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Theme for the next issue of the Asian Disaster Management News, October-December 2006:

## Multi-hazard Early Warning Systems (EWS)

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# Asian Disaster Management News

a newsletter of and for the community of disaster risk management practitioners and development workers

July-September Vol. 12 No. 3

# Flood Preparedness Planning

*In this Issue:*



adpc 20 years of reducing disaster risks in Asia and the Pacific

Asian Disaster Preparednesss Center

# highlight

**Dr. Suvit Yodmani**, the Executive Director of the Asian Disaster Preparedness Center has been honored with an invitation by the Royal Thai Government to join the new interim administration's cabinet as the Minister of Tourism and Sports. Dr. Suvit will assume the position of Senior Advisor during his time with the Royal Thai Government.

**Dr. Bhichit Rattakul**, will assume as Acting Executive Director for the coming year, who has over 20 years of experience in policy and management directing posts and is a former Governor of Bangkok. He is familiar with the programs and ongoing workings of ADPC as Senior Advisor to ADPC over the past year. Dr. Bhichit completed his undergraduate studies at Chulalongkorn University and his Master's and Doctorate at Brigham Young University, Utah, USA.

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# editor's note

Dear Readers,

This edition of the quarterly Asian Disaster Management News focuses on **Flood Preparedness Planning**. Flooding, one of most common hazard in Asia and a regular phenomenon in the South East Asia has caused widespread damage affecting the economy and development process. One of the major water resources in the region, the Mekong River is shared by Cambodia, Lao PDR, Thailand and Vietnam and the livelihoods of the communities living along this mighty river are depended on the ebb and flow of the Mekong. There is a constant and continued fear of loss of properties and lives that are threatened by the annual floods, as evident from the devastating power of the Mekong floods in 1999, 2000 and 2001, when tens of thousands of people lost their lives, homes and possessions. Thus, Flood Preparedness planning is a key to reduce the negative impact of flood on human and built environment.

We extend our thanks to all the contributors for their reflections and understanding on effects and impacts of flood. Special mention is due to the Director and all the team members of the Disaster Management Systems (DMS) team for their insight into conceptualizing and contributing to this edition.

**Dr. Luis Jorge Perez-Calderon**
Deputy Executive Director

## ADPC PARTNER MUNICIPALITY WINS NATIONAL DISASTER MANAGEMENT AWARD THRICE IN A ROW

The Dumangas Municipal Disaster Coordinating Council (MDCC) in the Philippines bagged its third Kalasag Award as the best MDCC in the third to fourth income class municipality category. The award was conferred on July 28, 2006 at a special ceremony in Quezon City, Philippines on the occasion of the 2006 National Disaster Consciousness Month in the Philippines. Kalasag - Filipino word for shield - is an award bestowed by the National Disaster Coordinating Council to local government units, organizations, emergency responders, and individuals for outstanding performance in implementing disaster management programs, disaster relief operations, and humanitarian assistance.

Dumangas, which perpetually confronts flood, drought, and typhoon hazards, has been working with the Asian Disaster Preparedness Center (ADPC) since 2002 as one of the pilot demonstration sites for ADPC's programs. Mayor Rolando Distura is also an alumnus of the Disaster Management Course – ADPC's training course which has been offered annually since 1986.

Mayor Distura said his municipality's collaboration with ADPC encouraged him to design and implement a holistic disaster management program in partnership with national government agencies, primarily the Philippine Atmospheric and Geophysical and Astronomical Administration (PAGASA). Two components of Dumangas's disaster management program – namely the local agromet station and the community-based flood early warning system - have been implemented following its involvement in ADPC's Extreme Climate Events Program (1998-2003) and Climate Forecast Applications Program for Disaster Mitigation (2003-2008), which are both funded by the Office of Foreign Disaster Assistance of the United States Agency for International Development (OFDA-USAID).

This year's Kalasag Award commended in particular the municipality's initiative to establish the first agro-met station in the Iloilo province. The station is responsible for collecting daily weather observations and for transmitting these data to PAGASA Central office for analysis. It also serves as a focal point for receiving and disseminating information from PAGASA. In order to sustain the operations of the agro-met station, the municipal legislative council passed an ordinance that guarantees an annual budget of PhP 200,000 (about US$4,000) for maintenance and operations. In the long term, the value of this local investment lies in having a reliable disaster early warning system as a result of the availability of high resolution local weather and climate data.

Under the Climate Forecast Applications program, ADPC is working towards strengthening the institutional mechanisms that would enable the municipality to use climate information in mitigating the impacts of hydro-meteorological hazards. One of the mechanisms being developed, in collaboration with PAGASA, the provincial and municipal agricultural offices, and the National Irrigation Administration Field Office in Iloilo, is the Climate Field School which is aimed at building the capacity of farmers to understand and apply climate information in agriculture and irrigation management. Dumangas is closely involved in this project and it will be providing local counter-part funding towards running the Climate Field Schools.

Agro-met station in the province of Iloilo

Community awareness

(photo credit: Municipality of Dumangas, Iloilo/2006)


>> **Mayor Rolando Distura** receives disaster management award for the municipality's initiative to establish the first agro-met station in the province of Iloilo.

Pictorial


# Flood Preparedness Planning

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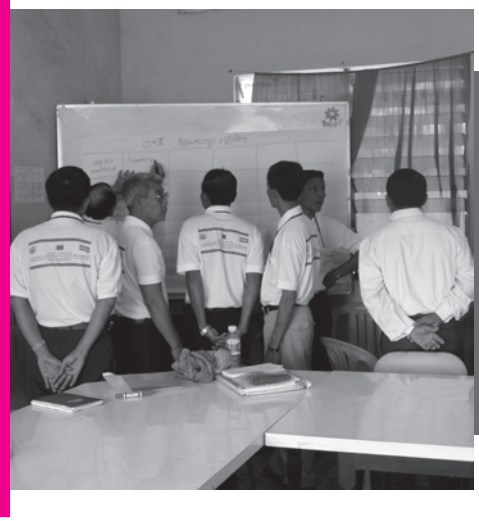


## INTRODUCTION

Floods are among the most destructive natural hazards causing extensive damage to infrastructure, public and private services, the environment, the economy and devastation to human settlements. The Asian region, in particular experiences flood disasters almost every year. As per the World Disaster Report 2004, out of the total 1,160 reported flood disasters worldwide during 1994-2003, about 411 reported flood disasters took place in Asia affecting more than 1.3 million people with a total of 45,961 deaths. The total damage estimated was around 121,438 million US Dollars during the same time. Interestingly, while the number of deaths caused by flooding has decreased over the last decade, the number of affected populations and economic losses has increased significantly. These trends demand better preparedness at national, provincial and local levels to make sure that appropriate and effective response measures are taken during flood emergency to minimize the loss of lives and properties.

Flood preparedness planning is about putting in place a set of appropriate arrangements in advance for an effective response to floods. Some of the commonly identified flood preparedness activities are:

- Public awareness raising on flood preparedness, response, and mitigation measures;
- Stockpiling of emergency relief materials i.e., food, fodder for livestock, emergency medicines, materials for temporary shelter etc;
- Installation of community-based early warning system for issuance of timely and effective flood warnings;
- Management of safe areas for temporary removal of people and property from a threatened location;
- Transportation to safe areas/ evacuation centre;
- Emergency Kindergarten Management for children;
- Ensuring access to health and sanitation facilities;
- Conducting drills and rehearsals.

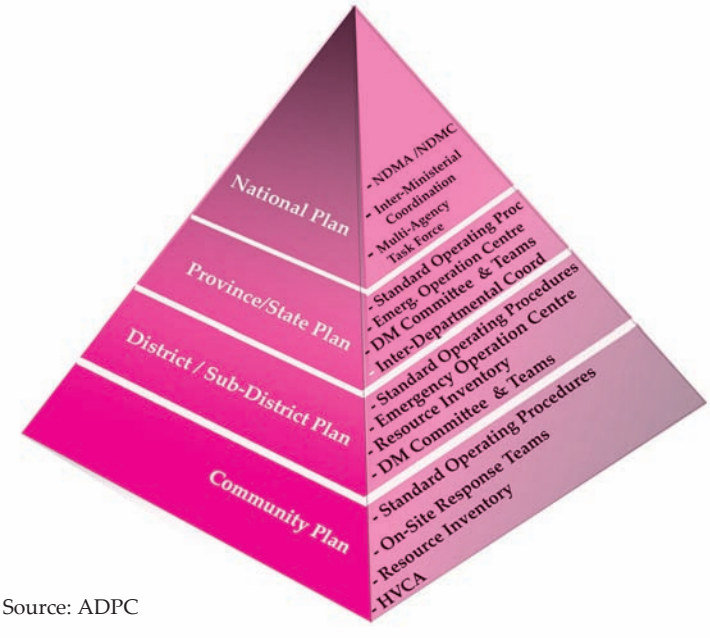
The key to flood preparedness planning is to have a clarity and agreement on the roles and responsibilities of relevant stakeholders such as the government line agencies, disaster management organisations, Red Cross, voluntary groups as well as community members. Such an arrangement is possible by forming disaster management committee and teams at various levels to agree on set of standard operating procedures (SOPs) defining what actions to be taken before, during and after floods. The benefits of the flood preparedness planning are many and some of them are listed:

- Systematic arrangement and deployment of resources to reduce the impact of flood disaster;
- Vulnerable communities to get access to crucial information, such as timely flood forecasts and warnings;
- The provision of basic needs, such as shelter and medical care, clean water, sanitation and food during floods;
- Continued access to livelihoods, in order to minimize disruption of economic activities;
- Effective coordination among disaster management agencies to ensure efficient emergency response during floods;
- Urgent restoration of critical infrastructure and measures to be taken to bring normalcy immediately after the floods.

## COMPONENTS OF FLOOD PREPAREDNESS PLAN

A flood preparedness plan (FPP) which is an integral component of the multi-hazard disaster management plan (See Figure 1) , is an action oriented document detailing specific actions to be undertaken prior to floods, which set the ground for effective execution of emergency response and recovery activities during and after floods. The component of a FPP is described as follows

Figure 1: Multi-hazard disaster management plans at various levels




Source: ADPC

1. **Assessment of probable needs:** Based on historical data from previous flood disasters, officials at the provincial and district levels compile a list of likely needs and available resources. Gaps between needs and resources are identified in advance and also ways to mobilise them.

2. **Institutional Mechanism for implementation of FPP:** The Flood Preparedness Plan outlines the institutional structure of the Provincial, District or Commune level Committees for Disaster Management, its roles and responsibilities before, during and after floods. The Plan also establishes the coordination among the line agencies and other stakeholder in implementation of priority activities identified in the plan.

3. **Activating early warning and disaster response systems:** The FPP defines how to warn the whole community, based on the forecast received from the national and regional agencies and what they should do in advance. The plan ensures ways of involving all stakeholders, according to their roles and responsibilities, and outlines these in the plan.

4. **Resource mobilization and allocation.** Responding to a flood requires resources; therefore the plan specifies what resources are already available at the province, district, commune and village levels. The plan also specifies what resources will be needed and where to find those resources.

5. **Communication within and outside the community.** To ensure clear and effective messages in an emergency, the plan specifies how communication will take place and via what media (radio or indigenous systems, etc.)

6. **Sectoral components.** A flood preparedness plan outlines standard operating procedures (SOPs) for specific measures such as search & rescue, emergency medical assistance, provision of water supply and sanitation, food and nutrition, logistics and transport, health, agriculture and environment management, temporary shelter, evacuation procedures; protection and security.

## EXAMPLE OF FLOOD PREPAREDNESS PLANNING IN THE LOWER MEKONG BASIN

The countries in the lower Mekong basin such as Cambodia, Vietnam, and Lao PDR face annual floods. The flood in year 2000 was the most devastating, causing widespread damage. Since then, the people have realized that socio-economic damage and loss of lives could be prevented if people are well prepared. With the formation of nodal department of disaster management and disaster management committees at all levels, the authorities prepare Annual Flood Preparedness Plans by reviewing the lessons learnt from the previous year.

In Cambodia, Asian Disaster Preparedness Center (ADPC) and Mekong River Commission Secretariat (MRCS) under the MRC Component 4- Flood Emergency Management Strengthening (FEMS) project with funding support from GTZ have supported the preparation and implementation of flood preparedness program through consultative planning process at the province and district levels. The provinces of Prey Veng, Kandal, Kratie and Kampong Cham along the Mekong River have prepared annual FPP with have started implementation of priority activities at selected districts and commune. One of the example is the Kandal Province in Cambodia, where a planning exercise have helped the Provincial Committee for Disaster Management (PCDM) in identifying the roles and responsibilities of each of the member line agencies and other stakeholders. The outline of the Kandal Province Flood Preparedness Program provincial for 2006-2007 is presented in box below.

