GSMA

Mobile-Enabled Early Warning Systems

The GSMA and the Early Warnings for All Initiative



Copyright © 2024 GSM Association



Introduction

In 2022, United Nations Secretary-General António Guterres launched the Early Warnings for All (EW4All) Initiative, which aims to ensure that everyone in the world is protected by an early warning system (EWS).

EWS are essential tools when disaster strikes, providing crucial alerts that help communities prepare for, and respond to, extreme weather events and environmental hazards. As disasters become more frequent and severe, the role of EWS and effective risk communication becomes increasingly critical. These systems offer a proactive approach to disaster risk reduction, enabling timely actions that can significantly mitigate loss of life and economic damage. Just 24 hours' notice of an impending hazardous event can cut the ensuing damage by 30%.[1]

In the past 20 years, natural hazards have claimed the lives of 1.23 million people, with 90% of these deaths occurring in low- and middle-income countries (LMICs). These events have also led to economic losses of USD 2.97 trillion worldwide.[2] The increasing frequency and intensity of such disasters is attributed to the escalating climate crisis, with the World Bank predicting that climate change could drive as many as 130 million people into extreme poverty by 2030.[3] The 2019 Global Commission on Adaptation flagship report, Adapt Now, found that EWS provide more than a tenfold return on investment, making them one of the most effective adaptation measures and critical to building climate resilience.[4]

Today, 95% of the global population reside in areas covered by a mobile network.[5] By the end of 2023, 5.6 billion people subscribed to a mobile service, cementing mobile technology as an essential tool to improve the reach and function of EWS.[6] While the EW4All Initiative has brought new attention to the importance of EWS, mobile network operators (MNOs) have been enabling the development and implementation of EWS for decades.

1 United Nations Climate Action. (2022). Early Warnings for All: The UN Global Early Warning Initiative for the Implementation of Climate Adaptation – Executive Action Plan 2023–2027.
2 United Nations Office for Disaster Risk Reduction (UNDRR). (2020). Human Cost of Disasters: An overview of the last 20 years – 2000–2019.
3 Jafino, B.A. (2020). "Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030". Policy Research Working Paper 9417. World Bank Group.
4 The Global Commission on Adaptation. (2019). Adapt Now: A Global Call for Leadership on Climate Resilience.
5 GSMA. (2023). The State of Mobile Internet Connectivity 2023.
6 GSMA. (2024). The Mobile Economy 2024.

EW4All: The Four Pillars



The GSMA is playing a leading role in the EW4All Initiative through the Mobile for Humanitarian Innovation (M4H) programme funded by the UK Foreign, Commonwealth & Development Office (FCDO). The GSMA is a member of the EW4All's Pillar 3: warning dissemination and communication, which is led by the International Telecommunication Union (ITU). The Director General of the GSMA sits on the EW4All High-Level Advisory Panel. The M4H programme has catalysed the role of the mobile industry in EWS for several years and is now playing an active role in the EW4All Initiative by:

- Convening the mobile industry and enabling multi-sectoral partnerships to develop and implement EWS
- Investing in innovative digital solutions for EWS through the GSMA Innovation Fund
- Publishing research on mobile-enabled EWS, including on cell broadcast (CB) and enhancing inclusion in risk communications
- Providing technical assistance to MNOs and partners developing EWS with a user-based approach
- Highlighting best practices, including through the GSMA's MWC and global M360 event series

This briefing note provides a snapshot of these activities and welcomes further coordination from national and global partners to advance the aim of everyone in the world being protected by inclusive and effective EWS.

Building public-private partnerships for effective early warning systems

As mobile is a crucial channel in delivering risk communications, collaboration across industries and the early involvement of MNOs are critical in developing effective EWS. However, public-private partnerships and coordination mechanisms are often not in place to successfully develop end-to-end EWS.

