

# Compilation of National Progress Reports on the implementation of the Hyogo Framework for Action:

## HFA Priority 2, core indicator 2.3:

*Early warning systems are in place for all major hazards, with outreach to communities.*

### Know the Risks and Take Action

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Reporting period: 2007-2009

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This document has been compiled from the national progress reports provided by 76 countries through the HFA Monitor.

Note that these extracts are provided for convenience only.  
National HFA progress reports should be considered in their entirety and can be found at:

<http://www.preventionweb.net/english/hyogo/framework/progress/>

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# Africa

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## Algeria (in French)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Il y a lieu de signaler que des systèmes d'alerte rapide satisfaisants sont en place dans certains secteurs ou domaines comme par exemple :

- Système (national et international) de surveillance et d'alerte des invasions acridiennes.
- Système national d'alerte par radio pour les incendies de forêts
- Système national d'alerte rapide pour les déversements massifs d'hydrocarbures
- Système national d'alerte rapide par radio des déversements ou ruptures de barrages
- Systèmes pilotes de prévision et d'alerte aux crues du bassin versant du Sebaou (Région de Tizi-Ouzou) et du bassin de l'oued El Harrach(Wilaya d'Alger)
- Systèmes d'alerte rapide spécialisés pour les grandes zones industrielles (pétro-chimiques et pétrolières en particulier)
- Système d'alerte météorologique pour les tempêtes et vents violents.
- Systèmes (en cours de formalisation) d'alerte rapide (différenciée en 3 niveaux en fonction de la magnitude et de la vulnérabilité de la région touchée) pour les séismes et d'alerte précoce pour les inondations

### Context & Constraints:

Les systèmes ne font pas l'objet de simulations régulières et d'évaluation.

Les principaux défis à relever résident dans la généralisation des systèmes d'alerte au maximum de risques possible, leur vulgarisation systématique au niveau des communautés concernées et l'organisation de simulations périodiques et d'évaluation.

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## Angola (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Existe um sistema piloto de aviso prévio instalado nas bacias hidrográficas dos rios Cavaco, Catumbela e Cuporolo na província de Benguela, com o objectivo primário de alertar em tempo real as variações dos caudais dos mesmos rios. O sistema serve também como base permitir a monitorização por parte dos membros da Comissão Nacional de Protecção Civil e do escritório regional para Africa da Organização Internacional de Meteorologia. Estão em cursos estudos para montagem do Sistema de Aviso Prévio a nível nacional.

### Context & Constraints:

O sistema surge na base de alertar os prejuizos humanos e materiais causados nas povoações ribeirinhas na província de Benguela. Esta experiência piloto permitiu o maior conhecimento da população como lidar com eventuais desastres naturais e correcta leitura dos sinais de perigo, o reassentamento das populações locais para área de maior segurança e organização das comissões municipais da protecção civil das populações ribeirinhas afectadas, criação de reservas naturais de água e o fomento da criação de gado. Para sua efectividade este sistema deve ser replicado noutras bacias hidrográficas em todo espaço do território nacional.

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## Burkina Faso (in French)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

L'engagement politique existe, mais les Systèmes d'alerte précoce existant ne sont pas très opérationnels pour prendre en compte tous les aspects liés aux risques de catastrophes et d'en atténuer les effets sur les communautés.

### Context & Constraints:

- Insuffisance organisationnelle;
  - Insuffisance de ressources (humaines, financiers et matériels) pour la mise en oeuvre des programmes.
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## Burundi (in French)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Les systèmes d'alerte existent dans certains secteurs clé et sont plus ou moins fonctionnels.

### Context & Constraints:

Les canaux de communication de sont pas accessibles à tous les niveaux.

Le Gouvernement doit recourir aux moyens des donateurs pour faire fonctionner les systèmes d'alerte précoce existants.

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## Cote d'Ivoire (in French)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

La Côte d'Ivoire dispose de programmes et de campagnes de sensibilisation relativement aux aléas naturels principalement en ce qui concerne les épidémies et les feux de brousses. Un système intégré ou des systèmes sectoriels d'alerte précoce des aléas naturels subis ou susceptibles d'être subis par notre pays est à mettre en place.

### Context & Constraints:

Pour rendre les communautés plus résilientes face aux catastrophes naturelles, la mise à leur disposition de l'information et des dispositions à prendre à travers un ou des systèmes d'alerte précoce sont indispensables. Pour y arriver, ce type d'outil doit être pris en compte dans l'élaboration des stratégies de développement, notamment le DSRP, comme un véritable facteur de réduction de la vulnérabilité et donc de la pauvreté.

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## Egypt (in English)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

Early warning systems linked to some major hazards (earthquakes, flash floods and air quality) are in place, with indirect outreach to communities. This warning system is linked mostly to the media and employs a variety of communication processes, with a structure of hierarchical relations through which communication flow.

Currently the CMDRS/IDSC has initiated and developed a system to enhance communication and serve at present as a focal point for national grid of communication, through the following:

- > Establishing a central operational room for crisis management in the IDSC (Focal Point).
- > Supporting ministries and governorates to establish operational rooms and enhance communications with the central operational room.
- > Setting up an emergency and communication system connecting all ministries and governorates with the main operational room.
- > Media broadcasts programs for raising community awareness with regard to disaster impacts and risk reduction, particularly on the following up of world wide disasters and impacts.

**Context & Constraints:**

Areas of weakness are to be identified prior to the establishment of a national early warning system, especially with regards to monitoring and response capabilities. The National Strategy for Crisis Management and Risk Reduction is to incorporate this urgent issue. The SAB is to continue its efforts and contribute to the identification of gaps and provide the necessary recommendations and plan of action to develop the EWS.

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**Ghana** (in English)

**Level of Progress achieved:**

2 - Some progress, but without systematic policy and/ or institutional commitment

**Description:**

There are some seismographs for the monitoring of earth tremors/quakes. The Agricultural sector also has systems for the monitoring and early warning of army-worm infestations by using pheromone traps. Some major rivers also have hydrological gauges for flooding. The Meteorological Agency also taps into the World Meteo-satellite system and is therefore able to forecast weather conditions countrywide and give early warning through the media. Dam-spillings of local, national and international origin are given prior notification as early warning to vulnerable communities.

**Context & Constraints:**

The early warning systems are not widespread. For example, rivers in flood prone areas are not gauged. Many people rarely listen to the broadcast of weather warnings, especially in the poor and vulnerable communities.

There are no seismograms in the mining and quarrying communities. Only three (3) analogue seismograms are currently functioning in the entire country.

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**Kenya** (in English)

**Level of Progress achieved:**

5 - Comprehensive achievement with sustained commitment and capacities at all levels

**Description:**

The Kenya Meteorological Department gives warning to weather related hazards. Kenya Food Security Monitoring System, Geology Department and Nairobi University monitors' earthquake and stress on the ground, floods being monitored by Western Kenya Flood Mitigation Project (WKFMP).

**Context & Constraints:**

## Madagascar (in French)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Le Système National d'Alerte Précoce (SNAP) est de plus en plus fonctionnel. Sa structure comprend le niveau central, régional et communal. Le SNAP relate tous les indicateurs de vulnérabilité d'une population donnée (sociaux, économiques, physiques, environnementaux, infrastructures, ...). Afin d'assurer la participation communautaire et pour que la population soit impliquée dans le développement, l'Etat donne un rôle et une responsabilité prépondérants aux fokontany, de ce fait la mise en place de la structure opérationnelle du SNAP à ce niveau est en cours de préparation. L'évaluation, l'analyse et la mise en cohérence avec le NVAC/SADC est aussi en cours. La collaboration et la coordination entre les services techniques pour chaque aléa et le BNGRC ont permis de mettre en place un système d'alerte qui avertisse à temps les communautés sur la survenance probable d'un aléa comme le cyclone, l'inondation, évacuation acridienne, ....

Les alertes au tsunami avec les centres internationaux sont opérationnelles grâce à l'acquisition des moyens matériels adéquats.

### Context & Constraints:

Malgré la validation du document de référence national sur l'Alerte Précoce à Madagascar, le SNAP ne dispose pas d'un cadre institutionnel.

On constate également une disparité des initiatives des acteurs clés, en particulier les bailleurs de fond dans l'appui au gouvernement pour la mise en œuvre effective du SNAP.

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## Malawi (in English)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

Early warning systems for specific hazards exist but there is no comprehensive early warning system for all hazards. The Department of Meteorological Services provides seasonal forecasts and weather bulletins which provide early warning for food security and floods. Ministry of Irrigation and Water Development provides monitors water levels which provide early warning for floods. Dissemination of the EWS to communities is a challenge although it has worked at times. Sometimes, communities do not access the information timely for its utilisation hence they end up being affected by disasters. A recommendation has been made to set up an Early Warning Systems sub committee for all disasters under the National Disaster Preparedness and Relief Committee.

### Context & Constraints:

Lack of a comprehensive effective integrated early warning system for all hazards. This is likely to be addressed when the sub committee being proposed is established.

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## Mauritius (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

The Mauritius Meteorological Services maintains a 24/7 watch for all hazards likely to affect Mauritius. The Meteorological Services has a well-understood cyclone warning system together with an ongoing outreach (public awareness) and education programme. A torrential rain warning system exists since the mid eighties. Some further fine-tuning may be needed here. A landslide warning system is already operational since last year.

A tsunami alert system has been developed and is in its final stages. This warning system will become operational as from September or beginning October.

Regular talk are organized at school, communities centres, village halls and municipals hall for the students and general public. Talk are also organized on the local radio and television.

**Context & Constraints:**

The efficacy of early warning systems for tropical cyclones is generally well established. Further outreach and public awareness for torrential rains and landslide warning need to be carried out. Warnings for tsunami will be implemented as from the next month. An outreach programme and public awareness has been planned for the last quarter of this year and thereon afterwards. Continuous education and public awareness on tsunami must be an ongoing feature.

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## Mozambique (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

The responsibility for flood forecasting and warning services in Mozambique rests with the National Directorate of Water in collaboration with Regional Water Authorities, National Institute of Meteorology and National Institute of Disaster Management. The effectiveness of the flood warning system depends on the cooperative involvement of the National Television, The national and the community radios and, Local Government working with flood-threatened communities. The responsibility for Cyclone monitoring and warning services in Mozambique rests with the National Institute of Meteorology in collaboration with Regional Center of Meteorology and National Institute of Disaster Management. The National Institute of Disaster Management (INGC) is the Government institution which coordinates the development and operation of early warning services all over the country and has representations in all provinces and 3 regions and some districts.

The community's radios, the local committees of risk management, the National Television in urban areas, the media, the river basin committees altogether, play an import role in dissemination of the information. There are also other tools for disaster warning such as flood risk maps developed by ARA-South in collaboration with FEWSNET, and flood economic zone in the low Limpopo developed by FEWSNet where the main objective is warning community in advance by locating safe and unsafe areas before disaster occur. A flood risk map is presently under development for the regions of the Save, Umbeluzi and Maputo rivers.

Mozambique has implemented a new cyclone early warning system using blue, yellow and red colors. Blue color is forecasting an event within 48 to 24 h, yellow color within 24 hours and red color within 6 hours. The food security early warning system developed by SETSAN, with the objective of analyzing the vulnerability among different communities is a good achievement toward improving early warning systems in Mozambique.

**Context & Constraints:**

The system is hampered by a lack of community awareness programmes for dissemination of the

information and generally inadequate contact between expert staff and the communities. Another problem is the inadequate training of local people in the warning cycle and poor knowledge of roles and responsibilities. Poor coordination within the national institutions, lack of continuity in operations, in most case the Mozambican Early Warning System is operating only during the rain season.

Lack of flexibility: In Mozambique the process of information exchange is still not flexible. An example is the situations between the National Institute of Meteorology and the National Directory of Water where, The first Institution is responsible by predicting expected rainfall, important to feed the hydrologic model for stream flow forecasting, but in most cases the National Directory of Water does not use information from National Institute of Meteorology preferring other sources, such as of the US Geological Survey. Lack of continuous funding, lack of maintenance and no insurance of equipment and operations is also major hindrance.

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## Senegal (in French)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

Une étude a été menée pour mettre en place un système d'alerte précoce (SAP). Les résultats de cette étude feront l'objet d'une vaste diffusion et d'un partage avant l'adoption finale du SAP.

### Context & Constraints:

Les ateliers de partage et de validation des résultats de l'étude sur la mise en place du SAP doivent être poursuivies pour arriver à un SAP fonctionnel.

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## Sierra Leone (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

The level is THREE. There is an overwhelming institutional commitment, however, the main provider of early warning for natural disasters, the national meteorological services got vandalized during the war and has yet been replaced. With regards to an-made emergencies, the services of local radio stations are normally requested for since the disaster management department don't have a designated channel of its own.

### Context & Constraints:

Re-equipping the meteorological station, recruiting and training of more personnel plus an improved communications network/information channel to be provided for the coordinating institution.

