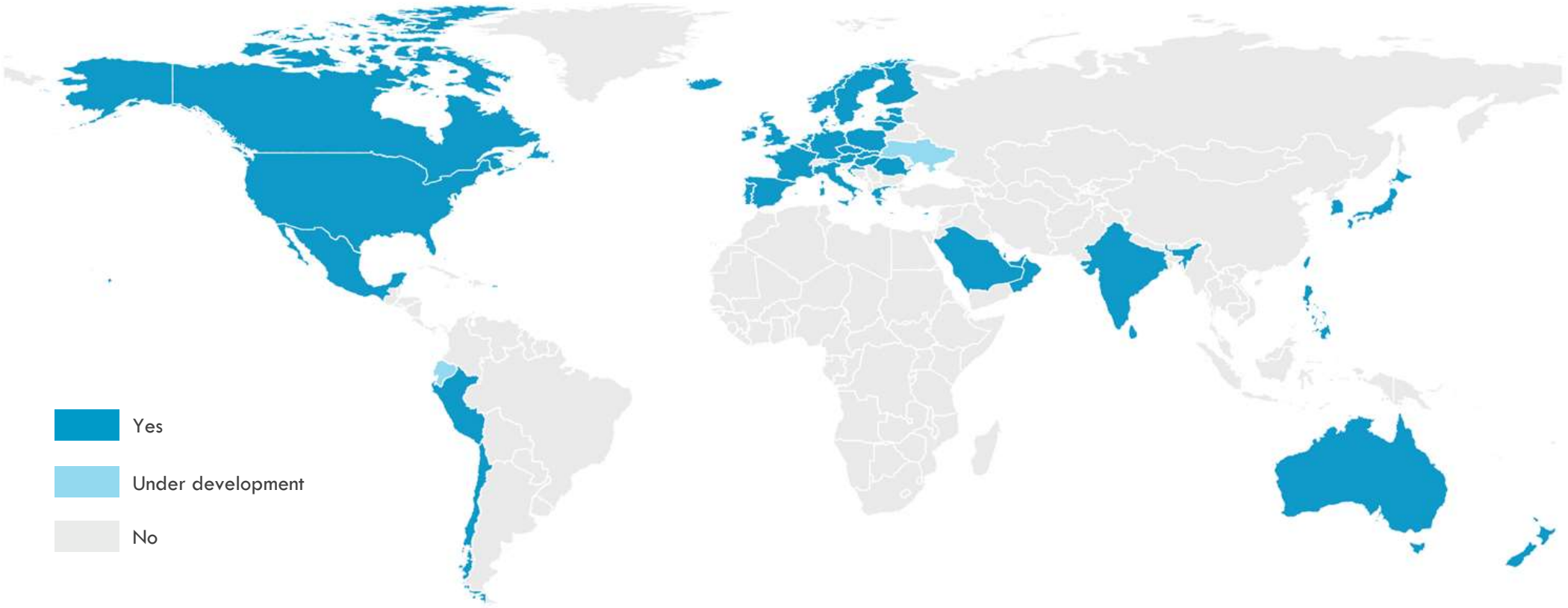
…a great opportunity to use mobile networks for early warning systems!

Population coverage by type of mobile network, 2021



Source: ITU, *Facts and Figures 2021*

Draft list of countries having EWS based on mobile network (work in progress)