The M4H programme convened three regional workshops in 2023 and 2024 that brought together a range of stakeholders from the Caribbean, Asia Pacific and Africa to discuss and coordinate the role of telecoms in disaster preparedness, response and recovery. EWS were a focus of these workshops, which were hosted under the banner of the GSMA Humanitarian Connectivity Charter (HCC), a set of shared principles adopted by key players in the mobile industry to enhance partnership and coordination to prepare for, respond to and recover from sudden onset emergencies.

These convenings have led to country-level coordination and development of EWS. For example, in August 2024, the GSMA and MNO Jazz signed a Statement of Commitment outlining their intent to collaborate on, and advocate for, the development and implementation of a mobile-enabled EWS in Pakistan, with this work now actively underway.

In Haiti, the M4H programme supported a collaboration between Digicel, Futura Labs and the government to design and deploy an EWS that built on the programme's experience in Sri Lanka launching the Disaster and Emergency Warning Network (DEWN). The DEWN-based system in Haiti was successfully tested in 2024 and is now being integrated in national EW4All plans.



Signing of the GSMA-Jazz Statement of Commitment at the GSMA Digital Nation Summit in Islamabad, Pakistan, 7 August 2024.

Industry-wide commitment to the EW4All Initiative

To catalyse and highlight the life-saving power of mobile in EWS, the GSMA launched an Industry Pledge with the ITU at the 2023 United Nations Climate Change Conference, COP28. This Industry Pledge, with a growing group of signatories, demonstrates the powerful role of the mobile industry in successful EWS and an industry-wide commitment to realise the ambition of the EW4All Initiative.

Industry Pledge

Early Warnings for All

With 95% of the world's population covered by a mobile network and 5.4 billion unique mobile subscribers globally, mobile plays a life-saving role in the dissemination of early warning alerts. The mobile industry has longstanding experience in the development and implementation of early warning systems, and we are committed to the ambition of the EW4All Initiative for everyone to be protected by 2027.

We know first-hand that cell-broadcast, location-based SMS, and digital technologies provide targeted and accessible information to communities. Through cross-sector stakeholder collaboration and sharing of expertise and best practice, we can ensure everyone is protected. We welcome our mobile industry colleagues in joining us to deploy these technologies and partnering to harness the power of mobile networks for early warnings.

axiata · Globe · KDDI · MTN · Safaricom · TIM · Telefónica · telenor group · vodafone · VEON

Technical assistance spotlight: Tanzania

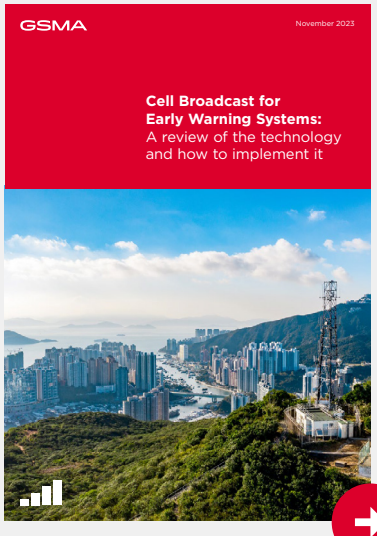
To support the Government of Tanzania, the Tanzania Red Cross Society and Vodacom Tanzania, the M4H programme convened key stakeholders and conducted user research to support the creation of a national strategy for mobile-enabled EWS. The research was conducted in Kilosa with local communities to understand user needs and preferences related to EWS dissemination channels and content. Participative qualitative methods were used to gain a deeper understanding of user experiences and inform design recommendations and the M4H programme identified an opportunity for peer-to-peer learning between the Kenya and Tanzania Red Cross Societies. The Kenyan Red Cross subsequently shared vital practical insights with its Tanzanian counterparts based on their experience delivering an EWS for first responders. The Tanzania Red Cross has applied this information to their anticipatory action plan for natural hazards.

Since the user research was conducted, more stakeholders have begun to collaborate in Tanzania. Tanzania is now receiving engagement from the broader EW4All Initiative and the M4H programme is collaborating with the EW4All interpillar programme in the country. Furthermore, the research was shared with partners to incorporate the findings in the next phases of a national EWS strategy, ensuring the system is sensitive to the local context.