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## Swaziland (in English)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

There are no proper structures in place.

### Context & Constraints:

Lack of both financial and human resources

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## Tanzania, United Rep of (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Effective disaster manageability depends on the level of development of warning systems. The severity of disaster consequences depends on the interplay between the warnings issued and the degree of public response to the warning.

The TMA monitor and provide warnings about severe weather events. Warning messages are communicated to relevant response agencies, and necessary to the public via media. For example, whenever necessary community always receive information on drought, floods, human and animal diseases. Response agencies develop their local systems as an extension of national network. Nevertheless the UN agencies in Tanzania have formed an emergency coordination group which receives and disseminate disaster information. Disaster coordination Group focal point is responsible to communicate with relevant government organs, specifically PMO soon after receiving any information on hazard and disasters

The early warning system in Tanzania include: the Tanzania Meteorological Agency; Seismology unit under the Ministry of energy and Minerals, the Emergence Preparedness and response Unit (EPRU); Plant protection, Food security Department and Famine Early Warning System Network (FEWS NET) under Ministry of Agriculture, food security and cooperatives are mandated with the obligation of early warning. Information on hazards/disasters such as drought, floods, and diseases can be passed on to the community through the system.

### Context & Constraints:

TMA which deals with early warning systems for meteorological events is generally well established. Ongoing challenge is establishing a National Emergency Operation Centre for appropriate warning systems and response arrangements for future disasters. For effective dissemination and use of early warning information public education programs at both the national and local level is necessary.

The efficiency of these units (early warning systems) is inadequate as they lack equipment, personnel and funds. Similarly traditional prediction mechanisms have not been developed to provide reliable information. In general there is no comprehensive warning system in the country. Therefore another challenge includes warning systems for all disasters to be developed and strengthened so as to ensure timely dissemination of information.

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## Togo (in French)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

le Togo ne dispose pas encore du système d'alerte précoce malgré l'engagement institutionnel

### Context & Constraints:

contraintes financières

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## Zambia (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial

resources and/ or operational capacities

**Description:**

The Early Warning Systems for major hazards are in place in Zambia. DMMU is the body that coordinates all Early Warning activities in the country. The Zambia Metrological Department gives warning with regard to weather related hazards such as droughts and floods. The Ministry of Energy and Water Development also gives hydrological data which aids in the determination of floods and other hazards in the country. The National Early Warning Unit in the Ministry of Agriculture working with institutions such as FEWSNET gives early warning information on Food Security.

DMMU is currently working on an Early Warning Systems Project whose goal is to empower individuals and vulnerable communities threatened by floods and other hazards to act in sufficient time and in an appropriate manner. It is hoped that the move will lead to minimizing of personal injury, loss of life and damage to property and the environment. The Project is funded by the Government of the Republic of Zambia.

**Context & Constraints:**

There are efforts to try and use local radio stations to disseminate early warning information at the district and community levels. However, resources for the districts for carrying out this activity are rather limited.

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# Americas

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## Anguilla (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Robust backbone system in place, tested and documented.

radio interrupt, text to voice system, internal computer pop-up in place.

Needs public registration component, education, training and outreach for 2009.

### Context & Constraints:

Extremely limited staff and no knowledge of such systems outside the director and a radio technician.

Trianing materials just generated by the RDS providor so trinaing to start soon.

Communications Officer coming online April 2009.

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## Argentina (in Spanish)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Los logros alcanzados, a través de los variados actores involucrados tanto en el Grupo de Proveedores de Información Primaria como en el de Monitoreo de Alertas, y algunas bases de datos consolidadas (como la del Instituto Geográfico Nacional y otros) permiten ser optimistas en este capítulo, sin perjuicio de lo cual las limitaciones fundamentalmente presupuestarias constriñen el desarrollo de esta capacidad.

### Context & Constraints:

Expandir el conocimiento sobre estas capacidades y mejorar las contribuciones presupuestarias para su desarrollo, será un reto.

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## Bolivia (in Spanish)

### Level of Progress achieved:

1 - Minor progress with few signs of forward action in plans or policy

### Description:

Hidrografía Naval y SENAMHI realizan el monitoreo hidrológico en los principales cuerpos de agua del país, en los cuales se han definido niveles de alerta. El trabajo se centraliza en el aspecto hídrico relacionado con fenómenos hidrológicos extremos.

Existen proyectos de implementación de sistemas de alerta temprana (SATs) que están llevando a efecto instituciones estatales en coordinación con organizaciones no gubernamentales.

### Context & Constraints:

El factor económico es el principal obstáculo para implementar sistemas de alerta temprana efectivos. No existe sostenibilidad de los recursos.

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## **British Virgin Islands** (in English)

### **Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### **Description:**

Early Warning System consists of state of the art technology managed by technically trained personnel and supported by the media through MOUs. In addition, a National Alert System is also in place that has legislative backing under the Disaster Management Act 2003. The DDM maintains and operates an Emergency Telecommunications Network consisting of some 70 stations located throughout the Territory. The NEOC is equipped with commercial and amateur emergency communication systems plus satellite phones are located on each island in the event that these networks fail. Agreements are also in place with the USVI to assist in this area if necessary. With the absence of a local Metrological Office, the DDM contracts weather monitoring services; and have established data collection capacity with the purchase and installation of a network of automated weather stations. Seismic monitoring is provided through a formal relationship with the Puerto Rico Seismic Network and the Strong Motion Sensor Programme at the University of Puerto Rico, Mayaguez. A network of seismic stations and strong motion sensors are located throughout the Territory.

Six (6) automatic outdoor warning sirens have been installed. Sirens are tested monthly and, at present, all are fully functional.

Four radio stations are set up to receive and transmit emergency broadcasts from the DDM.

36 Handheld radios, 30 Base Radios and their operators comprise the DDM VHF Emergency Network.

### **Context & Constraints:**

BVI Cable TV will allow the use of ONLY three (3) channels (ABC, CBS, NBC) to transmit the “ticker” that would display weather information without disrupting regular programming, or the display of information that would demand immediate attention, preceded by an emergency broadcast bulletin indicator. Delays have occurred with regards to installing this system. To date, four of the six text-scrolling components have been installed, but an electronic linkage is needed. Numerous requests have been made to the Ministry of Communications and Works by DDM to obtain the operating rights to Channel 5 (VITV), which is currently off the air. We have so far not received any word in the affirmative. Thus, no emergency broadcast channel exists. Discussions are ongoing with the Telecommunications Regulatory Commission to address these issues in annual licence renewals.

Five Radio Operators offered to enhanced capacity to operate VHF and HF networks. BVI Amateur Radio League took part in simulation exercise Region Rap and played an important role by relaying information for some countries. BVIARL also took part in summer program for students by introducing participants to Amateur Radio and giving them opportunities to speak to Amateurs on radio. The installation of HF Amateur Communications Rig in DDM Radio Room will enhance the ability to communicate over long distances during an emergency event via HF radio. There have been instances during disasters where HF is often the only and best means of communications into an area of post impact when all other forms of traditional communications equipment went down.

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## **Cayman Islands** (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Risk knowledge is very high for hurricanes and HMCI is working to increase the knowledge of the public in terms of other hazards.

National monitoring and weather services include the National Weather Service, Public Health, Department of Agriculture, MRCU, the seismograph network through HMCI.

A number of agencies are involved in disseminating information about hazards and vulnerabilities:

Hazard Management Cayman Islands employs a full time Communications Officer with responsibilities that include public awareness.

Several annual hurricane handbooks are produced and widely distributed.

HMCI establishes information booths at many public events and answers questions and distributes informational material.

The Agency has a regularly updated website, [www.caymanprepared.gov.ky](http://www.caymanprepared.gov.ky), which has useful data on the full range of potential disasters and includes mitigation strategies and ways of preparing for a possible disaster.

Public outreach is part of HMCI's strategy and involves speaking to volunteer organizations, schools, civic groups, churches, business organizations and clubs etc.

Relevant information about threats and disasters is also archived and a concerted effort is underway to make as much information available as possible. Publishing requirements are included in the Freedom of Information Legislation, which has been adopted in the Cayman Islands and which becomes operational January 2009.

Government Information Services (GIS) also plays an active role in disseminating hazard specific information.

During times of an approaching or actual threat from a disaster the Joint Communications Service becomes operational and has responsibility for disseminating information to the public, as well as specific sectors such as visiting tourists, the financial services, airports authority etc.

HMCI and GIS have established relationships with print and electronic media in the Cayman Islands and systems are in place to distribute information broadly and rapidly when the need arises.

Text messaging software is used to send mass messages before, during and after a threat.

Senior staff at HMCI and various representatives from partner agencies make frequent contributions in the form of interviews etc. to local television, radio and newspapers.

Screens in supermarkets also disseminate information on precautions and any threats facing the country.

**Context & Constraints:**

One of the biggest challenges is to make sure that messages get to virtually the entire population and get to them quickly in times of threat. Government has their own radio station and websites, but the television station and newspapers are privately owned, so it is important to have good ongoing relationships with the

media to ensure that messages get broadly disseminated.

Currently there is no established method of instantly placing warnings and crawling text on television channels. The existing mechanism has an approximately 30 minute lag time. It would be useful to establish a rapid public warning system, but the technology does not presently exist at the local television centre. Ongoing negotiations with the television centre may help to establish this useful public service facility.

Hurricanes are by their very nature somewhat unpredictable. When facing a threat HMCI has a responsibility to make the public aware and mobilize the nation to take precautionary measures to protect life and property. Bracing for disaster takes effort and costs families, individuals and businesses money. Sometimes the threat does not materialize (the country and people are spared) and that heightened level of readiness may be viewed as not having been necessary. If this occurs too often the public may be inclined to get complacent, or start to ignore public warnings. There is therefore a constant balance between maintaining the necessary level of readiness whenever impending disaster is possible and guarding against creeping complacency.

A balance also needs to be struck between too much disaster related information and not enough. Making sure the necessary disaster related messages are effectively conveyed to the people is critical, however overwhelming the public with a constant stream of disaster related information could cause fatigue and people may start ignoring crucial messages.

Certain threats carry a fairly low probability of actually occurring, like a damaging earthquake or tsunami, yet they both have potentially devastating consequences if they do occur. Getting the public to 'buy in' to the need to prepare for unlikely, but conceivable threats poses challenges.

Both local and overseas media organizations can occasionally 'over dramatize' a threat so there is sometimes a need to balance information and correct misinformation.

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## **Colombia** (in Spanish)

### **Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### **Description:**

El país cuenta con avances en Sistemas de Alerta Temprana SAT, especialmente para amenazas de tsunamis, erupciones volcánicas, e inundaciones entre otros. Los cuales están coordinados con las diferentes entidades encargadas de liderar la respuesta, que con un trabajo mancomunado con las comunidades son las encargadas de difundir las mismas y estar preparados ante cualquier tipo de contingencia. Un ejemplo son los mecanismos que se utilizan en tiempo real en la zona de influencia del Volcán Galeras. SAT (científico - comunitario); a nivel comunitario, lenguaje científico con entendimiento en el lenguaje local (p.e Bogotá, SAT con mecanismos "a la mano" de la comunidad, megáfonos, etc.), ingentes esfuerzos se realizan para que llegue a todas las comunidades. Se toma en cuenta el conocimiento y experiencia de la comunidad, para su evaluación e inclusión a los SAT. En este orden de ideas es de destacar que el país ha implementado grandes avances en la instalación de redes hidrometeorológicas con comunicación satelital y de forma complementaria se han instalado y puesto en operación redes hidrometeorológicas a nivel local operadas por la comunidad, así mismo se ha actualizado la red sísmica localizándola en puntos estratégicos del país. Es de destacar que algunas redes de varias ciudades como Bogotá, Medellín, Manizales, Ibagué y a nivel regional por algunas Corporaciones Regionales, monitorean además aspectos como la calidad del aire y del agua.

### **Context & Constraints:**

En la actualidad el país en cabeza de las instituciones responsables como lo son el IDEAM e INGEOMINAS, esta implementado una estrategia de cubrimiento y actualización tecnológica para potencializar el sistema de alerta temprana, sin embargo los costos de adquisición y administración de los equipos ha hecho que esta se vea retrasada, complementado lo anterior, dichas entidades de forma mancomunada con la DPAD y las entidades operativas están estructurando y actualizando los protocolos para la difusión de dichas alertas y a su vez la respuesta a las mismas por parte de las instituciones como también de la comunidad.

Se están formulando programas y proyectos unificados a nivel nacional para llegar a los sectores comunitarios con enfoques y herramientas que orienten un verdadero proyecto de sistema de alerta temprana comunitario medibles ante las ocurrencias de los desastres y con posibilidades de diseminación para todas las regiones. La percepción positiva de la utilidad de SAT por las autoridades a nivel municipal aun es incipiente, sin embargo en los últimos años se pueden mostrar avances exitosos en el tema.

