Warning Dissemination and Communication

Regional Initiative Accelerator Workshop on Strengthening the Emergency Preparedness Capabilities

Vanessa Gray
Head, Climate and Emergency Telecommunications Division, BDT
International Telecommunication Union (ITU)

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

194

Member States

1000+

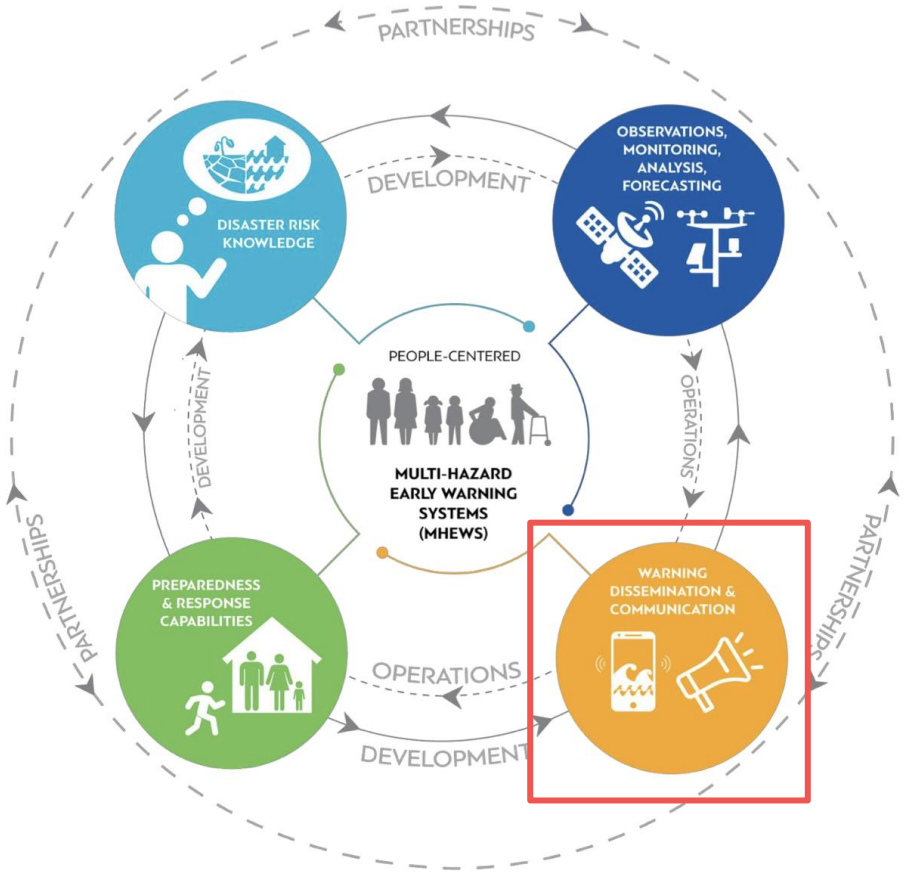
Companies, universities, and international and regional organizations.

Rich network of experts in the global ICT ecosystem

www.itu.int

UN Early Warnings for All Initiative

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

EW4All Return on Investment

- The World Bank has estimated that universal access to early warning systems would lead to **annual global reductions in asset losses of $13 billion.** In addition, socioeconomic conditions would be improved by reducing wellbeing losses by up to $22 billion per year, resulting in total avoided annual losses of $35 billion.

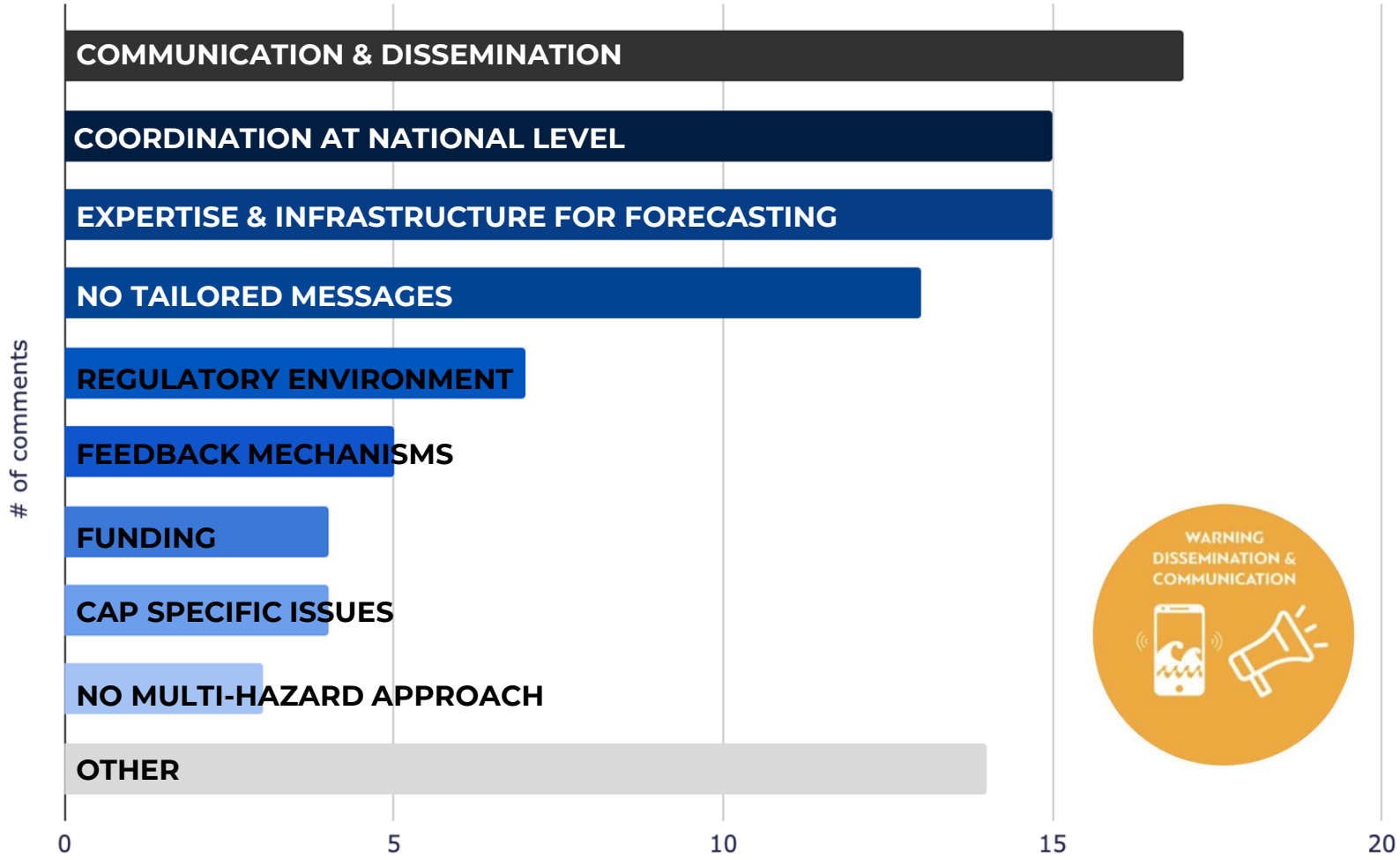
- The WFP-led Emergency Telecommunications Cluster undertook a study to quantify the cost-benefit returns in emergency telecommunications in 2022-2023. The findings demonstrated that for every one US dollar of invested resources, there is a monetary return of almost **three times the value of original investments** made (for assessed countries).

