



**East & Southeast Asia Regional Seminar on Flood Hazard Mapping, 2009**  
EDSA Shangri-La Hotel, Mandaluyong City, Metro Manila, Philippines  
17-19 February 2009

# **Community-Based Early Warning System**

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## **Outline of Presentation:**

- 1. Introduction**
- 2. Definition of EWS**
- 3. The community based EWS**
- 4. Challenges and opportunities**



1. Introduction

## Hazard impacts and vulnerability

**Hazards:**

- quick-onset or slow-onset, long-term, low grade and cumulative

Risk Assessment

```

    graph LR
      A[Natural Hazards] --> B[Exposure  
Event  
Vulnerability]
      B --> C[Expected Loss]
      C --> D[Consequences  
Cost  
Benefits]
      D --> E[Policy Adoption]
  
```

Schematic illustration of the science, technology, & fundamental knowledge needed for risk assessment (Hays, 1999).

*Should there be an EWS for vulnerability and vulnerability changes?*

1. Introduction

## EWS Definition

“I may not know how to define accurately an early warning system, but I’ll know one when I see it” (Anon.).

“A rose by any other name is still a rose” (M.H. Glantz).

“ EWS is a social process for generating maximally accurate information about possible future events” (Early Warning Systems: Do’s and Don’t’s, Shanghai, China, 2003).

*How early is early?  
 What constitutes a warning?  
 What is meant by a system?  
 What are to be its official functions?  
 What else might it do?  
 What are the levels of warning?*

## 1. Introduction

**Do we need early warning systems?**

***“To live is very dangerous” (Brazilian author, Joao Guimaraes Rosa, 1963)***

**Fact is: EWSs exist in every society.**

**EWS can be:**

- 1. Formal – with visible structures**
- 2. Informal – local and cultural in nature**

**Part of the human nature – to seek insights into the future through:**

- Looking at trends & making projections, forecasts & scenarios; and**
- Mystical and astrological means.**



## 1. Introduction

**EWS - provides an effective solution to this by giving people sufficient time to evacuate and protect their property from an impending hazard.**

**EWS solutions**

**conflicting requirements including cost and reliability**

**factors: technological, social, and political**

**maintainable and accessible by nontechnical personnel**



**3. The community based EWS**

**Key elements of People-Centered EWS**

<p><b>RISK KNOWLEDGE</b></p> <p><b>Systematically collect data and undertake risk assessments</b></p> <p>Are the hazards &amp; the vulnerabilities well known?                  What are the patterns &amp; trends in these factors?                  Are the risk maps &amp; data widely available?</p>	<p><b>MONITORING &amp; WARNING DEVICE</b></p> <p><b>Develop hazard monitoring &amp; early warning devices</b></p> <p>Are the right parameters being monitored?                  Is there a sound scientific basis for making forecasts?                  Can accurate &amp; timely warnings to be generated?</p>
<p><b>DISSEMINATION &amp; COMMUNICATION</b></p> <p><b>Communicate risk information &amp; early warnings</b></p> <p>Do warnings reach all of those at risk?                  Are the risks &amp; warnings understood?                  Is the warning information clear &amp; usable?</p>	<p><b>RESPONSE CAPABILITY</b></p> <p><b>Build national &amp; community response capabilities</b></p> <p>Are response plans up to date and tested?                  Are local capacities &amp; knowledge made use of?                  Are people prepared &amp; ready to react to warnings?</p>

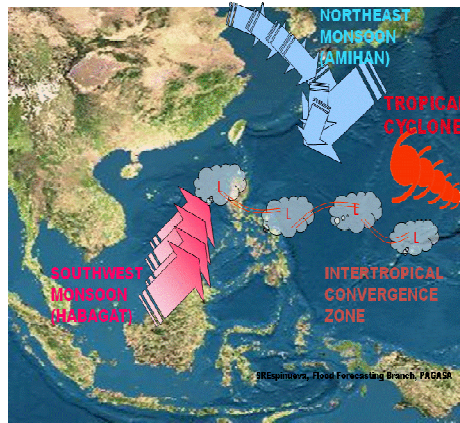







*Adapted from Developing Early Warning Systems: A Checklist, EWC III, March 2003*

