Community-based Early Warning Systems

KEY PRACTICES
for DRR Implementers

Humanitarian Aid
and Civil Protection

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- Information and Knowledge Management (COOPI)
- Mobile Health Technology (COOPI)
- Safe Hospitals (COOPI)
- Disaster Risk Reduction for Food and Nutrition Security (FAO)
- Appropriate Seed Varieties for Small-scale Farmers (FAO)
- Appropriate Seed and Grain Storage Systems for Small-scale Farmers (FAO)
- Farmer Field Schools (FAO)
- Irrigation Techniques for Small-scale Farmers (FAO)
- Management of Crop Diversity (FAO)
- Community-based Early Warning Systems (OCHA and FAO)
- Disaster Risk Reduction Architecture (UN-Habitat)

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Foreword by ECHO

The southern Africa and Indian Ocean region is extremely vulnerable to cyclones, floods, droughts and tropical storms. These recurrent climate-related shocks negatively affect the highly sensitive livelihoods and economies in the region, and erode communities' ability to fully recover, leading to increased fragility and vulnerability to subsequent disasters. The nature and pattern of weather-related disasters is shifting, becoming unpredictable, and increasing in frequency, intensity and magnitude as a result of climate change. Vulnerability in the region is further compounded by prevailing negative socio-economic factors, such as high HIV rates, extreme poverty, growing insecurity and demographic growth and trends (including intra-regional migration and increasing urbanization).

The European Commission's Office for Humanitarian Affairs (ECHO) has actively engaged in the region through the Disaster Preparedness ECHO (DIPECHO) programme since 2009, supporting multi-sectorial disaster risk reduction interventions in food security and agriculture, infrastructure and adapted architecture, information and knowledge management, water, sanitation and hygiene, and health. This programme operates with two objectives, notably:

- Emergency preparedness by building local capacities for sustainable weather-hazard preparedness and management, including seasonal preparedness plans, training, emergency stocks and rescue equipment, as well as Early Warning Systems.
- Empowering communities through multi-sectorial and multi-level approaches with DRR mainstreamed as a central component and improved food and nutrition security as an outcome.

This is done in alignment with national and regional strategies and frameworks.

For DIPECHO, one of the main measures of success is replicability. To this end, technical support through guidelines established for DRR implementers is a welcome output of the DIPECHO interventions in the region. ECHO has supported regional partners, namely COOPI, FAO, UN-Habitat and UN-OCHA, to enhance the resilience of vulnerable populations in southern Africa by providing the funding to field-test and establish good practices, and to develop a toolkit for their replication in southern Africa. It is the aim of the European Commission Office for Humanitarian Affairs and its partners to fulfil the two objectives sustainably and efficiently through the practices contained in this toolkit to ensure the increased resilience of the most vulnerable populations in the region.

Cees Wittebrood
Head of Unit, East, West and Southern Africa
Directorate-General for ECHO
European Commission

Foreword by OCHA

Southern Africa is a region exposed to compound and contiguous risks and multiple, frequently repeating and compounding shocks that prevent communities from fully recovering. Every year floods, droughts, crop pests, cyclones and economic shocks at household and community level and political risks/conflict necessitate emergency aid to hundreds of thousands of people across the region.

There are increasing numbers of people facing acute crises; many of these are found in the same populations year after year. There is little indication that most current short term humanitarian responses, while essential to cater for the most acute life-saving needs, are able to break this cycle of crisis and increasing vulnerability. It is within such a context that a growing consensus has emerged that development assistance should therefore embed disaster risk management and vulnerability analysis to enhance resilience.

One of the key tools of disaster risk management that can build the resilience of communities prone to this cycle of crisis and increasing vulnerability is early warning. Early warning saves lives by alerting the population of an imminent danger, empowering them to make decisions that can help protect their lives and livelihoods. Early warning, when linked to early action helps to mitigate the effect of a shock on a community, protecting the hard-earned gains the community has made in enhancing the future prospects for men, women, boys and girls in the community.

Ignacio Leon
Head of the Regional Office for Southern Africa
United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

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Acronyms and Abbreviations

DRR	disaster risk reduction
EWS	early warning systems
FAO	Food and Agriculture Organization of the United Nations
GIS	geographic information system
IFRC	International Federation of Red Cross and Red Crescent Societies
OCHA	Coordination of Humanitarian Affairs
RSS	rich site summary (often called 'really simple syndication')
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
VCA	vulnerability and capacity assessment
WFP	World Food Programme (UN)

1. Early Warning Systems: Functions and Objectives

Natural hazards, and their impacts on affected populations, can vary in time and space. Natural hazards can be either sudden or slow onset, with both having the potential to devastate a community, country or region. Sudden onset hazards are those that happen as the result of a single event with little to no warning, such as tsunamis and earthquakes, and they limit the ability of communities and institutions to react. A slow-onset hazard *does not emerge from a single, distinct event but is one that emerges gradually over time, often based on a confluence of different events* (OCHA, 2011), such as drought or pest infestations.