- The Global Commission on Adaptation found that just 24 hours warning of a coming storm or heat wave can **reduce the potential damage by 30 percent,** and an investment of $800 million in early warning systems in developing countries could prevent losses ranging from $3 to $16 billion annually, resulting in higher returns on investment than any other climate adaptation measure, with benefit/cost ratios of at least ten.

Warning Dissemination & Communication

-- is the biggest challenge for EWS, according to research conducted in 13 countries in Africa & Caribbean

Source: IFRC

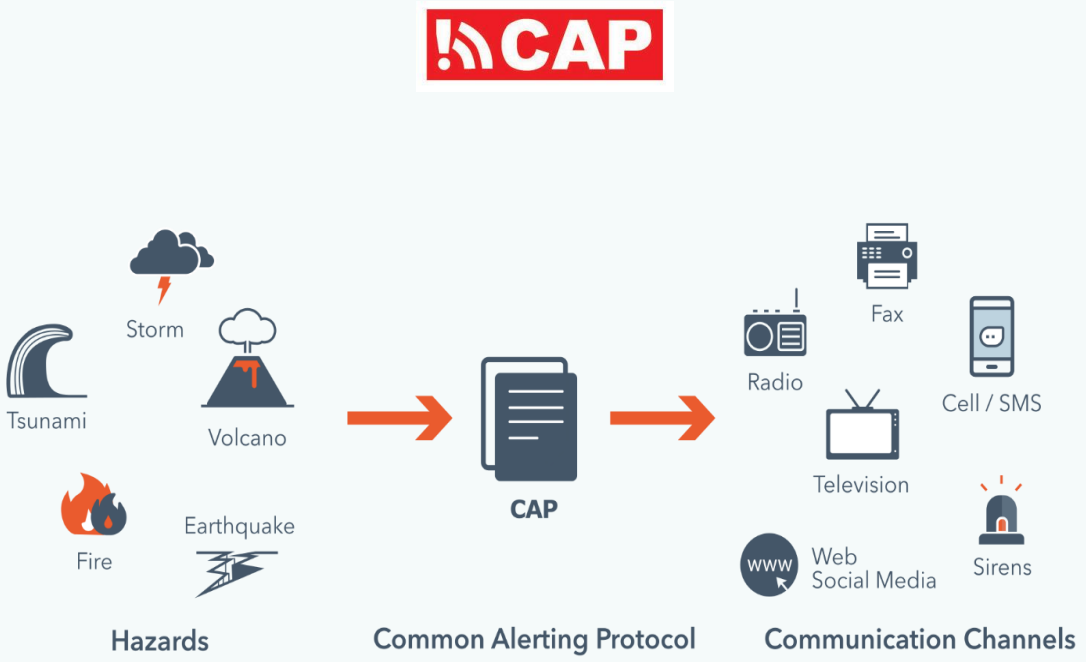


Multi-channel Approach for Warning Dissemination and Communication

- 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.

Integrating Common Alerting Protocol (ITU-T X. 1303)

- International standard format for emergency alerting to ensure the interoperability and consistency of alerts via different communication networks.
- Integrating CAP into Multi-Hazard Early Warning Systems
- Local agreement of the CAP specificities and the feedback between Authorities and Mobile Network Operators before implementation (negotiation)