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## Costa Rica (in Spanish)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

“Los sistemas de alerta temprana están habilitados y disponibles para todas las amenazas principales, con un elemento de alcance comunitario.”

Nivel alcanzado: 4

Los sistemas de alerta con que cuenta el país tienen un énfasis en la vigilancia de las cuencas ante problemas de inundación causados por desbordamiento de ríos, aunque se monitorean otras amenazas como los volcanes y los deslizamientos activos, con una buena base de información y documentación sobre los mismos.

Los sistemas de alerta que se trabajan con perspectiva de cuenca, para inundaciones y deslizamientos, integran el trabajo comunitario, bajo el concepto de “redes comunitarias”.

### Context & Constraints:

La alerta temprana en este país está específicamente referida al monitoreo de amenaza y en los casos en que generan eventos de manera recurrente o continua, integran el componente de comunicación y organización de la población a nivel de comunidad. Sin embargo, dada las características del país es prácticamente imposible admitir que “todas” las amenazas están siendo monitoreadas, pues algunas no lo son, pero si las más peligrosas o activas.

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## Dominican Republic (in Spanish)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

Existe un comité técnico de alerta temprana. Hay elaborado un proyecto para la instalación del sistema de alerta temprana hidrometeorológico.

### Context & Constraints:

Hace falta una inversión considerable del punto de vista tecnológico (para la producción de información), científico (para la interpretación) y gerencial (para la capacitación al uso y mantenimiento del sistema)

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## Ecuador (in Spanish)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

- AVANCE

POLÀTICA 6. Contar con un Sistema Nacional de Información para la Gestión del Riesgo. Se trabaja en su diseño.

### Context & Constraints:

Recomendación:

- Difusión de los avances en Sistema de Alerta Temprana.
- Involucramiento de técnicos expertos en estudio de las diferentes amenazas
- Priorizar eventos donde se podían implementar SAT y hacer un listado en función de impactos de los eventos.
- Involucrar de una manera mas directa a la comunidad

Limitación:

Recursos para el Fortalecimiento de capacidades en todos los niveles.

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## El Salvador (in Spanish)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Se ha trabajado más en SAT para inundaciones, volcanes y sequías; SAT para Se ha trabajado más en SAT para inundaciones, volcanes y sequías; SAT para deslizamientos existen esfuerzos muy localizados a nivel municipal.

La mayoría de SAT tienen un alcance nacional, con un aviso general (departamental y municipal). Es necesario trabajar más en llevarlos o conectarlos al nivel comunitario.

Muchos esfuerzos en el país, dicen llamarse SAT pero solo consisten de una red de radios comunitarios. Falta trabajar en la sistematización y seguimiento para los SAT.

### Context & Constraints:

Es necesario estandarizar el concepto de SAT, con sus cuatro componentes.

Promover una estrategia para institucionalizar la aplicabilidad de los SAT.

Fortalecer capacidades locales que ayude la organización de las personas para el conocimiento, transmisión de información, así como para tomar medidas en caso de evento extremo, que resguarde sus bienes y vidas.

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## Jamaica (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Extensive work has been accomplished in the establishment of Flood Early Warning Systems. Agency identified with dedicated responsibility in terms of data collection through rain, river and stream gauges complemented by community -based flood early warning systems. Community -based Flood Early warning

teams have been established along major river basins and waterways and have been given the capacity to communicate within a network to relay information both at the local and national level.

Strides have been made in terms of Early Warning Systems in place for Hurricanes & Floods. Doppler Radar Technology is utilized and complimented by satellite imagery. Telemetric Flood Warning Systems and Community Flood Gauges are also in place to enhance the early warning capabilities for floods. Three communities were also trained to interpret radar data via internet as a means of enhance early warning.

For Earthquakes, a National Seismograph Network is in place to generate data following an earthquake to quickly inform decision makers in taking the necessary steps to curtail infrastructural damage to affected communities and provide the necessary alerting mechanism for the probability of aftershocks. The country is now a signatory to a Regional Tsunami Warning System established with mechanisms established to expedite functions under this responsibility.

Data available in terms of earthquake and landslide susceptibility maps and research is continually being undertaken in tandem with universities, local continuing through country - based academia with partnerships with local and external universities and government agencies.

### **Context & Constraints:**

#### Challenges

- Earthquake susceptibility maps available for one geographic region. Greater progress made with landslide susceptibility maps which are also available at the local level. However these projects are largely implemented with international donor funding. As such there is the absence of an overarching programme with progress achieved annually.
- Several manual gauges need to be upgraded to telemetric and more data gathering sensors need to be implemented.
- The national documentation centre needs to function as a complete repository of hazard vulnerability data but is affected by space constraints and financial incapacity to improve current technologies.

#### Recommendations

- Expansion of community-based early warning systems utilizing current technologies such as sirens and alarm systems to complement manual use of flood gauges.
- Earthquake susceptibility maps need more comprehensive focus rather than concentration on an urban centre.
- Improvement of the telemetric system that is in place for major river basins and monitoring and surveillance network established with trigger mechanisms in place.
- Lobbying for resources to increase the level and accuracy of output of the Earthquake Unit

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## **Panama** (in Spanish)

### **Level of Progress achieved:**

2 - Some progress, but without systematic policy and/ or institutional commitment

### **Description:**

El País mantiene Sistemas de Alerta Temprana, con los cuales se realiza el trabajo de monitoreo y seguimiento de posibles amenazas identificadas. Este es un trabajo conjunto el cual busca una mayor comunicación; prever las posibles acciones a tomar y sobre todo compartir la información para que sea divulgada en caso de ser requerido y así reducir los daños en la comunidad.

### **Ejemplos:**

- Se instaló el Sistema de Alerta Temprana a Inundaciones en el río Changuinola;

- Fortalecimiento del Comité de Gestión Local de riesgos de Santa Rosa, Guayabalito (aguas debajo de la represa del Maddem).
- Sistema de Alerta Temprana en la cuenca del río Cabra (100% avance) (ETESA)
- Se mantiene información del Balance Hídrico Superficial (100%).
- Instalación de sensores de tormentas eléctricas atmosféricas (85% avance).
- Automatización de la Red de estaciones hidrometeorológicas - Fase 1 (80%).
- Modernización para la elaboración de los pronósticos (programa para seguimiento a los vientos, programas para procesar los datos crudos del radar de la ACP, programa para análisis integral de datos, capacitación y equipamiento).
- Se identificaron zonas propensas a inundaciones y deslizamientos de tierra identificados en el Distrito de San Miguelito: Villa Grecia; 8 comunidades de la Provincia de Darién; 10 comunidades de la Provincia de Bocas del Toro.
- Se Implementó el Sistema de Alerta Temprana a Inundaciones en el Río Mamoní y Cabra, para el monitoreo de las inundaciones.
- Evaluación y adecuación de herramientas de monitoreo de los ríos Cabra, Tocumén y Tataré.
- Se brindó el mejoramiento de la Coordinación Técnica con el Ministerio de Vivienda.
- Recolectar imágenes de diferentes parámetros y fuentes sobre las condiciones meteorológicas locales, regionales y globales.
- Recolectar datos de diferentes parámetros y fuentes
- Elaborar Pronósticos diarios y de 5 días (ETESA)
- Elaborar avisos de condiciones meteorológicas peligrosas y mantener una coordinación efectiva con SINAPROC para mantenerlo informado de la evolución de estas condiciones.
- Monitoreo y seguimiento de amenazas sísmicas, geológicas y volcánicas.
- Pronóstico diario de los índices UV, información desplegada en el Sitio Web ([www.igc.up.ac.pa/labfisat/lab220.htm](http://www.igc.up.ac.pa/labfisat/lab220.htm)) y medios televisivos locales.

El Ministerio de Desarrollo Agropecuario (MIDA) mantiene como herramienta de toma de decisiones el análisis de la evolución de las temperaturas de la corriente ecuatorial del pacífico, el ENOS, con relación a la ocurrencia cíclica de fenómenos como El Niño o La Niña, acompañado con análisis del uso y abastecimiento de granos básicos, en cada uno de los Países, esto aplicado al Sector Agropecuario principalmente.

Otra iniciativa desarrollada en el MIDA se estructuró y manejo conjuntamente con el MINSA un sistema SIG, (Sistema de Información Georeferenciado) de VULNERABILIDAD, dirigido principalmente a problemas de Seguridad Alimentaria Nutricional, en la que se toma en consideración elementos agropecuarios de establecimiento de cultivos entre otros, en la que se destacan indicadores sociales y que en la actualidad fue trasladado a la SENAPAN, adscrita al Despacho de la Primera Dama.

#### **Context & Constraints:**

Es necesario realizar algunas de las siguientes acciones con el fin de mejorar lo existente:

- Evaluación de la efectividad de los Sistemas de Alerta Temprana ante inundaciones
- Se requiere un Sistema de Alerta Temprana ante deslizamiento en zonas vulnerables.
- Investigación sobre modelos conceptuales sobre eventos adversos.
- Formación de investigadores en sismología, paleo-sismología y geomorfología tectónica, riesgos geológicos (movimientos de masas, erosión costera, etc.), riesgos hidrometeorológicos y SIG en temas de desastres.
- Fortalecimiento de las redes de monitoreo sísmico, geodésico y de laderas inestables.
- Establecer programas de docencia en temas de desastres.
- Se ha propuesto el establecimiento de una Maestría para capacitar a profesionales de diferentes áreas del conocimiento a través de enseñanzas teóricas y prácticas para la prevención y reducción de los desastres: gestión del riesgo.

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## Peru (in Spanish)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

- Existe de parte del INDECI, el compromiso de fortalecimiento de capacidades para potenciar la Alerta Temprana
- La Ley del SINADECI faculta la implementación de Sistemas de Alerta Temprana (SAT); esta Ley está en proceso de actualización.
- Existen SAT implementado (en Piura ha tenido mejoras o avances; en San Martín e Ica implementados recientemente)
- En relación a identificación de peligros y análisis de vulnerabilidades, se tiene avances en la identificación de peligros naturales y esta en proceso de creación una Comisión Multisectorial para el manejo del riesgo asociado al uso de materiales peligrosos.
- Existen esfuerzos institucionales aislados.
- Limitado acceso a la tecnología apropiada para la sostenibilidad de los sistemas de alerta temprana.
- Insuficiente compromiso de los gobiernos regionales y locales para la implementación sistemas de alertas tempranas

### Context & Constraints:

#### LIMITACIONES:

Limitada decisión política regional y local en la implementación de la normatividad establecida y sostenibilidad de las políticas vigentes.

Ausencia de políticas que permitan la labor integrada de las instituciones para la emisión, seguimiento y calificación de la efectividad de las alertas

Se requiere fortalecer la capacidad operativa de las instituciones científico tecnológicas

Limitado interés y conocimiento de las autoridades sobre los Sistemas de Alerta Temprana.

#### RECOMENDACIONES:

Fortalecer los mecanismos para el acceso a las tecnologías adecuadas a fin que la información sobre las alertas sea confiable, oportuna y efectiva (tiempo real).

Promover la participación del sector público y privado, especialmente de los medios de comunicación hablada y escrita.

Sensibilizar a las autoridades y los líderes de las comunidades sobre el conocimiento y la operatividad de Sistemas de Alerta Temprana.

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## Saint Lucia (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Systems are in place for early warning down to the community level for weather systems and volcanoes; however early warning for other hazards is lacking or inadequate, although efforts are afoot to establish an

early warning system for tsunami on a national scale and for floods due to rain on a community level. These are both being pursued under regionally promoted projects.

**Context & Constraints:**

A lack of financial and human resources to implement and maintain a comprehensive Early Warning System.

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## United States of America (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

The United States has deployed early warning systems for a number of hazards, including extreme weather events, floods, and tsunamis. A prototype debris-flow warning system has been deployed for wildfire impacted areas of southern California. Early-warning capabilities exist for some well-monitored volcanoes, and plans have been made to implement a National Volcano Early Warning System. The US does not currently have an early warning system for earthquakes; such a capability has been identified as aThe United States has had trans-boundary interactions on hazard and risk assessment for specific hazards and cases. On a related front, there are extensive efforts to share data with neighboring countries and global partners. The United States maintains a number of global space-based and in situ observation capabilities that generate data that are fully accessible to all Nations. In turn, the United States relies on data generated by the observation capabilities of other Nations as part of the Global Earth Observation System of Systems.n outcome of full implementation of the partially deployed Advanced National Seismic System.

**Context & Constraints:**

See above.

