UNITED NATIONS

Global Survey of Early Warning Systems

An assessment of capacities, gaps and opportunities towards building a comprehensive global early warning system for all natural hazards

Final Version
A report prepared at the request of
the Secretary-General of the United Nations

UNITED NATIONS

Global Survey of Early Warning Systems

An assessment of capacities, gaps and opportunities toward building a comprehensive global early warning system for all natural hazards

A report prepared at the request of
the Secretary-General of the United Nations

UNITED NATIONS NATIONS UNIES

THE SECRETARY-GENERAL

--

FOREWORD TO THE GLOBAL SURVEY OF EARLY WARNING SYSTEMS

September 2006

If an early warning system had been in place when the tsunami of 26 December 2004 struck the Indian Ocean region, many thousands of lives could have been saved. That catastrophe was a wake-up call for Governments and many others about the role early warning can play in avoiding and reducing the human and physical impacts of natural hazards.

In the days following the tsunami, I called for the development of a global early warning system for all natural hazards and all communities. Such a system would build upon existing national and regional capacities, and complement broader initiatives aimed at disaster preparedness and mitigation. As a further step, in March 2005, I asked the Secretariat of the United Nations International Strategy for Disaster Reduction (UNISDR), in consultation with relevant
United Nations organizations, to undertake a global survey to identify existing capacities and gaps in early warning systems. This report is a culmination of that process.

The report highlights the significant global progress that is being made in our ability to assess risks and to generate and communicate predictions and warnings. These gains are mainly a result of growing scientific understanding and the use of modern information and communication technologies.

However, considerable shortcomings and gaps remain, especially in developing countries, where basic capacities, equipment and resources are often not available. And at the human level, we are still failing to raise public awareness of risks, disseminate timely and understandable warnings, and strengthen community preparedness and resilience. We must address these issues if the growing toll of disasters is to be arrested and reversed.

I encourage all partners -- from decision-makers in Governments to organizations involved in early warning and preparedness -- to study and act on the information and recommendations contained in this report. In particular, I urge all relevant actors to develop and support comprehensive strategies and follow-up actions through the UNISDR and its International Early Warning Programme. Natural hazards will always challenge us, but people-centred early warning systems can be a potent weapon in ensuring that natural hazards do not turn into unmanageable disasters.

Kofi A. Annan

Acknowledgements

The Global Survey of Early Warning Systems was called for by the Secretary-General of the United Nations in his report of progress towards the implementation of the Millennium Development Goals[1] . Its preparation was coordinated by the International Strategy for Disaster Reduction (ISDR) secretariat through the ISDR Platform for the Promotion of Early Warning (PPEW) in consultation with relevant United Nations organisations.

The Inter-Agency Task Force for Disaster Reduction (IATF/DR), at its 11th session, May 2005, established a Working Group to support the preparation of the survey. The Working Group was co-chaired by the World Meteorological Organization (WMO) and the Office for the Coordination of Humanitarian Affairs of the United Nations Secretariat (OCHA) and included the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Nations Human Settlements Programme (UN-HABITAT), the United Nations Institute for Training and Research (UNITAR), the United Nations University Institute for Environment and Security (UNU-EHS), the Asian Disaster Preparedness Center (ADPC), the IGAD Climate Prediction and Applications Centre (ICPAC), the Global Fire Monitoring Center (GFMC), and the International Federation of Red Cross and Red Crescent Societies (IFRC).

A number of other organisations contributed to the survey, including: United Nations Children's Fund (UNICEF), the United Nations Convention to Combat Desertification (UNCCD), World Food Programme (WFP), Food and Agriculture Organisation (FAO), European Commission Joint Research Centre (EC-JRC), the Asian Disaster Reduction Center (ADRC), ProVention Consortium and South Pacific Applied Geoscience Commission (SOPAC).

A meeting of international experts was held in Bonn, Germany, 12-13 December 2005 to review a draft and to provide support for the preparation of the report.

The ISDR secretariat gratefully acknowledges the many contributions received from individuals, institutions and governments. In particular:
Working Group Co-Chairs Maryam Golnaraghi and Ricardo Mena;
Consultants Seth Vordzorgbe and Piero Calvi-Parisetti;
Expert-workshop participants Alessandro Annunziato, Douglas Pattie, David Rogers, John Scott and Karl-Otto Zentel;
Expert reviewers Robyn Betts, Fouad Bendimerad, Michael Glantz, Chip Guard, John Handmer, Terry Jeggle, Ilan Kelman, Sir David King, Horst Letz, Marcus Oxley, LeHuu Ti, Gordon McBean, Michael Coughlan, Juan Carlos Villagran, Ben Wisner and John Zillman.

Editorial and production team: Reid Basher, Mario Barrantes, John Harding, Silvia Llosa, Karen Moubarak, Carolin Schärpf and Parsa Zarian.

[1] In larger freedom: towards development, security and human rights for all, Report of the Secretary-General, 2005, http://www.un.org/largerfreedom/

Executive Summary

If an effective tsunami early warning system had been in place in the Indian Ocean region on 26 December 2004, thousands of lives would have been saved. The same stark lesson can be drawn from other disasters that have killed tens of thousands of people in the past few years. Effective early warning systems not only save lives but also help protect livelihoods and national development gains. Over the last thirty years, deaths from disasters have been declining[2], in part thanks to the role of early warning systems and associated preparedness and response systems.