## OUTLINE OF PROVINCIAL FLOOD PREPAREDNESS PLAN KANDAL PROVINCE

**1. INTRODUCTION**
- 1.1 Background
- 1.2 Flood disaster and its impacts
- 1.3 Goal and strategy
  - a. Why flood preparedness planning is needed?
  - b. How flood preparedness planning can help?
  - c. Who is responsible for developing the plan
  - d. Planning mechanism
  - e. Target audiences
- 1.4 Responsibility and authority
- 1.5 Duration and Updating of the Plan

**2. PROVINCIAL PROFILE**
- 2.1 Geography and Land Area
  - a. Detail Information of the Province
  - b. Number of districts, communes and villages
  - c. Land area
  - d. Schools
  - e. Health Center and Hospital
- 2.2 Population
  - a. Key occupations
  - b. Incomes
  - c. Population by District
  - d. Education
- 2.3 Main Rivers and Other Water Sources
  - a. Main Rivers
  - b. Other water sources
  - c. Irrigation System

**3. HAZARD, VULNERABILITY AND CAPACITY ANALYSIS**
- 3.1 Hazards
- 3.2 Vulnerability analysis
- 3.3 Provincial Resources
  - a. Number of Safe Area and Location
  - b. Transportation
  - c. Communication system
  - d. Human Resources
  - e. Organizations

**4. INSTITUTIONAL MECHANISM AND MANAGEMENT**
- 4.1 Provincial Committee for Disaster Management (PCDM)
  - a. Composition
  - b. Role of Provincial Committee for Disaster Management
  - c. Structure of Provincial Committee for Disaster Management (PCDM)
- 4.2 Provincial Disaster Management Teams
- 4.3 Standard Operation Procedures for Preparedness, Response and Rehabilitation

**5. FLOOD PREPAREDNESS (BEFORE FLOOD)**
- 5.1 Capacity Building of PCDM members at all levels (province, district, commune and village)
- 5.2 Public Awareness Raising in the Target Areas
- 5.3 Early Warning System Establishment and Flood Marks Installation in Target Villages and Communes
- 5.4 Management of Stockpiling
- 5.5 Development of Search & Rescue Strategies
- 5.6 Establishment and Management of Safe Areas before Flood Season
- 5.7 Information Management

**6. EMERGENCY RESPOND OPERATIONS (DURING FLOOD)**
- 6.1 Monitor Potential of Hazard and Risks (Situation Monitoring)
- 6.2 Dissemination of Flood Forecasts and Early Warning Information among Communities in Vulnerable Areas
- 6.3 Strategies for Search and Rescue and Evacuation Operations (July-November)
- 6.4 Safe Area Management
- 6.5 Health, Sanitation and Clean Water Program
- 6.6 Impact Assessment and Estimation of Resources Need
- 6.7 Emergency Response

**7. RECONSTRUCTION AND REHABILITATION AFTER DISASTER**
- 7.1 Estimation of Damage and Needs
- 7.2 Development of plan and Strategy for Rehabilitation and Reconstruction based on impact and need assessment
- 7.3 Implementation of "Reconstruction and Rehabilitation Plan and Strategy" after Flood

**8. RISK REDUCTION MEASURE (BEFORE FLOOD)**
- A. Structural Reduction Measure (dam, canal, safe area, etc)
  - 8.1Establishment of Operation & Maintenance Committee at District and Commune levels
  - 8.2 Identify and Assess Hazard, Vulnerability, and Community Capacity
  - 8.3 Prepare Plan for Risk Reduction Projects
  - 8.4 Action Plan Implementation
- B. Non-structural Risk Mitigation Measure (policy development, resources and fund mobilization)
  - 8.5 Mobilize Resources and Technical Support from Government Agencies
  - 8.6 Mobilize Resources and Technical Support from NGOs and Donors to Support the Plan
  - 8.7 Prepare and Develop Policy for Disaster Management at All Levels

**9. ANNEXES**
- Existing resource inventory (human resources and others resources)
- List of important institutions or organizations
- Provincial Map (Location of Safe areas , Map of vulnerable area)

In Vietnam , the Central Committee on Flood and Storm Control (CCFSC) have issued guidelines to the provincial flood and storm control committees (PCFSC) to develop annual Flood Preparedness and Storm Control Plans. Each year, the members of the PCFSC meet to review and update the Province Flood Preparedness and Storm Control Plans. Similarly; all the districts also prepare annual flood and storm control plan and submit to the PCFSC for approval and necessary resources. The provincial flood and storm disaster preparedness plan incorporates the plans received from all the districts. The box below presents the outline of the plan 2006 prepared by the An Giang Provincial Flood and StormControl Committee, one of the flood prone province in the Mekong Delta in Vietnam.

**OUTLINE OF AN GIANG PROVINCIAL FLOOD AND STORM CONTROL COMMITTEE PLAN 2006**

**I. Need for Flood Control, Search and Rescue Measure**

a. Annual Requirement for Province
b. Long Term ( 5 year ) Requirement for Province

**II. Immediate and Long-Term Measure for Flood, Storm Control, Search and Rescue Planning in the Province**

a. Safety for infrastructure
b. Protection of Agriculture production
c. Exploit the advantage of flood management programs
d. Ensure safety for people, particularly, households in high risk areas
e. Measures for storing food, medicine, equipments, and materials
f. Plan to mobilize military forces and transportation to be ready to respond to natural disaster situations
g. Policies to support people to overcome the impact of natural disaster
h. Invest to enhance the flood, storm forecasting and warning , search and rescue, dyke protection and information dissemination work

**III . Roles and Responsibility of Line Agencies at Province, District, Cities in three phases of Flood**

a. Agriculture
b. Transport
c. Education
d. Committee of Population, Family and Children
e. Construction
f. Health
g. Electricity & Water
h. .Post, Radio and Television
i Industry:
j. Hydrometeorology station
k Police
l. Armed forces
m. Red Cross
n. Labor, invalids and social affairs:
o. HMC Youth Union

**IV . Implementation Arrangement of the Flood, Storm Control and Search & Rescue Plan at all levels.**

a. Coordination among Line Agencies
b. Sectoral Plan development Infrastructure Restoration
c. Search and Rescue
d. Relief and Social Policies
e. Health, Education and Environment
f. Information and Communication
g. Reporting scheme
h and Report formats
i. Dissemination of the Plan

Similarly, in Lao PDR, the National Disaster Management Organisation (NDMO) has developed the National Strategic Plan on Disaster Management giving flood risk reduction as main focus. At provincial, district and local levels, disaster management committees are established with representatives of the concerned government bodies and NGOs. Some provinces have also prepared provincial strategies for disaster risk management. These documents outline the necessity to develop flood preparedness program at the provincial level and initiate implementation of the priority activity such as strengthening coordination among PDMC members, resource inventory, stock piling and warehouse, safe area identification, training programs. However, these strategies have multi year focus and the annual planning for flood and is still evolving.

## CHALLENGES AND RECOMMENDATIONS

The biggest challenge for Flood Preparedness Planning is the underlying capacities of the provincial and district authorities as well as the lack of resources to undertake implementation of the priority activities. In most case, local resources and capacities are often overlooked, thus relying too much upon external assistance. The linkages between disaster management and the national and local socio-economic development processes are most often ignored, resulting in re-creation of risks in already flood prone communities.

For a successful flood preparedness planning, it is imperative to learn from the experiences and best practices for greater collaboration and information sharing to enhance the synergy and to extend the resource base for more effective implementation of flood preparedness programs. It is also important to establish and integrate FPP within the overall developmental plan for securing resources for better implementation.

# Development of Flood Preparedness Programs in the Selected Provinces of Cambodia

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Cambodia lies between Thailand, Lao PDR and Vietnam. It has a total area of 181,035 sq. km. of which 4,520 sq. km is comprised of water. The Mekong River, one of the main water sources comprises almost the whole of the Lao PDR and Cambodia. The Mekong and its tributaries, combined with local rainfall, annually flood 17,100 sq km or 25% of the plain area. Heavy rains during slow moving storms aggravated by large-scale deforestation also results in flashflood.

In Cambodia, when the Mekong river overflows, excessive flood water runs into the Tonle Sap Lake which naturally increases its surface area to four times its normal size. Surrounding provinces within seven-kilometer radius get flooded. During wet season, the Mekong River also floods its banks up to four meters of water. The flat plains of Cambodia usually experience extensive lateral flow of floodwaters from Kratie to the border with Viet Nam. Up to 4 million ha of lowland areas in Cambodia are inundated annually. In 1961, 1966, 1978, 1984, 1991, 1996, 2000 and 2001, severe floods devastated Cambodia. Several provinces were affected, especially those located next to the Mekong mainstream and its tributaries. The flooding in 2000 was reportedly the worst in more than 70 years, being more widespread and severe than those in the recent past years. Provinces most severely affected were Kampong Cham, Prey Veng, Kandal and Kratie. Based on the lessons learnt from the 2000 flood, the National Committee for Disaster Management (NCDM) of Cambodia through its institutional arrangements at the Provincial and District levels have made some headway in flood preparedness planning. However, in the absence of an adequate legal framework and clear cut Disaster Management (DM) policy, limited human and material resources of the NCDM have resulted in low levels of preparedness and coordination of disaster management as the whole.

Recognizing the limited capacity and need to stregthen the flood emergency management systems in Cambodia, the Asian Disaster Preparedness Center (ADPC), in collaboration with Mekong River Commission Secretariat is implementing a project called "Flood Emergency Management Strengthening (FEMS)" in Cambodia, since September. The project is the component 4 of the wider MRC's Flood Management and Mitigation Program (FMMP) targeting 4 flood prone districts, two each in Cambodia and Vietnam. With the financial support from Deutsche Gesellschaft f◉r Technische Zusammenarbeit (GTZ) GmbH, the project focuses on enhancing the "***competence of civil authorities at various levels, emergency managers and communities in flood preparedness and mitigation***", which will ultimately lead to its objective of "***Emergency management systems in the Riparian countries more effectively dealing with Mekong floods***".

The project, in a conscious effort, selected 2 of the 7 most flood prone Mekong provinces, Prey Veng and Kandal, based on the historical flood severity data. Within these provinces, two districts are selected for pilot implementation: Peam Chor and Sithor Kandal districts of Prey Veng Province and Leuk Dek and Lovea Em districts of Kandal Province.

Under the project, following activities are undertaken:
- Pilot Flood Preparedness Programs developed and implemented in 2 target provinces and 4 districts;
- National capacity in Cambodia developed to support Provincial and District Flood Preparedness Programs;
- Public Awareness Campaigns in selected districts of the pilot provinces conducted;
- Regional knowledge sharing in Flood Emergency Management facilitated;
- Preparedness for province to province trans-boundary emergency assistance facilitated.

In order to enhance the capacities of the Provincial and District Committees on Disaster Management (PCDM and DCDM) and also to initiate the establishment of a proper planning mechanism at the local levels before the annual flood season, ADPC and NCDM-Cambodia provided technical assistance to the DCDMs and PCDMs of the target areas in Prey Veng (Peam Chor and Sithor Kandal districts) and Kandal (Leuk Dek and Lovea Em districts) to develop their own Flood Preparedness Programs. This was achieved through a series of consultative workshops at the provincial and district levels as well as one on one consultation with provincial and district offices. Focal points from each PCDM and DCDM in target areas were identified and they acted as key facilitators in all consultative workshops.

As the first step in Flood Preparedness Program development, a study on "Institutional role analysis and improvement identification" was conducted in March and April of 2005, in two target provinces of Kandal and Prey Veng, respectively. The outcomes of the study are identification of roles and responsibilities of each PCDM member line department with respect to flood preparedness activities (before, during and after floods) and the gaps and needs in the existing system. The key gaps identified were:
- Lack of systematic flood preparedness planning process at provincial and district levels;
- Weak/limited coordination between PCDM and DCDM

member line departments (resulting in overlapping of activities with little information sharing);
- Outdated flood data and flood records;
- Lack of flood maps;
- Poor access to flood information;
- Limited resources (transportation, equipment, funds, skilled personnel).

The needs were identified as:
- Capacity building of PCDM and DCDM members in areas such as safe area management, damage and loss assessment, etc.
- Public awareness raising on basic flood mitigation measures
- Clear defined roles and responsibilities of each member departments

Following the study, on 15 and 17 June 2005, two consultative workshops were organized, one each in each province, where the outcomes of the study were presented to the PCDM members. The workshop participants unanimously agreed that there should be a consolidated plan at the provincial level that clearly spells out the functions of each department required before, during and after floods[1]. Following that workshop, a format for flood preparedness plan was developed by FEMS team in collaboration with target PCDMs and DCDMs. The format was finalized in July 2005. With technical support from ADPC and NCDM-Cambodia, the two target PCDMs Secretariat, with assistance from its member departments, completed a draft Flood Preparedness Program (FPP) in October 2005. The first "Consultative Workshop on the Development of Flood Preparedness Program at the Provincial Level" was held in Prey Veng province to present the FPP to a wider audience in November 2005. The FPP was reviewed at the workshop and based on the inputs received at the first workshop, it was revised further. FPP finalization workshop was held in December 2005 and the FPP was approved and endorsed by Prey Veng PCDM and its members. Same process was followed in the other target areas.

By the end of June 2006, the FPPs of 2 provincial and 4 districts FPPs are finalized and completed. Two provincial and one district (Peam Chor) FPPs have been printed, with the inclusion of provincial/district maps and the district resource inventory. The PCDMs of Kandal and Prey Veng plan to have meetings to launch the FPPs, with the intention of distributing the documents to all its member departments, in all the districts within the province and also, to international and local NGOs working in the province.

The contents of the FPP include the background information on the province/district, the existing activities of each member departments before, during and after floods (or Standard Operating Procedures of PCDM and DCDM member line agencies), the ToR for four operational teams (based on suggestions by PCDMs and DCDMs) namely Search and Rescue Team, Health, Hygiene and Sanitation Team, Information Management and Assessment Team and Emergency Relief Operation Team, and identification of priority actions to mitigate flood risks each associated with specific responsible units/ organizations/team within the Committee.

The table below summarized development of flood preparedness programs at the provincial and district levels in Cambodia

| Activity | Results |
|---|---|
| "Institutional Role Analysis and Improvement Identification" Study | Identification of roles and responsibilities of each PCDM member line department with respect to flood preparedness activities (before, during and after floods) and the gaps and needs in the existing system |
| Provincial Consultative Workshops | Consensus on the need of a consolidated plan at the provincial level |
| Development of the format for flood preparedness programs(through bi-lateral meetings with PCDM/ DCDM of target areas) | Finalized format for flood preparedness programs with approval from PCDMs and DCDMs |
| Development of Flood Preparedness Program (FPP) (collection of necessary information and drafting the program in consultation with PCDM and DCDM member departments) | First drafts of provincial/district FPPs |
| Finalization of the plan through "Consultative Workshops on the Development/Finalization of Flood Preparedness Programs" at the provincial and the district levels | Inputs received from PCDM/DCDM line departments on the 1st draft of the provincial/district FPP<br>Finalized and endorsed provincial/district FPP |

Source: ADPC

[1]PCDM usually has two meetings per year: one at the beginning of the flood season when the water level becomes dangerously high and immediate emergency response become imminent and another meeting after the flood to report on the flood impacts.

# Flood Control Planning in the Mekong Delta of Vietnam

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Vietnam is one of the most natural disaster-prone countries in the world. Natural disasters often result in great losses, both in terms of materials and people's lives. According to general statistics office (GSO), in 2000, the total estimate in material loss was approximately 4,612.6 billion Vietnamese Dong, 3,730 (or 80%), which was due to losses in the Mekong Delta. Floods in the Mekong Delta in Vietnam is due to the floods from the upstream Mekong river; the regulation of the Great Lake and the inundation areas and the drainage of the river system located in Cambodia and Vietnam. Therefore, flood control planning in the Mekong Delta in Vietnam is closely related to water resources exploitation of the Mekong river, especially, the Mekong Delta.

