Community-Based Early Warning

Bringing institutions, science, and society together

Arvind Kumar, Project Officer in ADPC under Urban Disaster Risk Management (UDRM) team, arvindd@adpc.net
Vijay Khadgi, Network Officer, ICIMOD, vkhadgi@icimod.org

Category 3 'Cyclone Bhola' killed over 500,000 people in Bangladesh in 1970. Cyclone Sidr of a similar magnitude killed 3,500 in 2008, less than 1% of the fatalities in 1970. What made this huge difference possible? This article highlights how Bangladesh is reducing vulnerabilities to floods and cyclones by making information accessible to those to whom it matters most.

Floods and cyclones are the two most prominent hazards in Bangladesh, which is 1st and 6th respectively in terms of people at risk among countries facing similar hazards (see table).

Hazard type	Population exposed	Country ranking
Floods	19,279,960	1st out of 162
Tsunami	1,598,546	3rd out of 265
Cyclones	4,641,060	6th out of 89
Earthquakes	1,330,958	17th out of 153

Source: Extracted from the 2009 Global Assessment Report

Although cyclone monitoring technologies continue to improve significantly, the information rarely reaches communities in time to enable them to evacuate vulnerable areas. Similarly, although flood-forecasting observation systems have improved with time, information on impending floods is sent mostly to government and other agencies and fails to reach vulnerable communities in an understandable form. Even when the information is disseminated, the messages are often sophisticated and transmitted through technologies that are either inaccessible or incomprehensible to many vulnerable populations. Efforts are needed to make information accessible and understandable if it is to have a life-saving impact.

To address this problem, two noteworthy initiatives were introduced in Bangladesh that focus on adding value to information by simplifying messages and involving the communities so that they can benefit from the information.

The cyclone preparedness programme

The cyclone preparedness programme (CPP) was launched by the International Federation of Red Cross and Red Crescent Societies (IFRC) and Bangladesh Red Crescent Society (BDRCS) International Federation, and later institutionalised in 1973 by the Government of Bangladesh. The CPP uses a warning mechanism made up of signal systems that warn communities in the coastal districts of Bangladesh of impending cyclones in time for them to evacuate to safe places before an impending hazard becomes a disaster.

There are three committees and two institutions at national level: the National Disaster Management Council (NDMC), headed by the Prime Minister; the National Disaster Management Advisory Committee (NDMCC); the Inter Ministerial Disaster Management Coordination Committee (IMDMCC), headed by the Ministry of Food, Disaster Management and Relief (MFDMR); the Disaster Management Bureau (DMB); and the Directorate of Relief and Rehabilitation (DRRO). There are various disaster management committees at field level in the district, sub-district (upazilla), and union councils headed by a deputy commissioner, upazilla nirbahi officer, and chair of the respective areas (source: South Asian Disaster Management Centre). More importantly, community members act as volunteers for the CPP to mobilise people in the event of cyclones.

The effectiveness of the CPP was demonstrated in 2007 during Cyclone Sidr. News about the cyclone was relayed from the World Meteorological Organization to the Indian Meteorological Office in New Delhi which relayed the message to the authorities in Bangladesh. The authorities in Bangladesh then alerted the local Red Crescent office which mobilised 40,000 volunteers to relay the message to vulnerable communities using cycles and megaphones. Two million people had been shifted to cyclone shelters by the time the cyclone landed. (Details are available at www.preventionweb.net/english/professional/news/v.php?id=1115&pid:50.)

In this case, scientific information was generated at international level and the CPP became active from the moment the information reached the national threshold.

