

Early warning systems saves millions of lives

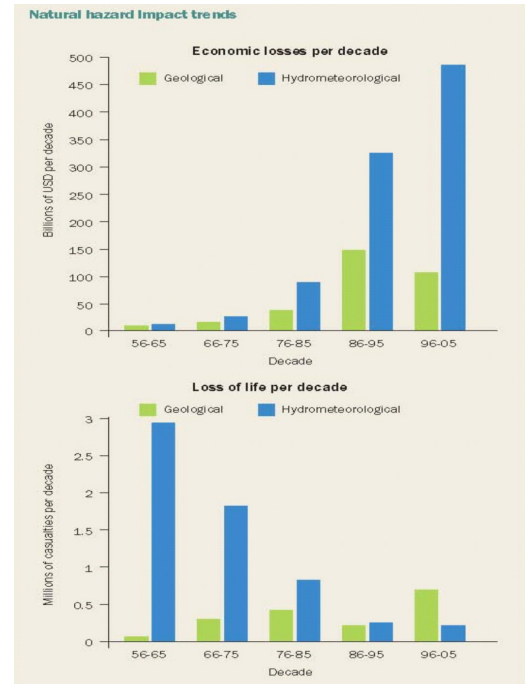
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Early warning systems (EWS) are a critical life-saving tool for floods, droughts, storms, bushfires and other hazards. Recorded economic losses linked to extreme hydro-meteorological events have increased nearly 50 times over the past five decades, but the global loss of life has decreased significantly, by a factor of about 10, thus millions of lives are being saved (Fig. 1). This has been attributed to advancements in monitoring and forecasting linked to effective emergency preparedness and response planning on the national and local levels (Box 1).

Effective EWS include four components: (1) detection, monitoring and forecasting the hazards; (2) analysis of risks involved; (3) dissemination of timely and authoritative warnings; and (4) activation of emergency preparedness and response plans. These need to be coordinated across many agencies at the national and community levels for the system to work. Failure in one component, or lack of coordination, can lead to the failure of the whole.

Figure 1: Loss of life and economic losses from natural hazards.

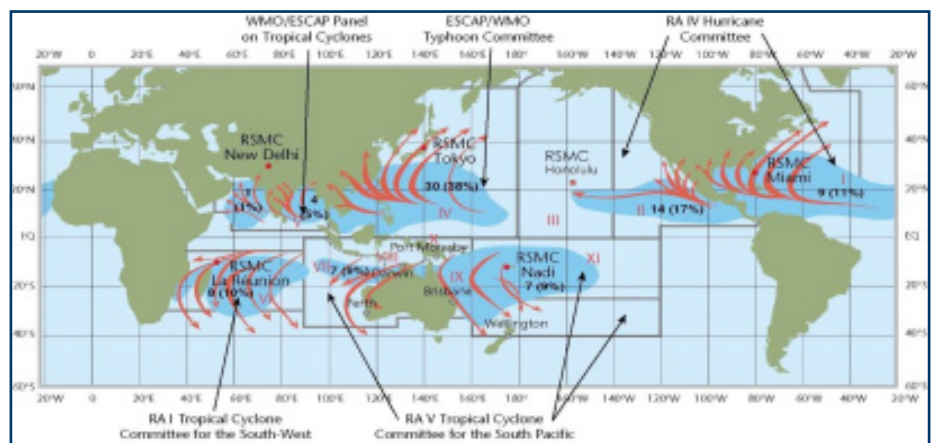
Source: Golnaraghi M., J. Douris, J.-B. Migraine (2009) "Saving Lives Through Early Warning Systems and Emergency Preparedness", Risk Wise, Tudor Rose, pp 137–141



Box 1: Globally and regionally coordinated Tropical Cyclone System

Source: WMO Tropical Cyclone Programme (www.wmo.int)

The Tropical Cyclone Programme illustrates how the WMO globally-coordinated network of National Meteorological Services function to support the national EWS for tropical cyclones. Six Regional Specialized Meteorological Centres provide tropical cyclone forecasts and alerts in support of NMHS operational warnings. The Programme is supported by five regional committees, involving forecasters from the NMHSs, which seek to improve and strengthen warning systems, especially in countries at risk.