The key concern of the flood control planning in the Mekong Delta is to find suitable measures to the flood water flow from the upper part to the Mekong river basin. During the 1961 floods, the highest flood water discharge flowed through the Mekong river comprised of about 68% through the Bassac river, 19% through low-lying areas of the Long Xuyen Quadrant and the remainng 13% through the Plain of Reeds. However, according to Meteo-Hydrological General Bureau, the above data were completely changed in the year 1996 to 49%, 17.5% and 33.5%, respectively. Thus, the changes of the hydrological and hydraulic regimes in the upper and lower parts of the river are the main factors in deciding flood control planning scenarios for the Mekong Delta. Over the past 40 years, human actions have affected and have changed the hydrological and hydraulic regimes in the Mekong Delta in Vietnam, causing longer period of inundation and annual flooding. In recent times, the flood of 2000 was the most damaging in almost all the Mekong Delta provinces.

Flood protection for the Mekong Delta in Vietnam must be structural and non-structural measures. Structural measures are the building of hydraulic works in order to initially control floods in accordance with objectives and purposes. Non-structural measures are to mitigate damages caused by floods, such as long and short-term flood forecast for controlling floods; building modern communications system in order to receive information immediately and as well as establishment of relief teams to respond to severe situations. Arrangement of production sectors; cultivation seasons must be suitable in order to avoid damages and to increase efficiency. A close combination between structural and non-structural measures bring much higher benefits with decreased investment cost.

## PROBLEMS ON FLOOD CONTROL PLANNING IN THE MEKONG DELTA IN VIETNAM

The reasons for floods causing serious damages in the Mekong Delta in Vietnam in recent years have been because of extreme climate, deforestation in the upper part, and human actions in the Mekong Delta of Vietnam. These impacts have resulted in increased flood flows from Cambodia through border areas to Vietnam, decreased capacity of flood drainage of the Mekong river and increased flood water levels in inner-farm areas. Hence, flood control for the Mekong Delta in Vietnam must limit floods from Cambodia through the Vietnam-Cambodia border areas as well as dredging and widening the river and canals in order to speed flood drainage to the Mekong river, the Bassac river, the Vam Co river and the Gulf of Thailand.

Constructions for flood control must combine with irrigation, drainage and salinity protection forming a complete water hydraulic works system for agriculture development. In addition, water resource constructions must be combined with transportation, establishment of inhabitant areas in order to construct rural areas in the Mekong Delta in Vietnam, in line with development and modernization.

In the deep inundation areas of the Mekong Delta in Vietnam there are many acid soil areas. Over the past 10 years, due to water resource measures for reclamation, many areas have been used for double rice yields (Winter-Spring and Summer-Autumn). Of these water resources measures for reclamation, water to flush acid water and cleaning farm areas is most important. Hence, when the acid sulfate soils are not completely reclaimed, it is not necessary to prevent floods through these areas. This is the main constraint to control year-around floods for the deep inundation areas.

## NEED FOR FLOOD CONTROL PLANNING

For a long time, floods and inundation are closely related to the development of the Mekong Delta in Vietnam. Due to a suitable water resources construction system, farmers in the Mekong Delta in Vietnam have reclaimed, recovered and changed cultivation regime, seasonal cultivated structure, step by step changes in long-term rice species (floating rice) to short-term rice species with high yield.

Although water resources construction have satisfied irrigation and drainage and brought favorable conditions for agricultural development with flood control aspects, flood prevention and protection have not yet met the main tasks of production, lives and properties of the people and infrastructure. Hence, annual damages caused by floods are still high, people's lives in the areas are not safe and socio-economy is still under-developed. High floods have occurred continuously since 1990 causing increase in flood water levels in farm fields, long-time inundation causing serious damages.

Short-term flood control planning to seek measures for flood control aimed proposes a number of essential, urgent and efficient, practical constructions which have to be implemented in order to protect the lives and properties of the local people; improving first-step living standards contributing to stable socio-economic development of agricultureand rural areas including national foodstuff security; meet demands of security, border and territory defense and environmental conservation; no contradiction with long-term development; suitable with mobilizing capacity of integrated sources; short-term implementation to serve the first phrase of industrialization, modernization of agriculture and rural development in the Mekong Delta in Vietnam.

Long-term objectives of flood control planning in the Mekong Delta are to create conditions for comprehensive socio-economic development of the Mekong Delta in Vietnam, to protect the ecological environment as well as to develop rural areas of the Mekong Delta in Vietnam in line with developing trends in industrialization and modernization. Flood control must not only overcome and mitigate damages caused by floods; protect and improve the living standard of the people; protect inhabited areas, urban areas, infrastructure; develop agriculture but also exploit benefit of floods in order to increase silt amounts, fisheries, watering down acid water, and cleaning farm fields in the inundation areas.

# Strengthening Capacity of Local Disaster Management Organization on Disaster Preparedness Response in Lao PDR

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The Lao PDR's exposure to disasters is due to the geographical and physical characteristics of the country. River floods and droughts, occurring in a year are the primary hazards causing widespread agriculture losses. Other hazards of importance include agriculture pests, rodent infestations, human and animal epidemics, UXO, opium addiction, fires (urban, rural, forest) and road accidents.

The National Disaster Management Office (NDMO), Ministry of Labour and Social Welfare, Lao PDR and the its NGO partner i.e, Concern World Wide during 2001-2004 jointly implemented a project on Disaster Preparedness, focussing flood as the main hazard. The project focused on capacity building in disaster risk management in the two most flood prone provinces of Savannakhet and Khammoune provinces covering seven districts and villages: In Khammoune province, Ilan village, Mahaxay district, Phoneo village, Yommalath district, Dongsangam village, Nongbok village; in Savannakhet, Khantanyad village, Songkhon district, Donegnamong village, Xonbuly district, Nonkhai village, Champhon district and Nadeur village, Outhomphone district.

The project aimed to increase livelihood security by reducing people's vulnerability to disasters in Lao PDR focusing on specific objectives in the third phase:

- To reduce the disaster risks facing seven villages in Khammoune and Savannakhet provinces by enabling seven district and village teams to implement disaster risk reduction plans prepared in the previous phase;
- To strengthen the capacity of Concern and its partners to prepare and response to disaster risks.

## MAJOR ACHIEVEMENTS

**1. Disaster management structures (province, district, village levels) are in place with clarified roles and responsibilities for implementation process**

Provincial Disaster Management Committee (PDMC) in Khammoune and Savannakhet, seven District Disaster Management Committees and seven Village Disaster Protection Units were re-organized. Also, District Disaster Focal Point Units (DDFPUs), which serve as the secretariat of the DDMCs were formed. The DFPUs are the main units assisting the villages implement vulnerability reduction plans. PDMCs of Khammoune and Savannakhet have completed their strategic planning for disaster management from 2005-2010.

**2. DDFPUs assisted seven vulnerable pilot villages to implement disaster risk reduction action plans**

Through the District Focal Point Units (DFPUs), the project implementation team assisted the pilot villages to implement their risk reduction plans, which included preparation and applications of organic fertilizers, risk bank management, operation of village funds and village development funds, formation of women's weaving groups, vegetable seed dispersal, borehole and construction of wells, and management.

**3. Improved capacities of five provincial trainers and two provincial focal point coordinators in:**
- Identifying and carrying-out their assignments
- Facilitating and managing training activities
- Supporting district teams in assisting vulnerable villages implement their disaster risk reduction action plans

Through participation in training activities (domestically and abroad), study visits and mentoring/side-by-side coaching, the provincial focal point coordinators and trainers further enhanced their skills and gained more confidence in carrying out their roles and responsibilities.

**4. Developing and disseminating to staff the guidelines for Emergency Management and practical guidelines for integrating Disaster Risk Management into Concern's Rural Development Programmes**

Concern Lao PDR's strategic plan identified the need for the organization to further develop the links between development and disaster management by mainstreaming disaster risk reduction activities into its livelihood security work. This is achieved by developing the capacity of project staff and partners to assess key disaster risks threatening the livelihoods of communities to ensure project interventions to reduce vulnerability. This also includes guidelines for a gender-conscious approach to disaster risk management.

## CHALLENGES AND LESSONS LEARNT

**1. Vulnerability and risk reduction as the focus of analysis and intervention**

Project intervention adopted the vulnerability approach to manage disaster risks. Pilot villages were selected on the basis of vulnerability. Some pilot village may not be affected by flood, but suffer from "everyday disasters" such as animal pests and human diseases. These recurrent disasters have more impact on poor people than big events like floods, as their are considerable reduced labour sources and assets, trapping them in a cycle of poverty and increased vulnerability.

A series of vulnerability reduction and organizational consolidation activities were implemented in the seven pilot districts and villages. These were technical inputs in managing rice banks, management of village funds/village development funds, preparing and applying organic fertilizers, implementing sustainable farming practices, organizing weaving groups among women, skills training on weaving and dyeing, constructing boreholes and wells.

Village-level activities are concrete manifestations of linking disaster risk management into integrated rural development. By examining the socio-economic and political structures and processes which determine their capacities and vulnerabilities to disasters, the people managed to come up with interventions that integrate disaster risk management into development. These interventions made sure the use of the existing local resources and capacities to address local needs.

**2. Capacity Building: a long-term process**

Disaster Preparedness Project attempted to simultaneously increase the capacity of the implementation team and partners, which has not been easy. Capacity building in various forms has been a slow-moving process. Another limiting factor is fast turnover of partners assigned to the project. Partners have been moved to other units with new responsibilities, making it difficult to sustain capacity and develop commitment.

Study tours, mentoring and side-by-side coaching, awareness-raising through workshop and training activities provided opportunities to enhance skills, knowledge and experience of project implementers and partners.

As the success of any project is determined by the adequate capacity of the team, it is important that a project reserves sufficient time for the development of staff and partners before embarking on the capacity building process with the beneficiaries.

**3. Planning, monitoring and review mainly on a project level**

Although a system of planning, monitoring and review has been in place, these remain to be initiated. Hence, discussions largely focused on DPP activities. Efficient information management and monitoring of disaster management activities at all levels of Government units required planning, monitoring and reviewing as part of the government system and procedure.

**4. Develop people's ownership over the project**

The implementation of DPP, simultaneously with Government of Lao (GoL) partners underscores participation as an approach to achieve project objectives. Over the years, there have been marked improvement in the level of participation among men and women project partners.

Whilst experiences proved that people's participation in planning, monitoring, and reviewing of project activities lead to more successful outcomes. However, it is required that people must develop a sense of ownership over the project, which may be facilitated through:
- Participation in decision-making in each phase of project cycle management;
- Consensus-building, which leads to shared understanding of issues and problems.

For the successful replication of community-based disaster management interventions, the partners must not only contribute to its development, but to be responsible for it. People's ownership over the project is the core for its success and sustainability.

## MRC'S FOCUS ON IMPROVEMENT OF FLOOD EARLY WARNING SYSTEMS AND FLOOD INFORMATION PRODUCTS

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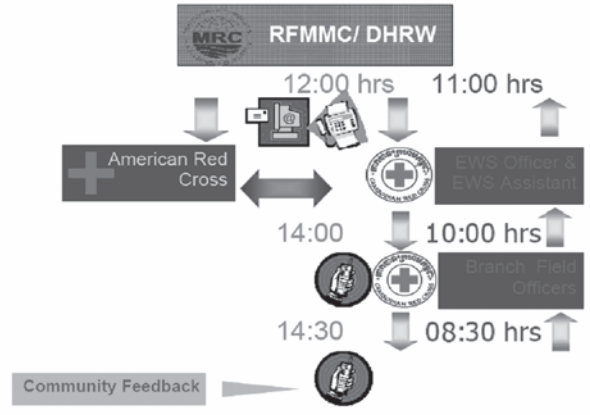
Every year floods claim lives and cause economic losses to the most vulnerable people in poor rural communities in the Lower Mekong Basin, but much of this loss could be avoided if there were prior warnings of impending floods and better preparedness.

The Mekong River Commission with support from donor agencies recognised this need and has focused one component of its Flood Management and Mitigation Programme (FMMP) on the improvement of flood forecasting and early warning systems.

It was the catastrophic 2000 floods, followed by serious floods in the year 2001and 2002, which claimed hundreds of lives and substantial economic loss that prompted the MRC Council to call for action. Their growing concerns about the rising severity of these annual hazards and increasing threat to the livelihood of communities living along the Mekong basin, led to the establishment of the MRC's Flood Management and Mitigation Programme (FMMP), which went into operation in 2005. The Regional Flood Management and Mitigation Centre (RFMMC) was established in mid-2005 in order to administer this core programme.

The overall development objective of the FMMP is to prevent, minimize or mitigate people's suffering and economic losses due to floods, while preserving the environmental benefits of floods. Funded by the USAID's Office of Foreign Disaster Assistance (OFDA), the RFMMC is working with the American Red Cross and Action Contre la Faim as the main partners and the Cambodia Red Cross and National Committee for Disaster Management as the main Cambodian counterparts in a project entitled "Provision of Flood Early Warning to Flood Vulnerable Communities in the Lower Mekong Basin". The main aim of this project is to reduce vulnerability of flood prone communities and to strengthen their capacity to prepare for and respond to flood disasters. The project has been operating in 40 villages in five provinces of Cambodia – Kandal, Prey Veng, Kampong Cham, Kratie and Stung Treng – for five years and has developed an operational early warning system (EWS) which involves information flow from national to community level and incorporates community feedback.

Figure: Flood Information Flow from MRC to community level




Source: MRCS

Using this system, accurate local flood forecasts are generated daily and sent to the community and feedback from the community is also sent daily to the RFMMC to assist in updating the early warning system on a regular basis. The MRC's involvement in the Flood Warning System consists of two components: flood forecasting as a technical issue and flood warning and dissemination as a communication issue.

The role of MRC in this project is to provide timely flood warnings to the population in flood-vulnerable communities. Based on the daily flood forecast bulletin of MRCS/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 all of the project's target villages. That flood bulletin is sent daily to communities through the Red Cross flood warning network. According to a RFMMC flood forecasting expert, during the flood season (June-October), water level measurements are taken daily at 21 hydrometerological stations along the Mekong mainstream and this data is used to compile 7-day flood forecasts which are updated every day.

These predicted water levels are sent daily via e-mail to concerned national organizations, the Cambodian Red Cross, NGOs and line agencies for further warning and dissemination purposes. These institutions pass on the information to the local community to aid their preparedness. Flood forecasting products are also disseminated to the public audience through the website: www.mrcmekong.org, where forecasted water levels in graphic and tabular format, water level trends and historical hydrographs are accessible.