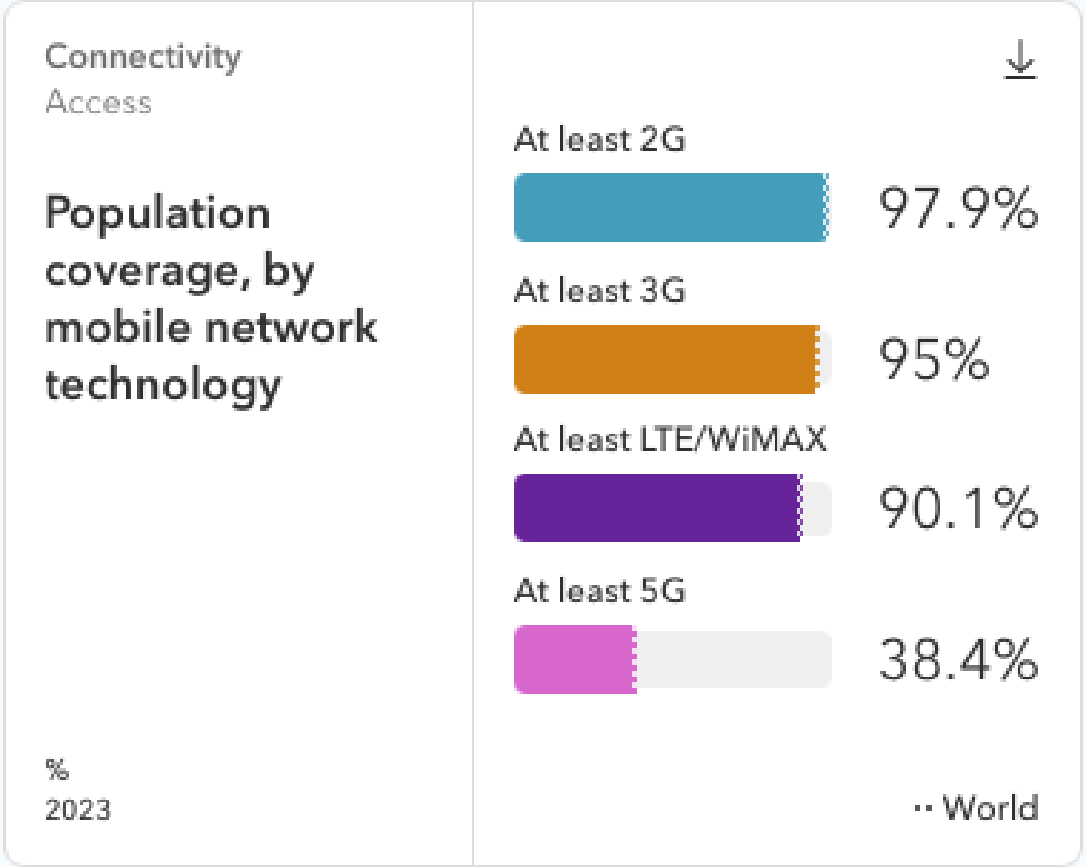


Mobile early warning systems – alerting people via mobile networks

Photo by ROBIN WORRALL on Unsplash

97.9% of the world population is covered by mobile network

…making mobile network an effective channel to reach people!

