



Mobile-based Early Warning Systems

For effective and inclusive alerting

Key Points

- With 3 out of 4 people owning a mobile phone (in 2022), mobile networks have become a powerful communication channel to alert populations about an imminent hazard.
- Cell broadcast and location-based SMS are proven technologies in mobile alerting.
- Regulatory frameworks and financial incentives will effectively speed up the rollout of mobile based early warning systems.

State of the Art

In 2022, ninety-five percent of the world's population had access to mobile broadband networks, and three quarters of people owned a mobile phone [1]. This makes mobile networks a powerful communication channel to alert populations about an imminent hazard, through two complementary technologies [2]:

- Location-based SMS sends a message to all mobile phones detected in an area.
- Cell-broadcast uses a different network than SMS, enabling messages to be sent almost immediately to millions of people without network congestion.

Using cell-broadcast (CB) and/or location-based SMS, warnings can be targeted to reach only those located in an at-risk area. The alerts are adaptable to specific requirements, such as a user's language.

Core Needs

Many countries have yet to implement a mobile-based Early Warning System (EWS), so the public and private sectors should work together to accelerate the rollout. People involved should include government policy makers, emergency managers, telecommunications workers, donors, international organizations, and non-governmental organisations, as well as EWS experts, mobile network operators, and software companies providing safety services to governments.

Recommendations

- Use both cell-broadcast and location-based SMS. Since both technologies have different advantages and shortcomings, their combination may be an ideal solution, especially in countries with the necessary financial resources and expertise.
- If funds are available for only one technology, then assess the risk of network congestion. The higher the risk, the more cell-broadcast should be prioritized.
- Combine cell-broadcast and location-based SMS with other technologies and channels, including sirens, billboards, radio, TV, mobile alerting apps, and social media. Keep a coherent message across the different channels, which will avoid confusion and reinforce the messages. Using the [Common Alerting Protocol \(CAP\)](#) is critical in this regard.
- As commercial interest for mobile network operators to implement EWSs is limited, clear regulatory frameworks and appropriate incentives, aligned closely with funding programmes, can drastically accelerate rollout of mobile-based EWSs, with massive benefits in terms of public safety.
- Prepare the population and increase their trust through regular tests and awareness campaigns.

Case Study – EU regulation on public warnings based on mobile

Mobile infrastructure is proving to be the most effective and inclusive way to reach everyone in seconds. As commercial interest remains limited, regulations and incentives are helpful for adopting mobile-based EWSs.

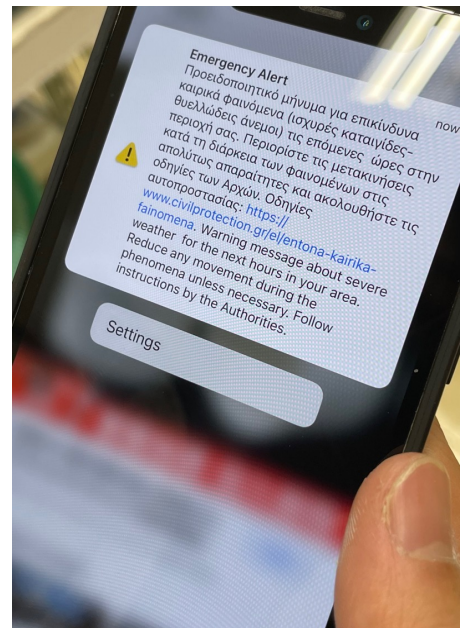
A law adopted by the European Union (EU) in 2018 requires all EU countries to set up [systems to send alerts via mobile networks](#) by June 2022. This regulatory approach has proven an effective way to accelerate the uptake of public warning systems across Europe.

European countries equipped with mobile early warning systems have successfully used the mobile network to alert the people at risk. During major floods that occurred around the EU in July 2021, Belgium sent around 2 million location-based SMS and more than 13,000 voice calls in 48 hours via their Multi-channel Multi-hazard early warning system, Be-Alert [3]. At the same time, 58 warning campaigns were sent by 37 different municipalities with access to BE-Alert [3]. These messages provided critical information regarding awareness, preparing to evacuate, where to evacuate, and then all-clears, thanks to using location-based technology.

UN Early Warnings for All (EW4A) Initiative

In March 2022, the UN launched the Early Warnings for All (EW4A) Initiative [4], which stipulates that every person in the world should be protected by an early warning system by 2027. The action plan for this initiative, launched during COP 27, calls for the promotion and implementation of geo-located mobile-based early warning services using cell-broadcast and/or location-based SMS, as a critical element for ‘warning dissemination and communication’.

[The International Telecommunication Union \(ITU\)](#) is leading the “Warning Dissemination and Communication” pillar of the EW4A initiative, with support from IFRC, REAP, UNDP, and WMO. This cooperation highlights the growing opportunities brought by digital technologies to reach people at risk. The pillar will also focus on promoting a regulatory approach, based on the model adopted by several countries, including the EU, which has mandated the use of geo-located alerts using mobile networks and engaging the mobile network operators to implement mobile EWS systems.



Cell-broadcast alert on severe weather (Image credit: Jiaman Lian)

References

- [1] ITU Facts and Figures. 2022. <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022>
- [2] Vivier, B. 2022. [8 recommendations to get the most out of Public Warning Systems](#), EENA blog.
- [3] Crisis Management Center of the Belgium Ministry of Interior, Interview in 2022 of Koen Debudt by Amélie Grangeat
- [4] WMO, 2022. [Early Warnings for All: Executive Action Plan 2023-2027](#)