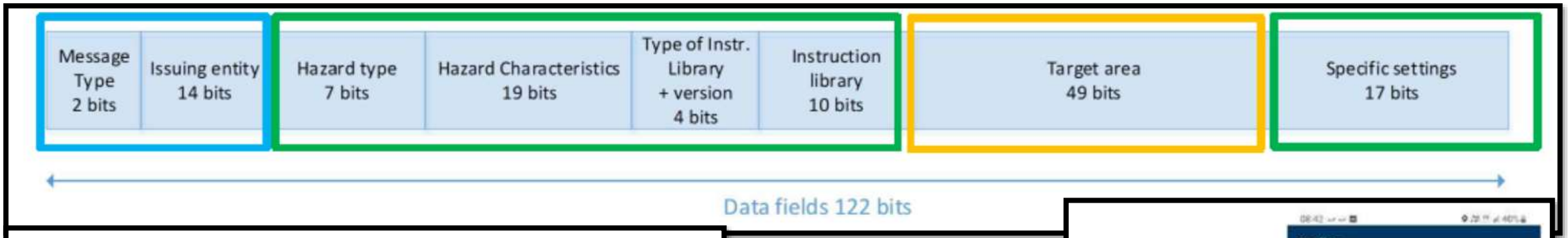
How and why alerting via mobile-cellular networks works?

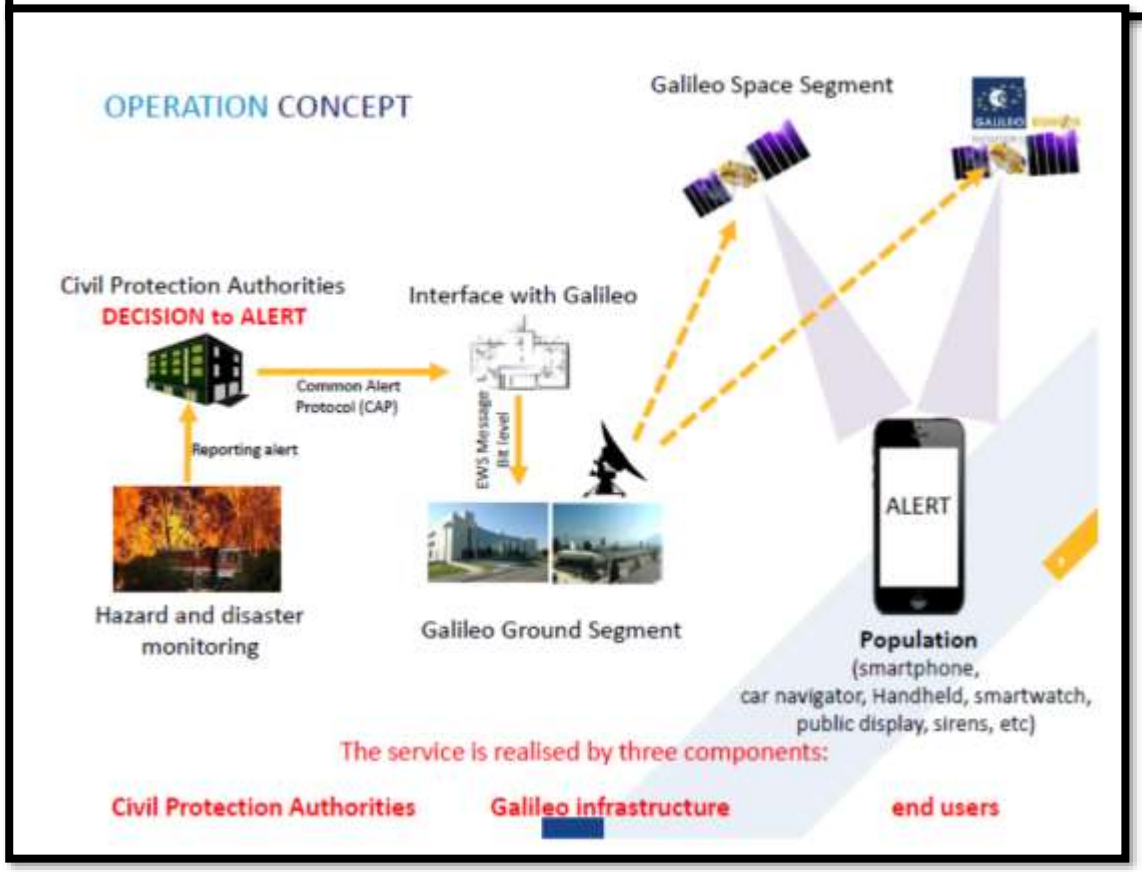
Photo credit: Dimone Hogan/Shutterstock

Cell-Broadcast (CB) & Location-based SMS (LB-SMS)