GSMA thought leadership: cell broadcast technology and inclusive early warning systems

The GSMA M4H programme publishes demand-driven research that addresses evidence gaps crucial to the success of the EW4All Initiative. This thought leadership provides technical information and lessons on effective and efficient EWS.

Mobile technology, particularly cell broadcast (CB) plays a pivotal role in many EWS. CB can rapidly deliver targeted location-based warnings, avoid network congestion and ensure recipients are alerted to critical information with audible and unique alerts and on-screen messages.



The GSMA report, Cell Broadcast for Early Warning Systems: A review of the technology and how to implement it, published in November 2023, presents the opportunities, challenges and considerations associated with CB-enabled EWS.

Several key insights emerged from this research:

- Multi-channel EWS are essential and CB is most effective when used in conjunction with other digital and analogue dissemination channels
- Multi-stakeholder collaboration is key and government agencies should lead the process to initiate the implementation of CB
- Investment in innovation is required. Financing initial set-up and ongoing costs may be the greatest barrier to implementing a CB-enabled EWS
- End users must be considered and involved from the start

The CB report has been shared in many fora, including with all stakeholders in Pillar 3 of the EW4All Initiative. Engagement with national stakeholders in the development of the research, including in Sri Lanka, has led to partnership engagement with the M4H programme and a refocusing of efforts to improve the countries' EWS.



To maximise their impact, risk communications (including EWS) must be inclusive – accessible, comprehensible and actionable to all. This was the focus of the 2024 GSMA report, Enhancing inclusion in mobile-enabled risk communications: Lessons from South Africa.

Given the critical nature of EWS, this research focuses on how mobile-enabled risk communications about weather hazards could be more inclusive. As mobile technology becomes more ubiquitous, there are opportunities to disseminate life-saving information to communities on even the most basic mobile devices. However, barriers to mobile technology persist, particularly for marginalised populations, who are often more vulnerable to climate risks and excluded from risk communications and emergency alerts.

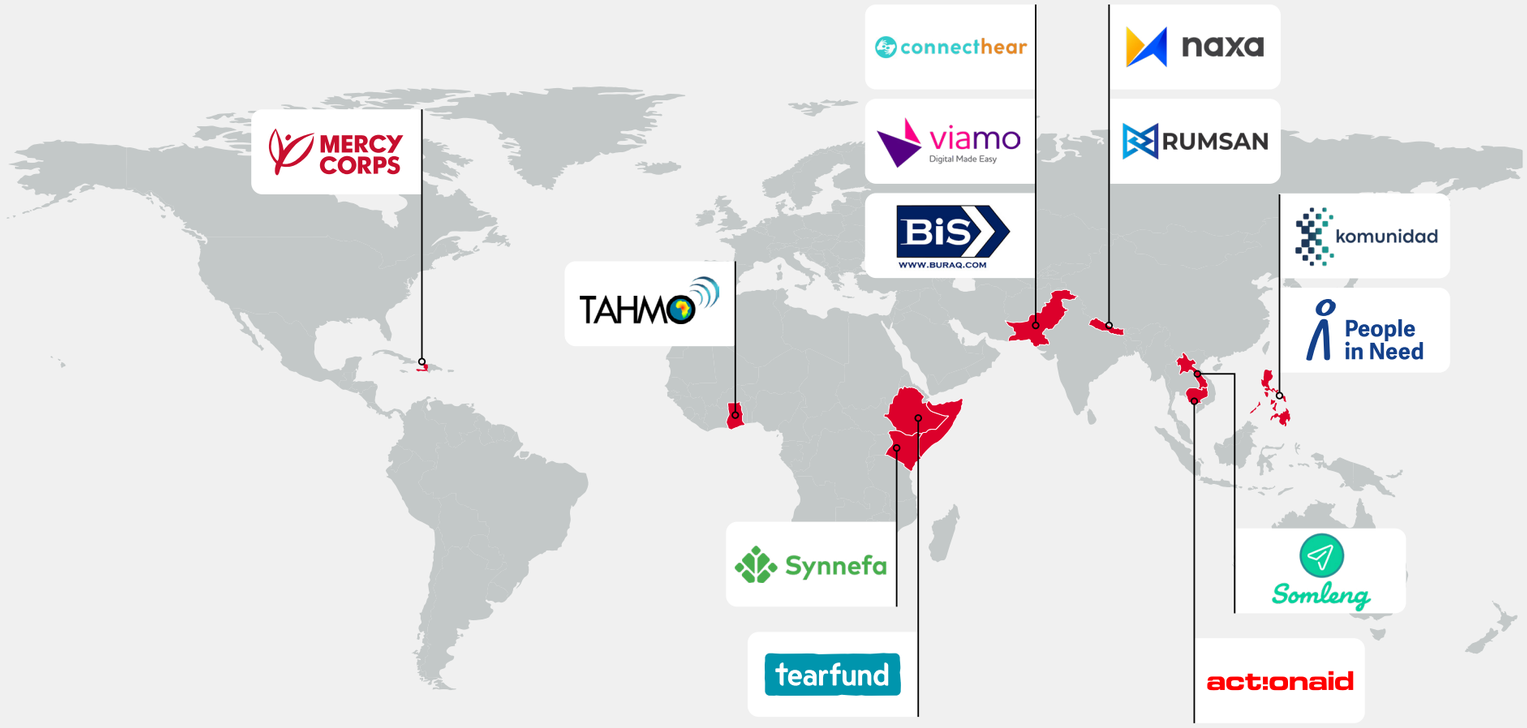
Using South Africa as a case study, the M4H programme used a human-centred design approach to assess the accessibility and effectiveness of current mobile risk communication methods among marginalised populations.

