

# BEST PRACTICE OF THE PROVISION OF FLOOD EARLY WARNING TO FLOOD-VULNERABLE COMMUNITIES IN CAMBODIA

NGUYEN HUY DZUNG<sup>1</sup> AND BOB PENGEL<sup>1</sup>

<sup>1</sup>*Regional Flood Management and Mitigation Centre (MRC-RFMMC), Mekong River Commission (MRC), Phnom Penh, Cambodia*

## 1. INTRODUCTION

The Mekong River is one of the world's largest rivers and flooding has been part of the River's seasonal cycle since earliest human habitation. Though many of the effects of flooding are highly beneficial - by enriching aquatic habitat and replenishing soil fertility - higher-than-expected annual floods and flash floods make communities vulnerable to the loss of human life, property, agricultural crops, and farm animals, and disruption of transportation and communications grids.

In 2000, more than 800 people, most of them children, including 362 people in Cambodia, died as a result of flooding. The total costs of damages exceeded US\$ 400 million, including US\$ 157 million in Cambodia. The flood in 2001 killed 300 people, including 62 people in Cambodia, and the damages were over one hundred million US dollars, including US\$ 30 million in Cambodia. Again, in 2002 Mekong floods hit the Mekong countries. In Cambodia alone, the 2002 floods killed 29 people and the total extent of damage was over US\$ 12 million. Most of the people at risk and hit by these floods are amongst the most economically vulnerable in the country.

To address to above concerns, a five-year project formally titled 'Provision of Flood Early Warning to Flood-Vulnerable Communities in the Lower Mekong River Basin' with a total implementation budget of US\$ 1,250,000, was initiated in early 2003. The USAID's Office of Foreign Disaster Assistance (OFDA) funded it.

The goal of this program is to reduce the vulnerability of communities in Cambodia to higher-than-normal annual floods and flash floods. The objectives of the project are:

- *objective #1.* Develop useful and understandable Mekong River Commission (MRC) flood warnings, which are responsive to the needs of, and promptly conveyed to, the most flood-vulnerable communities in Cambodia;
- *objective #2.* Develop tools and methods, with the help of community-based implementing partners, to enable flood-vulnerable populations to effectively respond to MRC-prepared warnings.

Via the Cambodian National Mekong Committee (CNMC), MRCS has been working with the American Red Cross (ARC) and Action Contre la Faim (ACF) as the main partners, and with the Cambodia Red Cross (CRC), National Committee for Disaster Management (NCDM) and its line offices as well as the Department of Hydrology and River Works (DHRW), as the main Cambodian counterparts in order to implement this project for the last four years.

The project has been operating in 40 flood-vulnerable villages in five provinces of Cambodia - Kandal, Prey Veng, Kampong Cham, Kratie and Stung Treng - and has developed an operational early warning system (EWS) which involves information flow from national to community level while incorporating community feedback. Using this system, accurate local flood forecasts are generated daily and sent to the community; feedback from the community is also sent daily to the MRC-RFMMC in order to assist in updating the early warning system on a regular basis.

The role of MRC in this project is to cooperate with the local flood forecaster, DHRW, providing

timely flood warnings to the population in flood-vulnerable communities. Based on the daily flood forecast bulletin of MRC-RFMMC, the Cambodian Department of Hydrology and River Works has a 3-day lead-time for flood forecasting at village flood warning boards which are installed in every project’s target village. The flood bulletin is sent daily to communities through the Red Cross flood-warning network.

The project management has evolved into a decentralized approach with the Red Cross Volunteers (RCV) assuming a greater role at community level. The aim of decentralization is to empower communities to become more involved in project planning, implementation, and monitoring and reporting. In turn, the CRC Phnom Penh and NCDMS staff has assumed a greater responsibility in coaching, facilitating, monitoring and evaluating the project’s goal and objectives.

