

## Early Warning Systems

Early Warning Systems (EWS) give advance notice of natural events and warn people to prepare and get to safety.

The system is made up of four components,

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|-----------------------------------|------------------------------|
| <b>1. Risk analysis</b>           | <b>3. Alert/alarm system</b> |
| <b>2. Monitoring and tracking</b> | <b>4. Response</b>           |

### The four components work together.

<b>1. Risk analysis</b>	Historical analysis of the natural event (or hazard) in the vulnerable area	Mapped in GIS or onto maps and an analysis of the vulnerabilities
<b>2. Monitoring and tracking</b>	Monitoring of the natural event (heavy rainfall, earthquakes, etc.) and consequences (flooding, landslides, mass movements, etc.)	Automatic sensors that continually measure the variables Incorporated into cloud-based (or private) data collection platforms. Specialised software for data acquisition, processing and calibration
<b>3. Alert/alarm system</b>	When thresholds are breached, alert/alarm systems are activated	Operations Centre (usually run by a by a regional or local political authority) Alert/alarm software (app) Back-up systems such as HF, VHF radios, SISMATE, etc. Visualisation systems such as Video Wall Civil defence sirens, multi-tone, public address with network operation
<b>4. Response</b>	Area specific protocols and evacuation. Evacuation diagrams (from the results of the analysis of the most vulnerable areas)	Software (app) that issue alerts. Diagrams (maps) marked in a GIS application in Real Time

Emergency response services need increasingly accurate warnings of natural events in order to put effective measures in place. Demands for improvements in extreme weather events require:

- Extension of warning times
- Improved warning accuracy
- Improved communication and dissemination of warnings
- Use of new technologies to alert populations
- Targeted warning services to relevant and specific users (providing the right information to the right people at the right time in the right place).
- Warning messages to be understood and appropriate actions put in place

The output of an EWS is the Alert and Alarm messages that reach the population, authorities and local entities related to the GrD; these messages have different ways of reaching their destination, namely:

- Messages in applications (apps on mobile phones)
- Voice messages (HF, VHF, cellular messaging)
- Sound messages (multi-tone sirens)

The ideal is to have all three ways in a single device or equipment