



United Nations Educational,
Scientific and Cultural Organization



United Nations Environment Programme

Awareness and Preparedness for Emergencies at the Local Level (APELL)



APELL and Floods
A community-based approach for disaster reduction



Gonaïves, Haiti, 2004,
2 600 deaths and around
250 000 people left homeless
Photo: Marko Kokic, IFRC*



Central Europe, 2002,
Austria, the Czech
Republic, Germany, France,
Romania, Bulgaria, Hungary
and Slovakia
85 deaths and around 273 000
people affected
Photo: Andrew MacColl, IFRC*



Mekong River, Vietnam and
Cambodia, 2000,
800 deaths and around
8 500 000 people affected
Photo: Viet Thanh, IFRC*



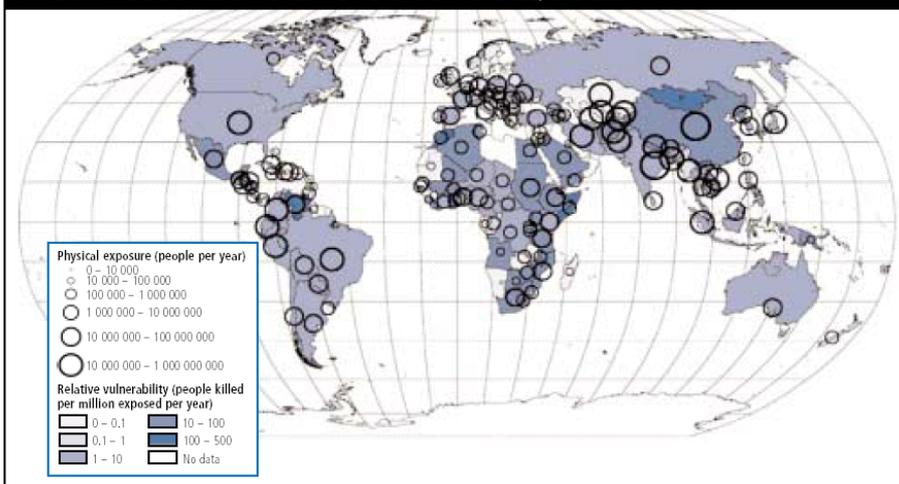
Venezuela, 1999,
30 000 deaths and around
500 000 people affected
Photo: IFRC*



China, Yangtze River, 1998,
3 656 deaths and around 16
million left homeless
Photo: IFRC*

*IFRC – International Federation of Red Cross and Red Crescent Society – Photos taken from IFRC website at: <http://www.ifrc.org/index.asp>

FIGURE 2.14 PHYSICAL EXPOSURE AND RELATIVE VULNERABILITY TO FLOODS, 1980–2000



Source: Université Catholique de Louvain; The EM-DAT The OFDA/CRED International Disaster Database (Victims); U. S. Geological Survey; HYDRO 1k Elevation Derivative Database (flood affected watersheds); CIESIN, IFPRI, WRI; Gridded Population of the World (GPW), Version 2 (population); Compilation and computation by UNEP/GRID-Geneva

From UNDP Publication: *Reducing Disaster Risk: A Challenge For Development*, 2004

Every year, some 195 million people in more than 90 countries are exposed to catastrophic flooding. Of all natural disasters, floods affect the greatest number of people worldwide and have the greatest potential to cause damage. When they occur in less developed countries, floods can result in thousands of deaths and lead to epidemics, as well as effectively wiping out decades of investment in infrastructure and seriously crippling economic prosperity.

High mortality from floods occurs in countries with poor, sparsely populated rural areas where disaster preparedness and early warning are almost non-existent, and where health coverage is weak and care not easily accessible. People in these areas have less possibilities for evacuation from flood prone areas and are more vulnerable to flood related diseases which can prove fatal.

Disaster inevitably leads to crisis and, once a crisis situation is established, it is the degree to which people are prepared for disaster that determines how vulnerable or resilient their community will be. Experience throughout the world has shown, time and again, that it is local people who are best placed to prepare for and respond to disasters, including floods.