Project Support Committees (PSC) have been established in the 38 villages in the four provinces Kandal, Prey Veng, Kratie and Strung Treng, to assume the responsibility of maintaining the implementation of key project activities. In Kampong Cham Province, the provincial and district Disaster Management Committees have successfully implemented the flood preparedness plan including flood early warning to communities with back-up support from ACF. PSC and Commune Committee for Disaster Management staff in the project target areas have received training, coaching, and support from the key stakeholders involved in the project.

**2. EARLY WARNING PROJECT IMPLEMENTATION**

The project uses CRC’s network of volunteers and NCDM’s network to provide two-way timely flood information including water levels, water gauge height at specific times, and at specified geographic locations in villages. According to its assigned role by Government, coordinating with CRC, NCDM has provided technical support and training to the staff of CRC and CDM at provincial, district and commune levels. The water level information is collected from village flood markers and referenced to river stations of the Mekong River Commission (MRC).

**2.1. Stakeholders**

The Mekong River Commission has received funding from OFDA to support the early warning project. Via the Cambodian National Mekong River Committee (CNMC) as the project coordinator, the Cambodian Red Cross (CRC) in close collaboration with National Committee for Disaster Management (NCDM) implements this project, with technical assistance by the American Red Cross (ARC) and Action Contre la Faim (ACF). The Department of Hydrology and River Works (DHRW) and its branch at provincial level also works under the technical assistance of the MRCS’s Regional Flood Management and Mitigation Centre (MRC-RFMMC) for providing a 3-day lead-time of flood forecast at flood-vulnerability villages. The table below identifies some of the key positions.

Table 1. Project participants

Red Cross network	NCDM network	Department of Hydrology and River Works (DHRW)
<ul style="list-style-type: none"> <li>• CRC disaster management dept.</li> <li>• CRC Project officer and assistant</li> <li>• CRC Project accountant</li> <li>• CRC branch director</li> <li>• CRC Field officer</li> <li>• CRC sub branch officer</li> <li>• Red Cross Volunteers</li> </ul>	<ul style="list-style-type: none"> <li>• NCDM Liaison officer</li> <li>• PCDM coordinator</li> <li>• DCDM coordinator</li> <li>• CCDM coordinator</li> <li>• Project Support Committee.</li> </ul>	<ul style="list-style-type: none"> <li>• Department of Hydrology and River Works</li> <li>• Provincial Hydrology Dept.</li> <li>• District Hydrology Dept.</li> </ul>

**2.2. Collecting Information from Village Flood Marks and Reporting (Community Feedback)**

- routine reporting from target villages by Red Cross Volunteers (RCV) as the member of CCDM

to the district offices of CRC and DCDM. The reading of the markers will be taken two times a day at 8:00 am and 3:00 pm and reported to the CRC and DCDM offices once a day (see reporting schedule);

- routine reporting from target district offices to the provincial offices of NCDM and CRC. The responsible staff at the district offices will relay the consolidated information from the RCVs to the provincial offices once a day by radio communication system (see reporting schedule);
- routine reporting from Provincial offices to CRC Headquarter. The responsible staff at the provincial offices will relay the consolidated information from the district offices to the headquarter offices once a day by radio communication system (see reporting schedule);
- routine reporting from CRC headquarter to MRCS/FMMC, DHRW and NCDM. The responsible staff at CRC headquarter will consolidate and relay the information from the provincial office to MRCS/FMMC, DHRW and NCDM once a day (see reporting schedule).