In both cases, the ability to monitor the factors that turn a hazard (the actual event) into a disaster (the worst-case result of the event) can help save both lives and livelihoods of populations that are at risk. Early warning systems (EWS) are central to limiting the loss of lives and livelihoods as a result of hazards and disasters. EWS are a series of organized surveillance mechanisms or actions that collect information on potential hazards in a given location, in order to trigger timely, coordinated responses. Early warning systems are used in all of the sectors involved in disaster risk reduction (DRR) including health, food security, agriculture and adaptive

1984-1985
Famines in Sudan and Somalia
The United States created the Famine Early Warning System (FEWS) –now FEWS NET – in response to the widely reported famines estimated to have caused up to one million deaths. The system aims to anticipate impending famines and advise policy-makers on how they might prevent famines

1990-99
The International Decade for Disaster Risk Reduction
Promoted awareness of the potential of early warning systems

1994
World conference on Natural Disaster Risk Reduction (Yokohama Japan)
The conference produced the Yokohama Strategy and Plan of action for a Safer World, which provides guidelines for disaster prevention, preparedness and mitigation and acknowledges early warning systems as a crucial component.

1995
Request for forecasting research
The process of preparing recommendations for effective early warning systems, the UN International Strategy for Disaster Reduction (UNISDR) requested further examination of new science-based methods to improve the accuracy and timeliness of short-term forecasting

Figure 1: Events leading to the evolution and development of EWS (continued on next page)

architecture, among others,[1] to provide communities, governments, NGOs and humanitarian actors with the information required to act effectively and efficiently.

EWS occur at various, ideally interrelated, levels ranging from community level to international surveillance systems, all of which play an important role in monitoring the known hazards in a region or locality to give advance warning to enable mitigation, preventative and response measures. Although the importance of EWS is widely recognized, in many cases they are not adequately invested in by stakeholders who translate policy intentions to on-the-ground reality; and where they do exist, breakdowns in critical junctures lead to inefficiency or ineffectiveness.

The present brief will demonstrate how EWS has evolved from a centralized process to becoming a system that blends technology and local knowledge and experiences to enhance complementarity and become more people-centred, and therefore have a greater impact on the ground.

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1 This series, *A Field Guide for Disaster Risk Reduction in Southern Africa: Key Practices for DRR Implementers*, has briefs for each of these specific sectors. For more information, consult these documents.

2004

The 2004 Indian Ocean Tsunami

More than 200,000 people in the tsunami, highlighting the need for a coordinated early warning system in the region. As a result, the Intergovernmental Oceanographic Commission (IOC) adopted a resolution to establish a global early warning system framework for ocean related hazards. Governments around Asia and the pacific also created disaster management departments and increased their disaster preparedness activities.

2005

2005 World Disaster Reduction Conference (Hyogo, Japan)

The Hyogo Framework for Action was adopted, in which risk assessment and early warning is one of the five themes.

2006

3rd International Conference on Early Warning

Development of a checklist by UNISDR to help governments and communities set up effective early warning systems.

2011

Tōhoku earthquake and tsunami

The earthquake and tsunami, which claimed about 15,000 lives, served as an opportunity to observe how Japan had prepared for such and extreme event. Warning systems, evacuation routes and coordination were put to the test and proved successful compared to the panic and lack of coordination seen seven years earlier in Asia and the Pacific. It also provided unprecedented opportunities and to study how buildings hold up under long periods of shaking and how to build them better.

Early warning systems' evolution and rise to prominence

Early warning systems have been increasingly in the global spotlight to address mitigation of and preparedness for natural hazards, since the mid-1980s. Through a series of coordinated efforts, spearheaded by the United Nations (OCHA, UNISDR) and many donor and developing country governments, the ability to follow key indicators and the systems required to do so have become mainstreamed into the disaster risk reduction, climate change adaptation and humanitarian discourse.

EWS has risen to prominence following the events outlined in Figure 1 and through its inclusion in the Hyogo Framework for Action, the global strategy for disaster risk reduction as a sector, where it is Priority Action 2: *Identify, assess and monitor disaster risks and enhance early warning.*

These experiences, in addition to recognizing the need to establish EWS, underscore the importance of linking different levels of actors within the system; the greater the interaction, the greater the chance of effectiveness. National and regional level systems will need very coordinated and effective communications and information dissemination mechanisms in order to reach the local levels and have an impact. The table below highlights different kinds of EWS at different levels; the various components of the EWS are elaborated in section 2.