This brochure gives some background information on floods and then highlights options for making communities better prepared through a bottom-up, community-based, participatory approach known as APELL. APELL, standing for Awareness and Preparedness for Emergencies at the Local Level, is a process designed to create public awareness of hazards and to ensure that communities and emergency services are adequately trained, coordinated and prepared to respond to and cope with disaster.

The importance of early warning systems (EWS) for flood prediction

Early warning systems are technological instruments for detecting and forecasting extreme flood events and for issuing alerts. If they are to be effective in helping to reduce risk, early warning systems need to be complemented by information on the actual risks posed by floods and likely mitigation strategies.

This information must then be communicated to the vulnerable groups, i.e. the communities. Communities should not be merely passive recipients of information; they should participate actively in the whole process of flood warning. Their indigenous knowledge of the river basin should be taken into account.

Early warning mechanisms comprise warning, risk information, preparedness and efficient communication. Early warning can empower communities. Warning must be given in good time, be precise and prompt, and should convey reliable information.

Case-Study

taken from ISDR Publication (2002). *Living with Risk*

The **RELSAT Project** (Strengthening of local structures and early warning systems) was implemented in pilot zones in each of the six Central American countries between November 1998 and December 1999.

The purpose of this project was to establish efficient and reliable early warning systems for floods, tailored to the realities and capabilities of the selected pilot zones.

The project developed early warning systems that work. People living in the upper parts of the river measure rainfall and water level regularly. They transmit this information by radio to a central office in the nearest municipality where the data are analysed. The centre communicates with people in the flood-prone areas. When danger is anticipated, the centre can alert the population exposed to risks and can prepare for their evacuation, if necessary. In order to be effective, this system requires reliable communication and coordination. Responsibilities must be clearly assigned and commitment must be continuous. More information on the ISDR publication *Living with Risk* (2002), on-line at:

http://www.unisdr.org/eng/about_isdr/basic_docs/LwR2004/ch5%20Section%205.pdf

Types of floods

River floods (seasonal flooding)

River floods are usually caused by seasonal precipitation over large catchment areas, by melting of snow that has accumulated over the winter, or sometimes by a combination of these. In contrast to flash floods (see below), river floods normally build up slowly, are often seasonal and may continue for days or weeks.

Floods are naturally occurring hazards. They become disasters when they have destructive effects on human settlements.

Floods caused by tropical storms (flash floods)

The heavy rain that accompanies tropical storms is one of the most common causes of flooding. These storms form over the warm ocean waters of the tropics and carry very large amounts of moisture. When conditions for their formation are right, giant storms can reach the land very quickly (in 6 hours), usually accompanied by torrential rainfall. The rain is too much for the streams and rivers to handle, causing water to overflow and produce floods.

Coastal Floods

Storms, wind and other events can sometimes cause ocean water to overflow, leading to onshore flooding. Tsunamis, exceptionally large ocean waves triggered by volcanic events, landslides, earthquakes, or explosions, also cause coastal flooding.

How does human activity contribute to floods?

The magnitude and frequency of floods is often increased by human activities. For instance:

Establishing settlements in floodplains endangers lives and property. The pressures of population growth and shortages of land can push people to settle in floodplains, putting them and their property at risk. Floodplain development can also alter water channels and this, if not well planned, can also contribute to floods.

Urbanization can contribute to flooding in several ways. Roads and buildings cover the land preventing water from infiltrating, so that runoff forms artificial streams. Natural or artificial channels can become constricted by debris or obstructed by river facilities, impeding drainage and causing overflowing. Particularly complex changes take place around large cities during their expansion, strongly modifying runoff production and drainage patterns.

Environmental and land degradation, deforestation and removal of root systems increase runoff. This effect can be compounded when material eroded as a result of these activities is deposited in river channels, decreasing their capacity.

Failure to maintain or manage drainage systems, dams or levees in vulnerable areas also contributes to flooding.