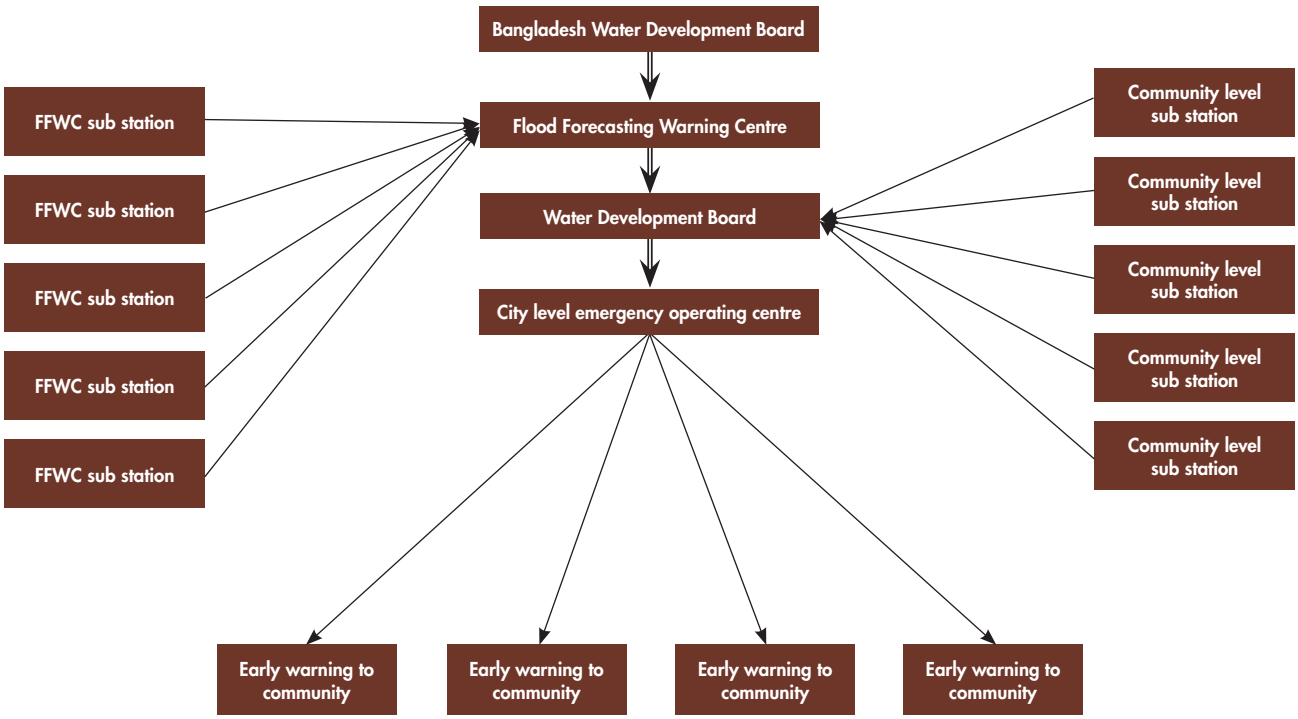
A people-centric early warning system for floods in Jamalpur, Bangladesh

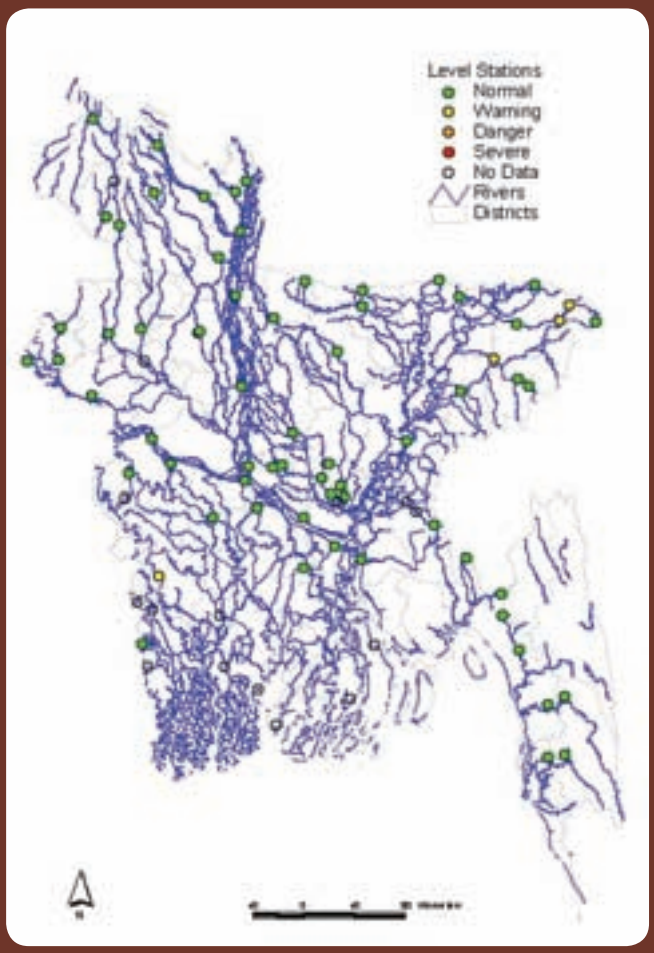
The Flood Forecasting Warning Centre (FFWC- www.ffwc.gov.bd) of the Bangladesh Water Development Board produces weather reports such as daily monsoon bulletins and river status reports; river-level forecasts for 24, 48, and 72 hours; current warning messages; special flood situation reports; inundation status maps; and flood forecast maps. This information, however, is confined to institutions and does not reach the communities.

