

# **THE INTEGRATED RIVER BASIN MANAGEMENT APPROACH : One of the Key Strategies to Effective Disaster Risk Management & Climate Change Adaptation**

Trainee Sharing Session during  
6<sup>th</sup> International Training Workshop on Natural Disaster Reduction  
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An aerial photograph of a river basin, showing a network of agricultural fields in various shades of green and brown, with a prominent blue river winding through the landscape. The text is overlaid on a semi-transparent white box in the center.

# **Outline of Presentation**

**PART I – Brief Background Information about the Philippines & Mandates of the River Basin Control Office**

**PART II – The Philippine Integrated River Basin Management and Development Framework Plan**

**PART III – Basin wide disaster events focus on typhoon-related disasters**

**PART IV - Issues, priority actions & challenges**





**The Philippines has...**

**12 Water Resources Region**

**421 Principal River Basins**

**20 Major River Basins**

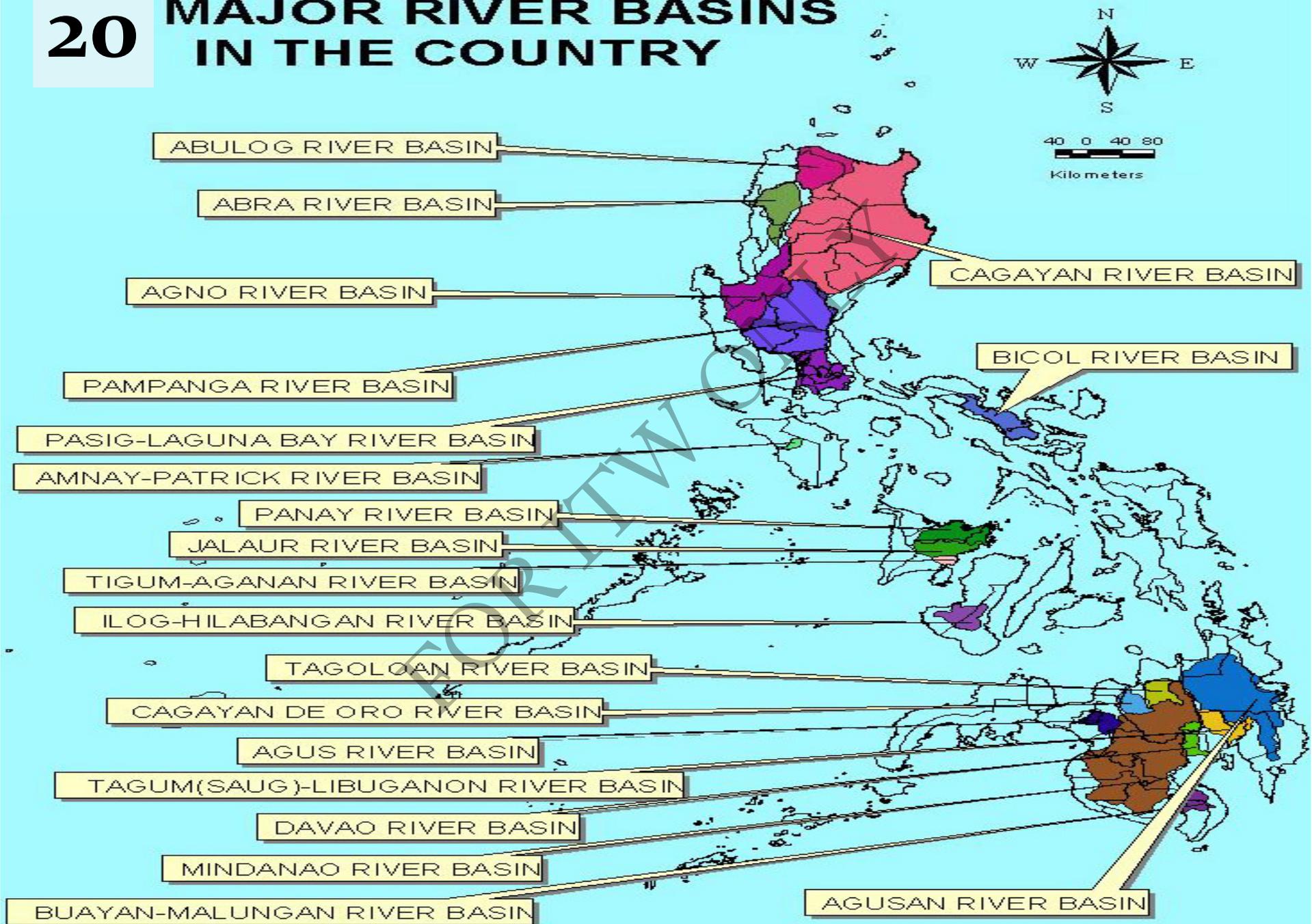
**72 Lakes**

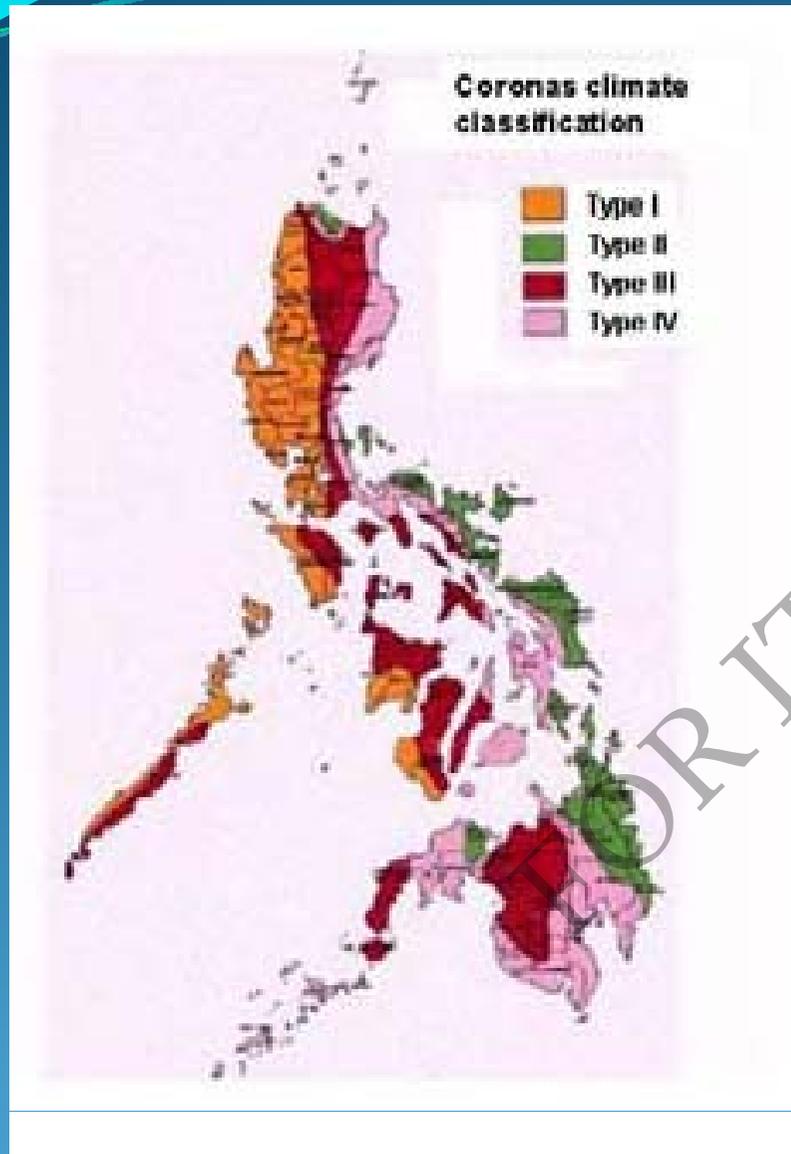
**266,000 sq. km. coastal bays & coastal waters**

**Thousands of smaller tertiary rivers spread in 7,100 islands**

20

# MAJOR RIVER BASINS IN THE COUNTRY





## CLIMATE TYPE BASED ON MODIFIED CORONAS CLASSIFICATION

TYPE I - Two pronounced seasons: dry (November to April), wet during the rest of the year

