EARLY WARNINGS

The term 'early warning' is used in many fields to describe the provision of information on an emerging dangerous circumstances where that information can enable action in advance to reduce the risks involved. Early warning systems exist for natural geophysical and biological hazards, complex socio-political emergencies, industrial hazards, personal health risks and many other related hazards[1].

An Early Warning System (EWS) can be defined as a set of capacities needed to generate and disseminate timely and meaningful warning information of the possible extreme events or disasters (e.g. floods, drought, fire, earthquake and tsunamis) that threatens people's lives. The purpose of this information is to enable individuals, communities and organizations threatened to prepare and act appropriately and in sufficient time to reduce the possibility of harm, loss or risk[2].

Elements of Early warning

Early warning is the integration of four main elements[3]:

1. **Risk Knowledge:** Risk assessment provides essential information to set priorities for mitigation and prevention strategies and designing early warning systems.

2. **Monitoring and Predicting:** Systems with monitoring and predicting capabilities provide timely estimates of the potential risk faced by communities, economies and the environment.

3. **Disseminating Information:** Communication systems are needed for delivering warning messages to the potentially affected locations to alert local and regional governmental agencies. The messages need to be reliable, synthetic and simple to be understood by authorities and public.

4. **Response:** Coordination, good governance and appropriate action plans are a key point in effective early warning. Likewise, public awareness and education are critical aspects of disaster mitigation.

The purpose of early warning systems is to detect, forecast, and when necessary, issue alerts related to impending hazard events[4]. In order to fulfill a risk reduction function, however, early warning needs to be supported by information about the actual and potential risks that a hazard poses, as well as the measures people can take to prepare for and mitigate its adverse impacts. Early warning information needs to be communicated in people friendly manner in such a way that facilitates decision-making and timely action of response organizations and vulnerable groups. Early warning information comes from different meteorological offices (for weather related disasters- flood, cyclone etc.); Ministries of Health (for example, disease outbreaks) and Agriculture (for example, crop forecasts); local and indigenous sources; media sources and increasingly from Internet early warning services.

Need of Early Warning System[5]

Early Warning for disaster reduction is a legitimate matter of public policy at the highest national levels for two main reasons:

- The first one, clearly, is public safety, and the protection of human lives.
- The second is the protection of the nation's resource base and productive assets (infrastructure and private property or investments) to ensure long-term development and economic growth. Conversely, by reducing the impact of disasters, a government avoids the financial –and political- burden of massive rehabilitation costs.

Investing in early warning and other measures of disaster reduction is neither simple nor inexpensive, but the benefits of doing so, and the costs of failing to, are considerable. For instance:

- In terms of reducing economic losses, early warning and disaster preparedness ‘pay for themselves’ many times over the life of the warning system.
- The reduction of environmental losses can, if properly managed and publicized, have both long-term benefits to the economy, and short-term benefits for the administration in-charge.
- A country can strengthen its stature and influence in international relations by a good handling of ‘externalities’, or indirect effects, on neighboring nations.

From a public policy viewpoint, early warning, disaster preparedness and prevention must be part of a single, well integrated process.

Communication of early warning information[3]

An effective early warning system needs an effective communication system. Early warning communication systems are made of two main components:

- communication infrastructure hardware that must be reliable and robust, especially during the natural disasters; and
- appropriate and effective interactions among the main actors of the early warning process such as the scientific community, stakeholders, decision makers, the public, and the media.

Many communication tools are currently available for warning dissemination such as Short Message Service (SMS) (cellular phone text messaging), email, radio, TV, and web service. Information and communication technology (ICT) is a key element in early warning. ICT plays an important role in disaster communication and dissemination of information to organizations in charge of responding to warnings and to the public during and after a disaster. Redundancy of communication systems is essential for disaster management, while emergency power supplies and back-up systems are critical in order to avoid the collapse of communication systems after disasters occur.

Community Based Early Warning System[1, 6]

Early warning systems have limitations in terms of saving lives if they are not combined with “people-centered” networks. To be effective, early warning systems must be understandable, trusted by and relevant to the communities that they serve. Warnings will have little value unless they reach the people most at risk, who need to be trained to respond appropriately to an approaching hazard.