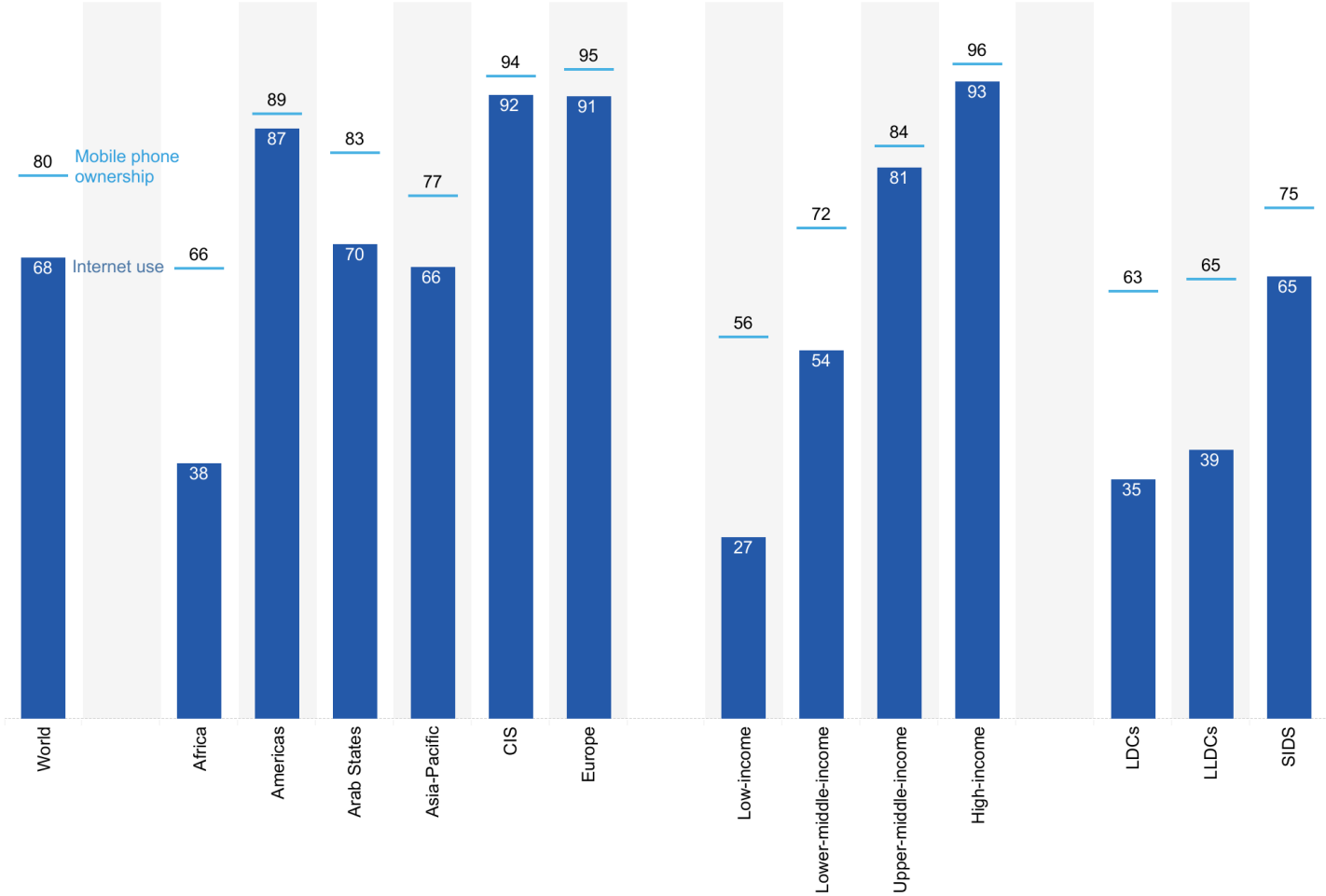


97.9% of the world population is covered by mobile network

4 out of 5 people in the world own a mobile phone

…making mobile network an effective channel to reach people!

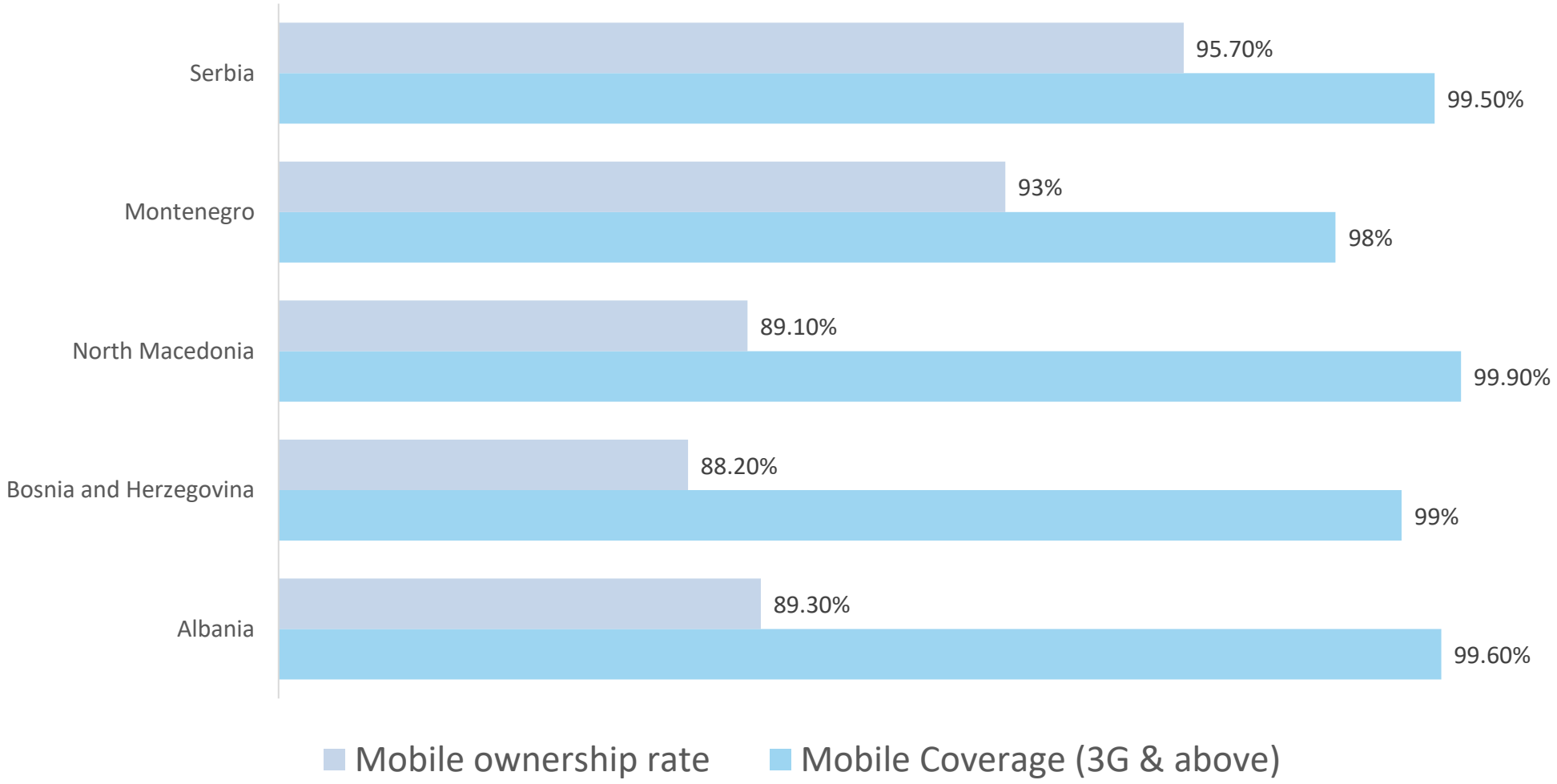
Percentage of individuals owning a mobile phone and using the Internet, 2024



Note: Mobile phone ownership refers to individuals aged 10 or older.