The findings of the research emphasise the importance of multi-channel communication strategies that integrate both digital and analogue methods to reach a broad audience with inclusive and accessible information. It highlights the need to involve at-risk communities from the start when designing risk communication strategies and underlines the shared responsibility of stakeholders, including government and MNOs.



Investing in innovation for early warning systems

Since the inception of the M4H programme, catalytic funding and technical assistance have been provided to grantees of the GSMA Innovation Fund to develop innovative and scalable digital solutions and approaches for EWS.



GSMA Innovation Fund grantees advancing EWS[7]

ActionAid

ActionAid Cambodia is upgrading and expanding the reach of the 1294 early warning system in Cambodia, focusing on providing accessible messaging to people living in high-risk provinces impacted by drought.

Buraq

Buraq is upgrading existing weather monitoring systems and deploying new automated weather monitoring systems in the flood-prone areas of Gilgit Baltistan in Pakistan, enabling accurate early warning communication.

ConnectHear

With nearly 1.35 million people affected by disabling hearing loss in Pakistan, this innovative solution enables online sign language interpretation and AI-generated sign language alerts, ensuring vital communication during crises.

Komunidad

Komunidad uses Software as a Service (SaaS) solutions and AI-powered mobile apps to improve disaster response. Komunidad's typhoon EWS and weather analytics platform help local governments plan and prepare for hazards more efficiently and accurately.

Mercy Corps

CHANTER delivered a 12-week curriculum via Viamo's mobile communications platform that supported beneficiaries in Haiti to better identify and prepare for weather extremes.

NAXA

NAXA, together with their partners, is scaling an anticipatory action platform, Digital and Spatial Technologies for Anticipatory Action (DASTAA), to flood-prone wards of Nepal's lower Mahakali basin, with the aim of enhancing anticipatory actions and reducing the impacts of disaster at the household level.

People in Need

People in Need is developing a monitoring system based on the Internet of Things (IoT) and connected sensors that integrates with government tools and disseminates flood warnings via mobile phones directly to affected populations in the Philippines.

Rumsan

In Nepal, Rumsan is building and piloting a multi-signature anticipatory action programme within an existing mobile technology cash and voucher assistance (CVA) platform. The solution is enabling timely distribution of CVA to affected populations before and during natural disasters.