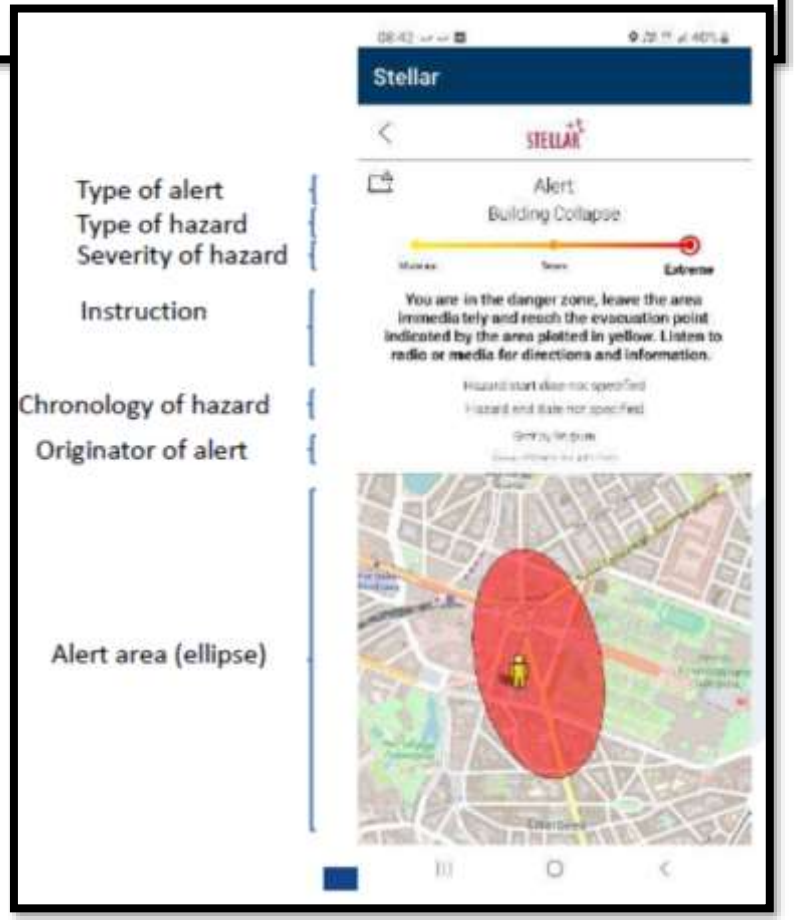
- **Wide reach:**
  - Send geo-located messages to users within risk areas, including roamers
  - Opt-in challenges limited(as opposed to mobile-apps)
  - Compatible on most (CB) /all devices (LB-SMS)
- No risk of congestion (CB)
- No subscription needed (CB)
- Supports multi-language alerts (CB & LB-SMS)
- A “blind technology” that does not allow 2-way communication (CB)
- 2-way communication to provide information such as number of users in risk areas (LB-SMS)