The pilot project "Early Warning System" being implemented in Cambodia aims to reduce the vulnerability of communities in Cambodia to higher-than-normal annual floods and flash floods. According to Mr Nguyen Huy Dzung, RFMMC's Flood Early Warning and Dissemination Expert, the effectiveness of an early warning system increases if a continuing dialogue between the clients of forecast information and forecasters is successfully established. "This effectiveness plus the accuracy of flood forecast will make the people living in flood-vulnerable communities hear the warning, understand the message, believe the message content, personalize the information, and decide and respond," Mr Dzung said.

Guidelines on how to deal with floods, posters and leaflets are also distributed by the project to villagers in the pilot areas in order to improve their knowledge on the EWS programme and flood preparedness in general. These have been well accepted and have proved very useful for the community groups to help themselves to minimize flood damages.

# Taking up Flooding through a Community-based Early Warning System

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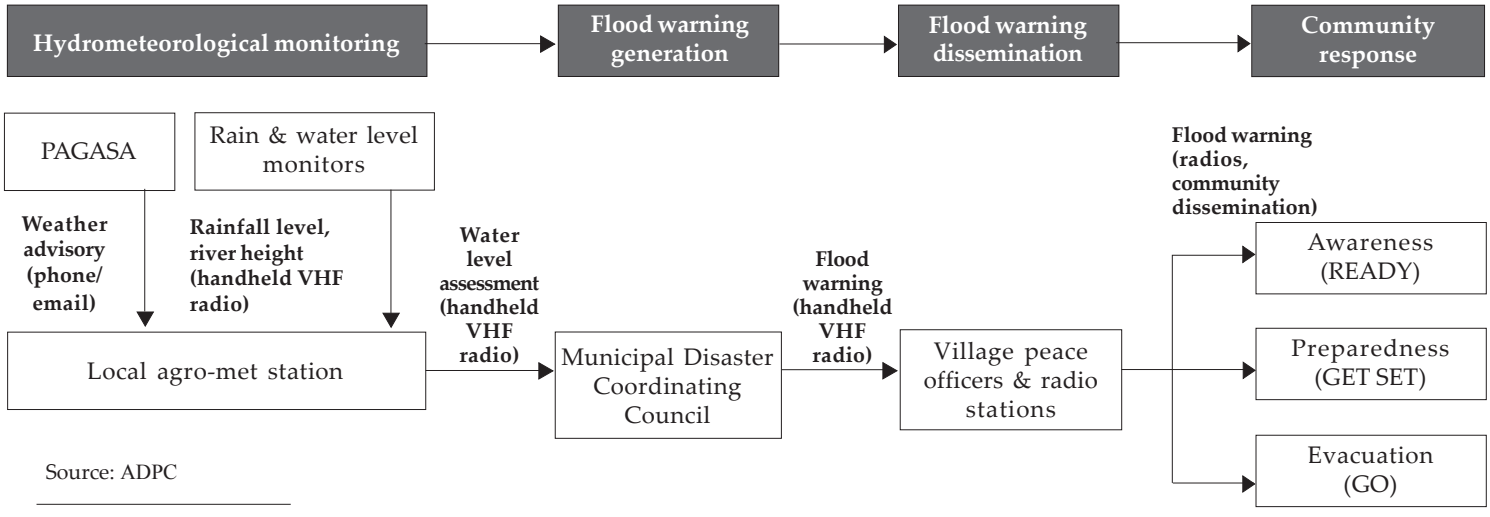
The capability of communities to monitor and warn people about impending floods is crucial to protecting lives and property. The high cost of telemetered flood forecasting equipment prompts a lot of communities in developing countries to search for cheap but equally effective mechanisms. One such alternative is a community-based flood early warning system (CBFEWS), such as the one being implemented by the municipality of Dumangas, a coastal municipality in Iloilo, Philippines, in cooperation with the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA). The CBFEWS complements the dikes that protect some parts of the municipality. The municipality's experience in recurrent and damaging flooding and its involvement as one of the pilot demonstration sites of the Climate Forecast Applications (CFA) program[1] since 2003 contributed to the people's interest in establishing a system that would provide early warning for hazards based on systematic hydrometeorological observations.

The CBFEWS is anchored on the community's participation in the monitoring and recording of rain data and water level behavior of rivers or streams. Observations from monitoring stations, coupled with meteorological forecasts, will be used to provide timely warnings to downstream communities about an impending flood with a lead time of several hours. It is called a community-based system because the community takes the lead role in the operations and maintenance of the system, although technical guidance and support is provided by PAGASA. To ensure the sustainability of the system, the local government unit is providing the necessary resources needed in operating it and in executing an emergency plan. The rain gauges and water level monitoring devices are fabricated by the community using locally available materials.

Dumangas is located at the tail end of Jalaur River (also known as Jalaud River) – one of the major river basins in the Philippines and the biggest river in Iloilo Province with a drainage area of 1,503 square kilometers. Aside from Jalaur, there are four more rivers that traverse the town. Flooding in Dumangas is mainly due to the overflowing of the Jalaur River, most notably during tropical disturbances, such as cyclones, southwest monsoon, and the Inter-tropical Convergence Zone. Being a coastal town, the area has active tidal flats and flooding is aggravated when the overflowing of the Jalaur River coincides with high tide.

The CBFEWS consists of four inextricably linked components namely 1) hydrometeorological monitoring; 2) flood warning generation; 3) warning communication; and 4) community response (see figure 1). This article discusses each component with particular attention on the institutional arrangement. A simple but well-defined institutional arrangement that describes the responsibilities of the stakeholders is stipulated in a memorandum of agreement among the institutions involved in CBFEWS.

Figure 1: Dumangas CBFEWS process flow diagram




Source: ADPC

[1] The CFA program is implemented by the Asian Disaster Preparedness Center with support from the USAID-Office of Foreign Disasters Assistance and in partnership with PAGASA and other national and local partners.

## HYDROMETEOROLOGICAL MONITORING

The hydrological monitoring system consists of a network of rainfall and water level monitoring stations, which are set up in strategic points in the Jalaur River basin. Four rivers that traverse Dumangas are being monitored, namely Balabag riverside, Dingle, Suage, and Linao Creek. In order to set up the monitoring system, the following steps were undertaken by the municipality with technical guidance from PAGASA's Flood Forecasting Branch:

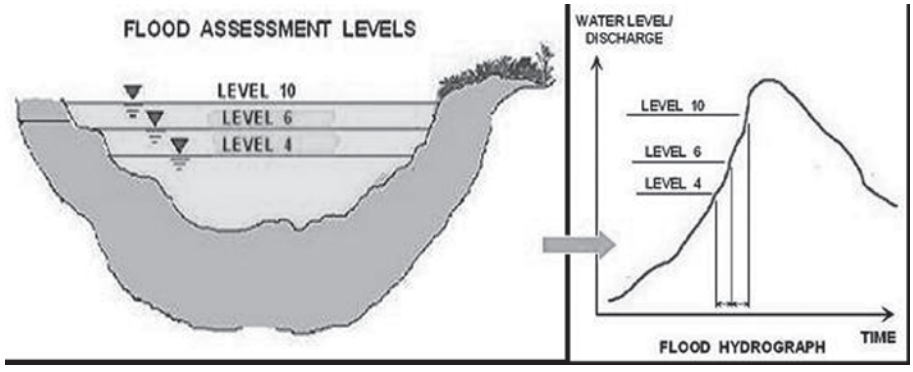
- Assessment of flood hazard and existing flood control structures;
- Identification and verification of locations for rainfall and water level gauges using the network density derived from a topographic map of the river basin;
- Acquisition, fabrication, and installation of rainfall, water level gauges, and flood markers;
- Identification and training of community volunteers as rain and water level observers; and
- Discharge measurement and cross-sectioning of rivers

The meteorological component of CBFEWS takes advantage of the direct linkage that has been established between Dumangas and PAGASA through the CFA program. When there are tropical disturbances that are likely to affect the river basin, PAGASA sends advisories and regular updates directly to the local agro-met station via phone and email.

Rainfall and water level monitoring protocols were put in place to systematize data collection. During normal conditions, rainfall observations shall be taken twice a day (8 AM and 5 PM) and recorded using forms provided by PAGASA. During inclement weather, such as when there is a tropical disturbance that will likely affect the basin, observations shall be made every three hours. When the water elevation at a particular reference point is 100% full (see figure 2), hourly observations shall be made. During inclement weather, every monitoring station transmits information in real-time to the local agro-met station using handheld VHF radios.

Table 1 shows the corresponding flood advisory/warning that is issued based on the assessment levels. When the water level reaches level 4 as measured by the water level gauge installed at a particular reference point, the designated observer shall immediately inform the local agro-met station, which will in turn process the information, determine the assessment level, and send this information by VHF radio to the Municipal Disaster Coordinating Council (MDCC). MDCC is the only body with the authority to issue disaster warnings.

Figure 2: The flood assessment levels used for the issuance of flood warnings/advisories




Source: PAGASA

Table 1: Flood warnings/advisories and prescribed community responses

| ASSESSMENT LEVEL | RIVER HEIGHT | FLOOD ADVISORY/ WARNING | MEANING | COMMUNITY RESPONSE |
|---|---|---|---|---|
| Alert | Level 4 (The river at a particular reference point is about 40% full) | READY | The message suggests *awareness* that flooding is possible within the next 24 hours | Listen to radio for weather updates |
| Alarm | Level 6 (The river at a particular reference point is about 60% full) | GET SET | The message suggests *preparedness* and that flooding is threatening within the next 12 hours | Secure moveable belongings and livestock; prepare basic necessities to take to the evacuation center |
| Critical | Level 10 (The river at a particular reference point is 100% full) | GO | The message prompts *response* as flooding is expected to occur/or will persist within the next 12 hours | Go to evacuation center |

## GENERATION OF FLOOD WARNING

The terms ALERT, ALARM, and CRITICAL are the three water assessment levels, which were determined by hydrographic surveys, i.e. cross-sectioning of rivers and discharge measurement. As shown in figure 2, these three levels correspond to different river heights.

## WARNING COMMUNICATION

When assessment level reaches ALERT, as reported by the local agro-met station to the MDCC, a flood advisory will be issued by the MDCC to at-risk barangays (villages) through the barangay tanods (village peace officers) via VHF radio. Finally, the village peace officers conduct information dissemination to the community. The same information is simultaneously broadcasted by radio stations.

The primary means of communication are handheld VHF radios and mobile phones, which serve as back up and support. Having reliable and redundant means of communication is crucial to the success of the system. Even if some components of the CBFEWS are working properly, the whole chain could break down without an effective communication system.

It is important to note that during non-critical times, the communication system is also used in disseminating other types of information. The village peace officers are also agents of disseminating different types of information other than flood warnings. Hence they are less likely to forget the communications protocol and the operation of VHF radios.

## COMMUNITY RESPONSE

Considerable attention has been given to providing understandable and actionable warnings to target communities. To this end, warning messages have been streamlined with only three different stages (READY, GET SET, and GO) so that the public can easily remember what each signal means.

Each household has a designated evacuation area. The evacuation area is a school building whose floors are elevated to make it impenetrable by flood water. There is a designated classroom for a cluster of households in each village so it would be easy to monitor if everybody was able to make it to the evacuation center.

## INSTITUTIONAL AND TECHNICAL CHALLENGES

Because long-term rainfall data is not yet available in the community, establishing correlation between rainfall and water level has been difficult. Once a longer time series of rainfall data becomes available, this correlation could be established with more confidence resulting in the increased lead time of warnings. The fact that the river basin is under the jurisdiction of several municipalities also pose another technical challenge. Since a river basin approach is adopted for the CBFEWS, several municipalities are covered within a basin and this entails negotiating with several local government units with different interests and requirements. This problem has been resolved through the effort of the Dumangas Mayor to enlist the participation of his counterparts in other municipalities.

In order to ensure the sustainability of the CBFEWS, the following measures are being undertaken:

- Policy support and guaranteed financial allocation for CBFEWS through a municipal legislation
- Institutionalization of local investment towards a local observation system through a municipal legislation
- Conducting regular orientations for the community, particularly for rainfall and water level observers
- Embedding CBFEWS within a holistic framework of disaster management

The CBFEWS in Dumangas has gained the municipality several local and national disaster management awards. The concepts and procedures as described in this article are all operational except the more systematic recording of rainfall and water levels as the formal training of rainfall and water level observers is yet to commence by the last quarter of this year. Under the CFA program, the Office of Foreign Disaster Assistance of the United States Agency for International Development is supporting this training. Realizing the importance of flood early warning system, some local government units initiated the implementation of CBFEWS in their municipalities. With support from the United Nations Development Program, PAGASA is also replicating the CBFEWS in another thirteen provinces all over the Philippines. In addition, the PAGASA is also implementing CBFEWS in areas based on the request of local government units.

References: Espinueva, Susan R. *"Establishment of a Community Based Flood Early Warning System in the Jalaur River Basin"*, Presentation, July 2006./Field work notes and interviews, July 2006./Hernando, Hilton, and A. P. Taruc. *"Community-Based Flood Warning Program in Dumangas, Iloilo"* Quezon City, PAGASA, June 2006.

### Climate Context

The province of Iloilo, where Dumangas is located, has two major rainfall regimes. In the southwestern parts of Iloilo, November through April is generally dry, while the Southwest monsoon brings rains from May through October. In other areas, there is less of a distinction between the two seasons. There is significant inter-annual variability in rainfall, with the ENSO cycle having a strong impact.

The key aspects of variability involve: 1) delayed monsoon rains, 2) lower than average monsoon rainfall, and 3) changes in the frequency of typhoons, which typically occur in October and November during El Ni◎o events.

In Iloilo, flooding is more frequent than droughts, but the impacts of floods are more localized, while droughts can cause more widespread and longer lasting impacts.

Floods are most common from September to November. Floods impact agriculture via reduced planting of crops or damaged crops (often due to typhoons), fish farming through damage to fishing nets and increased need for fish feed due to reduced algae levels, livestock deaths, human health impacts, and reduced school attendance.