Table 1: EWS components and stakeholders

EWS components	Local/community or hazard-scape	National	Regional/global
Risk knowledge	Maps of hazard-scapes drawn by community members (i.e. through the VCA process, also known as community risk assessment).	GIS risk maps showing hazards and vulnerabilities throughout the country; computer network that receives and tracks major storm signals.	Satellite imagery from 30+ years can be overlaid on observation data to produce rigorous risk maps with layers portraying hazards and vulnerability.
Monitoring	Manual river and rainfall gauges; billboards to announce river levels.	Automated gauge system with information flowing into a central location in capital city.	Satellite-based monitoring system in real time with current global conditions and projections based on global climate models.
Response capability	Evacuation routes signalled by locally made (and where available, fluorescent coloured) signs and cyclone shelters designed locally.	Any response at this level will probably draw on the same technology found in warning communication below.	
Warning communication	Local devices for communication: word-of-mouth, runners, criers, drums, flags, bells, telephone, radio, television, megaphone, mosque speakers.	Radio, telephone, television.	E-mail and internet-based seasonal forecasts, RSS feeds.

Source: IFRC Community Early Warning Systems: Guiding Principles (2012)

2. The Four Elements of Early Warning Systems

The table on page 9 presents different kinds of EWS at different stakeholder levels. There are two core elements that can be noted in the evolution of EWS and in the table:

1. EWS has necessarily evolved to become more people-centred, in a way that is respectful and recognisant of the participation of communities in the development of an EWS that concerns them at local level. In addition, people-centred EWS capitalizes on the knowledge, tools and systems within a community. The core idea is that for any EWS to be effective, the message from the '"top level' (e.g. government, research institutions) must reach the populations who stand to be affected by the hazards being monitored. In addition, communities can contribute substantially to EWS from 'the bottom up', in that they can raise initial warnings about changes of key indicators (e.g. rising water levels, increased prevalence of illness symptoms), and convey these messages to centralised systems or information managers who are in a position to raise the signal within an EWS (Figure 1).

2. In all levels, there are four core elements for the development of a complete and effective EWS: risk knowledge, monitoring and warning service, dissemination and response capacity (i.e. action on the early warnings received). Failure in any one of these elements could mean failure of the whole system. When looking to build resilience at community level through early warning systems, it is essential that all four elements be considered. While the source

of one of the elements is not found within the community (e.g. meteorological services), the importance lies in a community's access to relevant information. The four elements are examined in more detail below.

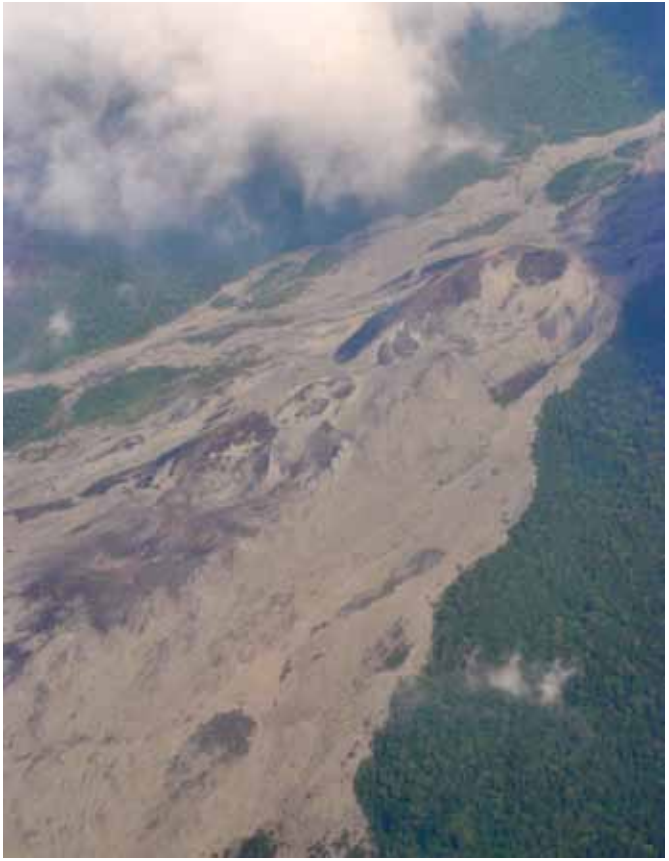
These two core elements are explored here, with focus being on the community-based, people-centred EWS which have a central role to play in increasing resilience of hazard-prone communities in southern Africa. This analysis is presented to help guide disaster risk reduction (DRR) implementers through the key elements, i.e. the essential questions to ask and the cross-cutting themes to be addressed when considering the development of an EWS at community level and the cross-cutting themes that should be addressed by an EWS at community level (see Annex 1 for operational guidelines for community early warning system).