How flood risks can be reduced

There is seldom a single approach to risk reduction and management, but rather a range of measures extending from development and enforcement of policies through land use planning and engineering work, to the development of forecasts, warnings, awareness-raising, and preparedness and response programmes. Emphasis should be placed on attaining solutions that are practical, appropriate and sustainable for the community at risk. Implementation will only be sustainable if solutions are suitable for the community in the long term.

Living with floods – The best approach to flood management at national level is to have it integrated into a broader water management strategy. Such a strategy should also take into account ecological benefits that are sometimes inherent to floods.

Put briefly, there are three complementary approaches to reducing flood risk:

- keep the flood away from people;
- keep the people away from the flood; and
- community preparedness

Keeping the flood away from people is a strategy that includes measures to contain or reduce the flood—i.e. structural flood control measures such as the construction of dykes, levees, dams, etc. and low cost non-structural measures such as soil and water conservation, or erosion and sedimentation control.

Keeping the people away from the flood is a strategy that includes floodplain management, with land use control, flood proofing of houses, and flood forecasting and warning. Preventing people from living in flood prone areas, or relocating those who do, is not always possible. When this is the case, the most useful and powerful strategy, Community Preparedness, comes into play.

Community preparedness for floods—*APELL in practice*

APELL means community preparedness. Flood preparedness based on the APELL process is achieved through a structured approach to community participation in emergency planning. It is based on a meaningful dialogue between all relevant stakeholders, including local authorities and community leaders. This dialogue is achieved through a broad-based multi-stakeholder, representative group which first reviews the flood situation and then proposes measures to address the risks. The outcome of this process is an emergency plan to which the community has provided substantial input, and which ordinary citizens can understand. Communities need their emergency plans; evacuation centres and hospitals need to be prepared to deal with evacuees and injured people—and that is APELL in practice.

The success of flood-related public participation initiatives relies on (i) the achievement of a consensus agreement between decision-makers and the communities on a decision's potential impact, taking into account the expectations of the communities; (ii) the involvement of stakeholders and the selection of an appropriate decision framework; and (iii) the adoption of highly effective flood and water management consultations.

Flood prevention and preparedness in practice

Within the community, individuals should:

- recognize and follow warning signals
- follow established evacuation plans
- know which news services are appropriate before, during and after floods
- stay away from landslide prone areas
- know if their property is in the floodplain and what prevention measures should be taken

Rescue services need:

- equipment and training
- local hazard maps showing flood prone areas, and vulnerability assessments
- to monitor changes in river flows and meteorological warnings on a continuous basis
- to implement local emergency plans
- to mobilize community resources
- to assess immediate needs for evacuation, shelter, medical care, route deviations, etc.
- to have communication channels with the public during crisis
- to perform full-scale evacuation drills

Government authorities should take steps towards:

- having policy on floodplain management integrated into the river basin water management plan
- strengthening and enforcing building codes in flood prone areas
- the acquisition of property in floodplains to prevent their development, and relocation of residents in high-risk areas
- the establishment and enforcement of legislation and safe land-use planning, to regulate development in floodplain areas
- the creation of economic incentives
- making public information on flood hazards available
- training emergency services and communities on flood preparedness
- making medical services ready for a flood crisis
- improving local preparedness by fostering links with national disaster management programmes

International agencies should:

- coordinate international and regional cooperation on disaster management
- support effective early warning alerts and assessment studies
- encourage governments to adopt and enforce suitable legislation and policy on disaster management, including national contingency plans
- support the promotion of prevention and preparedness procedures at the local level

How does APELL operate?

The APELL process is a management tool that helps local people develop the information and decision-making structures they need to address the hazards facing their community. By engaging stakeholders in a process of structured dialogue and coordination, APELL's 10-step approach leads to the development of a single, unified emergency response plan for the entire community. Implementing the process not only develops the crisis plan, it also fosters awareness raising and feedback within the community.

APELL can be useful in any situation that requires joint planning for disasters by several parties

Local communities often have the technology or knowledge required to reduce their own vulnerability, but some key community or social structure may be missing, preventing them from realizing the benefits of vulnerability reduction at the community level. APELL is a process that helps to empower local people so that they can organize, act together and overcome barriers to successful community action.