Source: ADPC and International Research Institute for Climate and Society. "Report on the Workshop on Climate Risk Management in Southeast Asia." July 2005. Thailand. Available at http://www.adpc.net/cfaresources/BangkokWorkshopReport_Jul05.pdf

# Information Dissemination of Hydrometeorological Hazards

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The United Nations International Strategy for Disaster Reduction (UN/ISDR) defines hydrometeorological hazards as a "natural processes or phenomena of atmospheric, hydrological or oceanographic nature, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation". *Hydrometeorological hazards include: floods, debris and mud flows; tropical cyclones, storm surges, thunder/ hailstorms, rain and wind storms, blizzards and other severe storms; drought, desertification, wildland fires, temperature extremes; sand or dust storms and snow or ice avalanches.*

In recent years, some 90 % of natural disasters worldwide have been weather and climate related; floods account for nearly 70% of the people affected by disasters in Asia. The impacts of natural disasters have been found to be most severe in developing countries. Floods and cyclones in India and Bangladesh from 1988-1998 have caused a loss of over US$ 20 billion. In Nepal from 1983-2005, the estimated economic loss due to floods and landslides is more than US$ 230 million. To reduce the impact of natural disasters such as floods an integrated approach to flood management is required keeping a balance of structural and non-structural measures. The exchange of real time data and information is one of the most important non-structural measures that enable timely warning and evacuation. Flood forecasting with reliability, accuracy and timeliness is essential for preparedness and response phases of disaster reduction.

The major rivers of the Hindu Kush Himalayan (HKH) region, the Indus, Ganges and Brahmaputra are all transboundary in nature flowing through more than two countries prior to reaching the ocean. Annually floods of various magnitudes and frequencies lead to loss of lives and property in the region and are an impediment to the development process. In each of the countries of the region, the national hydrological and meteorological services play a crucial role in providing vital data and information on the vulnerability of society to water related disasters and early warning of impeding disasters. To reduce the risk of water related hazards such as floods, technical capacity is needed to predict and monitor the magnitude, duration, timing and location as well as assessment and reduction of vulnerability as well as an efficient mechanism of information dissemination.

Since 2001, the International Centre for Integrated Mountain Development (ICIMOD) in collaboration with the World Meteorological organization (WMO) is working towards the establishment of a regional flood information system to reduce the flood vulnerabilities in the Indus, Ganges and Brahmaputra Basins. As part of the project on "Regional Cooperation in Flood Forecasting and Information Exchange in the HKH region" a HKH-Hydrological Cycle Observing System (HKH HYCOS) is being planned and implemented by ICIMOD and WMO. The first Phase of this project was funded by the United States Agency for International Development Office for US Disaster Assistance (USAID/OFDA) and the US Department of State Regional Environment Office for South Asia which ended in December 2005. The Project has contributed to strengthened regional cooperation and enhanced national capacity to forecast floods. It has created a platform for the exchange of knowledge, information and technology while recognizing the need to strengthen all elements of the flood forecasting and warning systems. The second Phase awaits donor funding for the implementation of the regional flood information system.

A flood information system should be such that the information is translated down to the community/users in time to enable timely evacuation. A forecast or warning received too late to permit evacuation of residents and movable property from a flood prone area has little value. Thus great stress must be placed on development of a forecast procedure that will enable flood warning to be issued at the earliest possible time to the users. For an End to End Flood Forecast a strong link of the five components; data observation and collection, data transmission and processing, modeling and forecasting, dissemination of forecast and information to the users, and coordination, action and response. The success of a flood information dissemination system is as good as the weakest link of the chain.

## DATA OBSERVATION AND COLLECTION

Manual and automated methods of data collection is practised in the countries of the HKH-region. In Nepal gauge readers manually read the staff gauge at each station three times a day. Some stations are also equipped with stilling wells where continuous water levels are recorded through Steven's recorder. A few of the meteorological stations in Nepal are equipped with automatic weather station with data loggers in addition to the manual observation systems. Similar kind of data collection system is in place in most of the countries of the HKH-region. In Pakistan there is a good network of radars collecting rainfall information. Further expansion of the radar to cover mountainous areas with greater accuracy and resolution is underway. Depending upon the application or need for example hydropower, irrigation or flood forecasting the data collection frequency varies. During the flood season water level data is collected on an hourly basis in some countries.

### DATA TRANSMISSION AND PROCESSING

The conventional methods of data transmission from the field station to the national centres have been through postal mail, hand delivery or through wireless, telephone or fax. With advancing technology, satellite transmission of data is becoming easier and cheaper, which could further be shared on a real time basis via the internet using world wide web. The World Hydrological Cycle Observing System (WHYCOS) concept of the WMO promotes and facilitates the dissemination and use of water related information using modern communication technology such as satellite and the world wide web.

### DATA MODELING AND FORECAST

Both meteorological and hydrological data are the basic inputs to a flood forecasting model. The available data and information is then fed into different computer models to forecast flows to enable issuance of warnings. Prior to feeding the data into flood forecasting models the data have to be screened for quality. There are various computer models ranging from time series data analysis to simple rainfall runoff models. The models for flood forecasting can be divided into two categories (i) deterministic models and (ii) stochastic models

### DISSEMINATION OF FORECAST

An effective dissemination mechanism is needed which is practical and reliable to reach the end users. The mechanism should be cost effective, technologically sustainable and appropriate to the local expertise. The usual mode of dissemination is through phone, radio, TV. In Bangladesh, following the 1987 and 1998 floods efforts have been made towards implementing an effective mechanism down to the community to enable timely evacuation. The religious head of villagers called "Iman" communicate such warnings for reliability and response from people in remote villages.

### CONCLUSION: COORDINATION, ACTION AND RESPONSE

Community planning, coordination and response are necessary for effective flood disaster mitigation. Public awareness and education is extremely essential for proper response.

Since most of the rivers of the HKH region are transboundary it is of utmost importance that real time data and information on floods be shared across borders in a timely manner to enable adequate leadtime for people to move out from the flood prone areas. For this there is a need for continued regional dialogue. At a national level an adequate institutional framework and information dissemination mechanism is needed to reduce the flood risk vulnerabilities. This would require the Ministries and line agencies particularly the national hydrometeorological services to be in good partnership with the districts and the communities, media such as national/local radio, TV, private sector and other non govt organizations for proper coordination. This will ensure having an efficient mechanism to disseminate information to the communities and evoke a timely public response for reducing the impacts of flood hazards.

ADPC RESOURCE

## Rapid assessment:

# Flashflood and Landslide Disaster in the provinces of Uttaradit and Sukhothai, Northern Thailand

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### FLASHFLOOD AND LANDSLIDE DEVASTATES UTTARADIT AND SUKHOTHAI

Uttaradit is one of the northern provinces (*changwat*) of Thailand, covering an area of 7.838 square kilometers, and located in the valley of the Nan River. The Sukhothai province covers an area of 6.596.1 square kilometers and is located in the valley of the Yom River.

Flash floods triggered by days of heavy rain peaked on 21-23 May 2006 affecting five provinces in the northern part of Thailand trapping thousands and hundreds of causalities. The floods inundated several districts on the provinces of Uttaradit, Sukhothai, Phrae, Nan and Lampang. Department of Disaster Prevention and Mitigation (DDPM), Bangkok confirmed that the flash flood affected five provinces, 26 districts (*amphoe*), 171 sub districts (*tamboon*) and 1200 villages. Houses and some other infrastructures were affected including bridges, road, drainage systems and agricultural areas. In addition to the loss of life, affected infrastructure and losses were also recorded. 1028 roads, 176 bridges, 314 drainage systems, 714,793 agricultural areas/rai, 226 schools, wats and other government offices and 245 dikes/ seir and mines were damaged.

### COMMUNITIES AFFECTED HAVE A POOR RISK PERCEPTION

On 16-17 June 2006, a team of ADPC and Department of Mineral Resources (DMR), Bangkok conducted a two-day field visit in the Province of Uttaradit and Sukhotai to observe the effect of the landslide and flashflood. Interviews with local people and victims to gather more information were conducted. The findings, observations revealed that the communities affected have a poor risk perception.

The villages affected were not new settlements and that they have been living in the same place for more than 50 years. However, the affected communities continued to live in a flood plain prone to high probability of flooding due to the poor perception of impending risks. Since there were no significant floods during the last 50 years, communities perceived the areas to be safe. Few houses have been constructed on hill slope in the immediate neighborhood but not on the high slopes. However, they have not considered the appropriateness of the location with regard to high risk potential when selecting the location. As observed, many houses were destroyed due to slope failures, while some others located on or in the vicinity of dry streams were destroyed due to gully erosion or debris attack coming trough the gullies

**THE EARLY WARNING SYSTEMS NOT EFFECTIVE**

There is an early warning system in place in some of the villages due to the commendable efforts of the Department of Mineral Resources (DMR) and Department of Disaster Prevention and Mitigation (DDPM), who had identified the risks in advance and had initiated the establishment of the community based early warning systems. However, since the floods occurred past midnight when all community members were fast asleep, the early warning could not be activated, as desired. Also, the early warning was not very effective during the early monsoon season since members of the community were not very vigilant.

**INTENSE RAINFALL CREATED SLOPE DESTABILIZATION**

Although the hourly rainfall data is not available, it appears to be that rainfall was very high, consistent and unusual, as observed by the communities two to three hours period preceding the event. Since, the catchments are smaller in size, the kind of rainfall they experienced created flooding to few meters. Floods in the city of Uttaradit and other urban areas hit later, but it is a cumulative effect of rainfall in a much larger catchment area.

Causes to slope destabilization in vast areas is due to factors such as soil type, strength parameters of sub soil layer, geology of subsurface formations, rainfall intensity, vegetation cover, land use slope gradient etc. Apparently, slopes stood firm and stable for a period of more than 50 years and thus, only parameters subjected to changes over the time should be considered. The slopes subjected to destabilization and inspected by the team categorized them in to:

- Shallow earth slips
- Gully erosion
- Failures of cuttings behind the houses or roadside cuttings
- Slope or bank failures due to erosion of the foothill and destabilization of upslope area.

Shallow earth slips are the predominant category and around 80% of failures fall under this category. Shallow failures have occurred due to saturation of the topsoil layer to a depth of up to 30-40 cm. Very rarely, the thickness exceeds 40 cm. Most of the failures are attributed to slopes with poor vegetation cover or vegetation cover with poor root system such as banana, wild bamboo.

**INAPPROPRIATE LAND USE RESULTED IN INCREASED RISKS**

The destabilized slopes are mostly abandoned land (after farming) or deforested land for commercial purposes. Lately, such slopes have inappropriate vegetation such as banana, wild bamboo etc. Farmers usually practice slash and burn methods for farming on slopes without proper understanding of slope degradation with potential for slope destabilization. Continuation of such practices, presently and also frequently, along with the population increase resulted in serious consequences.

**IMPACTS OF SLOPE DESTABILIZATION AND FLASH FLOODING TO HUMAN SETTLEMENTS**

Many houses have been destroyed due to flash flooding and also, due to the lethal attack associated with accompanied debris, which mostly consists of timber logs, tree branches and uprooted trees of different sizes. The mass of debris has been created by destabilization of slope, the sub soil layer and vegetation over the same which is transported by the floodwaters.

An analyses of land use yielded insights in to many facets of similar mountainous watershed systems including altered drainage regimes, pollutant sources created by livelihoods, natural and built features, community priorities indirectly responsible for flash flooding due to the rapid surface runoff and resultant land degradation. This led to reduction of bed load of rivers and drainage systems and subsequent destructions in the downstream areas, increase in siltation and overburden of deposits in lowlands and cultivated areas, especially rice fields, irrigation systems, fruit orchards etc. This led to subsequent crop failures and reduction of flood retention areas, potential increase in soil erosion and decline in soil fertility, pollution and degradation of water quality, as more soil particles are carried to the streams, and pollution of drinking water sources. The main problems will further increase risks to communities due to potential flash flood.

**INCREASED FLOOD RISKS IN URBAN AREAS**

The city of Uttaradit and few other urban areas located in the flood plain of the Nan River were inundated due to the heavy rain associated with the events described above. Since the urban area is located further in the catchments, there were no impact from debris flow and flooding but caused damages and losses to shops, commercial ventures and house hold items such as furniture, electronic items so on. The city transportation system, water supply, sewerage and drainage systems were also subjected to severe destruction or failure in functioning.

**RECOMMENDATIONS**

Based on the field visit and the analysis, the following are recommended by ADPC:

**1.Hazard mapping and selection of suitable safer location for reconstruction of houses as a first step in the recovery program.**

**2. Setting up a reliable early warning system**

The present system is good if floods occur during day time and if the communities are vigilant. In order to increase the reliability and effectiveness, some improvements can be considered.

This brings two important facts for consideration in future.

- Necessity to observe the hourly rainfall and developing a system for recording the intensity fluctuations to establish the threshold limits for initiation of landslides.
- The understanding of cyclone in low pressure systems accompanied with wind of 32 m/second or above. The meteorological departments need to monitor movement of low-pressure systems when it reaches the lower wind speed limits of cyclone classification. If the low-pressure systems movement can be tracked down, it can serve as an advance warning.

**3. Revision of policy on land use planning in mountainous areas prone to landslides and flash floods.**

**4. Developing emergency response mechanism at city level**

*Acknowledgement*

*The ADPC's UDRM team wishes to express its sincere gratitude to Dr. Wisut Chotikasathien, Senior Geologist, Mr. Kritapob Akarawinthawong and Mr. Pradit Noolo, Geologists from Department of Mineral Resources, Bangkok for providing assistance during the field visit.*

# STANDARD OPERATIVE PROCEDURE FOR FLOOD RESPONSE IN BANGLADESH

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## INTRODUCTION

Floods are almost annual events in Bangladesh. From time immemorial, Bangladesh has been experiencing floods. Mainly because of its topography of alluvial flood plains, its location at the confluence of the Ganges, the Brahmaputra and the Meghna, three largest river systems of the world, and due to climatic and ecological condition, Bangladesh is susceptible to annual flooding every year. This is not a matter of concern. However, when floods exceed normal flooding level, they take dangerous turns. Many a time in the history of this part of South Asia, floods took severe and sometimes catastrophic turns. In the past, Bangladesh experienced severe floods in 1955, 1974, 1987, 1988, 1998 and 2004. It may be noted that, in Bangladesh, average annual flooding area is 20%, severe flooding area is 36% and extreme flooding area is 68%.

## DISASTER RESPONSE SYSTEM

Due to frequent occurrence of disasters induced by natural hazards, the Ministry of Food and Disaster Management (MoFDM) of the Government of Bangladesh, which has been given the responsibility for coordinating national disaster management efforts across all agencies, has issued the Standing Orders on Disaster (SOD) in 1997 to guide and monitor disaster management activities in Bangladesh. Following an all-hazards approach, the SOD has replaced previously circulated hazard-based standing orders. A series of inter-related institutions, at both national and sub-national levels have been created to ensure effective planning and coordination of disaster management and emergency response events.