To be effective, early warning systems must be people-centred and must integrate four elements - (i) knowledge of the risks faced; (ii) technical monitoring and warning service; (iii) dissemination of meaningful warnings to those at risk; and (iv) public awareness and preparedness to act. Failure in any one of these elements can mean failure of the whole early warning system.

With a view to establish a "worldwide early warning system for all natural hazards building on existing national and regional capacity", United Nations Secretary-General Mr. Kofi Annan requested in March 2005 that a global survey of capacities and gaps for early warning systems be undertaken[3]. The present report synthesises the findings of this survey, which was carried out by the ISDR secretariat in collaboration with a multi-party working group established at the 11th session of the Inter-Agency Task Force on Disaster Reduction (IATF/DR) in May 2005.

Information for the survey was gathered from existing sources, including from reports submitted by 122 countries for the World Conference on Disaster Reduction, in 2005, regional reports prepared for the Second International Conference on Early Warning, in 2003 and ISDR publications. Inputs obtained specifically for the survey included updated information from 23 countries and 20 international agencies and early warning system reports and surveys undertaken by other agencies.

The survey finds that considerable progress has been made in developing the knowledge and technical tools required to assess risks and to generate and communicate predictions and warnings, particularly as a result of growing scientific understanding and the use of modern information and communication technologies. Early warning system technologies are now available for almost all types of hazards and are in operation in at least some parts of the world.

However, the experiences of the Indian Ocean tsunami, the hurricanes in the Gulf of Mexico and many other recent events such as heat waves, droughts, famine, wildfires, floods and mudflows, point to significant inadequacies in existing early warning systems. In many cases, especially in developing countries, warning systems lack the basic capacities of equipment, skills and resources. Systems for some hazards, such as tsunamis and landslides, are often absent. The survey concludes that there are

2 Centre for Research on the Epidemiology of Disasters (CRED), "Thirty Years of Natural Disasters 1974-2003: The Numbers", Presses Universitaires de Louvain, 2004.

3 *In Larger Freedom: towards development, security and human rights for all* (A/59/2005, paragraph 66), http://www.un.org/largerfreedom.

many gaps and shortcomings and the world is far from having the global system for all hazards and all communities that the United Nations Secretary-General first called for in January 2005.

Progress on each of the above four components of people-centred early warning systems is mixed. Even where the capability exists to reliably generate and issue warnings, the other three components are too often absent or weak. Among both developed and developing nations, the weakest elements concern warning dissemination and preparedness to act. Warnings may fail to reach those who must take action and may not be understood or address their concerns. Root causes appear to be inadequate political commitment, weak coordination among the various actors and lacks of public awareness and public participation in the development and operation of early warning systems.

However, and more positively, there are many and great capacities and strengths already available upon which a truly effective globally comprehensive early warning system can be built – not as a monolithic centralised system, but as a network of systems, drawing on the expertise and technical capacities of the different hazard fields and the knowledge and insight of relevant social and economic fields. Moreover, what needs to be done to address the shortcomings is not a mystery, but has been already laid out in general terms in a succession of documents and meetings over the last decade, such as the International Conference on Early Warning Systems (EWC'98), Potsdam, Germany, September 1998; Second International Conference on Early Warning (EWC II), Bonn, Germany, October 2003; and the Third International Conference on Early Warning (EWC III), Bonn, Germany, March 2006 (see www.unisdr-earlywarning.org).

The survey makes five main recommendations, as follows:

1. **Develop a globally comprehensive early warning system, rooted in existing early warning systems and capacities**
   A global early warning system will require long-term sustained action by diverse players, strong political commitment to engender public action and to make early warning a core task of national policy and disaster risk reduction strategy, strong international support and coordination, with clear roles and responsibilities and wide participation of NGO, private sector and regional organisations.

2. **Build national people-centred early warning systems**
   Country-based early warning systems are needed for the protection of citizens and also provide the building blocks of the global early warning system. The recommendation includes calls for a national multi-party roundtable on early warning, a national plan based on a survey of capabilities, a warning dissemination strategy, community-based approaches, public education and mock exercises.

3. **Fill the main gaps in global early warning capacities**
   The recommendation highlights gaps and opportunities that deserve immediate concerted action, including for tropical cyclones, floods and tsunamis for the most ill-protected populations, agreements and networking for drought, food security and wildland fire, a global survey and mobile monitoring facility for volcanoes and a major early warning project in each least-developed country.

4. **Strengthen the scientific and data foundations for early warning**
   The scientific and technical recommendation seeks action on a long-term global data plan, upgraded telecommunications, an agreement on basin-wide data exchange for floods, a pan-African project to fill major data gaps, improved hazard and vulnerability mapping, an early warning science and technology agenda and an internet portal for natural hazards, risks and warnings.

5. **Develop the institutional foundations for a global early warning system**
   This recommendation addresses the needs for underpinning mechanisms of international and regional governance, coordination and support, starting with a call for the UN system to affirm the goal of a global early warning system and including requests for various UN and international agencies in technical, humanitarian and development fields to undertake specific governance and support roles.

Contents