Risk knowledge Systematically collect data and undertake risk assessments • Are the hazards and the vulnerabilities well-known? • What are the patterns and trends in those factors? • Are risk maps widely available?	Monitoring and warning service Develop hazard monitoring and early warning services • Are the right parameters being monitored? • Is there a sound scientific basis for making forecasts? • Can accurate and timely warnings be generated?
Dissemination and communication Communicate risk information and early warnings • Do warnings reach all of those at risk? • Are the risks and warnings understood? • Is the warning information clear and usable?	Response capability Build national and community response capabilities • Are response plans up-to-date and tested? • Are local capacities and knowledge made use of? • Are people prepared and ready to react to early warnings?

ELEMENT 1: RISK KNOWLEDGE - PRIOR KNOWLEDGE OF THE RISKS

Guiding principle 1.1. Although risk knowledge exercises may not lead to early warning, all early warning must be founded on risk knowledge.

Guiding principle 1.2. Accept that a community's priorities may not be your own.



Communities are exposed and vulnerable to disaster risks from various hazards. It is important that community members themselves are aware of such risks and vulnerabilities. One way to develop this understanding in the community is through risk assessment and risk mapping exercises to help prioritize which hazards an early warning system will focus on and guide response preparedness activities, as well as disaster prevention. These assessment and mapping exercises could be based on the community's different categories of vulnerabilities (human, social, economic and environmental), as well as their previous experiences with natural hazards.

Raising awareness about the risks that communities face and using past experiences as guiding principles can help both DRR implementing partners and communities understand why certain risks are prioritized. These awareness-raising sessions that use participatory methodologies (e.g. oral history, focus groups), would be the first step in developing a people-centred EWS. At the end of the day, it is important that community members themselves determine the risks to which they are most exposed and vulnerable, and that DRR implementers concede that these may not match their own assessment of the situation.

Nevertheless, in this awareness-raising stage DRR implementers can assist communities establish the links between the disasters they are exposed to and the broader hazard profile of the community to make the 'bigger picture' more evident. Developing a problem tree with the community (see Annex 2) can help communities and

ELEMENT 2: WARNING SERVICE – TECHNICAL MONITORING AND WARNING SERVICE FOR IDENTIFIED RISKS

Guiding principle 2.1. Passive receivers of information do not save lives.

Guiding principle 2.2. Some communities will need to drive their EWS.

Guiding principle 2.3. Public displays of monitoring can motivate communities.

Guiding principle 2.4. When hazards evolve, so must their monitoring.

implementers understand local vulnerabilities and exposure as an outcome of interacting factors and causes, i.e. structural causes, underlying causes and immediate causes, which interact to lead to specific outcomes. At times, communities see the outcomes as the main problem, whereas these may be the result of a series of events, each of which can be addressed through various steps and interventions to prevent negative outcomes. An early warning system can be an important component to positively impact the interaction of these factors and mitigate negative outcomes, perhaps even making communities more resilient in the long term.

Following the awareness-raising activities, assessments and mapping can be done in a participatory way. This can include the use of satellite mapping images being overlaid with community maps, or having community members identify key infrastructures and the most vulnerable areas to the hazard at hand and the people/households most at risk. For more information on participatory global information systems (GIS) mapping, see the Information and Knowledge Management brief prepared by COOPI in this series.

The warning services are one element that has evolved significantly. From seismic sensors to meteorological modelling for cyclone trajectories, to satellite rainfall monitoring, science has brought technical monitoring and warning services to higher levels. Yet, this does not mean that traditional/indigenous ways of monitoring risks in the community should be abandoned; rather complementarities need to be sought between indigenous and scientific approaches, which usually involve various monitoring agencies. At the same time, efforts to support the evolution of traditional monitoring and warning mechanisms, so that they adapt to evolving contexts and hazards, should be undertaken.

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ELEMENT 3: DISSEMINATION OF UNDERSTANDABLE WARNINGS TO THOSE AT RISK

Guiding principle 3.1. Clearly delegate responsibility to alert or mediate.

Guiding principle 3.2. Do not fall into the 'sophistication trap' for warning devices.

Guiding principle 3.3. Use staged warnings (levels and colours) in dissemination.

Warnings need to reach those at risk, be understood properly by them and contain information that enables adequate and timely response.

Communication channels from regional to national to community levels have to be pre-identified, and it is necessary to have one authoritative voice. Many countries need to increase their

ELEMENT 4: RESPONSE CAPABILITY – KNOWLEDGE AND PREPAREDNESS TO ACT

Guiding principle 4.1. In EWS, we respond to warnings, not to disasters.

Guiding principle 4.2. Strive to organize robust 'no-regrets' response actions.

Guiding principle 4.3. Embed response options in annually updating contingency plans with links to funding.

Guiding principle 4.4. 'Practice makes perfect': test drive your response actions.

institutional capacity in disaster risk management and link various disaster management bodies from national to local levels and vice versa.