# Background & Evolution of Flood Early Warning System (FEWS) in the Philippines



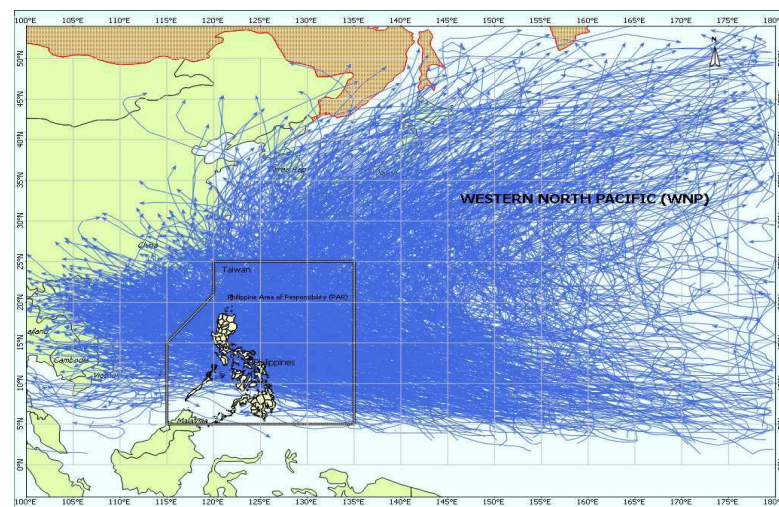
The climate of the Philippines is influenced by the complex interactions of various factors such as :



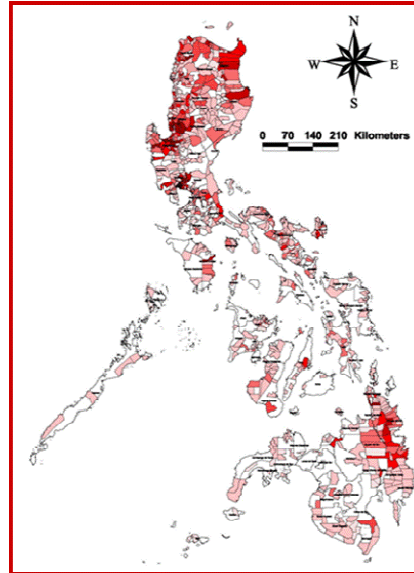
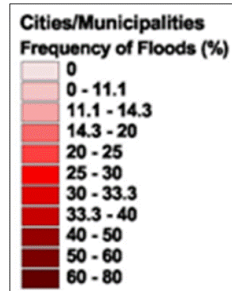
-  Philippine Geography and Topography
-  Ocean currents
-  Semi-permanent cyclones and anti-cyclones
-  Principal Air Streams
-  Linear systems
-  Tropical Cyclones



**Tracks of tropical cyclones (1148 entered PAR) that formed in the Western North Pacific (WNP) - 1948 - 2006**

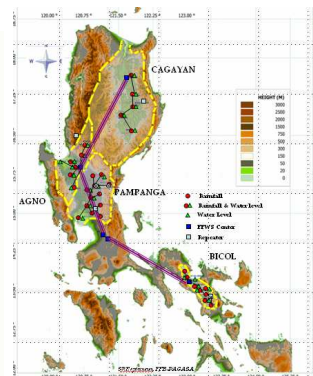
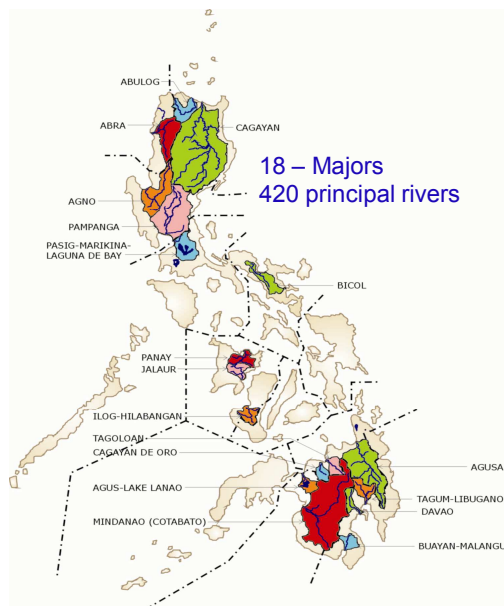