Somleng

Somleng is building on their open-source Communications Platform as a Service (CPaaS) to launch a full-stack EWS that will be piloted in Laos

Synnefa

Synnefa is integrating satellite imagery in their farm management platform, FarmCloud, to provide real-time data on crop health and weather patterns to smallholder farmers in Kenya.

TAHMO

The Trans-African Hydro-Meteorological Observatory (TAHMO) is establishing a cost-effective early warning flood system in Ghana by repurposing existing mobile technology, including the use of commercial microwave links.

Tearfund

In Ethiopia, Tearfund is using mobile technology to raise awareness of the benefits of insurance and equip agropastoralists facing climate change-related shocks with access to timely climate information and simple parametric insurance cover for extreme climate events.

Viamo

In Pakistan, Viamo is creating a voice-first Generative AI Voice Companion, able to understand open-ended questions related to disaster response and preparedness in Urdu and provide personalized advice. This will be made available without the need for the internet or a smartphone.

7 ActionAid, Buraq, NAXA, People in Need, Rumsan, Synnefa, TAHMO and Tearfund are grantees of the GSMA Innovation Fund for Anticipatory Humanitarian Action supported by UK FCDO. ConnectHear, Somleng and Viamo are grantees of the GSMA Innovation Fund for Humanitarian Challenges supported by UK FCDO. Mercy Corps is a grantee of the M4H Innovation Fund Round 1: Disaster Response supported by UK FCDO. Komunidad is a grantee of the GSMA Innovation Fund for Climate Resilience and Adaptation supported by UK FCDO and The Swedish International Development Cooperation Agency (Sida).

Promotion of early warning systems at GSMA events

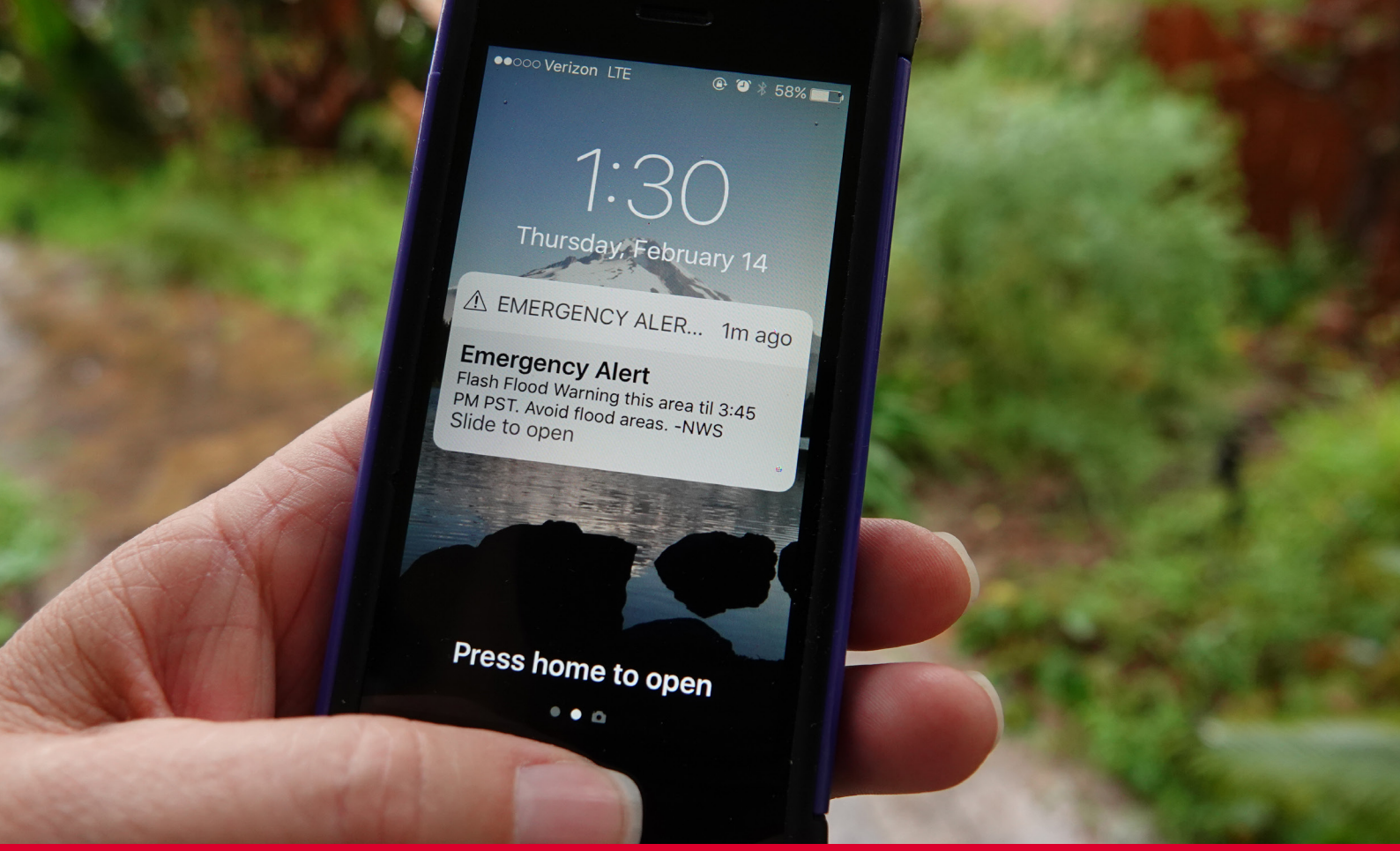
The GSMA convenes a unique set of stakeholders on EWS, sharing best practices, partnership models and technical expertise at the GSMA's global events series.