Communities need to know how to react when they receive warnings from warning services. This should be an outcome of response preparedness activities conducted with the community.

For some life-endangering sudden-onset hazards, households should be empowered with the knowledge of what to do immediately to save their families and protect their livelihoods. For other hazards which have not yet occurred, but are likely in the future, the community may decide to convene a gathering and make a plan (contingency planning).

People-centred EWS: enriching the four elements with cross-cutting issues

It is to be noted that many communities have combined indigenous knowledge with newer technologies. For instance in Mozambique, local risk committees around the Zambezi basin use colour-coded flags, whistles and loudspeakers to inform the population of impending cyclones and floods.

Many communities have been able to learn from previous incidents and incorporate this knowledge into warning and response plans.

Thanks to significant technical and technological advances which bring about new ways to detect risks and issue warnings, EWS has more potential to save lives and livelihoods and contribute to building a more resilient community. However, if an EWS does not serve the people it is targeted to protect and empower, its effectiveness will be limited.

Communities must receive clear and relevant messages regarding hazards, which lead to practised and informed responses. Many sectors and levels of society should be involved in a people-centred system, in which education and awareness-raising are central.

Cross-cutting issue 1: Combining 'bottom-up' and 'top-down' elements

To have an effective EWS, both of these approaches are crucial. Firstly, community participation is required to map needs, risks and vulnerabilities. Also, their involvement can lead to ownership and legitimacy to ensure that warnings lead to actions. Secondly, the early warning indications/messages from national, regional and global monitoring systems for specific risks – particularly those relating to weather – need to reach the community level. Communities cannot achieve what these scientific systems can do, but on their own they are not effective unless they receive information from these risk monitoring systems and respond to the information appropriately.

Cross-cutting issue 2: Involving local communities in the early warning process

When local communities use accessible technology to track some hazards like river levels and rainfall gauges, they are able to monitor threats and use some simple agreed-upon steps to initiate warnings. These can even feed into larger monitoring systems.

Cross-cutting issue 3: Using a multihazard approach

Developing mechanisms designed for a single hazard within the community may not be effective, especially if the hazard does not occur regularly. Systems should use a multihazard approach and be multipurpose. For example, a signboard used to advertise community events can be issue warnings for various hazards; cyclone shelters can be used as community spaces; and radios and phones can be useful in the everyday lives of the community.

Cross-cutting issue 4: Mainstreaming early warning

Community awareness of all four stages of an early system is vital. It is important that this awareness is mainstreamed into existing education, training and knowledge transfer exercises.

3. Pulling It All Together

While engaging the community in the awareness-raising and risk assessment/mapping exercises, a DRR practitioner/implementer should keep the following in mind: these considerations are based on a 'bottom up' approach to EWS where communities are the first point of entry for the EWS. This section draws heavily from the International Federation of Red Cross and Red Crescent Societies' publication *Community Early Warning Systems: Guiding Principles* (IFRC, 2012).

- Who in the community is best positioned to raise the alert about the impending hazard? What access do they need to have to community officials and fellow community members in order for the message to be taken seriously and to enact the full system? What skills must they have?
  - The people in the community who do this are called *authors* and they are responsible for the collection of information at the primary (community) level which they then pass on to other

stakeholders in the system; for example, a community member who tracks a river gauge in a certain location, or a community member who has been tasked to monitor food-price information in the local market.

- Who in the community can take the decision to enact the early warning systems and the subsequent actions once it has reached the various thresholds? What access do they need to have to community officials and fellow community members in order to enact the plan of action that follows the EWS? What skills must they have? With which other institutions must they be in contact?
  - These people are called *mediators*; they aggregate the information coming in from the various authors to get a more holistic picture. They use the established thresholds to define the tone and severity of the message which is sent to the recipient, i.e. the at-risk population which needs to be warned of the impending hazard, as well as the general public.

Defining who in the community can assume these roles is of extreme importance, and ensuring the viability and sustainability of the system should be done according to criteria identified with the community and its leadership structures.

- *What is the key information* that needs to be gathered and which indicators need to be monitored (i.e. when and how often) for a viable EWS in the community? For example, in a flood area dam levels, the upstream river levels and pluviometric indicators can be monitored; in food insecure areas market access, food availability, community/household food consumption changes, food prices, etc. can be used to monitor the situation. For the main indicators being monitored, thresholds for action must be defined based on the local context and international standards, where applicable.

Early warning is based on information. The indicators selected should target the core of the hazard being monitored and should not involve extraneous information; should be well aligned with the information that is realistically available at community level; and should be able to be communicated in a timely and efficient

manner. SMS-based systems are, for example, useful in food security monitoring. The various pieces of data can be assigned codes according to a template that has been identified among the authors and the mediators. The concept of the Likert scale (i.e. ranges from 1–5, where 1 is bad and 5 is good) can be a useful way to track tendencies for early warning.