## FREQUENCY OF FLOOD IN CITIES & MUNICIPALITIES



THE STUDY ON THE NATIONWIDE FLOOD RISK ASSESSMENT AND THE FLOOD MITIGATION PLAN FOR THE SELECTED AREAS IN THE REPUBLIC OF THE PHILIPPINES: JICA, 2004

## River Basins in the Philippines



Monitored river basins

4 – fully automatic  
 2 – combination of automatic & manual  
 Several – manual or community based



## A community based flood early warning system :

- involves institutions, instrumentation & community
- people centered
- cheap, non-structural flood mitigating measure



### 3. The community based EWS

#### **Why pursue a CBFEWS?**

- **It empowers local government units (LGU's) and the communities to protect themselves against floods.**
- **The community and LGUs are in the best position to undertake preparedness measures against floods.**
- **It promotes a sense of ownership on the part of the LGUs, hence it is easier to sustain.**



3. The community based EWS

### Objectives and Activities under CBFEWS

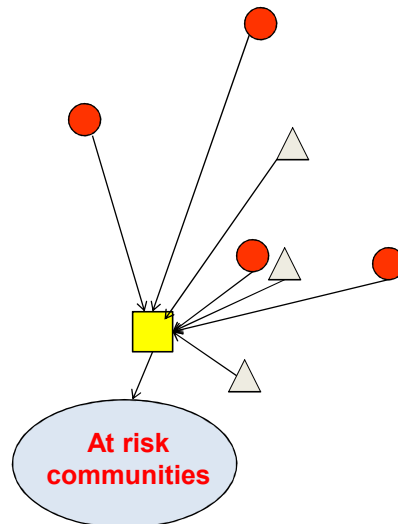
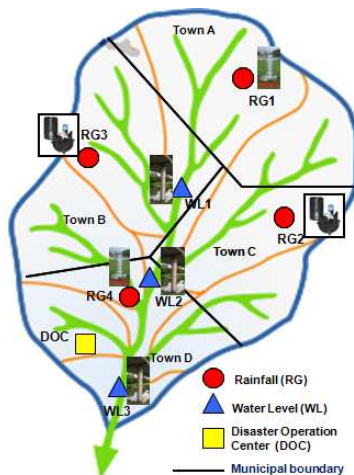


CBFEWS - mechanism for monitoring and registering rain data and river behavior upstream to provide timely warnings to downstream communities from a possible flood.



3. The community based EWS

### River basin approach



Network Design is based on river basin approach.





3. The community based EWS

## Partners:

1. **Community**
2. **Local government units (LGUs)**
3. **National government (OCD, DOST, academe, etc.)**
4. **Scientific institutions**
5. **NGOs**
6. **Foreign donors**



3. The community based EWS

## Activities of CBFES

### A. Implementation Phase

1. Consultation with LGUs & other institutions



2. Data gathering, survey & design of network



3. Procurement / fabrication & installation of equipment



6. IEC, Dry run/ flood drill & turn over



5. On-site Training of observers (members of community)



4. Setting of hydromet parameters for observation



3. The community based EWS

### Activities of CBFEWS

#### B. Operational Phase

- 7. Data Observation and analysis
- 8. Formulation and issuance of warnings
- 9. Documentation
- 10. Maintenance of early warning system
- 11. Evaluation after a flood event (for updating)
- 12. Conduct of IEC and flood drills



3. The community based EWS

### Activities of CBFEWS



3. The community based EWS

**Criteria for the issuance of warnings:**

**1. Threshold values of rainfall**

Rainfall Values	Meaning	Flood Warning
Continuous rainfall with rainfall observation of 15mm - 20mm/hr	Awareness	<b>READY</b>
Rainfall observation is (60mm - 80mm)/3hrs	Preparedness	<b>GET SET</b>
Continuous rainfall for the last three hours and 3-hourly observation is 80mm/3hrs	Response	<b>GO</b>