EWSS – Upcoming Galileo system





Source: Eric Guyader, European Commission, Galileo and EGNOS programme



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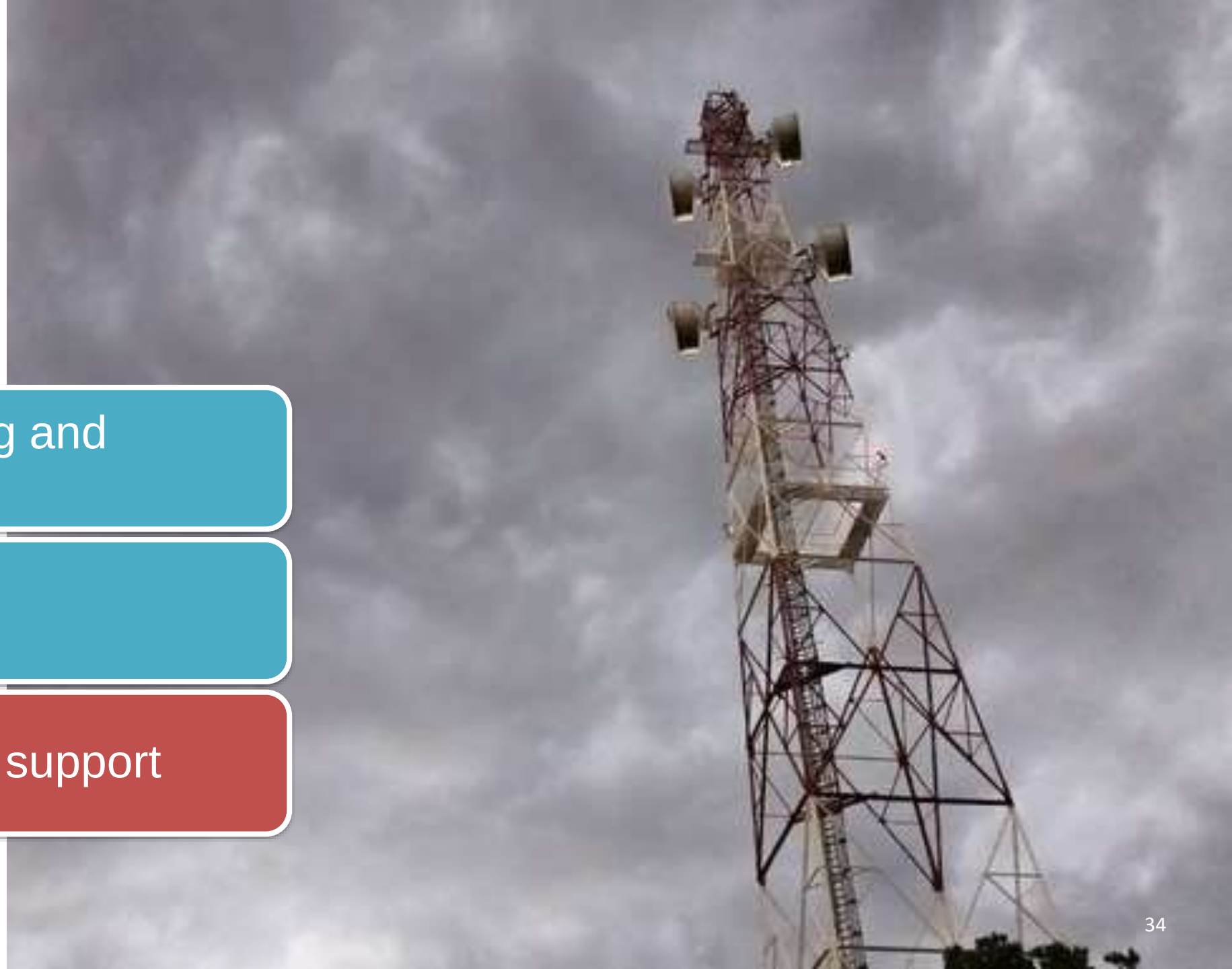
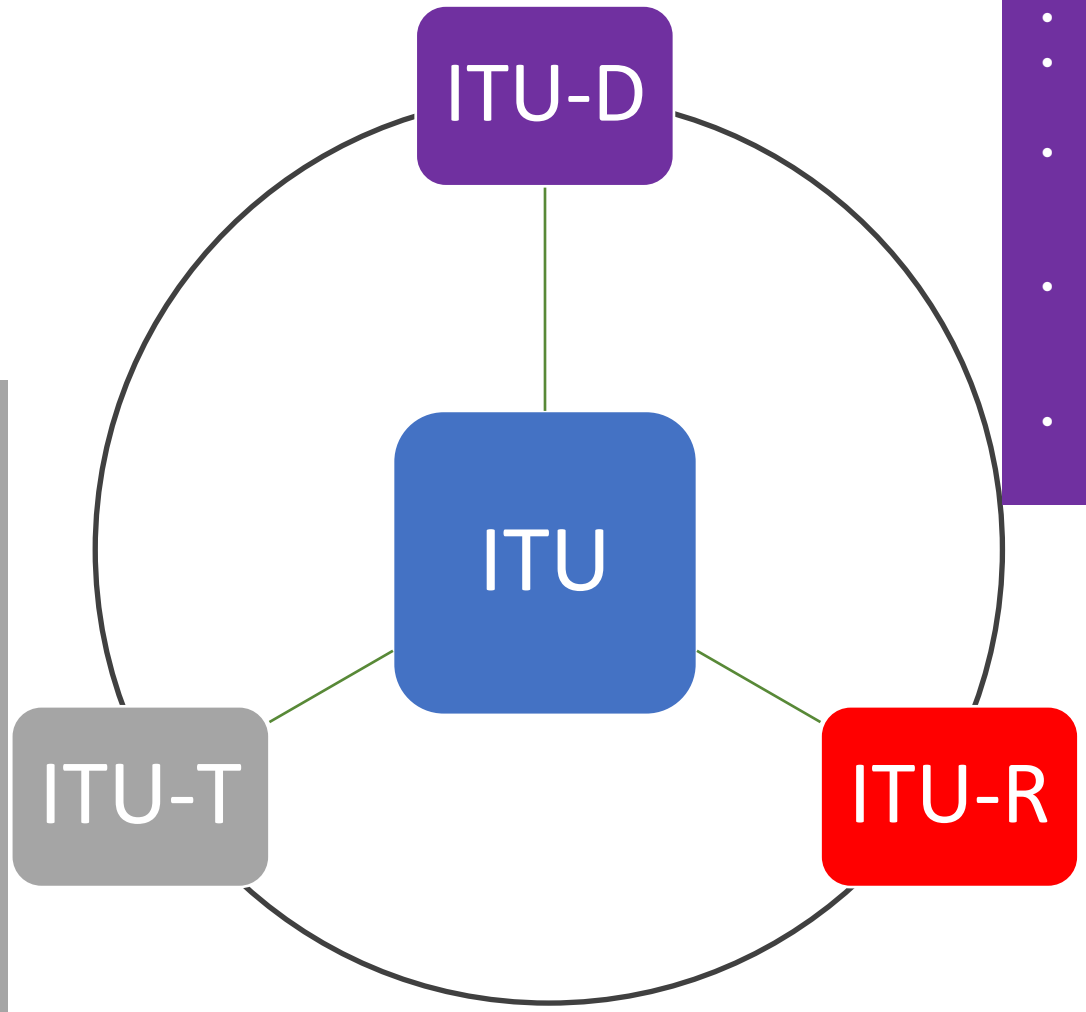