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## Venezuela, Bolivarian Rep of (in Spanish)

**Level of Progress achieved:**

2 - Some progress, but without systematic policy and/ or institutional commitment

**Description:**

Existen experiencias en comunidades puntuales, en el Distrito Capital, Mérida, Sucre y Vargas, donde han ocurrido eventos hidrometeorológicos con efecto adversos sobre las comunidades. Particularmente, Venezuela implementó un sistema de alerta a través de los Programas de Prevención de Desastres y Reconstrucción Social "PREDERES en el estado Vargas, con el objetivo general de contribuir al mejoramiento del nivel y condiciones de vida de la población de la Parroquia Catia La Mar".

Existen indicios de progreso en algunas regiones del país donde la alerta ante riesgos a la salud es del manejo y conocimiento de todos los integrantes de la comunidad, como es el caso de la Costa Oriental del Lago de Maracaibo, en las comunidades de Tía Juana y en las regiones indígenas del país.

La UNESCO ha promovido la implementación de un Sistema de Alerta Temprana contra tsunamis y otras amenazas costeras en el Caribe y regiones adyacentes, en el cual Venezuela esta participando activamente a través de FUNVISIS y la Dirección Nacional de Protección Civil y Administración de Desastres.

**Context & Constraints:**

Concienciar a las altas autoridades responsables de la RRD sobre la importancia del establecimiento de

las alertas tempranas en las zonas de mayor vulnerabilidad social.

Implementar sistemas de alerta temprana, con participación activa y protagónica de las comunidades, para que tomen acciones con suficiente tiempo y de forma apropiada, para reducir las afectaciones a la vida y sus bienes materiales.

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# Asia

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## Bahrain (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

- Industries using hazardous materials do have detection and early warning systems.
- The Environmental Commission has put in place air quality analysers monitored by the Environmental Department.
- The Environmental Commission has proposed and put forward for Parliamentary approval an update of Environmental Law No.21 of 1996.
- A decision to acquire radiation, detection and warning systems has been made. However, a decision on which agency will become the focal point is awaited.
- The Metrological Department has comprehensive equipment and stations to monitor atmospheric and sea conditions.
- The emplacement of a National Platform and Plan coordinated through the NCDM will do much to improve the situation and ensure closer liaison and coordination between all sectors - especially Private and Government.
- This will ensure coordination of the significant resources that are already in place.

### Context & Constraints:

- Lack of central monitoring stations for various hazards.
  - Insufficient procedures for dissemination of warning of impending hazards to the general population.
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## Bangladesh (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Country has well developed early warning and dissemination system for cyclone and flooding. However, based on recent experience, the cyclone early warning system is revised in early 2008. Stakeholder consultation is ongoing to define a rollout the system. Number of studies initiated during the reporting period by FFWC to pilot people centered dissemination of flood warning and forecasting. Country has piloted 10 days predication of flood, which has created a significant opportunity for country to strengthen it multi-hazard warning. A river erosion perdition modelling has also been developed as a pilot. Tsunami early warning centre has been established at Bangladesh Metrological department (BMD) in collaboration with Intergovernmental Oceanographic Commission (IOC). In addition to existing one, new three seismic observatories have been established at Dhaka, Sylhet and Rangpur.

### Context & Constraints:

Bangladesh is located in a delta of a three major river system, overflow of which is one of the reasons for flooding. Space based technologies are being explored. SAARC framework has created an opportunity in regional cooperation. Bangladesh Flood cannot be mitigated without establishment of regional data sharing and cooperation, considering flooding (and other hazards) as common hazard in the Ganges, Bharmaputra and Meghna basins. Simple earning warning dissemination of outreach to local communities is also being tested. Tornado forecasting model need to be more enhanced and coordination is needed between BMD and SPARRSO as tornado generates in the land and provided minimum time for early warning and forecasting.

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## Cambodia (in English)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

There are establishments of early warning system and dissemination of forecast and early warning information with outreach to communities at all levels, including at national level, Ministry of Water Resource and Meteorology (MoWRAM) through its Department of Hydrology and River Work (DHRW) and Department of Meteorology, established, reviews, maintains and disseminate flood forecast, early warning system, information and weather forecast. The both flood and weather forecast and early warning information is disseminated to line ministries, partner agencies including humanitarian agencies, UN agencies, funding agencies, NGOs, and Provincial Department of Water Resource and Water Work through facsimile. In addition, the information is disseminated to the end users at communities through national and private TV channels, Radios and existing networks of partner agencies. At local levels, the flood and weather early warning, forecast system are established, reviewed, and disseminated by concerned partner agencies in collaborating with Ministry of Water Resource and Meteorology through Department of Hydrology and River Work (DHRW) and Department of Meteorology, for example, the Mekong River Commission partnered with the Cambodian Red Cross, Action Against Hunger (AAH) and Asian Disaster Preparedness Centre (ADPC) to implement the Community Based Flood Early Warning System in only 58 villages in four flood prone provinces in the Mekong Lower Basin (Steung Treng, Kratie, Kampong Cham, Kandal and Prey Veng provinces), In addition to this, Oxfam GB in collaborating with Department of Hydrology and River Work (DHRW) established the same system in flood prone districts in Takeo province. However, some systems are still effectively operating while others are not well functioning due to financially and technically phased out and systems have not properly integrated into local development processes and the existing networks have not built into local authority systems.

### Context & Constraints:

However, the achievements are neither comprehensive and nor substantial due to national and local authorities and partner agencies are encountering some following challenges and constrain, including:

- Out of 58 villages in four flood prone province have not established the early warning system to effectively, timely and accurately disseminate forecast and early warning information to communities, and decision-makers in those specific areas
- Dissemination mechanism of forecast and early warning to the end-users at community levels has not been well established and functioned. The forecast and early warning information from the national level usually outreach to existing networks at province, but do not to community levels, because of insufficient mechanisms and communication system and equipments.
- Existing systems and tools are not well regularly maintained and reviewed while technically and financially supports phased out, due failed of dedication of resource from the government to keep the momentum of implementation.

### Recommendation to Overcome:

To ensure of early warning and forecast information would be effectively, timely and accurately outreached the communities and responsible agencies, the following recommendations should be addressed:

- The system should be made in place in other disaster prone areas out of the 58 villages. The existing systems are in only mainstreams could not much effectively, timely and accurately serve to the remote areas from long distance stations

- The mechanism to maintain the existing system and to review and disseminate information is considered as the priority consideration to take account
  - The government should develop and review strategy and action plan, and allocate resources to extend the systems to other areas and maintain and the existing systems by including in development framework.
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## India (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Government of India has identified key departments/ organizations to provide early warnings on different natural hazards. Cyclone warnings are provided by India Meteorological Department(IMD)from the Area Cyclone Warning Centres (ACWCs) and Cyclone Bulletins are shared with television and radio stations for inclusion in the national broadcast/teletcast. Flood Forecasting is done by Central Water Commission (CWC) on all major flood prone rivers and inflow forecasts for selected important reservoirs. Flood Bulletins are issued and circulated to concerned ministries and agencies. For early warning on tsunami and storm surge Indian National Centre for Ocean Information Services (INCOIS) has been established. As a part of the early warning system for Tsunami Real Time Seismic Monitoring Network (RTSMN) has been established at IMD. The network has been designed to monitor and report, in the least possible time, the occurrence of earthquakes capable of generating Tsunamis from the two probable Tsunamigenic sources, viz. the Andaman-Nicobar-Sumatra Island arc regionand the Makran coast in the north Arabian Sea area. The data from the 17 broadband seismic field stations is received simultaneously in real time through V-SAT communication facilities at the Central Receiving Stations (CRSs) located at IMD, New Delhi and INCOIS, Hyderabad for processing and interpretation.At the national level a 24/7 Integrated Emergency Operation Centre exists and connected with the State and District Emergency Operation Centers/Control Rooms. The Indian Space Research Organization (ISRO) has set up a communication hub on V-Sat terminal with audio, video and data communication facilities at the national capital and it is connected to client nodes positioned at different states and national nodes like Prime Minister's Office,Cabinet Secretariat,Ministry Of Home Affairs, National Institute of Disaster Management, Central Water Commission (CWC) and National Disaster Management Authority .Under the DM Act, state governments have been made responsible for establishing adequate warning systems with outreach to the vulnerable communities. Several Non governmental agencies have supported the grassroot community to develop their local systems for early warning as an extension of the national and state network. Government of India along with UNDP is also implementing a community based Disaster Risk Management Programme in selected states across the country under which community have been trained on early warning communications.

### Context & Constraints:

The institutional mechanism required for early warning of hydro meteorological events is in place. The major challenge faced is to reach out to the vulnerable communities in a timely manner and to build their capacity to respond to the warnings. There is a strong need to strengthen the existing information sharing protocols and procedures to provide public warning both horizontally between different agencies at national, subnational and district level as well vertically from the state and district agencies to the vulnerable communities. The major broadcasters in the country need to be adequately trained on early warning dissemination and a Memoranda of Understanding supported by procedures at different levels need to be put in place with them to provide public warnings. The community based programmes though exist need to be further strengthened to build in the capacity of local community on early warning dissemination and response management.

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## Indonesia (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

Early warning systems in national level for several types of hazard, such as earthquakes, tsunami, volcanic eruption, and floods are available and functioning, which have been disseminated to the community level of the communities at risk. Evaluation on the early warning system for several types of disasters in the community level has been done professionally. This is supported by experts from research institutions/universities/disaster studies, adapting the early warning system to the development of the local situation and condition, by taking the existing indigenous knowledge and culture into account. The example is the early warning system developed by the community of Forum Merapi. However, in many other regions, due to the limited capacity of human resources, the response to the early warning system being advocated is not optimal.

The commitment of the relevant institutions on each disaster to provide and disseminate the early warning systems has been realized. However, the outcome is still unsatisfactory due to limited capacity, in terms of financial, human resources and physical capacity.

**Context & Constraints:**

The geographical landscape of Indonesian archipelago is very extensive. The development of infrastructure does not reach the remote areas, leading to information gap in the level of society. In addition, the limited capacity in the local level, both in the local government and relevant communities, in understanding the information of early warning systems and emergency preparedness to respond to the early warnings has become the major obstacle.

To overcome such challenges, an appropriate development system to promote the information dissemination of the early warning system must be developed. Education and training on the various types of hazards and vulnerabilities must be increased among the relevant community groups so that they can understand and respond to the information on the early warning. Sometimes the incorporation of indigenous and local knowledge is more acceptable than that of the scientific knowledge-based in early warning system. The capacity of the local government and the community must be improved through advocacy, training and drill conducted periodically so that the early warning system developed can reduce the vulnerabilities faced by the communities at risk.

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## Iran, Islamic Rep of (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

There are early warning systems for some disaster such as droughts, floods and frost.

At the beginning of the twenty-first century, disasters are increasingly affecting societies worldwide, draining resources that could be better used for development and poverty reduction initiatives. There is an urgent need for the implementation of effective early warning systems.

The importance of early warning is recognized in Agenda 21 and the current follow-up processes. In addition, a particular focus is given by the international community to early warning in the structure and programs of the international strategy for Disaster Reduction (ISDR). The 1998 Potsdam international conference on early warning systems for Reduction of Natural Disasters (EWC'98) confirmed early warning as a core component of national and international prevention strategies for the 21st century.

In the country the National Disaster Early Warning system (NDEWS) has been designed and is operated by IRIMO in cooperation of CRI., the following chart shows the general features of the NDEWS.

The NDEWS has been applied mostly for drought and flood disasters, and this system covers all parts of the country.

In the regards of lessons-learnt from the use of NDEWS, the early warning systems successfully do help to public for disaster risk reduction.

Also, in the case of some natural disasters such as dust storms and heavy rainfall, IRIMO has carried out some researches to forecast and timely early warning. Recently the natural disaster research institute of Iran has developed a system of instrumentally prediction of earthquakes which has proved to be effective in providing necessary information to the authorities for preparedness purposes'. This system is installed in more than seventeen process of the country.

**Context & Constraints:**

When the warnings are issued the people must be provided with necessary training how to react for protecting the lives and properties. And the people must also be familiar with the implication that the warnings present they must easy manner and by using easy understanding sign's and tools.

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**Japan** (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

All of Japan's national territory is covered by early warning systems for storms, torrential rains, heavy snow, sediment disasters, tsunamis, tidal waves, high surf, inundation and floods, the Ministry of Land, Infrastructure and Transport, the Japan Meteorological Agency and local government bodies being the main institutions involved. The organizations use 24-hour systems to carefully monitor various natural phenomena and weather conditions. Areas deemed to be at particularly high risk of earthquake or volcanic eruption are also covered by specific countermeasures.

The development of a quick and accurate communications system is essential for the effective use of early warning information. Online system linking disaster management organizations of the national and local governments and media organizations has been developed for the purpose. Radio communications networks exclusively for disasters have also set up for connecting national organizations, firefighting organizations, local governments, residents, and designated public corporations. Furthermore, as a backup, a satellite communications system has been constructed. Simultaneous wireless communications systems using outdoor loudspeakers and indoor radio receivers are used to disseminate disaster information to residents. Tsunami and severe weather warnings are widely provided to citizens via TV and radio broadcasts.