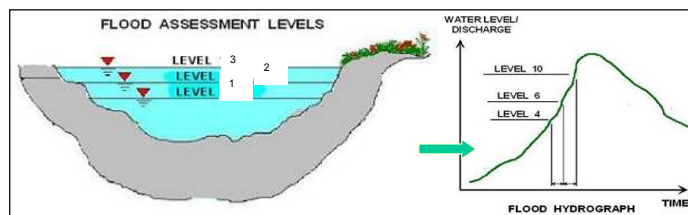
Note: Threshold values of rainfall are based on previous studies, hence these are arbitrary. These values will be modified when sufficient data are available in the locality or area (based on observation of LGUs).



3. The community based EWS

**Criteria for the issuance of warnings:**

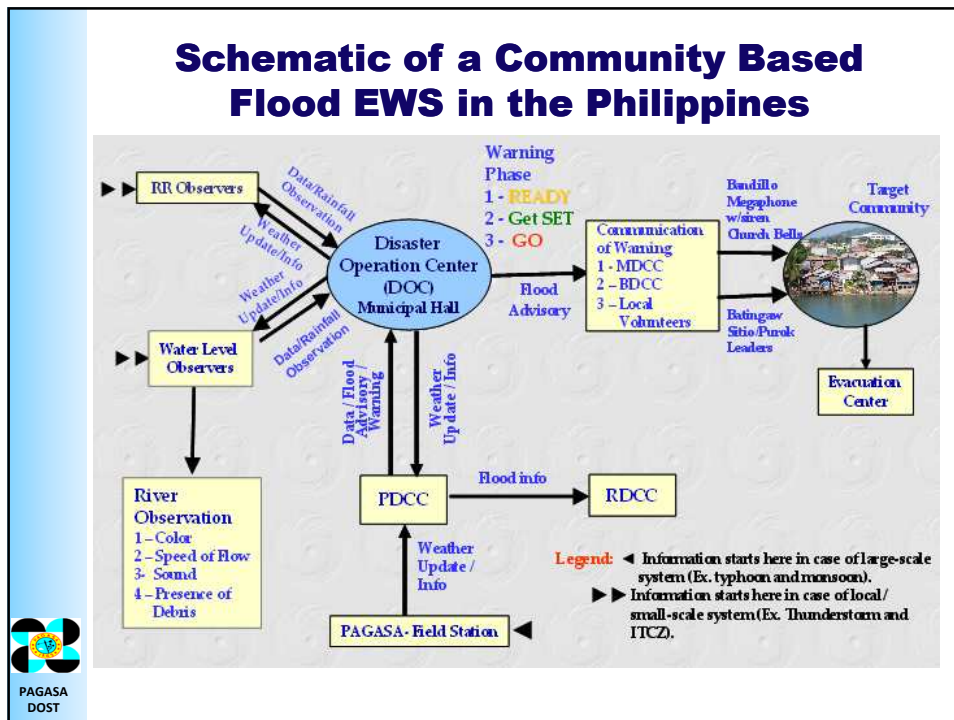
**2. Assessment water levels**



	Water Level	Meaning	Flood Warning
Level 1		Awareness	<b>READY</b>
Level 2		Preparedness	<b>GET SET</b>
Level 3		Response	<b>GO</b>

Note: Assessment water levels are based on surveys on the river at a particular cross section. Again, these values will be modified when sufficient observations are available.





## Challenges & Opportunities

1. Objectives and Activities - clear
2. Network Design – upstream & downstream issues
3. Communication – which is the most appropriate?
4. Warning dissemination & notification mechanism
5. Operation & maintenance
6. Stakeholder network & volunteer management
7. Funding & sustainability issues – mainstreaming EWS in local contingency plan

The success of an EWS  
is implicit in the  
operative capability and  
the response of the  
community which  
operates it.



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**Thank you.**

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