UNEP developed the APELL programme in the 1980s, in association with the chemicals industry, with the intention of addressing public hazards from industrial installations. It has since been widened to encompass ports, transport, mining, industrial estates and natural disasters.

UNEP and UNESCO

The mission of the **United Nations Environment Programme (UNEP)** in the field of disaster reduction is to address the immediate and long term human, social, health, economic and environmental impacts of natural and human-induced disasters, minimizing the resulting environmental emergencies that they cause. UNEP's approach is to promote disaster management to reduce vulnerability and enhance coping-mechanisms through capacity building, and activities in the field of early warning and assessment, prevention and preparedness, emergency response mechanisms, post-disaster assessment and post-conflict assessment, and environmental rehabilitation.

UNESCO is the **United Nations Educational, Scientific and Cultural Organization**. UNESCO's aims in the field of natural disasters are: to promote a better understanding of the distribution in time and space of natural hazards and of their intensity; to help set up reliable early warning systems; to support rational land use plans; to encourage the adoption of suitable building designs; to promote the protection of educational buildings and cultural monuments; to enhance preparedness and public awareness through education and training; and to foster technical post-disaster investigation, recovery and rehabilitation.

UNEP - Division of Technology, Industry and Economics

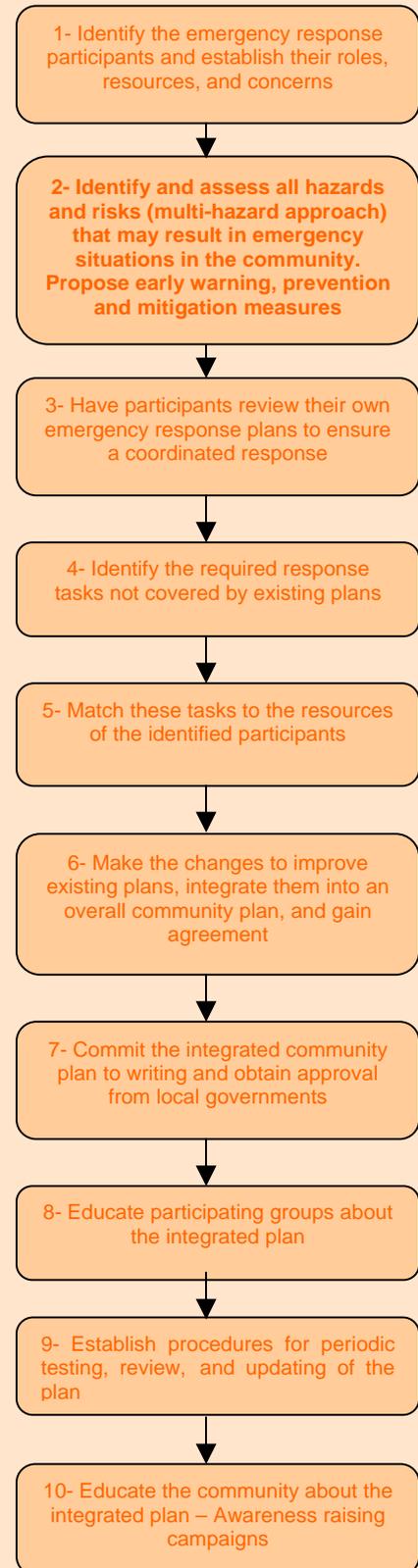
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APELL 10-step approach



Brochure Bibliography:

UNDP Publication (2004). *Reducing Disaster Risk: A Challenge for Development*
Several publications from the UNDP Disaster Management Training Programme
ISDR Publication: *Living with Risk* (2002) and *Guidelines for Reducing Flood Losses* (2004)
UNESCO (1993). *Environment and Development Briefs*
OCHA Publication (1997). *Floods, People at Risk, Strategies for Prevention*
UNEP Publication (1988). *APELL Handbook*