Table 2. Schedule for Collecting and Reporting Flood Information (Community Feedback)

Responsible person or organization	Marker reading schedule		Reporting schedule
	Morning	Afternoon	
RCVs	by 8:00 am	by 3:00 pm	by 08:30 am
District offices			by 09:30 am
Provincial offices			by 10:00 am
CRC headquarter			by 11:00 am

### 2.3. Supervision

- during flood season, routine supervisory visit to target villages are made by the responsible staff from the district office to ensure quality, effectiveness and accuracy of information collected by RCVs. The supervisory visit will be done two days per week. During the visit, the responsible staff will gather the weekly reports from the RCVs;
- during flood season, routine supervisory visits are made to target district by the provincial office to ensure quality, effectiveness and accuracy of information gathered by the district office. The supervisory visit will be done at least 6 days per month or 3 days every two weeks;
- during flood season, routine supervisory visits to villages, district and provincial offices by staff from Headquarter offices of NCDM and CRC are made to ensure quality, effectiveness and accuracy of information gathered by provincial and district office. They will also address/respond to any perceived problems that the provincial and district office cannot resolve. The visit is scheduled for 10 days per month per province;
- during non-flood season, the Headquarter offices in coordination with the provincial office conducts quarterly site visits to prepare for the next flood season and to ensure that flood referencing tools in the villages are maintained and installed (new flood marks, if required).

Table 3. Schedule for Supervision during Flood Season and Non-Flood Season

Responsible from	Flood season	Non-flood season
District office	Weekly	
Provincial office	3 days every two weeks, 6 days/month	Quarterly - 5 days
Headquarter office	10 days every month	Quarterly - 5 days

### 2.5. Receiving flood warning and sending community feedback

During flood season, the RCVs read the water level from the flood marker and record the water level information onto the billboard. RCVs then report the village water level through walkie-talkies (base radio station) to the provincial office via the district office. The provincial office compiles and reports the information to the CRC headquarters, and in turn the CRC headquarters reports the information to the MRCS/FMMC, DHRW and NCDM. The MRCS/FMMC in cooperation with DHRW makes a flood forecast for the project target villages and then sends the information to the villages via the same chain of contacts.

### Warning information to villages

- MRCS/FMMC posts the daily flood bulletin of the river stations on its website before noon in every day;
- DHRW makes a flood forecast for the village flood markers based on the MRC-RFMMC's flood bulletin and observed water levels at village flood markers, which is daily reported by CRC; then sends the flood forecasting results to CRC via e-mail before *1:30 pm*;
- CRC sends the daily flood forecast bulletin of DHRW to the PRC and PCDM offices through e-mail, radio and/or mobile phone at *2:00 pm*;
- the provincial office sends the daily bulletin of flood forecasting and prediction of water depth in the villages to the district office through radio and/or mobile phone at *2:30 pm*;
- District office forwards the daily bulletin of flood forecasting and prediction of water depth in the villages to RCVs through radio at *3:00 pm*.

### Feedback from villages

- at the District level, the district office receives the daily readings, feedbacks, and other information from the village RCVs by *08:30 am*;
- at the provincial level, the provincial office receives the consolidated readings, feedbacks and other information from the district office by *09:30 am*;
- CRC headquarters receives the consolidated information from the provincial office by *10:00 am*;
- MRC-RFMMC, DHRW and NCDM receives information feedback from CRC headquarters by *11:00 am* at the same day.

Table 4. Schedule for Sending DHRW Flood Bulletin and Receiving Feedback from Villages

Responsible person/organization	DHRW flood bulletin	Feedback from villages
MRC post on website	before 12:00 pm	
DHRW to CRC/NCDM	before 12:00 pm	
CRC to FO	by 2:00 pm	
FO to SBO	by 2:30 pm	
SBO to RCVs	by 3:00 pm	
RCVs to SBO		by 08:30 am
SBO to FO		by 09:30 am
FO to CRC		by 10:00 am
CRC to DHRW and NCDM		by 11:00 am

### 3. COMMUNITY PARTICIPATION

- active participation in the project activities and formed a foundation by establishment of the PSC in each community. PSC membership ranges from four to six members per community. The PSC members are from RCVs, CCDM and local authorities and civil servants. They are complemented by key persons of the communities, which are selected through voting by community members;
- producing home and public flood markers including repairs and maintenance of flood markers and billboard information;
- reading flood markers and posting the flood information onto the billboard;
- sharing information with fellow villagers through village meetings, group meetings, and house to house visits;
- contributing funds to support the project.