Further, Since 1 October 2007, the Earthquake Early Warning service has been started for provision through a number of media outlets such as TV and radio. The Earthquake Early Warning system was developed to provide advance announcement of the estimated seismic intensities and expected arrival time of principal motion based on prompt analysis of the focus and magnitude of the earthquake using wave form data observed by seismographs near the epicenter. The system allow countermeasures such as promptly slowing down trains, controlling elevators to avoid danger and enabling people to quickly protect themselves in various environments such as factories, offices, houses and near cliffs.

**Context & Constraints:**

Adverse affect of an overflow of information as highly-advanced information society could lead to excessive social anxiety. Delivering information in an easily comprehensible manner should be further considered as

well as the system to disseminate precise information promptly.

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## **Kazakhstan** (in English)

### **Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### **Description:**

To enhance the information, communication and system for NSES the integrated corporative information-communication system (ICS) for population and national bodies is developing in Kazakhstan. An implementation of automated systems of safety control for technological risky processes is also carrying out.

The concept of ICS is included into Strategic Plan of the Ministry for Emergency Situations for 2009-2011. In 2009 the first step of ISC implementation as design works is planned to perform within a budget program for 2009 fiscal year.

Measures to introduce an integrated telephone rescue number "112" are also performing and Ministry has developed the Concept and Technical Order for the Integrated Dispatcher Service in Kazakhstan.

There are 127 permanent stations for monitoring in mountain area. Control data are processed by 34 dispatcher posts including the Head Post in Almaty. Information of ES is transmitted following an approved scheme to Ministry, regional Departments, local bodies.

A technical improvement of the Republican Crisis Center provides by supplying of additional communication channels as through SW, USW, satellite, GSP and video.

### **Context & Constraints:**

The existing system of population warning is based on a technology of 60s-70s years which requires its immediate modernization.

More than 62% of radio communication systems are outdated. Territorial bodies of MES are equipped by modern systems only by 30-40%. There are no automatic interception of 40% radio and TV channels and 65% of alarm systems.

The most dangerous areas are not completely supplied by monitoring and early warning systems.

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## **Korea, Rep of** (in English)

### **Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### **Description:**

In 2005 capacity assessment system regarding early warning has been adopted in 250 local governments. The assessment system covers items on disasters response organization, mitigation activities, response capacity, recovery processes, etc.

Real-time disaster information dissemination system is in operation against tsunami, flood, typhoons, and other common disaster types in Korea.

### **Context & Constraints:**

There are some cases of delayed warning dissemination. On March 3, 2005 a small tsunami generated by an earthquake near Fukuoka, Japan reached southern and eastern coasts of the Korea peninsula and the warning information was delayed.

What went wrong were identified and the system is being improved with more advanced IT and budget support.

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## Kyrgyzstan (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Warning of the population and the state authorities is directly linked with the monitoring system of disasters caused by activation of geological, meteorological and other processes.

The control point – communication station “Riziya” of the Chief operative department of MoES of the Kyrgyz Republic – has constant radio-telephone and telegraph communication with all regions of Kyrgyzstan, the CIS and far-abroad countries. There are three main modes of the warning system: everyday activity, advanced preparedness, and emergency.

Provincial, urban and rural executive authorities, regional and relevant district administrative departments have external radio, telephone or telegraph communication with all towns of the republic, the CIS and far-abroad countries. They can communicate with the control point of the Chief operative department of MoES of the Kyrgyz Republic.

The valuable assistance in overcoming of the difficulties with the communication established in 2006 was rendered by the implementation of the World Bank project “Emergency situations prevention”. The Center on crisis situations management was established within the framework of this project. This Center is the operative body of the Inter-agency Commission on emergencies prevention and mitigation. At the moment there is the on-line communication Osh-Bishkek-Jalalabad.

It is planned to organize the activity of a similar center in other areas of the center in other areas of the country, and equip two mobile vehicles so that the information could be transmitted from disaster locations.

### Context & Constraints:

The existing problems and constraints are as follows:

#### Funding

1. Paralyzed internal line communication in districts and economy objects
2. Malfunctioning of the earlier established almost in all rural areas radio centers, and individual radio points located in private houses.
3. Lack of the monitoring and early warning systems in other more vulnerable areas. It would be appropriate to use the experience accumulated within the framework of the project on installation of the monitoring and early warning systems in other areas of the country after the preliminary assessment of the safety of the man-made and natural dams.
4. Lack or malfunctioning of the early warning system in the economy objects that use highly toxic poisonous agents.

Replacement of the worn-out telephone stations with new ones and implementation of serious rehabilitation works on the broken communication lines require significant material and monetary expenses. But in case of such an opportunity it would be more appropriate to install the up-to-date communication devices that could provide wireless external and internal communication.

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## Lao People's Democratic Republic (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

The Department of Meteorology and Hydrology is the main agency that produces the early warning information and disseminates to disaster management organizations, mainly to the NDMO. The NDMO then sends this information to the local disaster management organizations to take appropriate actions and disseminate early warnings to communities at risk. The early warning information consists of weather forecast (rainfalls, storms, typhoons) and information on water level along the main river and its tributaries.

Under project cooperation with NGOs, community based early warning systems are developed which include setting up monitoring equipment (flood mark) along the river and assignment of responsible unit and person in charge of monitoring and reporting to the village disaster protection unit head, district authority and province. In addition, village disaster risk maps are produced and placed within the village head. The disaster risk maps consist of information on disaster types in different areas within the village, elements at risk, evacuation route, etc.

A communication system exists from national to the local (provincial) level by using the telephone, fax machines, etc. However, the communication system for issuing the EW information from province to district and villages are inadequate. Thus communities located in very remote areas often can not receive early warning information due to difficult or total lack of access to road, mountain areas with deep slope and isolated villages.

**Context & Constraints:**

Communication infrastructure in the country is inadequate and the sparse distribution of population in wide and rugged areas poses a major challenges. More attention is given to flood early warning than drought early warning, as floods are 'seen' to be more urgent.

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**Maldives** (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

The Meteorology Department has procured equipments and carried out staff training to enhance the department's monitoring mechanism. A National Early Warning System Code has been developed and disseminated among all departments to standardize early warning mechanisms. Although all major hazards have not been addressed key hazards in the region are addressed to.

Outreach to communities has been a priority to the government and the process is strengthening day by day.

**Context & Constraints:**

The progress has been slow as transfer of knowledge took its own pace. All early warning systems were introduced recently and with limited human capacity outreach activities are moving at a slow pace. Early Warning Systems which could be maintained by communities should be introduced with incentive for regular maintenance. Ownership by the community for protecting their lives should be emphasized by the government and international agencies.

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**Nepal** (in English)

**Level of Progress achieved:**

1 - Minor progress with few signs of forward action in plans or policy

**Description:**

Few localized single hazard oriented early warning systems are in few places for last 2 decades (Tsho Rolpa GLOF, Chitwan Flood, etc.). However, there is no early warning system in place for major hazards with outreach to disaster prone communities (end to end EWS).

**Context & Constraints:**

Technical know-how, financial resources, trained human resources, and collaboration between government agencies and communities, are the major challenges to establish a fully functional and effective multi-hazard early warning system both at central and community levels.

## Recommendations:

Identification of major hazards and institution to deal with such hazard, capacity of such identified agency for an effective and efficient early warning, networking with similar organization both within and outside country, appropriate policy and institutional mechanism will help to establish efficient and effective end to end early warning system. Government should initiate/improve public-private partnership for EWS (especially in case of GLOF, flash floods, landslides, etc.) and people centered EWS.

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## Pakistan (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

With regard to effective Early Warning Systems, Pakistan can be ranked at level three. Pakistan has good institutional capacities for monitoring and warning of flood hazards. Following floods of 1992, a comprehensive Indus Forecasting system was launched with the assistance of Asian Development Bank (ADB). It is an ongoing work executed by Federal Flood Commission (FFC). Flood Forecasting Division (FFD), Lahore which is part of Pakistan Meteorological Department (PMD), undertakes dissemination of flood early warning to national stakeholders through an institutionalized process that connects inputs down to vulnerable communities using multiple channels.

Accurate forecasts with regard to precipitation are disseminated by PMD one week in advance and progressively these are issued till one hour before occurrence.

Flood forecasting occurs through a four fold input system which includes:-

- Network of weather radars
- Telemetric system which sends real time inputs on water flows
- Satellite coverage which includes both indigenous capacity and through WMO network
- Ground observation through PMD ground station deployed across the country
- Among weather radars deployed across the country more significant are the Doppler radars that furnish quantified inputs and are deployed in Lahore, Sialkot and Mangla to cover the flood catchments region.
- Water and Power Development Authority (WAPDA) has installed telemetry gauges along the rim of rivers in the catchments region and along some major rivers and it monitors water flows in these channels and provides real time information to FFD.
- Provincial Irrigation Departments also monitor river flows in respective provinces and they also communicate inputs to FFD.

Indus Water Commission (IWC) receives flood information from India and its inputs also end up with FFD. FFD (PMD) in Lahore constitutes the nerve centre for flood early warning in the country. Warning is sent to over 100 end users which include disaster management agencies, provincial and affected district administrations, armed forces, FFC, WAPDA, Irrigation departments, maritime agencies and airspace users. However, NDMA provides early warning to key national stakeholders. Critical warnings are communicated verbally besides other channels to relevant stakeholders.

Early warning within districts to vulnerable communities is communicated through the following channels:-

- Revenue Department down to 'patwaris', who work in group of 3-4 villages.
- Police wireless network deployed in police stations across the district.
- Through the Forestry Department in forested districts
- Through mosque committees and other grass root organizations. However, experience shows that vulnerable communities tend to keep each other informed courtesy the ever widening GSM network.

In order to further augment its existing EW capacities the Government of Pakistan has prepared a National Plan on Strengthening National Capacities for Multi-Hazard Early Warning and Response System and

submitted it as part of Phase 1 in the Third Session of the Intergovernmental Coordination Group for the IOTWS, Bali, Indonesia (31 July to 2 August 2006). The cost of the first phase of the National Plan is estimated about US\$ 32 million. It includes nine essential components dealing with all major disasters generally experienced in Pakistan. This was subsequently revised to US\$ 8 million for IOTWS.

Among the eleven countries, Pakistan has requested for capacity building support from the Indian Ocean Consortium in the Third Session. Specifically, Pakistan has requested support for Power systems, central recording station, strengthening onshore / offshore sea-level network, up-gradation of warning capabilities of National Meteorological Service and establishment of specialised control centre at NDMA.

**Context & Constraints:**

Pakistan needs consistent support from the international community for implementation of its National Plan for EW capacity building. As already mentioned above, the Government of Pakistan has prepared a National Plan on Strengthening National Capacities for Multi-Hazard Early Warning and Response System and submitted it as part of Phase 1 in the Third Session of the Intergovernmental Coordination Group for the IOTWS, Bali, Indonesia.

Under Phase II, the Consortium partners need to assist in the implementation of the national plan, as their existing programmes and resources allow, and further assist in fundraising efforts to support the implementation stage. Progress reviews will be conducted at the middle and end of year. Due to resource constraints and the tight time-frame of 4 months under Phase 1, the Consortium can only guarantee assistance to 10 requesting Governments. There is an urgent need to accelerate national efforts and better synchronise them with regional and global developments.

Pakistan was one of the first countries to submit the Plan. Increased efforts are needed from ISDR to mobilize necessary funding, the absence of which is causing serious delays in being prepared for meeting future challenges.

## **Philippines** (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

Forecasting and warning systems for typhoons and floods exist. Radio and television remain the speediest source of warnings related to hazard events.

Inexpensive tsunami sensors developed by PHIVOLCS scientists have been deployed in a pilot site in Lubang Island and are planned to be installed in other parts of the country. The installation of sensors is being done while also intensifying community-based early warning systems (CBEWS) in the provinces. CBEWS for tsunami, established in pilot coastal villages in several provinces, includes hazard and risk assessments, evacuation planning, drills, tsunami signage installation, and information and education campaigns. Drills utilize indigenous practices such as ringing of a bell (“batingaw”). SMART, a telecommunications company also donates mobile phones and airtime load to PHIVOLCS and OCD Region 5 (Barangay Bulusan, Irosin, and Sorsogon) as preparedness measure. Early warning signs like flood markers are only beginning to be put up in areas where recent hazard events became near disasters or reached disaster proportions. PAGASA has partnered with SMART to provide the public with weather alert service for typhoons, floods, and climate change updates. A more proactive approach to early warning is yet to develop in many hazard-prone LGUs.

There are few good examples where different parties collaborated in preparedness activities incorporating locally generated EWS. For example, a community radio station that was put up since late 1999 in the

Municipality of Labo Camarines Norte (located 335 km south of Manila), was recognized as a good practice in an Oxfam Publication. DWLB-FM provided the cheapest yet fastest information tool to warn residents of threats and educate people of their responsibilities to reduce disaster risks.