It is important to define from the beginning the information that is to be included in the messaging, both from the author to mediator and mediator to recipient.

From the author to the mediator, it is imperative to include:

- the location where the information is coming from;
- the date and time of the information;
- the basic indicator monitoring information (in non-crisis times) or the scale of the change in indicator when a hazard is impending.

For the mediator, it is important for him/her to include the above information, as well as:

- the likely impact of the hazard on the community and which areas are most at risk;
- when the hazard is likely to happen;
- what the community should do in preparation for the hazard (e.g. move livestock to higher ground, safely store personal assets, etc.), and what actions will be required during the hazard (if an evacuation is likely, how it will be communicated, where the safe haven is, etc.)

How the information is to be communicated is one of the main considerations in an EWS. The communication strategy must take into account both the way in which the authors send information to mediators, and how mediators communicate the information to the at-risk population. In both cases, the decision should be based on the local context, taking into consideration the reliability of the chosen system in non-crisis times and in crisis times (e.g. SMS may be fine for regular monitoring of flood prone areas, but telecommunications may be impossible during the flood itself). In this regard, a centralized audio method (e.g. drums, runners, flags, mosque towers, whistles, etc.) may need to accompany more technology-based options to ensure the messages are well communicated and received in the most critical moments.

Coordination saves lives

Coordination is the key to ensure strong interlinkages between the four elements of an early warning system, as well as between the different stakeholders involved at different levels. In addition to being well-coordinated, early warning-related activities should be supported politically through legislation, regulation, policies and trained technical staff. Preparedness and its early warning component need to be ingrained at all levels.

Ensuring that the system being developed – while rooted in the community – has the appropriate support from local, sub-national and national government; local and national NGOs working in

the relevant sectors; and other relevant sectorial stakeholders is critical to the ability of the system to function in the short term, and have an impact in the long term. In order to do this, engaging the government at all levels and stakeholders who could help or hinder the success of the system is important at all phases of the initiative.

Often, the most effective and efficient way to approach consultations, updates and end-of-action lesson learning is through a coordination body, such as the relevant government platforms, OCHA, or taskforces that are recognised and can assemble the necessary stakeholders.

Linking EWS with broader agendas

Embedding the system into a greater framework, whether DRR, climate change adaptation, resilience, etc., could help it receive more visibility, which would encourage community members to continue with monitoring; help it receive longer-term funding, if the initial set-up is based on project funding; and help to increase communities' resilience to allow them to focus on development (structural issues) and not annual/cyclical reconstruction (outcomes).

Resilience, according to UNISDR, is:

"The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures."

Given this definition, EWS is central to a resilience agenda because of the participatory and consultative process it adopts in its formulation and during context analyses, the holistic approach to hazards, sectors and stakeholders, the cost efficiency it promotes (early response versus resilience) and enhanced partnerships and synergies. Early warning has a key role to play in saving the lives and livelihoods of the communities that are at risk of disasters and promoting their resilience through learning what has happened and applying these lessons to what is to come.

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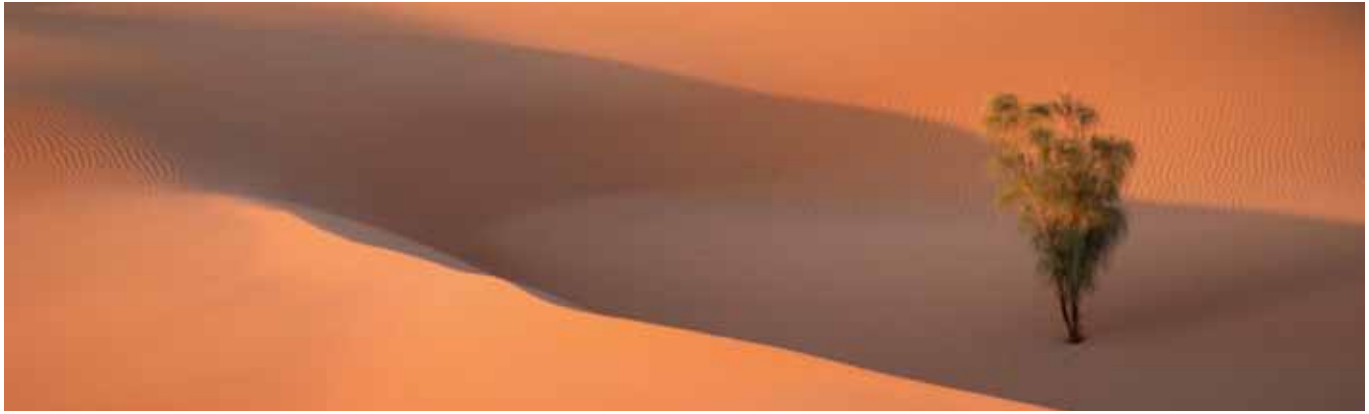

Annexes

Annex 1. Operational guidelines for working with communities on early warning

Making a plan, making a commitment and coordinating

Consider the four different elements of an early warning system and the different activities recommended to help support a community become more resilient to shocks. One element on its own may not be effective, e.g. if a community is able to receive warnings but does not know what to do.