ITU's ROLE

Disaster management, network resiliency and recovery recommendations and best practices

- Collects and documents information and concepts helpful to the work on disaster relief systems/ applications, network resilience and recovery from a telecommunication network perspective
- Critical information infrastructure protection
- Standards development and adoption such as common alerting protocol (cap, x.1303)
- Energy efficient devices standards, etc.
- Smart Cities, villages, etc.



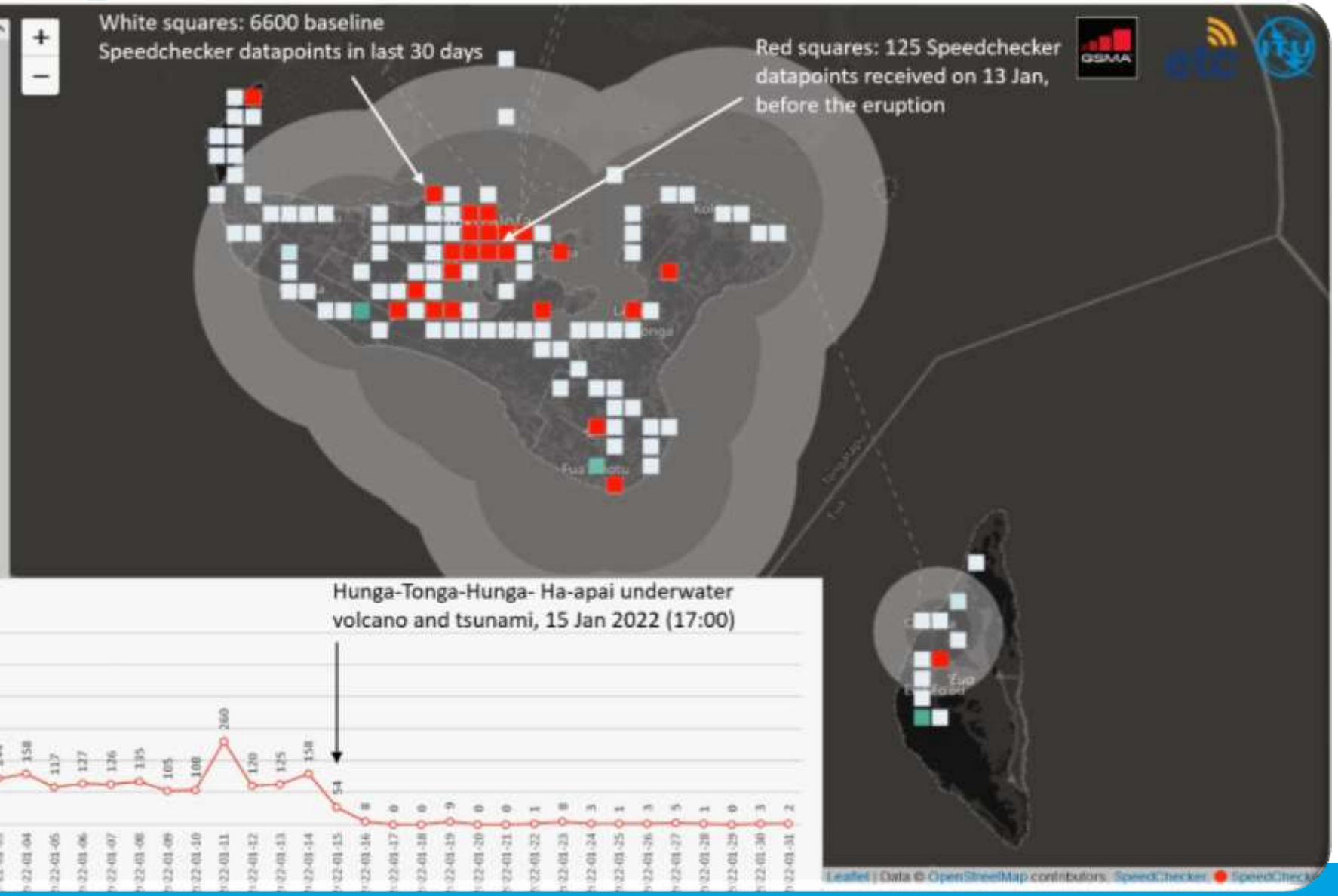
ICT Needs of Developing Countries for Disaster Prevention Preparedness, Response and Recovery

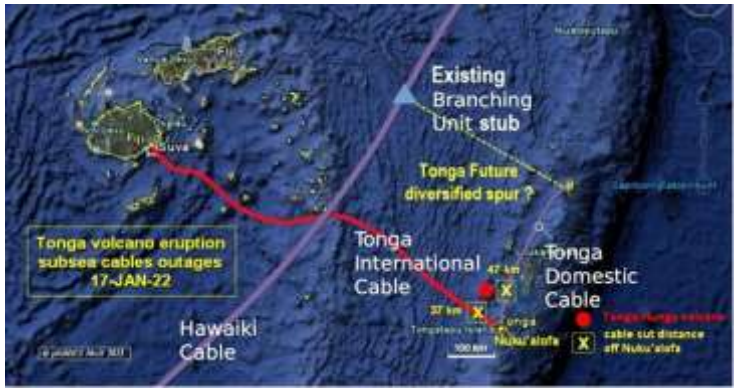
- Captures the unique needs of developing countries
- Promulgates and promotes DRR solutions
- **Implements projects on disaster warning and alerting systems**
- Development and review of policies and regulations on emergency telecommunications and climate change adaptation
- Promotes international cooperation and implementation of standards – Tampere Convention, Common Alerting Protocol (CAP)
- Provides direct assistance during emergencies on telecommunications