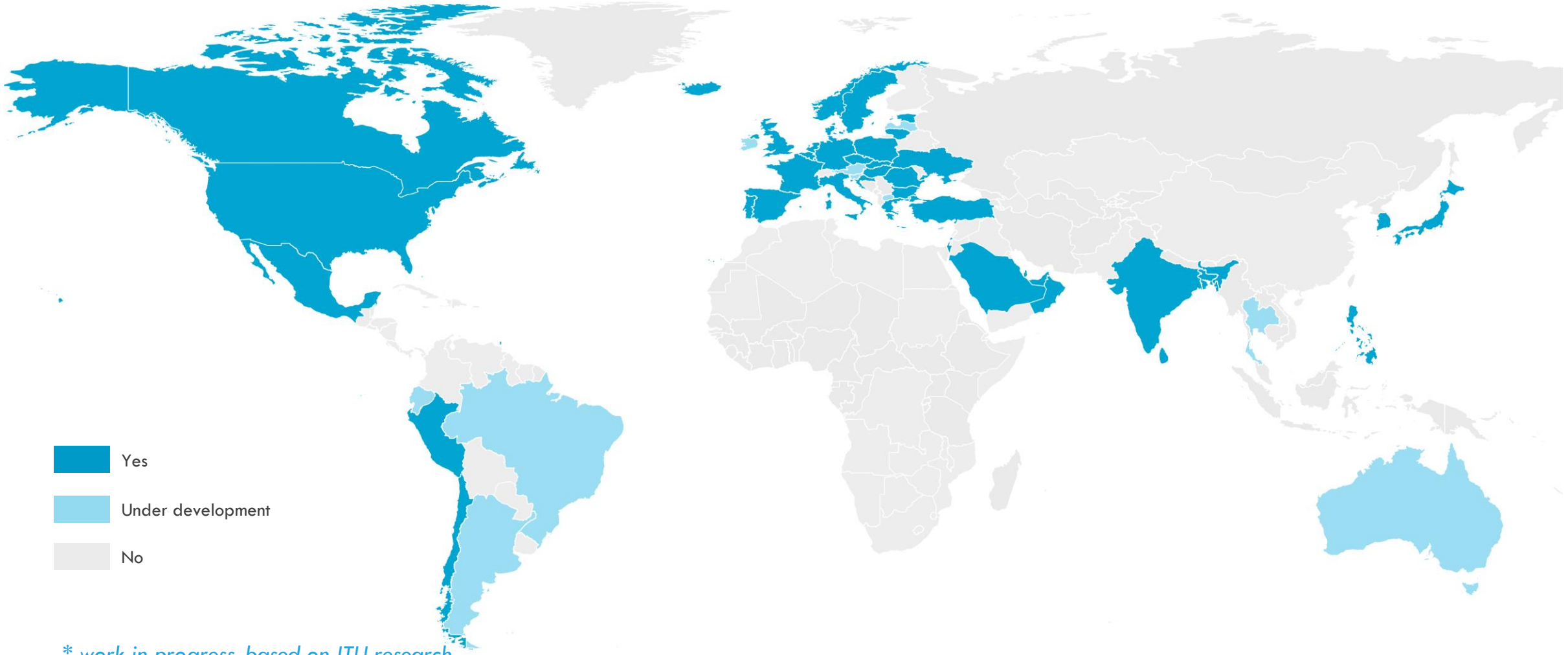
Source: ITU

Statistics Western Balkan



Countries with mobile EWS in place

using cell broadcast and/or location-based SMS*



** work in progress, based on ITU research*

How and why alerting via mobile-cellular networks works?

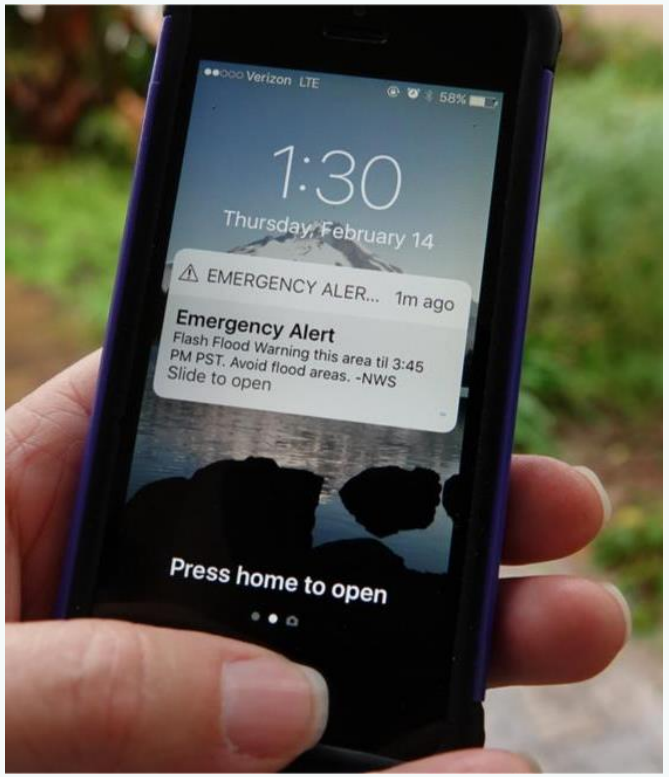


Photo credit: Dimone Hogan/Shutterstock

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

- **Wide reach:**
  - Send geo-located messages to users within risk areas, including roamers/tourists
  - 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)

Regulatory Approach: Europe Legislation on EWS

European Electronic Communications Code (EECC)

Directive (EU) 2018/1972, Article 110

Public warning system

1. By 21 June 2022, Member States shall ensure that, when public warning systems regarding imminent or developing major emergencies and disasters are in place, public warnings are transmitted by providers of mobile number-based interpersonal communications services to the end-users concerned.

2. Notwithstanding paragraph 1, Member States may determine that public warnings be transmitted through publicly available electronic communications services other than those referred to in paragraph 1, and other than broadcasting services, or through a mobile application relying on an internet access service, provided that the effectiveness of the public warning system is equivalent in terms of coverage and capacity to reach end-users, including those only temporarily present in the area concerned, taking utmost account of BEREC guidelines. Public warnings shall be easy for end-users to receive.

By 21 June 2020, and after consulting the authorities in charge of PSAPs, BEREC shall publish guidelines on how to assess whether the effectiveness of public warning systems under this paragraph is equivalent to the effectiveness of those under paragraph 1.