Community-Based Early Warning Systems (CBEWS) are anchored in the communities and managed by the communities. It is based on a "people-centered" approach that empowers individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner in a bid to reduce the possibility of personal injury, loss of life, damage to property, environment and loss of livelihood. It provides communities, practitioners and organizations involved in disaster risk management with advance information of risks that can be readily translated into prevention, preparedness and response actions. CBEWS helps to reduce economic losses by allowing people to better protect their assets and livelihood. Essential features of community-based early warning systems are:

- All community members especially the vulnerable groups should be involved at all stages of the CBEWS from designing to operating the systems, receiving the warning messages and responding to the warning.
- Measures taken should be based on the needs of everyone in the community including the most vulnerable segments of the community.
- The community members will own the process and system.
- CBEWS measures will enhance the capacity of the community members to deal with their situation.
- Meaningful participation in the decision-making process of EWS.

Early warning systems and policy[3, 5]

For early warning systems to be effective, it is essential that they be integrated into policies for disaster mitigation. Good governance priorities include protecting the public from disasters through the implementation of disaster risk reduction

policies. It is clear that natural phenomena cannot be prevented, but their human, socio-economic and environmental impacts can and should be minimized through appropriate measures, including risk and vulnerability reduction strategies, early warning, and appropriate action plans. Most often, these problems are given attention during or immediately after a disaster. Disaster risk reduction measures require long term plans and early warning should be seen as a strategy to effectively reduce the growing vulnerability of communities and assets.

The information provided by early warning systems enables authorities and institutions at various levels to immediately and effectively respond to a disaster. It is crucial that local government, local institutions, and communities be involved in the entire policy making process, so they are fully aware and prepared to respond with short and long-term action plans.

Key elements for successful implementation of early warning:

- *Understand the most likely threats, likelihood of disasters and their potential consequences*

Although natural disasters are not precisely predictable, they are most often generally foreseeable. In other words, there are many areas where the occurrence of floods is likely; one does not necessarily know exactly when, but one knows they will occur sooner or later. Many natural hazards can be foreseen, or anticipated, from past experience, the analysis of current patterns of land use, or population distribution.

- *Establish proper priorities*

To allocate scarce resources most wisely, decision makers must rely on the type of analysis above, and make the disaster management choices which have the highest 'value', in terms of losses avoided. One common approach is to use the expected value criteria; that is, the likelihood of an event multiplied by the potential cost of this event if it occurred. Simply stated, it is a matter of giving priority to the 'worst-most likely' over the 'most benign-least likely' events.

- *Developing institutional networks with clear responsibilities*

Understanding the nature of natural hazards and related vulnerabilities, for early warning purposes, requires a combination of actors from several areas, such as science and research (including social sciences and cultural aspects), land use planning, environment, finance, development, education, health, energy, communications, transportation, labor and social security as well as national defence. On the other hand, a prompt and effective response to a disaster, based on early warning, implies that concerted action –managed by a higher authority—be taken by specific types of institutions: civil defence or public safety personnel, power and other utility agencies or companies, public health authorities, etc. at levels ranging from the cabinet minister's to the community leaders.

- *Establish or strengthen the legislative/legal framework and mechanisms*

Just as for any other aspect of public policy, early warning systems, as well as other disaster reduction applications need to be motivated and based within governmental responsibilities, especially since response to disasters may require exceptional executive powers for a specific period of time but its success cannot be accomplished without the benefits of widespread decision making and the participation of many others.

- *Developing effective communication strategies*

The context of early warning system communications has two aspects; the hardware aspect relates to the maintenance of lifelines, i.e. the necessity to build or strengthen robust hazard-resistant communication systems; the software aspect relates to the maintenance of relationships, i.e. the need to establish and maintain effective links and working relationships among the actors involved in the early warning communication chain.

- *Securing resources*

A substantial amount of resources is needed to ensure monitoring, adequate early

warning, concerted disaster reduction, and a return to normal life. To a great extent, the capacity to secure resources to do this versus undertaking a competing public program—depends on the quality and credibility of the overall system: understanding threats, clear priority setting and institutional networks, and appropriate legislative dialogue.

References

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