Radiocommunications in DRR

- Satellite services regulation – meteo services, earth observation, etc.
- Develop recommendations and reports on radiocommunications for disaster management
- Emergency frequency allocation best practices

Contactless Disaster response in Tonga





Preparedness

- National Emergency Telecommunications Plans (NETPs)
- Pandemic Contingency Plans
- ICT-focused Tabletop Exercises

Multi-hazard

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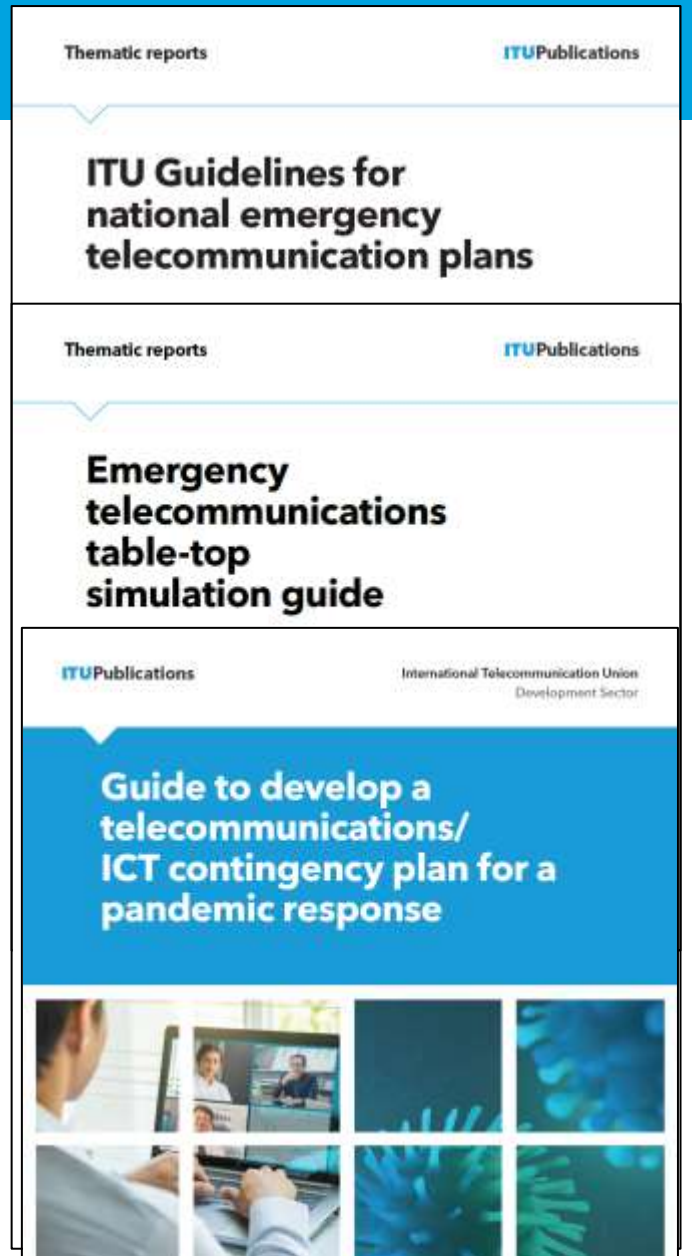

Conclusion

- **Broadcast and ICT media both have some salient features that are needed in DR**
- **Full CAP and EWS adoption is required through a policy intervention at national level**
- **Harness technologies for benefit of ALL.**

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