Over the last few decades, meteorological, hydrological and climate forecasts have become increasingly accurate and accessible as a result of remarkable international co-operation, facilitated by the World Meteorological Organization (WMO) and the National Meteorological and Hydrological Services (NMHS) of its 191 Members.

Despite a history of recurring disasters, some lower income countries such as Bangladesh and Cuba have made dramatic strides in reducing mortality risks through effective EWS for tropical cyclones, storm surge and flooding. In Cuba, the government has made the protection of lives its highest priority, investing significantly in the development of the Cuban Tropical Cyclone Early Warning System. In Bangladesh, following the tropical cyclones and storm surges in 1970 and 1991, which led to some 300 000 and 140 000 casualties respectively, the government together with the Red Crescent Societies of Bangladesh implemented a Cyclone Preparedness Programme. This resulted in a much-reduced death toll, with less than 3 500 casualties from super cyclone Sidr in November 2007.

In France, following the devastating December 1999 winter storm Lothar in which 100 people died, the public Vigilance warning system was developed as part of revised emergency planning and response mechanisms. A similar storm in January 2009 resulted in only eight deaths. Later, following the intense heat wave in 2003 which led to over 15 000 deaths in France, Vigilance was upgraded to include heat/health warnings. As a result, the 2006 heat wave caused only 31 per cent of the number of deaths that would have occurred without the warning and response mechanisms. River flood risk warnings were included following a major flood in 2007.

To capitalize on these national successes and facilitate the sharing of experiences, an international effort coordinated by WMO documented good practices from EWS in Bangladesh, Shanghai, China, Cuba, France, Germany, Japan and the United States. These case studies, along with guidelines on "Institutional partnerships and coordination on Multi-Hazard EWS" were published in 2012 and have been used to develop training activities and identify needs for strengthening/development of NMHS capacities to support disaster risk management and multi-hazard early warning systems. A detailed synthesis of these good practices has revealed ten principles common to all countries, irrespective of their political, social, and institutional settings (see Box 2). Initiatives have been launched in South East Europe, Central America,

Box 2: Ten principles common to development of Multi-Hazard Early Warning Systems.

1. There is a strong political recognition of the benefits of EWS reflected in harmonized national and local disaster risk management policies, planning, legislation and budgeting.
2. Effective EWS are built upon four components: (i) hazard detection, monitoring and forecasting; (ii) analyzing risks and incorporation of risk information in emergency planning and warnings; (iii) disseminating timely and "authoritative" warnings, and (iv) community planning and preparedness.
3. EWS stakeholders are identified and their roles and responsibilities and coordination mechanisms clearly defined and documented within national and local plans, legislation, directives, MOUs, etc.
4. EWS capacities are supported by adequate resources (e.g., human, financial, equipment, etc.) at the national and local levels and the system is designed and for long-term sustainability.
5. Hazard, exposure and vulnerability information are used to carry-out risk assessments at different levels, as critical input into emergency planning and development of warning messages.
6. Warning messages are; (i) clear, consistent and include risk information, (ii) designed with consideration for linking threat levels to emergency preparedness and response actions (e.g., using colour, flags, etc) and understood by authorities and the population, and (iii) issued by a single (or unified), recognized and "authoritative" source.
7. Warning dissemination mechanisms are able to reach the authorities, other EWS stakeholders and the population at risk in a timely and reliable fashion.
8. Emergency response plans are developed with consideration for hazard/risk levels, characteristics of the exposed communities.
9. Training on hazard/risk/emergency preparedness awareness integrated in various formal and informal educational programmes with regular drills to ensure operational readiness.
10. Effective feedback and improvement mechanisms are in place at all levels of EWS to provide systematic evaluation and ensure improvement over time.

Source: Institutional Partnerships in Multi-Hazard Early Warning Systems, Golnaraghi, M (Ed.), Springer Verlag Publishers, ISBN 978-3-642-25372-0 (2012).