## ORGANIZATIONAL STRUCTURE AT THE NATIONAL LEVEL

- National Disaster Management Council (NDMC)
- Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)
- National Disaster Management Advisory Committee (NDMAC)
- Focal Point Operation Coordination Group of Disaster Management (FPOCG)
- NGO Coordination Committee on Disaster Management (NGOCC)
- Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS)

## ORGANIZATIONAL STRUCTURE AT SUB-NATIONAL LEVELS

- District Disaster Management Committee (DDMC)
- Upazila Disaster Management Committee (UZDMC)
- Union Disaster Management Committee (UDMC)
- Pourashava (Municipality) Disaster Management Committee (PDMC)
- City Corporation Disaster Management Committee (CCDMC)

The SOD provides detailed roles and responsibilities for all disaster management committees, relevant ministries, divisions, departments and agencies at all levels for normal period risk reduction and during emergency response periods.

## OPERATIONALIZATION OF FLOOD RESPONSE SYSTEM

During catastrophic floods, a typical response include: (1) Activation of Standing Committees, setting up of Control Rooms and other relevant outfits, (2) Deployment of Senior officials at the flood affected districts (Joint Secretaries to the Government) (3) Deployment of Armed Forces, (4) GO-NGO/National-international Partnership, (5) Extensive Relief Measures—Gratuitous Relief (GR), both in cash and in kinds, (6) Rehabilitation Programmes such as, Vulnerable Group Feeding (VGF), House Building Grant, Test Relief (TR), Food For Works (FFW), etc.

## RECENT POLICY SHIFT

After the devastating flood of 2004, Bangladesh organized a National Workshop on Options for Flood Risks and Damage Reduction in Bangladesh held in Dhaka from 7-9 September 2004. The workshop objective was to develop/design a context based set of policy recommendations for flood management in Bangladesh and evaluate the experiences of flooding and flood management initiatives and lessons learnt from different kinds of interventions in the flood plains. The workshop also explored socio-economic aspects of the problem.

As a follow up to the workshop recommendations, the MoFDM initiated its strategic planning process with publication of the Corporate Plan: A Framework for Action 2005-2009 with a view to achieve a paradigm shift from traditional relief and response orientation to a comprehensive risk reduction culture. The reform efforts are focused on: (1) Professionalizing the disaster management system, (2) Mainstreaming of risk management programming through partnership development, (3) Strengthening of community institutional mechanisms through community empowerment, (4) Expanding risk reduction programming across a broader range of hazards, (5) Strengthening emergency response systems, and (6) Maintaining and strengthening of the national food security system.

The aftermath of the 2004 flood has also witnessed the introduction of the Disaster Risk Mitigation Fund by the MoFDM. It was introduced in December 2004 as a part of post-Flood 2004 Recovery efforts in the form of assistance to the flood affected micro-entrepreneurs across Bangladesh. Each individual received Tk. 5000 to Tk 20,000 of which 20% was grant and 80% was loan with an annual interest rate of 5% repayable within 3 years period. In 2004-2005, 59,000 beneficiaries in 27 districts received Tk. 45.27 crore and in 2005-2006, Tk 75 crore has been allocated.

Bangladesh's flood response mechanism has been tested time and again over the last one and a half decade. Successive governments at various times have claimed success in managing catastrophic floods. However, there is no room for complacency. There is ample scope of improvement of the systems and procedures. Disaster professionals in Bangladesh are working towards that end.

# MAINSTREAMING GENDER IN FLOOD MANAGEMENT

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The story of Hamida Bibi is an example of how a lone woman in a flood-prone village in rural Pakistan fought the odds of poverty and disaster.

Bibi's family of five, depended on her husband's paltry wage at a factory until he was struck down by asthma. Since he could not cultivate their small landholding or do any heavy work, Bibi began to look for ways of improving her livelihood. Through flood-mitigation programme in the village that also put onus upon developing skills and livelihood options of the poverty-ridden populace, Bibi accessed a small loan. She bought lambs and by fattening and selling them for good profit, she bought a second-hand mat-weaving machine. The family began a mat making enterprise and finally Bibi's nine year old son could attend school because he had the clothes, shoes and books.

Hamida is also more secure today, because she is confident that the village early warning system will alert her in time of an impending flooding of the bridge over the 'pond' that isolated Kamra from the rest of the local neighbourhood.

Kamra is bound from all sides by the river Jhelum and the flood brings havoc on the lives and livelihoods of the community, which results in loss of livestock and personal possessions, damaged houses, land displacement and the increased risk of flood related diseases. Mobility is disrupted due to the flooding of the protective embankments and stagnant pools of water. Apart from the economic loss due to poor mobility, there has also been the loss of lives of people venturing to cross the stagnant water. As Bibi recalls, "the bridge, though very helpful was risky and embarrassing to cross the water barrier since I had to partially undress myself to do so". The Kamra Project attempted to look at disaster preparedness not merely through structural elements and early warning, but also through community transformation. This transformation is never more evident than in women like Bibi, whose views were heard for the first time at community meetings and who acquired the necessary skills and capital to break away from the drudgery of acute poverty.

Today, Kamra village has become a model for up scaling and development by the local government and the NGOs in Punjab Province in Pakistan. Many government officials from nearby flood prone areas have visited Kamra on 'exposure visits'. OXFAM Pakistan in its flood management programme will replicate the 'Kamra model' in 10 villages in Athara Hazarri Union Council. This is expected to exert pressure at the district level since the demonstration is in a cluster of villages.

Considering the South East Asian Tsunami, it is realized that women were the most vulnerable in the disaster. In some villages in India and Sri Lanka, the death toll of women reached 80 percent of the total who died (three to four times the male mortality rate). This appears to result for various reasons:

- Many women had stayed behind to look after their children,
- Most of the women did not know to swim or climb a tree,
- Many women would have been waiting on the shore for their husbands to return, (eg Indian fishing villages),
- Many women were bathing at the seaside,
- Many women returned to search for their missing children and relatives and became the victims of the second wave,
- Also, the style of their clothing hampered their mobility in the water.

Women suffer other disproportionate burden from a disaster in addition to the immediate casualty and mortality rates. Following a disaster, women, especially the unaccompanied ones are the most vulnerable group. Many cases are reported of women survivors experiencing verbal and physical harassment by men. They are also victimized in various ways, facing the risks of sexual abuse and domestic violence. In some incidents and places, women were forcefully married to older men, who have lost their wives in the tsunami. In many instances, women had limited choice other than to submit to sexual exploitation, due to the loss of their income and livelihood. In many locations, women face the discomfort of extended periods in camps with in the midst of unknown men, etc.

It is to be noted that gender issues are more frequently not about gender, but about sex discrimination and biased views from outsiders who may have an "agenda", or at best limited understanding of the social and gender dynamics in cultures which are far different from their culture and "frame of reference". It is common and often in respect of Asia, misplaced assumption by various "gender experts" that Asian women are the weaker and less determinate members of society.

Although the popular media perceptions label women as being helpless 'victims' of disasters in post-disaster situations, women often play a significant role in social and family cohesiveness and stability, and with necessity may have to additionally assume the "bread winner" status.

Many experts believe that women, assuming the multiple roles of a care giver often have superior coping mechanisms with disaster and the aftermath than men.

Many non-governmental organizations and UN bodies now incorporate gender-biased planning in all disaster-related programmes. In South Asian governments however, some lip-service is paid to gender concerns, but little of that 'rhetoric' actually trickles down to the grassroots where action can change the lives of women like Hamida Bibi and the outlook of an entire village.

Sources: Meeting the Challenge of Disasters. ITDG South Asia 2005. Gender and Disaster Sourcebook



## CLIMATE RISK MANAGEMENT (CRM)

**Flood forecast products, 3 Jul, Bangladesh:** With the availability of flood forecast products for Bangladesh through the "Flood Forecast Technology for Disaster Preparedness in Bangladesh" (also known as Climate Forecast Applications in Bangladesh II), ADPC ensured that these products are available to institutions in various flood-prone districts. Follow up missions were conducted to profile the pilot locations and to evaluate the development of the forecast products. The project is implemented by ADPC in collaboration with Bangladeshi partner institutions with support from USAID Bangladesh and CARE Bangladesh.

**ADPC monitored demonstration sites for "Livelihood Adaptation to Climate Change in Bangladesh" project, 15-19 Jul** A senior technical expert was in Dhaka and Rajshahi, Bangladesh to monitor the demonstration sites under the "Livelihood Adaptation to Climate Change" project and to identify additional adaptation options for field demonstrations for the next season. The field demonstration activities were implemented in partnership with the UN Food and Agriculture Organization and Bangladesh's Department of Agricultural Extension.

**ADPC signed Memoranda of Agreement on the implementation of Climate Field School, 15 Aug, Philippines** ADPC signed memoranda of agreement (MOA) with the provincial government of Iloilo and the municipality of Dumangas on the development of Climate Field School (CFS) and implementation of climate risk mitigation activities. The MOA signing was held in Dumangas, Iloilo on the occasion of the inter-sectoral Provincial Agriculture and Fisheries Council meeting. The development of CFS in Dumangas is supported by the Office of Foreign Disaster Assistance of the USAID under the "Climate Forecast Applications for Disaster Mitigation in Indonesia and the Philippines" program.

**Regional multi-hazard early warning system program: ADPC-facilitated regional early warning meeting, 2-14 Jul, Bangkok**
ADPC, in partnership with the Royal Thai Government, and with support from the Danish International Development Agency, US Agency for International Development, and the UN International Strategy for Disaster Reduction, convened a meeting on "Regional Cooperation on Early Warning for Preparedness and Mitigation of Natural Hazards." The meeting brought together 10 participating countries in the ADPC-facilitated regional multi-hazard early warning arrangement namely, Bangladesh, Cambodia, China, Lao PDR, Maldives, Myanmar, Philippines, Sri Lanka, Thailand, and Vietnam. The meeting passed a resolution supporting the implementation of the ADPC-led regional program, which addressed gaps and needs for an end-to-end multi-hazard early warning system. For more details about the meeting, visit the program website at www.adpc.net/ews/.

**ADPC participated in the coastal community resilience core group meeting, 11-17 Jul, Hawaii, USA** A senior Social Scientist from ADPC participated in the coastal community resilience (CCR) core group meting in Hawaii, USA. As Program Integrator for the US Indian Ocean Tsunami Warning System (IOTWS) program, ADPC shared technical inputs towards the development of CCR Guidebook and other collaborative efforts to implement CCR in the Indian Ocean region. The meeting was attended by representatives from ADPC, NOAA, PRiMO, Tetra Tech, and the University of Rhode Island.

**ADPC facilitated national risk communications workshops, 17-18 Jul-Myanmar, 11 Jul-Maldives, and 21-22 Sep-Colombo** Senior technical experts from ADPC facilitated national workshops on risk communication in Yangon, Male, and Colombo with the broad goal of improving community response to warning. The workshops were organized in collaboration with national partners with funding support from the UN International Strategy for Disaster Reduction (UNISDR). The workshops brought together stakeholders involved in communicating disaster risks. Discussions during the workshops focused on 1) describing the status of communicating risks for enhancing disaster prevention, mitigation, and preparedness; and 2) identifying constraints and needs of institutions involved in communicating risks. Participants also recommended a set of actions, including a risk communication strategy.

**ADPC facilitated coastal community resilience (CCR) national workshops, 9-13 Aug-Indonesia, 14-19 Aug, Sri Lanka** As part of the US IOTWS Program Integrator team, ADPC provided technical support to two national workshops on Coastal Community Resilience (CCR) initiatives in Indonesia and Sri Lanka. Along with the National Oceanic and Atmospheric Administration, University of Rhode Island, Tetra Tech, and other partners, ADPC led the overall coordination of the national level workshops. The workshops provided inputs for the development of CCR program, develop CCR guidelines, generate dialogue and consultation, and foster collaborative effort to build community resilience in these countries.

**Sri Lankan officials and ADPC went on a study tour to the USA, 19 Aug-2 Sep**
ADPC and Sri Lankan officials went on a study tour to several cities in the United States of America under the US Indian Ocean Tsunami Warning System program (US IOTWS). The disaster management study tour exposed officials to disaster management practices with a focus on the Incident Command System. The tour was facilitated by the US Forest Service. A few days before the tour, the Sri Lankan officials also visited Thailand's National Disaster Warning Center to learn about Thailand's early warning and dissemination system for tsunami and other natural hazards.

**ADPC facilitated a training/workshop on communicating disaster risks, 16-18 Aug, Thailand** ADPC conducted a training/workshop on disaster risk communication through early warning for the staff of Thailand's National Disaster Warning Center. The workshop focused on enhancing capacities to communicate different hazards, including the tsunami. Participants met key stakeholders to evaluate information needs, get user perspectives, and test warning messages.

**ADPC assessed status of observational network and numerical weather prediction, 27 Aug-1 Sep, Cambodia** Under the "Enhancing Community Resilience to Natural Disasters in Southeast Asia" project, technical experts from the Climate Risk Management team prepared action plans for regional and national level implementation with project partners. In order to design a capacity building plan to improve the capacity of Cambodia for severe weather forecasting, ADPC conducted an assessment of the status of observational networks in each country as well as their capacities to conduct numerical weather forecasting.

**ADPC conducted disaster management policy and institutional assessment, Jul-Oct, Indonesia, Sri Lanka, Thailand** ADPC, together with USAID consultant Nan Borton, conducted an assessment of disaster risk management policy and institutional framework in Indonesia, Sri Lanka, and Thailand. The assessment

identified gaps and possible interventions through the US Indian Ocean Tsunami Warning System program (US IOTWS) program. The results of the study will be shared to relevant national authorities.

## DISASTER MANAGEMENT SYSTEMS (DMS)

**UNEP's environmental recovery program, 12-13 Jul, Sri Lanka** The Disaster Management Systems team of ADPC provided technical support to UNEP in developing a background paper on **Environmental Management for Disaster Risk Reduction** and in conducting a session on **Integrating Disaster Risk Reduction concerns into Environmental Plans and Policies**, in a workshop in Colombo, Sri Lanka under UNEP's "Environmental Recovery Program to support Environmental Information for Early Warning".