Getting ready for 2022 with a Public Warning System

By June 2022, the European Electronic Communications Code (EECC) Article 110 requires all EU countries to operate a public warning system that can send geo-targeted emergency alerts to all mobile phone users located in the affected area during a natural or man-made disaster.

Crisis manager must be able to **warn every handset located in an area, without prior subscription** to a system

This implies to deploy a **location-based SMS** or/and a **Cell Broadcast** technology

Regulatory Approach: Europe Legislation on EWS

- Almost all European countries have adopted an EWS or are in the process of selection (tender) to have one. A mix of technology has been chosen: Cell-broadcast OR/AND Location-based SMS.

- A regulatory approach speeds up the process and facilitates negotiations between the public and private sector stakeholders.

Lieges, Belgium's third-largest city. July 2021. Valentin Bianchi/Associated Press. NY Times
https://www.nytimes.com/2021/07/16/world/europe/liege-belgium-flooding.html

The intensive usage of CB in Netherlands and LB-SMS in Belgium saved lives with evacuations orders during the deadly floods in BENELUX, July ,2021

Satellite Direct-to-handset Alert Dissemination

- Work closely with satellite industry to look into direct-to-handset solution.
- Complementarity between the alert by satellite and the alert via CB and/or LB-SMS
- Global coverage – including for communities in remote areas without connection.
- Ensure people at risk could be alerted even when the connectivity is down/affected by disasters
- The Case of Europe: Galileo's Emergency Warning Satellite Service

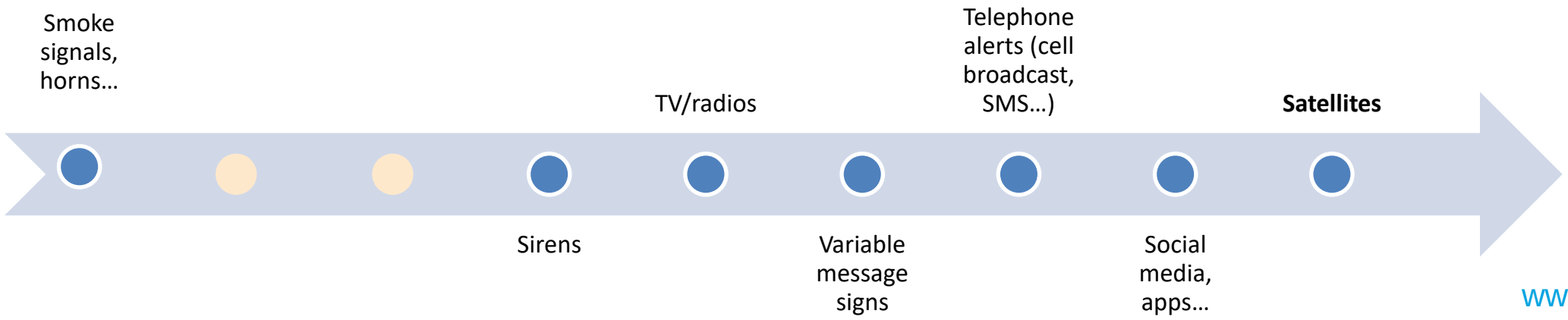
Satellite Industry Commitment to EW4All

GSOA
GLOBAL SATELLITE OPERATORS ASSOCIATION

"Satellites provide coverage to 99% of the world's geography and plays a critical life-saving role in emergency messaging in all environments and geographies and is also able to provide reliable service in disaster situations that might render other technologies and communication mediums inoperable. The satellite industry has longstanding experience in emergency messaging and will be an essential component of any truly global emergency warning and messaging system. We are committed to the ambition of the Early Warnings for All Initiative for everyone to be protected by 2027.

Under the leadership of GSOA, the satellite industry is committed to do its best efforts to supporting the ambitious goal of the EW4all initiative. This includes identifying opportunities and addressing challenges in the area of direct-to-handset. Through cross-sector collaboration and sharing of expertise and best practices, we will make progress in helping protect everyone. GSOA, in collaboration with key satellite partners, will work to assess and, as appropriate, address, the remaining challenges for the adoption of these life-saving technological solutions and applications. This could include reaching out to relevant stakeholders outside the satellite industry, including device manufacturers and standardization bodies, terrestrial service providers and other relevant trade associations. "

Green Digital Action @COP28



Key Stakeholders and Partners

- National and local disaster management agencies
- Scientific and technical agencies such as meteorological and hydrological organizations
- Health authorities and geophysical agencies
- Military and civil authorities
- Telecommunication organizations
  - National telecommunication regulators
  - Satellite operators
  - Mobile-cellular network operators
  - GSMA
  - Global Satellite Operator‘s Association (GSOA)
- Media organizations (e.g. television, radio and social media) and amateur radio;
- Community-based and grassroots organizations

Pillar 3 Implementation & Activities

Photo by Glenn Carstens-Peters on Unsplash

4 Outcomes of Pillar 3: Warning Dissemination and Communication

Outcome 1: Governance

All countries have agreed on functions, roles and responsibilities for each actor in the warning dissemination process and this is defined through government policy

Outcome 2: Infrastructure networks and services

Last-mile communication - All countries have multichannel dissemination and communication alerting to ensure the warnings reach those at risk.

Outcome 3: Inclusion and people-centered approach

Strengthened and expanded alert dissemination and feedback channels reaching all people with actionable information.

Outcome 4: Quality and trust

All countries have the capability for effective, authoritative emergency alerting that leverages the Common Alerting Protocol (CAP), suitable for all media and all hazards.