Step One: Research existing early warning systems

- Are you aware of existing early warning systems at the district, national and institutional level?

Step Two: Engage with any existing disaster preparedness activities affecting the community and ensure synergies and complementarity

- Are you aware of existing disaster preparedness activities implemented by district authorities, NGOs, the National Red Cross Society, UN agencies and community leaders?

Step Three: See if hazard and risk mapping has been previously done in the area

- Has hazard and risk mapping been conducted previously in the area? Is it still relevant?

Step Four: Seek buy-in from community leaders and community members

- Have you consulted local community stakeholders and have their buy-in to the process?
- Are you able to be part of a long (multi-year) process which consolidates the community's early warning system and links it to other programmes?

Step Five: Agree on steps and activities with community leaders

- Depending on previous steps, activities could include the following:
  - Hazard and risk mapping – from the beginning or by revising previous mapping to ensure community priorities are reflected (see example activity in Annex 3).
  - Monitoring and warning assessment.
  - Warning communication assessment.
  - Response capability mapping.
  - Planning activities to address gaps and weaknesses identified in mapping activities. The activities are expected to involve a wide spectrum of community stakeholders.
  - Drills and simulations.
  - 'Lessons-learned' activities after the occurrence of an event.

Annex 2. Problem tree development

After a community has identified the main hazards and related disasters that they face, ask them to decide if the hazard/resulting disaster is a structural factor, an underlying cause, an immediate outcome or an impact. The relationship between factors, causes, outcomes and impacts can be either positive or negative.

A structural factor is something that is reinforced by administrative, economic and social barriers; for example a failure in governance is a structural issue that can have impacts on the ability of early warning systems to be established and function properly.

An underlying cause is linked to services (education, health), products (medicines, infrastructure), access (markets) and specific recurring events (floods, cyclones, prolonged dry spells) that have an impact on the population in question. Examples include: conflict, specific hazards or shocks, lack of education services, land degradation, production declines, etc.

Immediate outcomes are the manifestations of the underlying causes that emerge in the short term. Examples include: low immunization rates (as a result of lack of health services) and limited household access to food.

Impacts are the long-term, compounded and larger-scale implications of the factors, causes and effects that result from the interaction between various factors, causes and outcomes. Examples include: disrupted livelihoods, prevalence of illnesses and malnutrition.

For each hazard/disaster, form a work group and have them map the differed levels of factors that lead to and result from the hazard/disaster they have identified. Bring the work groups back to plenary and have them present the factors from bottom up: What is the structural factor that leads to the underlying factors, which have an immediate outcome and lead to an impact?

Once all of the groups have presented, take time in plenary to establish the relationship between the various hazards through their structural and underlying factors, through the immediate outcomes and finally to the impacts.

This exercise can be helpful to link resilience efforts to rehabilitation and development by identifying the structural and underlying issues that lead to disasters resulting from natural hazards. By addressing some of the structural issues, the impact of the hazard may be lessened in the long term. Further, in relation to EWS, it can help establish the positive and negative relationships between the factors, outcomes and impacts at each level. This can help community awareness of how the occurrence of a specific hazard event can trigger secondary or parallel problems, which must also be monitored, have timely warnings issued and actions planned. This can inform contingency planning, which is the next step in developing a Plan of Action following the enactment of the community early warning system.

Annex 3. Community-level exercises – risk knowledge, defining concepts and putting them into practice

Example activity 1: Risk knowledge

Requirements: Flipchart, cards, markers

Exercise One

Present the following to community members:
Disaster = Hazard x Vulnerability
Capacity

Explain to participants that the magnitude of a disaster is defined by the hazard and the degree of vulnerability divided by their capacity.

Later the participants will explore further the definitions of each word. To begin, however, use each question to understand the relationship between the words.

Will the disaster be bigger or smaller if:

- The hazard is bigger?
- The community is more vulnerable?
- The community has more hazards?

Exercise Two

Defining key concepts

Give the definition to the community members and then ask them about examples in their communities.