#### 4. PROJECT SUPPORT COMMITTEE (PSC)

The PSC was established to assist RCVs disseminate the project activities, to raise funds in the community, and to ensure that the project activities will continue after the project funding ends.

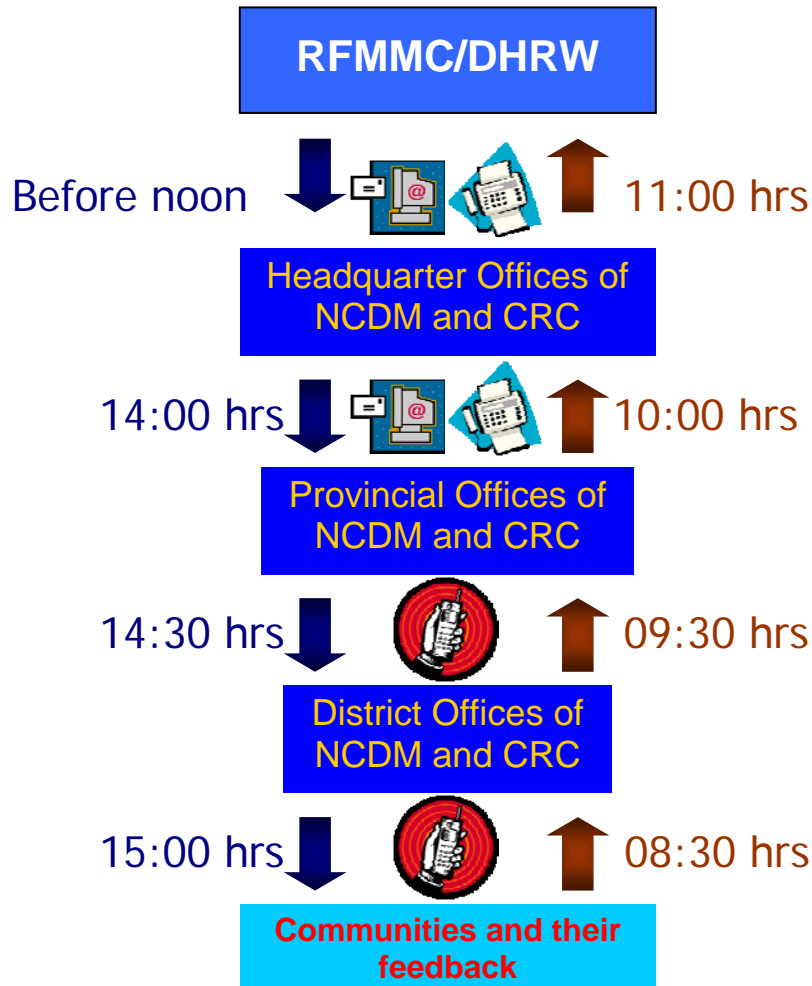


Figure 1. EWS information flow

#### 5. CONCLUSIONS

The project can certainly be termed successful, as all involved parties are positive or even enthusiastic about it, most of all the villagers themselves, who are actively investing their time and even collecting funds to support the project activities. The project is also highly relevant in terms of its target groups of vulnerable communities living in flood prone areas of Cambodia.

The EWS tools developed in Cambodia are simple and easily understandable. Therefore these tools could be easily replicated. Moreover, all stakeholders are eager to extend the concept to all flood vulnerable communities. Given the nature of this client base in LMB for flood warning it is strongly recommended that the Cambodian local authorities, who by now have enhanced capacity on the flood early warning, should keep supporting the existing 40 villages and to secure funding for wide implementation of the system. It also may be a good opportunity to consider expanding the system in other flood-vulnerable areas in Cambodia or introducing the same in other MRC Member States.