Pillar 3 technical assistance

Assessment of current warning dissemination and communication

- Assess current use of different warning dissemination channels (e.g., mobile, TV, broadcast, siren, etc.)
- Analyze necessary steps to be taken to implement most appropriate dissemination channels
- Conduct assessment of current legislation and SOPs
- National Gap Analysis Digital Infrastructure Resilience, Preparedness and ICT service affordability

Technical Assistance

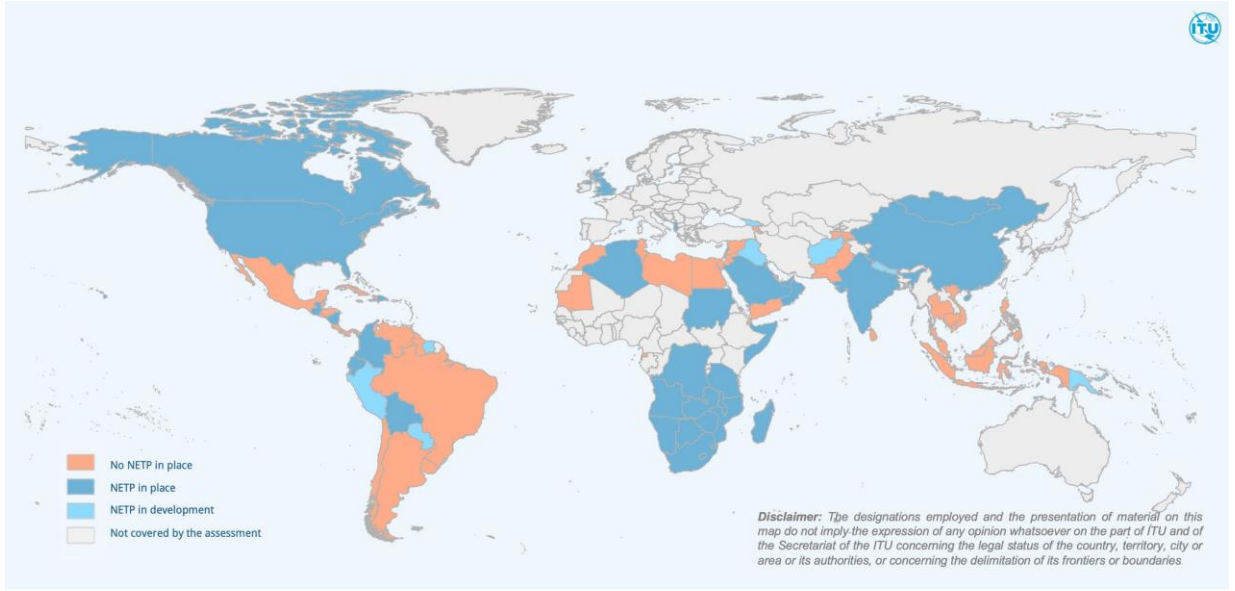
- Support countries in developing National Emergency Telecommunication Plan (NETP) to enhance the country capacity in disaster risk management and coordination
- Support countries develop bidding document
- Advice on Common Alerting Protocol
- Last Mile Connectivity planning

Capacity building and beyond

- Capacity building including providing trainings and organize drills
- Working with and support the capacity building of media outlets, broadcasters, and other actors who relay the warnings
- Identify possible funding opportunities

National Emergency Telecommunication Plan (NETP)

- The NETP is a comprehensive document that outlines all the **activities and actions to be developed and implemented across each phase of the disaster management** cycle, extending beyond the ICT sector.
- This includes **recommendations to be incorporated into Policy, Legal, and Regulatory frameworks**, which are essential for leveraging ICTs and digital technologies in emergency telecommunications.
- These NETPs serve as the foundation for the implementation of the EW4All initiative.
- The ITU has facilitated the development of NETPs in **41 countries** and established **2 regional NETP frameworks** in Africa.



About 58% of countries have or are developing a National Emergency Telecommunication Plan (NETP)

...out of 100 countries covered by ITU Emergency Telecommunication Baseline Assessments (carried out in 2021-2023)

*A model NETP is developed for SADC member states: Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, United Republic Tanzania, Zambia and Zimbabwe.

ITU background paper:

Digital transformation & EWS for saving lives

- Use growth in digital services and networks to deliver alerts to people at risk
- Focus on mobile networks and services
- Promote regulatory approach adopted by EU
- Bring on board MNOs/GSMA
- Discuss technologies and standards for implementation (including CAP)
- Identify experts and share best practices for awareness raising
- Bring on board partners and identify financing opportunities