Urbanized areas bring a challenge different from rural communities. A local tsunami early warning system for Manila Bay and vicinity is being started through a project implemented by PHIVOLCS with funding support by the Finnish government.

PHIVOLCS is also linked with the Hawaii-based Pacific Tsunami Warning Centre (PTWC) which evaluates potential tsunami triggering earthquakes and disseminates tsunami warnings based on seismic waveform data streams from a network of seismic stations all over the Pacific.

**Context & Constraints:**

When communication facilities break down during strong typhoons, most LGUs do not have an alternate system to communicate warnings to residents and inform when and where to evacuate. Forecasting models and equipment for tropical cyclones are available but constantly require maintenance and upgrading; thus the need for appropriate government investment.

Setting up an end-to-end EWS that delivers accurate warning information of potential hazards dependably and in a timely manner to authorities and populations at risk, and enabling them to take action remains to be a challenge. A multi-hazard approach would make it possible to building on existing EWS capacities and infrastructure of various stakeholders. The job of facilitating stakeholders' involvement bears mostly on LDCCs, which themselves need capacity building in the area of community participation. Much work is needed to integrate the EWS in the emergency preparedness and response planning. NGAs also need to be alert on what guidelines may be needed and what technical assistance and know-how can be shared to communities and their LGUs.

Government funds must also be available to enable procurement of monitoring instruments and equipment, which has been dependent on foreign aid. Investment for continuous training of personnel, particularly from the warning agencies, is also a concern.

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**Singapore** (in English)

**Level of Progress achieved:**

5 - Comprehensive achievement with sustained commitment and capacities at all levels

**Description:**

SCDF also has in place a Public Warning System (PWS) to provide early warning to the general population of any imminent threats that could endanger lives and property. In the event of an impending attack by a hostile element or the occurrence of a man-made or natural disaster, the PWS will be sounded to alert the public to seek refuge at communal or household shelters. In conjunction with the activation of the PWS, the commercial radio and television stations will also broadcast any advisory messages from SCDF.

The Met Service has in place all SOPs for early warnings of heavy floods, prolonged rain, high temperature, strong winds, tremors due to earthquake and tsunami warning.

Strong outreach to communities on prevention of dengue fever and ways to reduce aedes mosquito breedings.

Regular exercises conducted by various individual organisations to deal with Avian epidemic flu.

**Context & Constraints:**

More effort required to educate the communities.

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**Sri Lanka** (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

Nationally based early warning system for floods, tsunami, cyclone, landslides and sea surges is in place. Focal points for formulation of warning messages are identified.

DMC is responsible for dissemination of early warning messages up to the last mile.

An effective people centered early warning system available with the participation of early warning teams using local communication methods (Bells, Drums, Horns, etc).

Community level early warning systems are implemented in selected sites on pilot basis.

Assessment was made after tsunami early warning issued in September 2007 to identify gaps and improve the system. It was observed that 80% of the populations in the coastal belt have moved away from the coast after issue of the tsunami early warning.

Periodical tsunami early warnings issued at Community level for training and preparedness purposes.

Island wide communication system being implementing to cover the whole island with special emphasis on coastal belt. The project will be completed by year 2009.

Early warnings disseminate through TV, radio, and other local systems are in place. Mobile phone operators have initiated actions to send early warning messages to their client using their system.

Three early warning towers are in operation on pilot basis at present and 25 towers are added to the system in April 2009. Balance will be completed by the end of 2009.

Department of Metrology (DoM) issue early warning messages for cyclone. International links are established to receive data and information from early warning providers.

DoM is in the process of establishing Doppler Radar system which will improve the prediction capability of the dept.

DMC disseminate weather forecast through early warning towers. An assessment done in Hikkaduwa has shown that people are very receptive to the forecast issued. This system will keep the people alive to the early warning dissemination system.

**Context & Constraints:**

Sri Lanka does not have financial capacity to acquire and maintain necessary equipment for data collection and human resources to analyze and forecast natural hazards. Sharing information regionally also not in place at present. This has become a major obstacle in issuing early warning messages in time.

The community level mechanism to disseminate the early warning to the last mile with in the lead time available is not adequate and should be improved.

Community loose confidence and doubt about the reliability of the warning issued if the disasters do not occurred as predicted by respective authorities.

Early warning system based on electronic media may not be suitable in the night and some times could create panic situation if they make it sensational.

It is required to strengthen dissemination of EW messages through police communication network improve the capacity of Local police to disseminate the message help to evacuate vulnerable communities.

A system to network early warning committees in the area and data base available to DM workers should be developed.

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## Syrian Arab Republic (in English)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

There aren't early warning systems for all hazards, but if we take the elements of early warning individually (risk knowledge, monitoring and warning services, dissemination and communication, and response capabilities) we can consider that some of them are available in some regions such as monitoring services for forests where there are many centers for monitoring wild fires 24 hrs.

For the element of response capabilities, there are some means which are available to deal with disasters such as alternative routes in forests for facilitating the mission of fire fighters during wildfires.

Another example on early warning systems is the earthquake early warning systems (GPS systems) placed near active faults that give seismic data on the location, depth, and strength of the earthquake if it occurs.

### Context & Constraints:

Constraints are the insufficient financial resources according to the high costs of these systems.

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## Tajikistan (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

Substantial achievement attained but with recognized limitations in capacities and resources

Alerting population and the state is based on the system of monitoring of emergencies caused by geological, meteorological and other processes.

The Republican Center for Management of Emergency Situations (RCMES) at CoES has permanent radio-telephone and telegraph connection with all regions of Tajikistan, countries of CIS and beyond. There are three main regimes for alert and signal systems: regular, high alert and emergency.

The regional, city and district Hukumats and ES branches have radio, telephone or telegraph communication with all cities of the Republic, CIS countries and beyond. In need, they have communication with the Republican Center for Management of ES at CoES.

Beginning of operation of mobile communication companies in 2004 was helped overcome the difficulties, and by the moment the issue of reliable communications is almost resolved.

For the timely alert of settlements in the valleys of rivers Bartang, Panj, Amu-Darya of the possible burst of Lake Sarez, in accordance with the June 1999 resolution of the Inter-State Council of CIS on emergency situations of natural and technological character, and with financial support of ECHO and WB and with support of the Government of RT, the system of monitoring and early warning was installed in the Bartang valley. The system from the Usoy facility on Lake Sarez to Rushan, to Khorog in MBAR, and to Dushanbe and eight villages in the Valley of Bartang. The system uses the compact alert system Codan. The facility was tested, put into operation and is run by the Directorate for Lake Sarez of CoES.

The plans include installing similar equipment in the settlements on river Panj downstream of Rushan up to the border of Uzbekistan. According to CoES and NGO Focus, 116 settlements are in the Sarez flood area.

**Context & Constraints:**

The existing problems and difficulties include:

1. Paralysis of wire communications within districts and within organizations
2. Non-functioning radio systems and wire information networks in the district centers with extensions to individual households. Only the Sughd region and some districts in MBAR are the exception (e.g. the Rushan district).
3. Lack of system of monitoring and early warning in most dangerous areas. In particular, it would be rational to use the experience accumulated through other projects in installation of systems of monitoring and early warning in other districts of the Republic, with preliminary assessment of safety of natural and artificial dams.

With the purpose of timely alert of the population in case of threat or actual burst of a glacier lake the radio stations were installed in four settlements (Vanj, Khrustalny, Chkalov, and Godjavist). These radio stations do not function now; creation of radio and telephone communications in the mountainous areas has always been difficult, even in the former USSR.

It would be rational to install the compact early warning systems similar to the system in Bartang in the valley of river Vanj and in other most vulnerable territories of the Republic of Tajikistan. The probability of mudslides in the Vanj valley due to activities of the Medvezhi and RGO glaciers and other threats is much higher than probability of the similar threats to Bartang valley due to burst of Lake Sarez.

Replacement of the worn-out telephone stations and serious repair and restoration works at destroyed communication lines requires significant financial and material resources. However, if such resources become available, it would be more rational to install modern means of communication providing wireless internal and external communication.

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## Uzbekistan [\(in English\)](#)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

In case of emergency situations on republican level, the governmental commission comprised of stakeholder ministries and agencies conducts analysis of the socio economic and ecological consequences and losses. The results of the analysis are shared with stakeholder structures by way of recommendations for making decisions and taking urgent measures. A centralized state early warning system which goes down to district level and performs by means of sirens, loudspeakers, television and radio broadcasting, as well as by the special local early warning systems on dangerous facilities. Within the framework of the SSES system, there also exists a well-adjusted system where non-governmental organizations share information on emergency situations of natural and technological character.

Specifically, mobile (cellular) communication companies have been used since 2007. In this way, the population is provided in advance with information on potential hazardous natural phenomena (avalanches, mudflow dangers, floods, and etc.). The legislation stipulates that information in the field of protection of population and territories in emergency situations is open, and the organs of state power and administration, the self-governance structures, administration of enterprises and organizations are responsible for the timely and accurate informing the population through the means of mass media and other channels.

**Context & Constraints:**

n/a

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## Viet Nam [\(in English\)](#)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Recently, disaster early warning information has been disseminated through two channels: a government system, and a mass media system (television, and radio). The government system disseminates the information down to local communities through the CCFSC communication networks by using telephone, fax, and finally by loudspeaker system to the local people. However, at some isolated areas the disseminating early warning message to as well as receiving reports from on the disaster situation is difficult due to the poor communication system such as no landline or mobile phone system available. Moreover, Radio the Voice of Viet Nam (VOV) in collaboration with relevant agencies timely and promptly disseminate the information of disaster, of the response and recovery activities.

In 2008, VOV has completed all the procedures to start the first phase of “East Sea radio signal coverage project” which can cover the sea areas up to 3,500km. VOV also built small and medium radio stations at northern mountainous areas, valleys, and weak-signal areas. It is planned that by 2009 99% of all residential areas have been covered radio signal in order to effectively disseminate the disaster information to isolated and remote areas.

At provincial level, warning messages received from the CCFSC are passed on to the district, which in turn passes to the commune. Though, daily weather forecast are show on Vietnam TV and radio, warnings are given to people using the telephone and fax to all provinces.

**Context & Constraints:**

The geographic and socio-economic conditions of Viet Nam included many isolated and remote areas with limited infrastructures, especially in the areas far from city centers, contributes to the possibility of information gap on the dissemination of early warning information at the community level. Furthermore, the limited capacity at the local levels in understanding or comprehending the early warning information and its preparedness measures in responding to early warning also adds the challenges face by the country.

Proposed solution:

Ministry of Information and Communications, VOV, VTV, other ministries, and local authorities should strengthen, upgrade, an develop the disaster early warning systems at local levels to ensure the warning message can reach to the remote and isolated communities before and during the disasters.

Education or knowledge on various hazards and vulnerabilities should also be increased, especially to relevant communities so that they could understand and response effectively toward the early warning information that they receive. The utilization of local wisdom and knowledge can also enhance the acceptance of local community as compared to scientific early warning information.

**Yemen** (in English)

**Level of Progress achieved:**

1 - Minor progress with few signs of forward action in plans or policy

**Description:**

Same issues as at the national level.

**Context & Constraints:**

- Lacking for the National Strategies and legal framework.
- lacking for the financial and technical resources.
- Lacking for knowledge.
- Lacking for the public and official awareness.
- Lacking for the required equipments, capacity and experience.
- Absent of the historical data- bases.

# Europe

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## Armenia [\(in English\)](#)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

Earthquake early warning non-automatic system (so called “early notification”) is in place with distinctive hierarchical subordination and responsibilities. The core element of the system is expert evaluation of the seismic situation based on brainstorming method of decision-making.

The automatic or technical early warning system for Yerevan-city which main principles had been developed in 1998 is still not operable due to lack of funding.

### Context & Constraints:

It is necessary to include the early warning system development in national poverty reduction plan.

Request the ISDR platform for the promotion of Early Warning to facilitate the decision on funding the Project “ Towards the Implementation of Earthquake Early Warning for Megacities (Capital of Yerevan)

Ref.17 presented to the Third International Conference on Early Warning in March 2006 (Bonn, Germany).

Implementation of the International Early Warning Programme as called for at the EWCIII.

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## Bulgaria [\(in English\)](#)

### Level of Progress achieved:

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

### Description:

This is the first time in Bulgaria at 09.2008 when It has given the start of design, delivery and installation of a modern nationwide System for early warning and announcement in case of disaster. The system will have 2 subsystems:

- Subsystem 1 for announcement of authorities and the parts of Single Life-Saving Integrated Rescue System;
- Subsystem 2 (The Siren system) for early warning and announcement population of the country. All existing warning installations will be upgraded with the latest radio-communication technology, the warning installations network will be expanded to meet up the infrastructural changes over the past years, and the control command system will be replaced with State-of-the-Art control equipment.

