

FLOOD EARLY WARNING SYSTEM

Cambodia's Experience

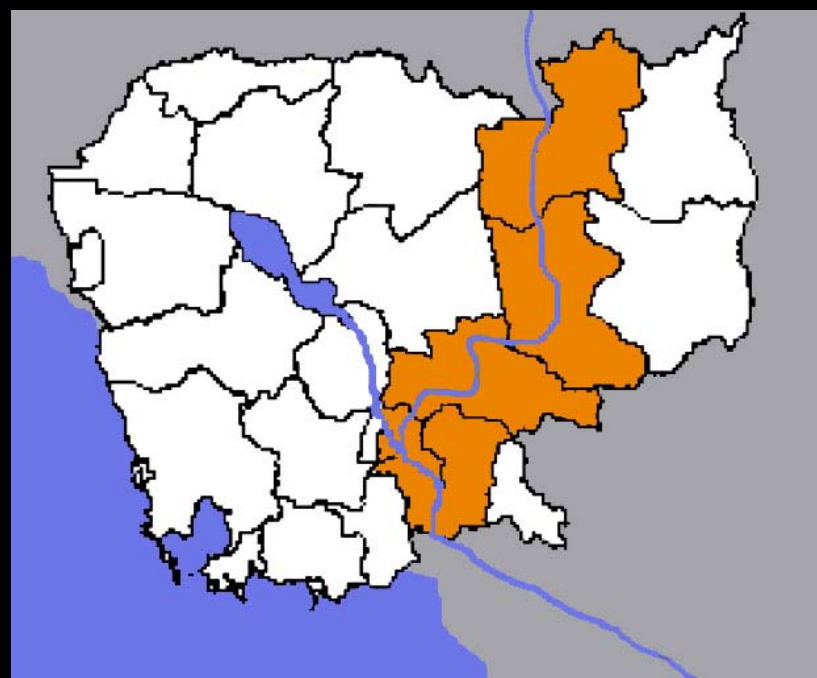
A Project

Implemented by:

- *American Red Cross*
- *Action Contre la Faim*
- *Cambodian Red Cross*

Funded by:

- *MRC / OFDA*
- *DIPECHO*



LOCAL CONTEXT

- *Floods largely affects the provinces of the lower Mekong basin: **Kampong Cham, Prey Veng, Kandal***
- ***600,000 people from 650 villages** vulnerable for Kampong Cham Province.*
- ***Exceptional and irregular floods: 1996, 1997, 2000 and 2001.***
- ***Risk increased** by deforestation, changing weather patterns, recent infrastructures.*

Timely, relevant and accurate forecast warning

- *For people to reduce risk*
 - *Move to safe areas (people, livestock), save properties, lives, crops...*
- *For administrations and authorities*
 - *Inform population, prepare emergency response...*
- *For Red Cross - Branch, volunteers...*
 - *Prepare response to floods...*

OBJECTIVES

GOAL: *To reduce the risk of vulnerable communities to higher than normal floods.*

SPECIFIC OBJECTIVES:

- *To enable flood-vulnerable population in Cambodia to understand and effectively respond to MRC flood forecast and warning.*
- *To increase capacities of CRC, PCDM at provincial, district and communes levels to understand and respond to flood forecast.*

1. Training, raising awareness

BEFORE FLOOD SEASON

- RCVs assist MRC with Village Flood Markers installation (3 - 5 per village).*
- RCVs and MRC install Village "Billboards" for presenting forecast and alerts to Villagers.*



2. Dissemination of forecast: 2 systems

- *1-way: EWS implemented by ACF since 2002 in KC Province in 45 villages and 19 communes using MRC forecast.*
- *2-ways: promoted and funded by MRC, project started in 2003.*

ACTIVITIES

1 - way EWS

① Phnom Penh:
MRC - 12h00



Sent forecast by internet

② Kampong Cham:
CRC Branch - 14h00



Send forecast by VHF Icom

③ Village: RCVs or
Villagechief - 15h00

EWS
volunteer

Write forecast on Public Board

④ Village: households
after 15h30

Villagers

Write forecast on Public Board

Microsoft Excel - F13Sep03.xls

Mekong Bulletin
MRC Secretariat
Forecast period: 14 -18 September
Date: 13 September 2003

LOCATION	Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Flood stage (m)	Alarm stage (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)				
					12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	17-Sep	18-Sep
Pakse	14.4	86.490	12.00	11.00	10.28	10.72	11.06	11.10	11.15	11.20	10.75
Stung Treng	23.3	36.790	12.00	10.70	9.45	9.75	10.04	10.22	10.32	10.24	10.10
Kratie	n/r	-1.080	23.00	22.00	20.03	20.15	20.47	20.77	20.94	21.03	20.95
Kompong Cham	n/r	-0.930	16.20	15.20	14.00	14.07	14.20	14.41	14.59	14.70	14.77
Phnom Penh (Bassac)	n/r	-1.020	12.00	10.50	8.57	8.64	8.71	8.80	8.91	9.02	9.11