**Community Self -Reliance and Flood Risk Reduction, Cambodia (Jul-Sep)** Under the ADB funded technical assistance on Community Self Reliance and Flood Risk Reduction, implemented by the Disaster Management System (DMS) team of ADPC along with the Department of Hydrology and River Work, Ministry of Water Resources and Meteorology, Cambodia, the following activities were conducted:

- **Consultative Workshop for discussing the Community Based Disaster Risk Reduction (CBDRR) Strategy and its various components, 21 Aug** Consultative workshop was organized to receive feedback from various agencies working on disaster risk reduction at the community level on the Community Based Disaster Risk Reduction (CBDRR) Strategy developed under the ADB TA on Community Self Reliance and Flood Risk Reduction. The workshop was attended by various stakeholders, including representatives from Ministry of Water Resources and Meteorology, National Committee for Disaster Management, and various NGOs. The components of the strategy document were presented separately, for feedback. The CBDRR Strategy distributed in English along with key sections translated into the Khmer language.

- **CBDRR training program 29-31 Aug** Training program was conducted for the staff of the Church World Service (CWS) and Chamroen Chiet Khmer (CCK). These two NGOs were identified to carry out the implementation of the TA pilot project. The training also included participants from Provincial Department of Water Resources of four provinces, as well as participants from the provincial and district disaster management committees from the places where the CWS and CCK were supposed to implement the pilot projects. Following the training received from ADPC on the CBDRR, the two NGOs, CWS and CCK plans to start the implementation of the pilot project.

**Regional workshop on local level recovery planning and hazard mitigation, 2-4 Aug, Bangkok** ADPC's Disaster Management Systems team organized a regional workshop in AIT, Bangkok with support from PBS&J, a US-based consulting firm engaged in risk and emergency management, on ***"Local level recovery planning and hazard mitigation"***. The workshop was attended by senior officials and disaster management professionals from the NDMOs and national reconstruction authorities, Red Cross societies and local NGOs from India, Maldives, Pakistan, Sri Lanka, Thailand and Indonesia.

**Disaster preparedness plans for natural hazards, 7-9 Aug, Nepal** Mr. Loy Rego, Director of ADPC Disaster Management Systems team represented ADPC in the regional workshop on 'Disaster Preparedness Plans for Natural Hazards' at ICIMOD headquaters, Kathmandu, Nepal. The workshop was a platform for knowledge sharing and exchange of experiences across the Himalayan region. Mr. Loy Rego delivered the key note presentation on the "Importance of Plans for Disaster Preparedness".

**Emergency Preparedness and Response Planning Exercise on Children and Women issues organized by - DDMFSC and UNICEF, 14-15 Aug, Vietnam** The DMS team represented by senior Program Coordinator and National Program Coordinator participated in the workshop organized by the Department of Dyke Management, Flood and Storm Control (DDMFSC) and UNICEF, the national partners under the FEMS project in Vietnam. The objective of the workshop was to identify and discuss the flood emergency issues related to women and children that need to be addressed in the Vietnam National Strategy (2006-2020) on disaster risk management and the provincial annual disaster preparedness and response plans. ADPC made a presentation on the activities focusing on children and women undertaken under FEMS project in An Giang and Dong Thap provinces of Vietnam.

**ASEAN committee on disaster management (ACDM), 31 Aug-1 Sep, Yogyakarta, Indonesia** ADPC, represented by the Director of the Disaster Management Systems (DMS) team, Mr. Loy Rego participated at the 7th meeting of the ACDM. The meeting heard discussions on implementation of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER), planning for the ASEAN Regional Disaster Emergency Response Simulation Exercise, updates on ACDM Collaborations etc. ADPC reported on its ongoing support and future proposal for collaboration in implementation of a priority sub project of the ASEAN Regional Program of Disaster Management.

**Flood Emergency Management Strengthening (FEMS), Cambodia & Vietnam** Under the Flood Emergency Management Strengthening project implemented by Disaster Management Systems (DMS) team of ADPC in collaboration with Mekong River Commission and GTZ, the following activities were carried out:

- **Training in Damage and Needs Assessment (DANA) and the Community Based Flood Management (CBFM)** DANA trainings were conducted to strengthen the capacity of disaster management authorities at commune, district and provincial level to collect and manage flood loss and damage, data and information in an accurate and reliable manner, to improve the capacity in making rapid analysis/assessment information for emergency response/relief operation during flood and for recovery and rehabilitation after floods and to raise awareness of the importance of preparedness activity for loss and damage assessment, particularly during a pre-flood period. The CBFM training strengthened the preparedness planning capacity of disaster management authorities at district and commune level in coping with floods to enhance knowledge on flood management and capacity in flood preparedness. The training was conducted in partnership with National Committee on Disaster Management (NCDM)-Cambodia, Provincial Red Cross Chapters and Department of Hydrology and River Works. Four trainings on DANA and two trainings on CBFM were conducted in Kandal and Prey Veng Province of Cambodia.

- District level workshops in Cambodia-Two workshops on "**Orientation workshop for teachers"** targeting teachers and educators for dissemination of information on flood risk reduction at the community level were conducted in Cambodia. The workshops were organized in collaboration with district Department of Education and Department of Health as well as provincial and district committees on disaster management.

- Two workshops on **"Development of district action plan to meet the special needs of Women-headed Households"** were conducted for the provincial and district Department of Women's Affairs in four target districts of Lovea Em, Leuk Dek districts in Kandal province and SIthor Kandal and Peam Chor districts in Prey Veng of Cambodia.

- Provincial workshops in Vietnam; two workshops on **"Review of flood risk reduction activities in FEMS"** in An Giang and Dong Thap provinces were conducted to present the status and lessons learnt of the FEMS priority activities in the country. The workshop also reviewed and identified the linkages between such priority activities and the existing storm and flood control plans at the provincial and district levels as well as the future activities for the coming months, which included trans-boundary province to province flood emergency management and the regional and national lessons learnt workshops to be organized in the early 2007.

- **Search and rescue training:** Four training courses were conducted in Tan Chau and Chau Thanh of An Giang and Tan Hong and Thanh Binh of Don Thap provinces of Vietnam. The Province/District Military Operations and the Vietnam National Red Cross trainers acted as resource persons to train 138 (127 men and 11 women) participants from the Red Cross Volunteers, Youth members and Commune Security Officers. The Provincial and District Flood and Storm Control Committees, the People Committee actively participated in the training to provide overall guidance in linking these capacity building exercises with the annual flood preparedness planning and victim rescue plan of the target districts. PCFSC and DCFSC were willing to replicate such trainings to cover all Rescue Posts in the high risk communes.

- **Emergency kindergarten management training:** Four training courses are planned out which two training courses, one each in Tan Hong and Thanh Binh of Don Thap provinces of Vietnam have been conducted. The remaining two training courses will be conducted during the first and second week of September 2006 in Chau Thanh and Tan Chau district (An Giang), respectively. A total of 80 ( 46 Women and 4 Men ) representing the existing Child Caretakers, EK supervisors, and Volunteers of Women Union participated in the first two trainings. Another 90 participants are expected to join the next two training course in An Giang Province. The focus of the training is to refresh and develop basic skills of the Child Caretakers in managing the Emergency Kindergarten and enhances knowledge in Child rights and Child protection issues in Flood Emergency. The resource persons were invited from the Committee for Population, Family and Children (CPFC), the Department of Education (DoET) and Pedagogical University, Dong Thap.

- **Swimming lessons for children:** Eight swimming lessons training were conducted in An Giang and Dong Thap in Vietnam. Officials from provincial and district committees for Sports and Physical Training acted as resource persons to teach swimming to 457 children (250 Boys and 207 Girls). The volunteers from Women Union, including the parents of the participating children provided additional logistical support during the training. Swimming nets as per standard specification was provided at the training sites. PCFSC and DCFSC showed interest to utilize the swimming nets for further training to cover maximum children under the National Program on Universalization of Swimming skills for Children in Mekong River Delta.

**ASEAN regional disaster emergency response simulation exercise (ARDEX), Tak Mau City, Kandal Province, 27-28 Sep, Cambodia** The DMS team participated in the ASEAN regional disaster emergency simulation exercise (ARDEX) in Tak Mau City, Kandal Province, Cambodia. The exercise was organized by the ASEAN Disaster Management Committee (ACDM), in collaboration with the National Committee on Disaster Management (NCDM). In addition, ADPC is also sponsoring five officials from Vietnam–one from DDMFSC, Vietnam and two each from the An Giang and Dong Thap provinces to participate in this exercise under the Flood Emergency Flood Strengthening (FEMS) project. The objective of this exercise is to provide guidance to the ASEAN and its partners to operationalise policy framework on disaster management and emergency response.

**Community self-reliance and flood risk reduction, Cambodia (ADB TA)** The ADB funded technical assistance on Community Self Reliance and Flood Risk Reduction was implemented by the Disaster Management System (DMS) team of ADPC along with the Department of Hydrology and River Work, Ministry of Water Resources and Meteorology, Cambodia, and is currently in its second phase, where two selected NGOs in Cambodia namely, Church World Service (CWS) and Chamroen Chiet Khmer (CCK) are implementing a pilot project of 9 months duration starting from July 2006.CWS is implementing the pilot project in 9 villages in 2 districts of Svay Rieng Province and CCK is implementing the project in 7 villages in 2 districts of Takeo Province. The NGOs will be carrying out community-based flood preparedness and mitigation works in selected villages using the Community-Based Disaster Risk Reduction Strategy developed by ADPC in the first phase of the project. Regular field visits would be undertaken by the project team of ADPC to monitor and evaluate the progress of pilot projects. A tripartite meeting between Ministry of Water Resources and Meteorology, Cambodia, Asian Development Bank and ADPC is being scheduled for mid October to review the progress of the project and to decide on the future strategies for the sustainability of the work initiated under the TA.

## OFFICE OF THE EXECUTIVE DIRECTOR (OED)

**Mine risk education, Mae Hong Son, 19-21 Jul, Thailand** ADPC organized a training programme to disseminate the warning information related to dangers of land mines located near the Thailand-Burma border in Mae Hong Sin for students living in risk areas. The programme in partnership with UNICEF was planned for approximately 130 participants from 11 schools at Namtok Mae Surin National Park, Mae Hong Son, north of Thailand.

**ADPC signed MoU with National Electronics and Computer Technology Center (NECTEC), 21 Jul, Bangkok** ADPC signed MoU with NECTEC highlighting the Emergency and Education Communication Vehicle Project (E2CV).

**Map Asia conference, 29 Aug-3 Sep, Bangkok** ADPC participated at the International Conference organized by GIS development India, held at Bangkok, Thailand. Ms. Gabrielle Iglesias from ADPC's Urban Disaster Risk Management (UDRM) team received a "Best Paper Presentation Award" as the 2nd best paper at Map Asia 2006. The paper was titled "GIS and E-Government Initiatives in Four Philippine Cities". The conference was the 5th Annual International Conference and Exhibition on Geographic Information Technology and Applications, organized by the magazine GIS Development. For more information, please visit http://www.adpc.net

**6th ASEAN regional forum inter-sessional meeting on disaster relief, 18-20 Sep, Qingdao, China** Dr. Luis Jorge Perez, Deputy Executive Director of ADPC and Ms. LingLing Jiang, Project Manager for China and North-East Asia on an invitation from H.E. Mr. Wu Dawei, Vice Minister of China's Ministry of Foreign Affairs attended the 6th ARF Inter-Sessional Meeting on Disaster Relief, which was

jointly organized and chaired by the China's Ministry of Foreign Affairs, Ministry of Civil Affairs, and the Indonesia's Ministry of Foreign Affairs in Qingdao City, Shandong Province, P.R.China.

## PUBLIC HEALTH IN EMERGENCIES (PHE)

**Public Health and Emergency Management in Asia and the Pacific (PHEMAP) facilitators orientation workshop, 4-5 Aug, Bangkok** ADPC's Public Health in Emergencies (PHE) team organized a workshop to orient facilitators and to review the new PHEMAP curriculum.

**Sixth inter-regional training course on PHEMAP-6, 7-18 Aug, Bangkok** Participants from WHO-SEARO member states, WHO-WPRO member states,UNICEF Pakistan, Ministry of Public Health (MOPH) Sudan, WHO Sudan and Ministry of Public Health (MOPH) Malaysia participated in the Public Health and Emergency Management in Asia and the Pacific (PHEMAP-6). The training course was conducted in partnership with WHO-WPRO, WHO-SEARO and the Royal Government of Norway.

**18th Public Health and Emergency Management in Asia and the Pacific (PHEMAP) steering committee meeting, 8 Aug, Bangkok** H.E. Ms. Merete Fjeld Brattested, Ambassador Extraordinary and Plenipotentiary, The Royal Norwegian Embassy, Dr. Suvit Yodmani, ADPC's Executive Director, Dr. Luis Jorge Perez, ADPC's Deputy Executive Director, Mr. Jonathan Abrahams, ADPC's Public Health in Emergencies Team Leader, Dr. PT Jayawickramanarajah, WHO Representative to Thailand, Dr. Arturo Pesigan, EHA/WHO-Western Pacific Regional Office participated at the 18th PHEMAP Steering Committee Meeting to plan future work in PHEMAP.

**ADPC organized the first international training workshop on Health Care Facility Emergency Preparedness and Response to Epidemics (HCF-EPREP-1), 26–29 Sep, Bangkok**
ADPC in partnership with the World Health Organization (WHO), who also provided the funding support, organized the first International Training Course on Health Care Facility Emergency Preparedness and Response to Epidemics (HCF-HEPREP-1). The workshop, organized by ADPC's Public Health in Emergencies (PHE) team was to enhance emergency preparedness planning capacity of health care facilities to effectively prepare and respond to communicable disease emergencies using the model of pandemic influenza. More than 30 participants from Bhutan, Philippines, Thailand and Vietnam were involved in the workshop. The participants are expected to use the emergency planning process to develop comprehensive HCF emergency plan; apply the planning process and adopt plans for other communicable diseases; and identify the concrete next steps for implementation in their HCF.

**MoU signed for Public Health in Complex Emergencies (PHCE) partnership, Sep** The PHCE partnership has been formalized by the signing of a Memorandum of Understanding (MoU) by the five partner organizations which are committed to building the capacity of the humanitarian community to respond more effectively to the health needs of refugees and internally displaced persons around the world. The PHCE Partners were Makerere University Institute of Public Health, Uganda; Faculty of Health Sciences, American University of Beirut, Lebanon; Asian Disaster Preparedness Center (ADPC), Thailand; World Education , Inc. (WEI) based in USA; and the International Rescue Committee (IRC) also based in USA.. The members of the PHCE Partnership worked together to develop and deliver high quality training programs for humanitarian workers worldwide, especially in Africa, Middle East and Asia. The MoU outlined the terms of cooperation for the PHCE Partnership, such as PHCE course administration & implementation, joint development of funding proposals, curriculum review, regional and global promotion of PHCE courses, and evaluation.