Concept	Definition	Examples in the community
Disaster	A serious disruption of the functioning of a society, causing widespread human, material or environmental losses which exceed the ability of the affected society to cope using only its own resources. Disaster is sometimes also used to describe a catastrophic situation in which the normal patterns of life (or ecosystems) have been disrupted and extraordinary, emergency interventions are required to save and preserve human lives and/or the environment. Disasters are frequently categorised according to their perceived causes and speed of impact.	Has the community ever experienced a disaster according to this definition?
Hazard	A rare or extreme natural or human-made event that threatens to adversely affect human life, property or activity to the extent of causing disaster. A hazard is a natural or human-made phenomenon which may cause physical damage, economic losses or threaten human life and well-being if it occurs in an area of human settlement, agricultural or industrial activity. Examples of types of hazards: Natural hazards (rapid onset and slow onset) Rapid onset, e.g. earthquake, tsunami. Slow onset, e.g. drought. Human-instigated, e.g. chemical spill, nuclear reactor meltdown. Complex emergencies and other situations of violence, e.g. internal armed conflict.	What hazards is your community exposed to? Natural Human-instigated Complex emergencies (e.g. combination of natural disaster and conflict/unrest)
Vulnerability	The extent to which an individual, community, subgroup, structure, service or geographic area is likely to be damaged or disrupted by the impact of a particular disaster hazard.	Are men, women, boys and girls affected equally when disasters occur? Are there particular vulnerable groups in your community? Why are they vulnerable? Are there geographic areas of your community that are more exposed to hazards? How do different groups (social, economic, gender) cope with the hazards?
Capacity	Capacity refers to individual and collective strength and resources that can be enhanced, mobilized and accessed, to allow individuals and communities to shape their future by reducing their disaster risk. Examples of kinds of capacity: Individual survivability (taking individual action) Community readiness (community having warning signals) Preventive capacity (actions that prevent hazard impacts, e.g. soil stabilization, floodplain regulation) Mitigation capacity (actions that reduce hazard impacts, e.g. property protection, education and awareness)	What do people do to survive a disaster that has previously worked well? Are members of the community aware when hazards are approaching? Have the community members taken steps to avoid being impacted by disasters? What steps have been taken? Who is responsible for their implementation?

Exercise Three

- Write four words (disaster, hazard, vulnerability, capacity) on four cards.

Place cards in four corners of the workshop/discussion area.
Read out definitions and selected examples in mixed order and ask participants to point to or walk to the correct card.

OR

Read out definitions and ask participants to point to or walk to correct card. Ask each participant who got the correct answer to give an example for each.

- Explore using an example:

Community X is prone to riverine flooding which leads to loss of life and livelihoods. Sometimes while crossing streams and creeks, many children and women are known to drown while trying to access their crops. The village grows maize and raises chickens. Some men and women do day labouring. Many men and women cannot get to their day labour jobs as they are too afraid to cross the river because they cannot feel they riverbed when they walk across. When there is a big flood, the chickens often drown and the community has to start the chicken farming from zero. The maize crops are often destroyed when they are flooded. One in ten members of the community has HIV. There is no clinic in the village. The school and the village church are on higher ground and often community members go there, but there is often little warning that a flood wave is coming, so many families do not have enough time to take their possessions or move their chickens.

What is the hazard mentioned in this passage?
What could be some other hazards that this village is exposed to but which are not mentioned here?
What could be some of the results of a disaster?
Where are the most vulnerable areas?
Who are the most vulnerable people mentioned?
What other vulnerable people are not mentioned?
What capacities exist within this community that are mentioned?
What could be some of the capacities that are not mentioned?

Bonus

What are some measures that this community could take to reduce vulnerability and enhance capacity?

Try and be as innovative as possible, e.g. swimming lessons for women; keep ducks instead of chickens (as ducks can swim).

Additional optional activity: *Use risk determination (impact and probability) to rank hazards.*

Example activity 2: Monitoring and warning service and dissemination and communication

Requirements: cards, markers

A Look at the hazards identified in the 'Risk Knowledge' activity.
B Write a hazard on each card.
C Divide the community members into small groups.
D Assign each group a hazard.
E Ask each group if they have received warnings for that hazard.
F If they do, ask them about the following, to be discussed in small groups:

- How do they receive the warnings? For example, how do they know there is going to be a flood?
- Does everyone receive the warning?
- Does everyone understand the warning?
- When warnings are given, do people react?
- Are the warnings local/indigenous, meaning that they are passed on from generation to generation as a result of culture of beliefs? For example, knowing when to plan, knowing when not to go to sea? OR
- Are the warnings scientifically based on research and studies? For example, warnings from hydro-meteorological services, text messages, media, radio, information given at school?
- How does the community react?
- Is there a plan of action developed related to the warning?

Ask groups to present back to plenary and then ask participants to stand up. Point to your left and say that that point represents 'no warning' and then point to your right and say that point represents 'everyone warned with ample time to react'. Go through each hazard one at a time and ask participants to put themselves at the point where they think the community is in terms of early warning. As a follow-up, ask community members how they think they can improve the early warnings within the community.

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