Installation of flood gauge at the community level

To address this, the Asian Disaster Preparedness Center (ADPC) is implementing a 'Programme for Hydrometeorological Disaster Mitigation in Secondary Cities in Asia' (PROMISE) in Jamalpur, Bangladesh. The city is on the banks of the Brahmaputra and Jamuna and prone every year to floods, cyclones, soil and river erosion, and water logging. Of the city's 12 administrative wards, three are in low-lying areas and densely populated by poor, landless, and vulnerable communities. The PROMISE project brings science and society together by adopting a people-centric, end-to-end flood early warning system (Figure). The city-level water development board (WDB), municipality, and community are the stakeholders in this system which has a technical working group chaired by the municipality chairperson

People-centric flood forecasting system





Typical flood status report from the Flood Forecasting Warning Centre. www.ffwc.gov.bd/

and includes government departments such as the local government and engineering department (LGED), water development board, agriculture, town planning, elected representatives, NGOs working on floods, and Red Crescent Society and community volunteers.

The PROMISE project focuses on simplifying the information generated by FFWC by using rainfall and river-level data to determine which areas will be inundated to what depths within the city. Under the project, the Jamalpur Water Development Board has installed 14 community-level sub-stations where trained volunteers from the community collect information on river-level data by reading flood gauges located upstream and downstream at strategic locations in the city. Flood-gauge readings are based on WDB measurements observing increasing water levels along the river at different intervals during the monsoon season. Volunteers collect river-level data and provide them to the WBD and an emergency operating centre (EOC). The WDB then forwards data to the Flood Forecasting Warning Centre (FFWC) and in return receives inundation maps. The WDB has developed indicators or danger levels for the flood gauges to make them easy to understand. After collecting the information from community sub-stations and the FFWC, the WDB provides flood forecasting information in terms of inundation and water depth and also the time to evacuate to the EOC operated by the municipality. The EOC then mobilises its trained volunteers and elected representatives from the respective wards to inform the community through display boards.

The project has provided the community, the end user, with access to the scientific knowledge. This early warning facility has bridged the gap between central-level government institutions and the municipality and enabled them to coordinate and work together to save the lives and property of the most vulnerable in the floodplains of Bangladesh.

Key challenges and limitations

The initiatives are noteworthy for making information accessible to communities which enables them to save lives and property. However, Information sharing is a means, not an end, and must be integrated into a warning system. The ideas in this article may be replicated elsewhere; nevertheless, there is a great need to consider the limitations and external factors that determine the success or not of such models. Some of these are outlined below.

1. Accuracy and reliability of information – Although flood-prediction models have improved significantly in recent years, the tools for prediction are not accurate enough. As a result, there have been occasions when false alarms have been triggered, leading to loss of faith in the information and the systems in the community.

2. Preparedness first and access to resources – It is insufficient to provide flood warnings and information alone. The system must be holistic and provide the necessary resources such as evacuation centres and adequate training about how to respond to flood warnings. Mobilisation of volunteers and management of logistics are other areas for which good practices can be shared region-wide.

3. Reluctance of communities to relocate – Frequently communities prefer to stay back in vulnerable areas in the hope of saving their limited possessions. These communities need assurance about rebuilding rather than access to information.

4. Oiling the machinery – The effectiveness of a warning system depends on a holistic community-based disaster preparedness programme which prepares people to act in a particular way during emergencies. Regular drills are needed to check on the preparedness aspect as well as keeping people's knowledge and priorities up-to-date.