Photo credit: USAID

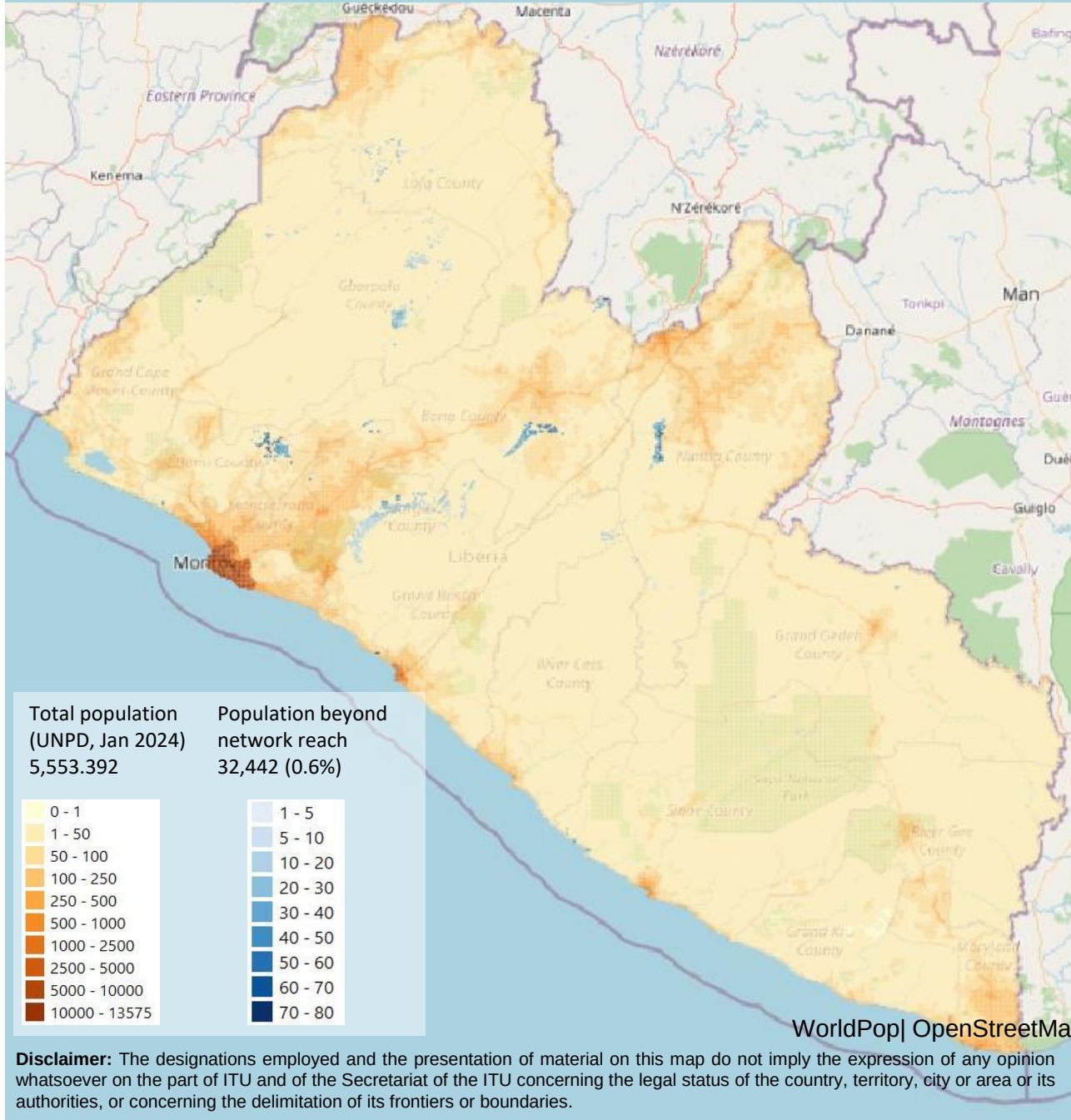
Leveraging AI in Pillar 3

- The EW4All Action Plan highlights the importance of accelerating innovation and technology, with a focus on AI and private sector collaboration.
- AI transforms disaster management practices e.g. enhances monitoring, analysis, and forecasting of hazards.
- Optimises information delivery to communities at risk, ensuring timely response to warnings.
- Establishment of the AI Sub-Group for EW4All to cultivate public-private partnerships to further leverage AI in early warnings systems globally.

Piloting AI on Disaster Connectivity Risk Assessment

- ITU collaborates with Microsoft AI for Good Lab, Planet, and the Institute for Health Metrics and Evaluation (IHME) at the University of Washington.
- Integrates AI with satellite imagery to create high-resolution population density maps and visualize connectivity data, to **highlight areas where people are vulnerable to natural hazards due to limited access to emergency notifications.**
- First results available for Ethiopia, Dominican Republic, Antigua and Barbuda, Bangladesh, and Liberia, scaling to 30+ countries to enhance disaster response and connectivity resilience.

Example of Initial Assessment Result: Population Beyond Reach of Fixed Broadband, 2G, and 3G Networks in Liberia



Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Thank you!

Cross-cutting work on Common Alerting Protocol

- **Pillar 3 Outcome:**
  - All countries have the capability for effective, authoritative emergency alerting that leverages the Common Alerting Protocol (CAP), suitable for all media and all hazards – closely link to pillar 2 and pillar 4
- **Catalytic Actions, together with WMO and IFRC:**
  - Establish a CAP Help Desk to support countries
  - Establish CAP editor and Alert Hub
  - Training of various sectoral 'clients' to support the use of CAP messages in decision making
  - Develop an attribution statement for redistributors, such as the private sector, when using alerting information
  - Develop global, regional and national dashboards that display active early warning messages / alerts

Piloting AI on Disaster Connectivity Risk Assessment

Methodology and datasets

This assessment employs a comprehensive methodology that integrates multiple data sources and techniques. This multi-layered approach identifies connectivity "coldspots" -- where coverage is limited for mobile alerts.

These results will guide data-driven decisions on warning dissemination strategies, helping determine **the most effective channels to alert at-risk populations** and ensuring no one is left behind.

Datasets

- **AI-Driven Population Density Analysis:** Microsoft AI for Good Lab, Planet Labs and IHME at the University of Washington, use AI to process satellite imagery and estimate population density, producing high resolution (100m resolution) time-enabled population density data.
- **Historic Population Density Data:** Employs WorldPop 1-km resolution UN-adjusted data, aligned with UN Population Division World Population Prospects (WPP) data as of 1 January 2024, for validation and comparison.
- **Network Coverage Datasets:** Incorporates Nine distinct datasets, including: fixed broadband (Ookla for Good, Speedchecker); 2G (Collins Bartholomew Ltd. and GSMA, Opencellid); 3G+ (Collins Bartholomew Ltd. and GSMA, Opencellid, Meta for Good, Ookla for Good, Speedchecker).
- **Mobile Ownership Data:** from GSMA Mobile Connectivity Index and ITU Datahub is also included to refine warning strategies.