## TRAINING

**Earthquake Vulnerability Reduction for Cities (EVRC), 10-12 Jul, Pakistan** ADPC's Training Resources Group (TRG) and the Urban Disaster Risk Management (UDRM) team facilitated the EVRC course with funding support from Citizen Foundation, Pakistan.

**Mason training course, 13-15 Jul, Pakistan** ADPC's Training Resources Group (TRG) and the Urban Disaster Risk Management (UDRM) team facilitated the Mason Training course in Muzaffarabad, Pakistan in partnership with the Citizen Foundation, Karachi.

**Course on community-based disaster risk management, 17-28 Jul, Bangkok** ADPC's Training Resources Group (TRG) conducted the 14th Regional Course on Community Based Disaster Risk Management.

**Conference on geoinformation technology, 2-4 Sep, Pakistan** Mr. Falak Nawaz, Training Manager from ADPC's Training Resources Group participated at the "Use of Geoinformation Technology in Disaster Management" conference in Islamabad. He also co-chaired a session on Remote Sensing. The event was organized by the National University of Science and Technology, Islamabad.

## URBAN DISASTER RISK MANAGEMENT (UDRM)

**PROMISE program, 9-27 Jul, Philippines** Mr. NMSI Arambepola, Director of ADPC's Urban Disaster Risk Management, and a technical expert on technological adoption of geographic information systems (GIS) were on mission to the Philippines to discuss with partners the upcoming activities of the Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia. The team met with senior executives of the Center for Disaster Preparedness (CDP), the National Disaster Coordination Council (NDCC), the Department of the Interior and Local Government (DILG), the League of Cities of the Philippines; and Mayor Benjamin Lim and other city officials of Dagupan City. Workshops were conducted with Center for Disaster Preparedness (CDP) and with Dagupan City Government's Technical Working Group for disaster mitigation to determine the user needs of GIS for evacuation route planning.

**Distance education course, 10-14 Jul** Under the Capacity building in Asia using Information Technology Application (CASITA II) project, Indian Institute of Remote Sensing (IIRS)-India conducted the distance education course on awareness on Geoinformatics for Disaster Management at country level with support from National Institute of Disaster Management (NIDM), ADPC and ITC-The Netherlands. The CASITA II project promotes research and develops a postgraduate program in the field of GIS/RS applications in natural hazard and risk assessment in several universities in Asia. The project also developed a distance education course at ADPC to help practitioners aspiring to advance the knowledge and skills in application of modern disaster mitigation tools and also to advocate increased collaboration between European and Asian academic institutions for joint academic programs, courses and distance education using modern IT&C techniques. CASITA II is in collaboration with International Institute for Geo-Information Science and Earth Observation-ITC, The Netherlands and Bonn University, Germany, and funded by the European Commission.

**Landslide/flashflood study, 20-23 Jul, Thailand** Mr. NMSI Arambepola, Director of ADPC's Urban Disaster Risk Management led a team from UDRM to Mae Hong Son province to study the impacts of the landslide and flash floods. A technical expert delivered a videoconference session on 'Participation and Governance Issues' course for the Sri Lanka Disaster Learning Centre (DLC), a communications node of the World Bank's Global Development Learning Network. The session was on the "Participatory and

ADPC Activities

Governance Process", with focus on: (1) post-tsunami recovery efforts of Thailand, and (2) the observations from PROMISE demonstration project cities. The videoconference sessions were funded by the Sri Lanka Ministry of Finance.

**Phase I completion of hazard and vulnerability mapping of SHOUHARDO program of CARE Bangladesh, 8-21 Aug** ADPC provided technical assistance to CARE Bangladesh's SHOUHARDO program (Strengthening Household Abilities for Responding to Development Opportunities) targeting communities to better prepare, mitigate and respond to natural disaster. The first phase of this project was hazard and vulnerability mapping in order to select the most vulnerable communities to natural hazard. The project was carried out by Department of Geography and Environment of Dhaka University under the assistance of ADPC's UDRM. This phase was completed on 21 August 2006.

**Damage and loss estimation workshop, 9-11 Aug, Chennai, Tamil Nadu** ADPC's UDRM team organized a workshop on damage and loss estimation workshop in Tamilnadu, India. It was attended by 35 government employees. This workshop was organized with the funding support of The Netherlands Development Organization (SNV) for the tsunami affected countries.

**SHOUHARDO program, Bangladesh, 15-17 Aug** Mr. NMSI Arambepola, Director of ADPC's Urban Disaster Risk Management was on mission to Bangladesh to discuss the next year plan of Strengthening Household Abilities for Responding to Development Opportunities (SHOUHARDO) program with CARE Bangladesh (2006-2007). This was in continuation from the first year program of ADPC as a consultant for SHOUHARDO Program.

**Regional capacity enhancement for landslide impact mitigation (RECLAIM) project, 21-22 Aug, Thailand** ADPC Urban Disaster Risk Management team organized a two-day kick off meeting of the Landslide Mitigation Demonstration Projects (LMDP) in Patong, Thailand. This meeting discussed strategic plans for Thailand's landslide demonstration project and was attended by senior officials from Department of Mineral Resources and Kasertsart University. The RECLAIM project is funded by The Royal Government of Norway.

**Representative from ITC visited ADPC, Aug** A senior delegation from the International Institute of Geoinformation Science and Earth Observations (ITC) of the Netherlands visited ADPC.

**Workshop on earthquake vulnerability reduction for cities and damage and loss estimation, 28 Aug–01 Sep, Yogyakarta, Indonesia**
Under the Netherlands Development Organization (SNV)-project funding support for tsunami and earthquake affected areas, ADPC organized two-theme workshop on Earthquake Vulnerability Reduction for Cities and Damage and Loss Estimation in Yogyakarta, Indonesia. The workshop was co-organized by the Center for Disaster Studies of University of Gadjah Mada, Yogyakarta, Indonesia.

**Use of GIS and remote sensing in disaster management, 4-9 Sep, Pakistan** Under the Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE), ADPC through its Urban Disaster Risk Management (UDRM) team in collaboration with the Training Resources Group organized a five-day workshop on disaster management using geographic information systems (GIS) for mapping vulnerability and hazard assessment. The workshop participants were staff members of Aga Khan Planning and Business Services, Pakistan (AKPBSP). AKPBSP received the World Habitat Award on 2 October in Naples, Italy as part of the Habitat Day celebration organized by the UN Human Settlements Programme (UN HABITAT). This is part of the capability building activity for PROMISE project partners.

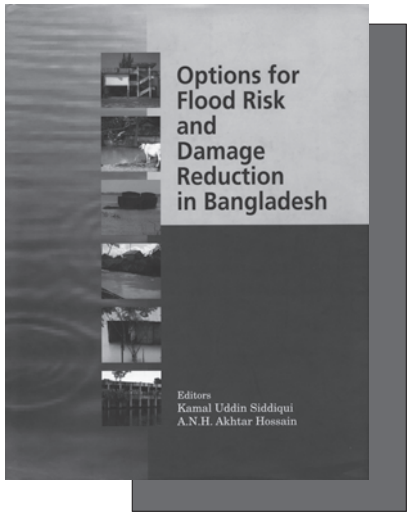
**Needs assessment workshop, 5-8 Sep, Bangladesh** ADPC through its Urban Disaster Risk Management (UDRM) team conducted a needs assessment workshop for relevant stakeholders of the Strengthening Household Ability to Respond to Development Opportunities program. A CBDRM ToT comprising of three modules, each for a specific target audience, was designed, developed and delivered by ADPC as part of the SHOUHARDO Urban Program annual work plan of 2006-07. Participants in the workshop included senior level CARE-Bangladesh staff, CARE-BD project staff, and partner organizations.

**PROMISE regional course on governance and disaster risk reduction, 25-30 Sep, Philippines** ADPC's program for Hydro-Meteorological Disaster Mitigation in secondary cities in Asia (PROMISE), being implemented by the Urban Disaster Risk Management (UDRM) team, held a regional course in Manila. This international course was designed to develop local government professionals sensitive to issues presented by recurrent hydro-meteorological hazards. The course covered urban governance and risk management, vulnerability reduction, community-based and participatory approaches to disaster risk management, and mainstreaming risk reduction as a component of governance. PROMISE is funded and supported by the US Agency for International Development-Office of US Foreign Disaster Assistance (USAID-OFDA).

**6th Meeting of the ADPC Regional Consultative Committee (RCC-6) on Disaster Management**
in collaboration with the Ministry of Civil Affairs, Government of China,
supported by the Government of Australia
**9-11 November 2006, Kunming, China**

**For more information, please visit www.adpc.net**

Bookreview




## OPTIONS FOR FLOOD RISK AND DAMAGE REDUCTION IN BANGLADESH

Dr. K. Iftekhar Ahmed
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Options for Flood Risk and Damage Reduction in BangladeshThere are plenty of publications on floods in Bangladesh, but this one stands out for its assemblage of diverse, yet related array of contents. Almost all sectors on which floods have impact have been included, thus indicating a comprehensive approach to addressing the flood problem, akin to the government's current approach to disaster risk management. This publication highlights the proceedings and recommendations of the National Workshop on Floods, organized in September 2004, Bangladesh. The editors of this book are both highly placed and experienced government officials in Bangladesh - Kamal Uddin Siddiqui, Principal Secretary in the Prime Minister's Office and A.N.H. Akhtar Hossain, Secretary, Ministry of Power, Energy and Mineral Resources.

Its timely publication after the extensive floods of 2004 meant that the wisdom offered in the book was available for the variety of post-flood recovery and reconstruction programs, and for future mitigation and risk reduction planning. The book draws together the knowledge of experts from a variety of fields, thus in a way serving as a national knowledge database on the subject - a useful resource volume on topics ranging from those pertaining to the 'softer' human sciences to 'hard' technological concerns. Nonetheless, attempt has been made to compose the more specialized articles for wider readership beyond specialist interest without compromising technical content, yet reader-friendly enough for the non-specialist to gain general understanding of these technical, but important, aspects of flood. The matrix of recommendations at the end provides a snapshot of the scope of the book as a whole and is a very useful element for those interested in seeking out specific knowledge and information without thumbing through the whole volume. The matrix also has great utility value: it is possible to draw out elements for flood risk reduction programs in each sector. For the reader caring to go through the whole book, it offers a holistic understanding of the flood problem and its mitigation options in Bangladesh, and also presents lessons for the wider context as floods increasingly affect more and more parts of the world in recent times.

The book could, however, have benefited by consolidating common information - flood typologies, effects of floods, disaster management cycle, flood maps, etc. - which has been repeated in different forms in a number of articles. An important concept that has emerged in recent time is that of "Damage and Loss Estimation", propagated by the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC). A basic premise of this concept is that damage estimation of physical assets and infrastructure is relatively easier to carry out compared to economic loss estimation, a reason why the former is much more common. In the case of slow-onset floods as in Bangladesh, the monetary value of economic losses can be much more than physical damage, all the more reason in this case to carry out loss estimation. This current, and important, concept is missing from the otherwise comprehensive volume on flood. Typically, it dwells on damage estimation without providing information on loss estimation. For a book such as this one, discussing and presenting methodology of total flood disaster impact should have been of paramount importance.

Nonetheless, for a book of such exhaustive intent and subject matter, some shortcomings are natural. Its value as a significant contribution to the field cannot be undermined. What now remains to be done is for specialists to utilize its subject matter as stepping stones to a broader platform, so that the flood problem not only in Bangladesh, but globally, is mitigated.

information resources

Mekong River Commission Secretariat
www.mrcmekong.org

The Network of Asian River Basin Organizations - NARBO
www.adb.org/Water/NARBO/default.asp

DHI Water & Environment
www.dhi.dk

Australian Mekong Resource Centre, University of Sydney, Australia
www.mekong.es.usyd.edu.au/index.htm

FEMA Floodplain Management
www.fema.gov/fima/floodplain.shtm

UNESCO-IHE: Institute for Water Education
www.ihe.nl/publications/newpub.htm

Associated Program on FLood Management of WMO
www.apfm.info/

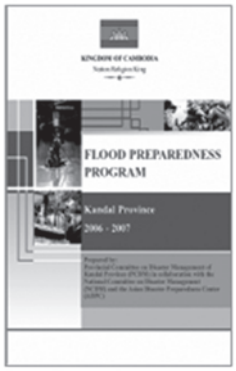
Department of Water Resources, California
www.fpm.water.ca.gov/

Flood Plain Management Association
www.floodplain.org/

Department of Natural Resources, New South Wales Government, Australia
www.naturalresources.nsw.gov.au/water/index.shtml

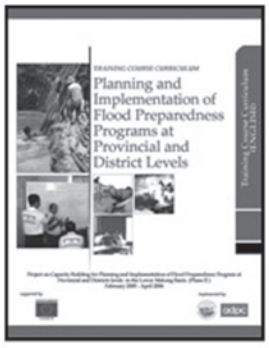
# ADPC Publications

Flood Preparedness Programs-Cambodia



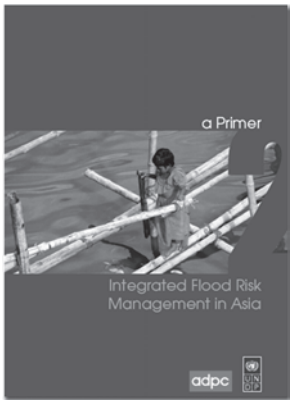

Flood Safety Posters-Cambodia

Training course curriculum on Planning and Implementation of Flood Preparedness program in English, Khmer, Vietnamese and Lao languages





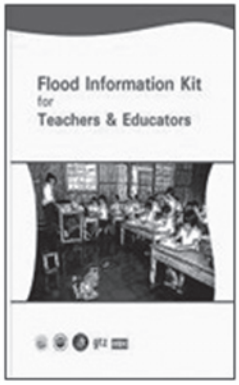
Integrated Flood Risk Management in Asia -A Primer




**Contact Information**
For more information about ADPC publications, please email apdc@adpc.net or roopa@adpc.net

Flood Booklet- Cambodia

Flood Information Kit For Teachers and Educators




Flood Safety Posters-Vietnam

# Announcement

## ADPC welcomes your contributions

**ADPC facilitates information sharing at the local, national and regional level throughout Asia and the Pacific.**
**Accordingly, ADPC invites highlights of activities, initiatives, projects, studies, good practices and publications covering various aspects of disaster management from disaster practitioners & organizations in the Asia-Pacific region. The information received will be highlighted in the ADPC website. We look forward to receiving your contributions.**

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