Ready NUM

MRC Forecast bulletin



CRC broadcast forecast

ACTIVITIES

1 - way EWS



Dissemination
in villages



Flood signage

the forecast of Mekong water level at Kampong Cham meteorological station

ថ្ងៃ ~ ខែ	កំពស់ទឹកនៅខេត្តកំពង់ចាម	ទៀង ↑	ស្រក ↓
14 ~ 10	10.27 m		
15 ~ 10	10.20 m		
16 ~ 10	10.09 m		
17 ~ 10	10.01 m		
19 ~ 10	09.92 m		
20 ~	09.84 m		



eCHO European Commission
 ឧបត្ថម្ភកម្មចម្រើនដោយ អគ្គ
 Project funded by ECHO

ACTION AGAINST HUNGER
 កម្មវិធីប្រយុទ្ធនឹងការឃោសឃាត
 Project implemented by...

1 - way EWS ACTIVITIES

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Dissemination in town by PCDM

DURING FLOOD SEASON

- *RCVs record Village Flood Markers twice a day.*
- *MRC reports River Station levels and predictions/forecasts to CRC NHQ daily.*
- *CRC NHQ relays information from MRC to RCVs and reports Village Flood Marker readings back to MRC.*
- *RCVs update and maintain Billboard information and village flood maps and set warning levels.*



ACTIVITIES

FLOOD EARLY WARNING SYSTEM
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Community Billboard

Flood Level Information Table

Village : អូរសៀង
Population : ២០៥៤នាក់
Area : ៤៥០ហិកតា

Warning Level 1
Warning Level 2
Warning Level 3

Day Month Year	Water Level at NL st. (meter)	Water Level at Vil. (meter)	Flooded area (ha)
Yesterday	26.903	6 - 94	2.18
Today	27.903	6 - 88	367
Tomorrow	28.903	6 - 85	
After Tomorrow	29.903	6 - 84	

គំរោង ផ្តល់ព័ត៌មានជាមុន ពីទឹកខ្ពស់ដល់សហគមន៍ងាយរងគ្រោះ
 ក្នុងអាណត្តិមេគង្គខាងក្រោម ដំណាក់កាលទី១ កម្ពុជា និង ឡាវ

Project: Provision of Flood Early Warning to Flood-Vulnerable
 Communities in the Lower Mekong Basin, Phase1, Cambodia and Lao PDR

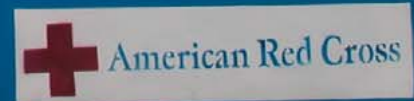
ឧបត្ថម្ភថវិកាដោយ : OFDA/USAID

Funded by : OFDA/USAID

ប្រតិបត្តិការដោយ : លេខាធិការដ្ឋានគណៈកម្មការមន្ទីរមេតង្គ

Executed by : MRC Secretariat & CRC/ARC

កាកបាទក្រហមកម្ពុជា និង កាកបាទក្រហមអាមេរិកកាំង





ACTIVITIES

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AFTER FLOOD SEASON

- *RCVs and CRC staff work with villages' leaders and villagers to assess effectiveness and how to improve referencing and forecasts for subsequent floods.*
- *Project will design and produce an EWS manual that has specific guidelines for each village.*

FINE TUNING

- *Throughout the life of the project the methods of information dissemination and communication will be refined and improved by means of continual feedback and input from the Villages.*
- *As more years are added to the database, the forecasts should become more and more accurate.*



LEASSONS LEARNED



- *Autonomous communication from MRC to villages.*
- *Daily forecast is received and displayed in the villages.*
- *The 1-way EWS is sustainable, low cost, easy to replicate.*
- *Support from all stakeholders*
- *1 day forecast from Kampong Cham station credible and accurate.*

LESSONS LEARNED



- *2 EWS systems going on in Cambodia. Need for single agreed system.*
- *Little understanding among villagers and no beneficiaries ownership.*
- *Lack of communication within the village.*
- *Public board forecast doesn't reach all the population.*
- *Sustainability and Replicability of the 2-ways EWS not ensured.*

WAY FORWARD

- *More participation from communities to favour ownership: they should decide the best way to receive forecast.*
- *Find a way to reach the whole village population.*
- *Simplify the message.*
- *Improve communication within the village.*
- *To focus on Household small reducing measure.*

WAY FORWARD

- *In 2005 MRC will expand to Lao PDR and the Lao partner will visit the project site.*
- *The Department of Hydrology will take over local flood forecasting from MRC.*
- *MRC Regional Flood Forecasting center will move back to Cambodia.*