At MWC Barcelona 2024, the GSMA hosted a panel discussion within the Ministerial Programme, "Early Warning Systems: The Power of Partnership", chaired by John Giusti, Chief Regulatory Officer for the GSMA and President of the GSMA Mobile for Development Foundation, with panelists Doreen Bogdan-Martin (Secretary General of the ITU), Xavier Castellanos Mosquera (Under Secretary General of the International Federation of Red Cross and Red Crescent Societies), Supun Weerasinghe (CEO of Dialog Axiata) and H.E. Mauricio Lizcano (Minister of ICT, Colombia).

On the sidelines of the GSMA's M360 event in Seoul, South Korea, in October 2024, the M4H programme briefed the GSMA Board and Policy Group on the EW4All Initiative, which has fostered increased engagement from the industry and led to regional and country-level developments in EWS.



Panel discussion at MWC Barcelona 2024, "Early Warning Systems: the Power of Partnership"



Partner with us

The M4H programme welcomes the opportunity to collaborate with all stakeholders to realise the ambitions of the EW4All Initiative.

Please contact us at: m4h@gsma.com

GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

We invite you to find out more at www.gsma.com

Follow the GSMA on Twitter/X: @GSMA

GSMA Mobile for Humanitarian Innovation

The GSMA Mobile for Humanitarian Innovation programme works to accelerate the delivery and impact of digital humanitarian assistance. This is achieved by building a learning and research agenda to inform the future of digital humanitarian response, catalysing partnerships and innovation for new digital humanitarian services, advocating for enabling policy environments, monitoring and evaluating performance, disseminating insights and profiling achievements.

Learn more at www.gsma.com/m4h or contact us at m4h@gsma.com

Follow GSMA Mobile for Development on Twitter/X: @GSMAm4d

Author: Kimberly Brown, Head of Mobile for Humanitarian Innovation, GSMA

Contributors: Bryce Hartley, Senior Market Engagement Manager, GSMA; Kara Norton, Market Engagement Manager, GSMA; Sophie Pitcher, Senior Marketing Manager, GSMA; Zoe Hamilton, Senior Insights Manager, GSMA

UK International Development
Partnership | Progress | Prosperity

This material has been funded by UK International Development from the UK government and is supported by the GSMA and its members. The views expressed do not necessarily reflect the UK government's official policies.