At the moment we have deployed Subsystem 1 in 6 regions. We are going to have deployments in the rest 22 regions.

We have deployed Subsystem 2 in towns Sofia (20 sq. km zone), Bourgas, Ruse, Kurdjaly, Pleven and Smolian.

### Context & Constraints:

The development will continue.

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## Croatia [\(in English\)](#)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

The system functioned well during the war in 1991-1995. The system is now upgraded but the modernization has not been finished yet due to financial limits. It is regularly maintained and tested.

**Context & Constraints:**

Expensive maintenance of equipment and the overall system have resulted in search of new contemporary solutions based on the information technology development.

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## Czech Republic (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Early warning systems are well build for all kinds of Hydrometeorological hazards and also for nuclear hazards. All levels have been included in the system. Early warning has been provided for all hydrometeorological hazards by the Czech Hydrometeorological Institute and disseminated via the Fire and rescue Service, via media and also by means of an Internet and SMS messages.

**Context & Constraints:**

Financial constraints occur in some cases and levels.

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## France (in French)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

- Autre pilier de la prévention, la surveillance des phénomènes relève pour l'essentiel de l'Etat et des établissements publics compétents placés sous sa tutelle, en particulier pour les phénomènes de grande ampleur. Certaines collectivités territoriales se sont engagées dans la mise en place de dispositifs de surveillance sur des zones restreintes notamment vis à vis des crues rapides.
- Pour assurer cette surveillance, il existe des structures et des systèmes de mesure. Ainsi en est-il des volcans, des séismes, des avalanches, des cavités souterraines, du niveau de la mer...
- La carte de vigilance météorologique a été instaurée à l'automne 2001. La procédure de vigilance crues est opérationnelle depuis juillet 2006. Dans les deux cas, les informations sont directement accessibles par tous sur internet. Quatre niveaux de couleur indiquent le degré de vigilance à porter aux crues sur les cours d'eau surveillés par l'Etat. Des bulletins complémentaires commentent les phases de forte vigilance. Ces informations sont disponibles sur les sites [www.meteo.fr](http://www.meteo.fr) et [www.vigicrues.ecologie.gouv.fr](http://www.vigicrues.ecologie.gouv.fr) pour toute la France métropolitaine.
- Cette surveillance permet une première approche de la cartographie des zones à risques. Celle-ci est cependant délicate car elle suppose des référentiels largement tributaires de l'expertise et de l'appréciation du possible et du probable.

**Context & Constraints:**

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## Germany (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial

resources and/ or operational capacities

**Description:**

The “German Meteorological Service” (DWD: see link “Weather + Warnings”) has a multi-level warning system of three pillars: “Early Warning”, “Forecast/Premonition” and specific “County Warnings” which improve gradually in chronological and geographic sophistication. “Early Warning” as on week prognosis of risky weather events enfolds spacious areas like entire Federal States (Laender), while the “County Warnings” work as accurately as possible to allow the emergency management facilities an early planning tool. The DWD delivers information directly to facilities like fire fighters, police or civil protection and even to special users like the energy industry or water management services (see link DWD Special Users). The public weather forecast and the storm and thunderstorm warnings of the DWD are provided through the media or Internet (see link). Since 2005 the DWD has been running a steadily improving “Heat Warning System” (HWS), which is based on the “Health Related Assessment of the Thermal Environment” (HeRATE). A “Forest Fire Danger Index” and an “Experimental Grassland Fire Danger Index” has also been developed by the DWD, which is accessible on the Internet (see link) and provides the weather-based prognosis of fire danger for the next day. During periods of high fire danger, this index is published/broadcasted systematically by the media. Weather warnings are also available on different German websites or even distributed by text message (see attached links). The “German Emergency Planning Information System” (deNIS) and the “Joint Hazard Estimation of the Federal States (Laender) and the Federal Government” have also implemented first approaches to early warnings.

Most Federal States (Laender) have their own flood management centres that deliver local information and are integrated into local emergency services (see for example the centre in Cologne in the link below that even conducts risk assessment for private properties). On the one hand, these are organized through their relevant ministries in the “Working Group on Water Issues” (LAWA: see link) for all water-related concerns, while the different international river commissions (see ICPR, ICPO, ICPDR and ICPEP in the following Core Indicator), on the other hand, simultaneously manage such issues. The flood management centres have different early warning systems in place because there is no central regulation, rather outreach at the community level.

Baden-Wuerttemberg, Bavaria, Hesse, North Rhine-Westphalia, Rhineland-Palatinate and Saxony each has its own seismological service and earthquake early warning system, also organized in the “Federal Institute for Geosciences and Natural Resources Seismic Data Analysis Centre” (SDAC: see link). For single communities in the alpine area, avalanche warning systems exist.

The GFZ Helmholtz Centre in Potsdam (see link) is engaged in different early warning systems worldwide, including the “German Indonesian Tsunami Early Warning System” (GI-TEWS) mentioned above or the earthquake information service GEOFON (see link). The GEOFON Global Seismic Monitor works as an ongoing information platform and “Early Warning” system, which informs stakeholders in real-time after an earthquake.

The “Federal Foreign Office” (AA) and the “Federal Ministry for Economic Cooperation and Development” (BMZ: see links), support the development and extension of early warning systems worldwide through the GTZ, InWEnt or local partner organizations. These people-centred early warnings aim to accumulate data through communities, analyse them centrally and disseminate the warnings back through the local authorities. In addition, the AA supports the Platform for the Promotion of Early Warning, PPEW of the UN/ISDR, which resides in Bonn. In 2006 the German Government hosted the “Third International Early Warning Conference” (EWC III) in Bonn, which resulted in a checklist of actions and a catalogue of early warning projects (see link for conclusions from the conference).

The GTZ and the Munich Re Foundation, for example, have supported local early warning systems in a Public Private Partnership (PPP) for the Buzi river in Mozambique since 2005. This people-centred early warning system integrates the communities in data collection and dissemination of warnings. The GTZ is

also engaged in the GI-TEWS by implementing effective communication structures, public campaigns and consulting. Further German actors in this project are InWEnt, the “Federal Institute for Geosciences and Natural Resources” (BGR) and the United Nations University (UNU-EHS) (see links).

**Context & Constraints:**

The DWD aims to take a Single Voice Approach because it usually has, as a federal state authority, the sole duty to warn the public, although not by law. The “Forest Fire Danger Index” and the “Experimental Grassland Fire Danger Index” do not yet offer forecasts beyond one day. The DWD should receive the necessary financial support to develop medium-term (1 to 2 weeks) fire-danger forecast capabilities. The precipitation prediction capacity of the DWD is on the raise to be able to provide improved high water predictions and secure early warnings. Moreover, a large-scale or Federal State coverage area must be further developed to guarantee national early warning capabilities.

The DWD plans to improve early warnings particularly by including the prediction tools of other nations and new statistical procedures (ensemble calculations), but altogether data access across national boundaries is complicated, time consuming and at times impossible, as individual data owners must be addressed in each country. Therefore, new international agreements (but also between the Federal States (Laender)) need to be reached, based on the aforementioned examples of the GFZ or the BBK.

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## Italy (in English)

**Level of Progress achieved:**

5 - Comprehensive achievement with sustained commitment and capacities at all levels

**Description:**

Early warning is a National and regional commitment. It is ensured through an extensive use of technologies owned by different administration and agencies. A number of remote networks and sensors systems covering all risks affecting the Country is in place. Early Warning has been improved through the creation of a “National warning system” composed by a Central Functional Centre and some Regional Functional Centres, introduced under a Directive issued by the Prime Minister on February 27th, 2004. Each centre has the responsibility to receive, assemble and integrate all data relevant for the main foreseeable risks, to consult with other centres and to make information circulate h24 among decision-makers of all tiers of the National Civil Protection System.

**Context & Constraints:**

The main challenges concerning the future of early warning can be found in the field of technological systems integration. The national warning system provides an extensive coverage of hydro, hydrogeologic and meteorological risks, but a number of independent systems and networks still exist covering the same risks as well as other ones. While almost all systems owned by National-level institutions and agencies are already linked to the network, there still remain resources managed at the regional and sub-regional level by a wide number of subjects including regional government agencies as well as research networks and private/business companies that still have to be integrated, or to be fully integrated, into the National Civil Protection Service.

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## Macedonia, The former Yugoslav Rep of (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

The EWS is an integral part of the system for public informing and alarming in case of emergencies (hereafter PIACE). Currently, EWS is composed of over 250 remote control sirens grouped into 30 independent PIACEs.

CMC is currently implementing a project for modernization and improvement of the EWS by replacing the old, outdated equipment while utilizing modern information technologies.

On that point, informing and public alarming of the population, as well as the operation of the entire system is regulated by “Regulations for Conditions and Procedure for Informing and Alarming in Emergencies”. All CMS participants are obliged to ensure continuous intersectoral communication, coordination and cooperation so that appropriate measures and activities for prevention and early warning can be taken.

Also, there is substantial progress on the implementation of E-112.

Furthermore, there is a project on the introduction of an regional USWRN. The network will amplify the E-112 system and the EWS alarming system. It will also improve the coordination with all USW Radio systems in the country.

Finally, CMC is launching an IT network that will enhance the cooperation and coordination of all CMS stakeholders.

**Context & Constraints:**

Currently, the PIACE has conventional and often outdated (from the 1970s and 1980s) equipment. Although the sirens are still functional, most of them don't have an independent power source. Instead of utilizing the modern technologies by using the wireless system for information dissemination, the old copper wire is still used.

CMC is working on a project that will introduce a three level control of the system for public informing and alarming in case of emergencies: local, regional and national. Also, CMC plans to introduce wireless remote control of the sirens and replace the old electric and pneumatic with electronic sirens, with independent power source.

The unification of all emergency numbers into the E-112 is yet to be implemented.

Supportive to E-112 is the concept of using media (TV and radio) and mobile phone operators by sending pre-fabricated messages providing pre-disaster warning, post-disaster announcement and messages containing information and guidelines for the citizens in the affected areas.

## **Montenegro** [\(in English\)](#)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Early warning systems are in place for seismic, meteorological hazards and fire in the open space . The same will apply for CBRN hazard after the implementation of the ARGOS project, which is expected in the following months.

**Context & Constraints:**

After an integrated disaster response was established, competent authorities placed the main focus of their activities on the early warning system. The main challenge relates to modernizing the institutions for hazard monitoring and early warning.

## **Norway** [\(in English\)](#)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

It is an continuous process to assess capacity of the four elements of early warning (risk knowledge, monitoring and warning services, dissemination and communication, and response capabilities) to empower the communities threatened by hazards.

**Context & Constraints:**

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**Serbia** (in English)**Level of Progress achieved:**

2 - Some progress, but without systematic policy and/ or institutional commitment

**Description:**

Nothing reported within this timeframe.

**Context & Constraints:**

Nothing reported within this timeframe.

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**Slovenia** (in English)**Level of Progress achieved:**

5 - Comprehensive achievement with sustained commitment and capacities at all levels

**Description:**

An unified early warning system is comprised of:

- the monitoring network
- notification centres
- early warning computer support application
- warning.

Central part in the system has Emergency Notification Centres (1 national and 13 regional). The main tasks of national Emergency Notification centre is the monitoring of the events, and the alerting and warning in case of emergencies. The Regional Emergency Notification Centres collect and answer to the emergency calls (Single European Number 112 was introduced in 1997), and they coordinate information flow during the intervention of operational units. They have special secure connections with the special units of Fire Brigades for so called technical rescuing (those who intervene in car accidents, fires in tunnels, accidents with chemicals, and so on).

In accordance with a Study on the audibility the sirens are taking over from the local communities and are included into the common monitoring, notification and warning system. By end of 2008 more that half of 1600 sirens will already be included into common monitoring, notification and warning system, most of them will also renewed.

To improve the quality of the 112 emergency call number, some additional services are being implemented. Two of them are: E112 (to identify the location of the caller) and eCall (automatic call in case of a car accident).

THE FILED OF METEOROLOGY

Processes for elaboration and dissemination of early meteorological warnings were improved with introduction of new warning scheme for public in accordance with meteoalarm.eu principle, but there are shortcomings in human resources for further development of operational meteorological and hydrological early warning system.

**Context & Constraints:**

Continue to introduce and implement new, advanced technologies into the unified monitoring, notification and warning system.

Include all sirens into the unified monitoring, notification and warning system by 2011.

**THE FILED OF METEOROLOGY**

Ensuring human resources and financial means for improvement of meteorological and hydrological early warning system, consisting especially of the operational processing part within the national meteorological and hydrological service and the dissemination part in collaboration with protection, rescue and relief institutions and public media.

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**Sweden** (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

Meteorological, hydrological and oceanological warnings are issued 24 hours before the expected incident. Warnings are issued as level 1, 2 or 3 depending on expected consequences, and published via radio TV and the SMHI home page. Warnings are also sent directly to concerned authorities.

The development of the spring flood is monitored by collating information from the county administrative boards. The information is compiled on a weekly basis and submitted to the Ministry of Defence.

Some areas with high risk for natural hazards are monitored (e.g. risk for landslides in the valley of the river Göta älv).

The user group for the system, "Important public announcement", has been expanded with enterprises operating power transmission and electronic communications.

A project regarding dam safety and warning has started. The aim of the project is to investigate the need for specific warning systems and how they should be designed.

**Context & Constraints:**

Natural hazards in Sweden are mainly geological, meteorological and hydrological. The need and requirement for warning systems is mainly enhanced and more precise forecasts.

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**Switzerland** (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

The National Emergency Operations Centre (NEOC) is working 24 hours a day, all year round. As the federal centre of expertise it is responsible for both natural and technological hazards. In cases such as chemical accidents, dam failure or storms, the NEOC provides the cantons with guidance, information or

coordination to bring a situation under control.

**Context & Constraints:**

The 2005 floods showed that there are still gaps to be filled. The supply of data is still heterogeneous, because different institutions participate with their own methods. A Common Natural Hazard Information Platform (Gemeinsame Informationsplattform Naturgefahren, GIN) is being developed as part of a broader system designed to improve early warning and alert (project "Optimization of Early Warning and Alerting" / "Optimierung von Warnung und Alarmierung, OWARNA"), which also aims at a better outreach to the population.

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**Turkey** (in English)

**Level of Progress achieved:**

3 - Institutional commitment attained, but achievements are neither comprehensive nor substantial

**Description:**

In terms of monitoring there are two national seismic observation systems in Turkey. One of them is operated by GDDA and there are 137 seismic stations and 231 strong motion instruments all around the country. Another institute operating seismic network is Bogazici University, Kandilli Observatory. In addition to these national systems, there are some local and regional sub-systems operated by academic research institutes.

Early warning systems in Turkey are operated by several governmental institutions. State Meteorological Organization G.D. has short and long term climate predictions and for some cases announces warning messages for flooding, severe weather conditions, meteorological hazards, extreme heat weather.

General Directorate of State Hydraulic Works, operating flood early warning and prediction systems mainly established after 1998 heavy rains and flash flood occurred in NW Black Sea Region which is funded by World Bank. The project is executed for river basins in Black Sea and Western Aegean regions. Within this project there established 206 automatic meteorological stations, 3 meteorological Doppler radar stations, 148 hydrometric data storage platforms and VSAT Telecommunication systems. By using continuous measurements, the system predicts the floods by using several flood prediction models. There are studies in order to develop those systems for other regions and studies to develop in Thrace Meric and Antalya (Mediterranean) regions have started.

In 2008 General Directorate of Forestry started pilot project on forest fires early warning. This is a joint project between Turkish Scientific and Technological Research Council and Bilkent University. The aim of this early warning system is to respond forest fires immediately and effectively. Some forests in the Western parts of Turkey are being monitored by several on-line cameras and analyzed 24 hours basis. The system automatically alarms the administrators and response teams can be directed to the fire in a short time interval. The system also uses geographical information system data layers like topography, vegetation, roads etc. Integration of those systems with online camera records facilitates effective and rapid response to forest fires.

After 1999 earthquake, by taking into consideration the vital importance of Early Warning and Emergency Rapid Response, the project prepared by Bogazici University Kandilli Observatory and Earthquake Research Institute, has been realized. The agreement involving Turkish Republic and Credit Suisse First Boston in relation to Istanbul Earthquake Early Warning System and Rapid (Emergency) Response project that will be carried out by Bogazici University Kandilli Observatory and Earthquake Research Institute, has become valid after decree of Council of Minister on 2001 Fiscal Year. The system is designed and operated by Bogazici University with logistic support of the Governorate of Istanbul, First Army Headquarters and Istanbul Metropolitan Municipality.

**Context & Constraints:**

Early warning systems for some types of disasters are still polemical and on evaluation process. For example, since there are some theoretical studies on early warning systems for earthquakes, there is no general acceptance on the reliability and use of those systems.

Early warning systems for atmospheric and hydrological disasters are effective tools for disaster risk reduction in these fields and national systems might contribute for long term disaster risk reduction achievement.

There had been some experimental early warning systems initiatives on landslides in Denizli (Western Turkey) and Sivas (Eastern Turkey) regions performed by universities, but those are not applicable everywhere at this moment.

The high cost of those systems are another factor for not to enhance those technology all over the country.

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## United Kingdom (in English)

**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Early warning systems are dependent to a large extent on the nature of the risk. The UK, for example, a risk with a long early warning lead in could be drought. As such the early warnings of a drought occurring would be seen up to 2 dry winters ahead. Early warning of 'slow burn ' risks are picked up through horizon scanning to prevent the UK being caught unawares.

However for shorter term risks of disruption caused mainly by the weather around the UK several early warning systems are in place. The UK Met Office produce early warnings for the following; Storms, Gales, Cold, Ice, Snow, Blizzards, Heatwave.

These warnings are given with up to 60% certainty, up to 5 days before the event, and on a daily basis as the weather approaches. The Environment Agency produce flood warnings for the areas affected by heavy rain. All departments and private industry and the public have access to these warnings.

Tidal flooding is also a joint venture between the Met Office and EA. The Met Office produce a model of the weather and tidal surge showing the size of the tide which will hit the coasts. The EA will then issue warnings along the coastline should that be necessary.

Warnings are also given for potential animal health diseases whilst tests are being undertaken.

**Context & Constraints:**

Despite a fairly comprehensive early warning system there is an absence of clear statutory responsibilities for warning the public during many types of incidents. The lack of a national culture of awareness amongst the public of how to respond to large-scale emergencies is also a concern.

The ability to warn both a static and transient population at all times of day and night needs further development.

There is clearly a need to influence the development information and communication technology so that it can be more effectively used to warn and inform members of the public

There have been improvements in public warning and information systems in some local areas where there are identified hazardous locations, and nationally to deal with flooding. reality does not meet with public expectations.

Whilst the value of the media in informing the public should not be underestimated, not everyone is listening to either TV or radio when they need to be alerted to an emergency. Often the immediate alerting phase has been passed before the media have had an opportunity to broadcast the warning information. Depending on the location and time of the incident there could be a large percentage of the population in

transit, either on public transport, in their own vehicles or on foot at the time. The ability to alert these people to the need to take shelter or evacuate is an essential component to any successful handling of the incident.

As suggested above, not everyone located within their home is likely to be listening to TV or radio. Emergencies do not just affect the residential population. Chemical sites are often located next to other industrial or commercial premises, a number being sited near to large out of town shopping complexes. Communicating with the population during the late evening, overnight and early morning periods when most people are sleeping is a difficult problem to resolve. This may be less of a problem if the solution is to keep people indoors. However, where there is a need to evacuate or a problem with water contamination requiring people to be informed either to boil or not to drink the water, there are no easy options.

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# Oceania

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## Australia (in English)

### Level of Progress achieved:

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

### Description:

The Australian Government is currently assessing the availability of current and emerging technologies which are capable of delivering a national emergency warning system.

The Bureau of Meteorology's Head Office Weather Services Policy Branch coordinates Forecast Offices in each State and Territory and has close links with Australian Government and State emergency services and disaster preparedness organisations.

The Bureau's Early Warning Services comprise the following:

(a) Tropical Cyclone Warnings

- Provided for cyclone prone areas. Planning and operation of the tropical cyclone warning service is closely linked to, and coordinated with, emergency services organisations to maximise the effectiveness of community preparedness and response.

(b) Severe Thunderstorm Warnings

- The Bureau provides forecasts of severe thunderstorms, as well as severe weather warnings

(c) Fire Danger Warnings

- The fire weather warning service provides public, routine forecasts of fire danger during the fire season and fire weather warnings when the fire danger is expected to exceed a certain critical level.
- It provides fire management authorities and emergency services with detailed routine forecasts, fire weather warnings and operational forecasts to assist in combating ongoing fires. This service includes special forecasts for hazard reduction burns and other advice to assist the assessment and management of fire risk.

The Australian Tsunami Warning System aims to provide a comprehensive tsunami warning system for Australia, capable of delivering timely tsunami warnings to the Australian population in an effective way.

As part of a coordinated national emergency plan, a distinctive audio signal has been adopted to alert the community to the broadcast of an urgent safety message relating to a major emergency/disaster. The Standard Emergency Warning Signal (SEWS) is a wailing siren sound which is used across Australia to attract attention to a range of imminent hazards through a variety of media.

### Context & Constraints:

Effective emergency warning systems alert, inform and reassure people. Emergency managers recognise that: basic warning information needs are consistent and predictable across cultures, abilities and ages; presentation needs vary; people do not act on a single warning message (corroboration is required); authoritative, factual and timely warnings are necessary to ensure that those most at risk take appropriate action; over-alerting can cause complacency; dissemination through multiple media including telecommunications, internet, broadcast media and sirens is required to ensure that warnings are accessible to the widest possible audience including vulnerable members of our community; and using different warning methods for different threats can create confusion and reduce effectiveness.

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## Marshall Islands (in English)

**Level of Progress achieved:**

2 - Some progress, but without systematic policy and/ or institutional commitment

**Description:**

1. Regional Early Warning Strategy endorsed by SOPAC Governing Council covers a range of initiatives with regard to early warning for different hazards which PICs and partner/donor organisations can collaborate on.
2. Australian Tsunami Warning System capacity assessment programmed for 2009. The assessment will highlight areas for capacity strengthening in RMI.
3. RMI DRM NAP Goal 4 addresses Early Warning. Actions and agencies responsible identified

**Context & Constraints:**

- \* communities are far apart
  - \* require technical resources and capacity to setup, test and maintain
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**New Zealand** (in English)**Level of Progress achieved:**

4 - Substantial achievement attained but with recognized limitations in key aspects, such as financial resources and/ or operational capacities

**Description:**

Regional councils and the National Institute of Water & Atmospheric (NIWA) monitor, model and advise on river flows (flooding), climatic events (droughts), storm surge, sea level rise, and coastal geomorphologic processes.

GeoNet is a project to build and operate a modern geological hazard monitoring system in New Zealand.

GeoNet comprises a network of geophysical instruments, automated software applications and skilled staff.

It detects, analyses and informs responses to earthquakes, volcanic activity, large landslides, tsunami, and the slow deformation that precedes large earthquakes.

The MetService is contracted by Government to monitor and provide warnings about severe weather events.

New Zealand receives advisories and warnings from the Pacific Tsunami Warning Centre in Hawaii, and has commenced with installation of a local sea level monitoring network.

A 24/7 National Warning System operates as part of the national Civil Defence Emergency Management arrangements. Warning messages are communicated to relevant response agencies, and as necessary to the public via the media. Response agencies, and notably local agencies, develop their local systems as an extension of the national network.

Memoranda of Understandings, supported by procedures and exercises, are in place with major radio and TV broadcast companies to provide public warnings.

**Context & Constraints:**

The efficacy of early warning systems for meteorological events is generally well established. However outreach of warnings for tsunami are only now being implemented. Establishing appropriate warning systems and response arrangements for near source tsunami events is an ongoing challenge.

For some events, for example earthquake and local tsunami, the issues are less about early warnings, and more about being prepared for any event, necessitating ongoing public education programmes at both the national and local level.

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## Vanuatu (in English)

### Level of Progress achieved:

2 - Some progress, but without systematic policy and/ or institutional commitment

### Description:

Vanuatu's major natural hazards are: cyclones, volcanic eruptions, floods, earthquakes and tsunamis and droughts. Under the all hazards approach adopted and encompassed in their disaster risk management arrangements, the human induced one includes industrial accidents, fires, vehicle accidents, hazardous materials accidents, marine oil spillage, aircraft accidents, exotic diseases and health epidemics. At present, there are existing early warning systems in place for:

- a. meteorological hazards - real time links with World Meteorological Organisation, Bureau of Meteorological, Fiji Meteorological Services and NIWA
- b. tsunamis from the Pacific Tsunami Warning Centre.

Current initiatives include the implementation of 2 seismic gauges for early warning of geological hazards. In addition, the e-gov initiative of Vanuatu is being supported by the VMS as this will enable the expansion of RANET at Siviri Village to the other provinces. RANET is an international collaboration to make weather, climate, and related information more accessible to remote and resource poor populations.

Other than the early warning systems, VMS has a regular awareness programs and articles through Vanuatu's local radio stations and newspapers. There are also awareness groups around the different communities in Vanuatu.

### Context & Constraints:

A risk reduction and hazard mitigation working group has just been established in Vanuatu to improve the understanding of hazards, vulnerabilities and communities at risk. The working group has been convening meetings with geology and mines, the water unit and geo-hazard to discuss monitoring arrangements and alerts systems for Vanuatu's key hazards.

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