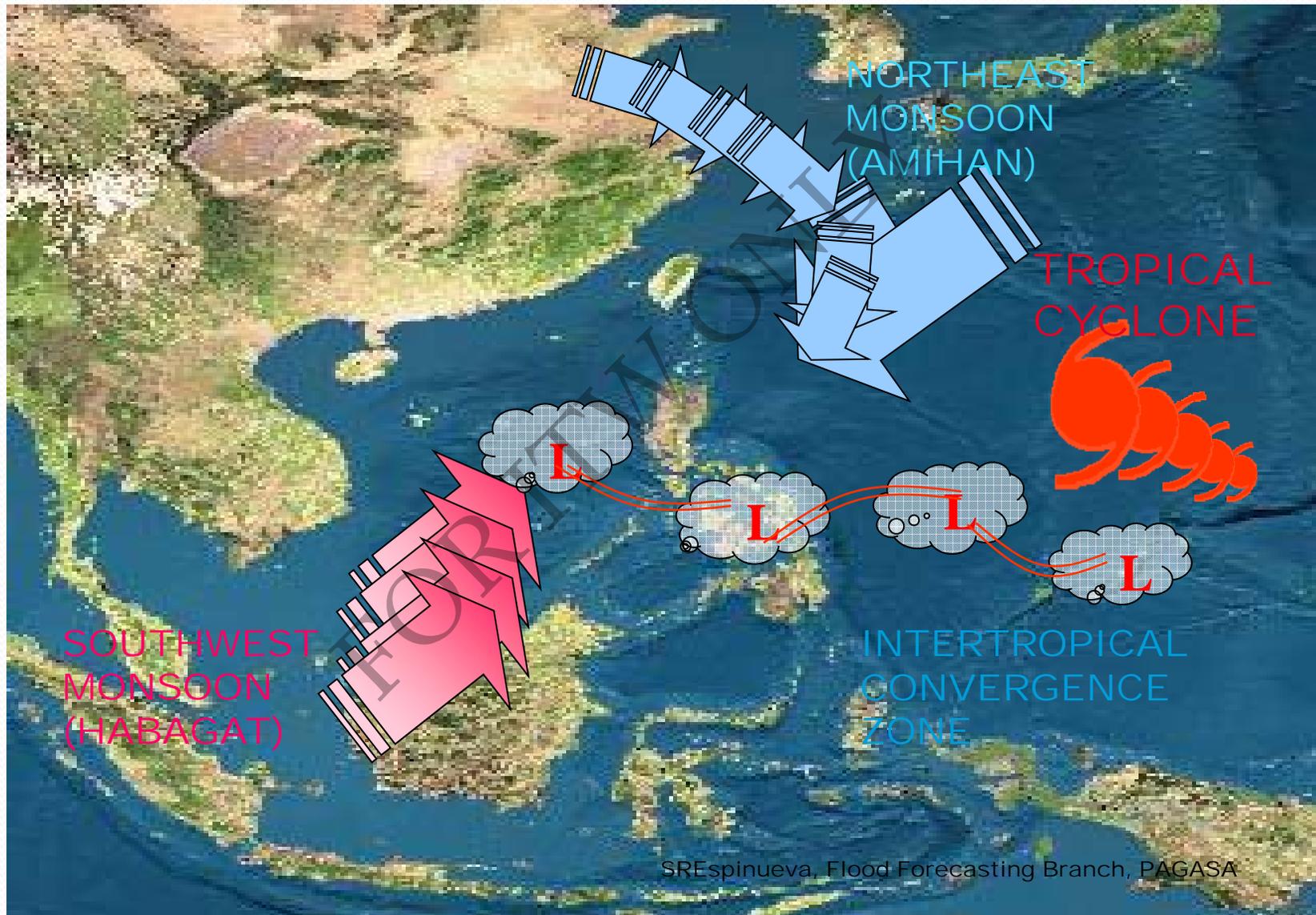
TYPE II - No dry season with very pronounced rainfall from November to January

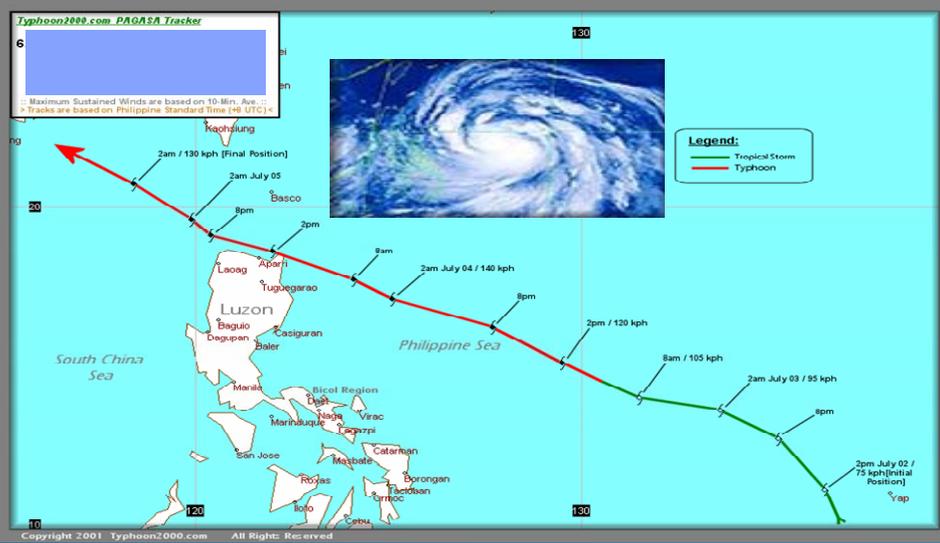
TYPE III - Seasons are not very pronounced. Relatively dry from November to April and wet during the rest of the year

TYPE IV - Rainfall is more or less evenly distributed throughout the year

**ANNUAL AVERAGE RAINFALL 2,400 mm**

# Weather Causing Phenomena in the Philippines





**Typhoon Feria – July, 2001**

**Typhoon Feria (July, 2001) :**

**Damage Cost: 1.5 billion**

**Damaged/Under water houses: 5,471 units**

**Typhoon IGME (June, 2004) :**

**Damage Cost: 2.48 billion**

**Damaged/Under water houses: 14,193 units**

**Typhoon Labuyo (Sep, 2005) :**

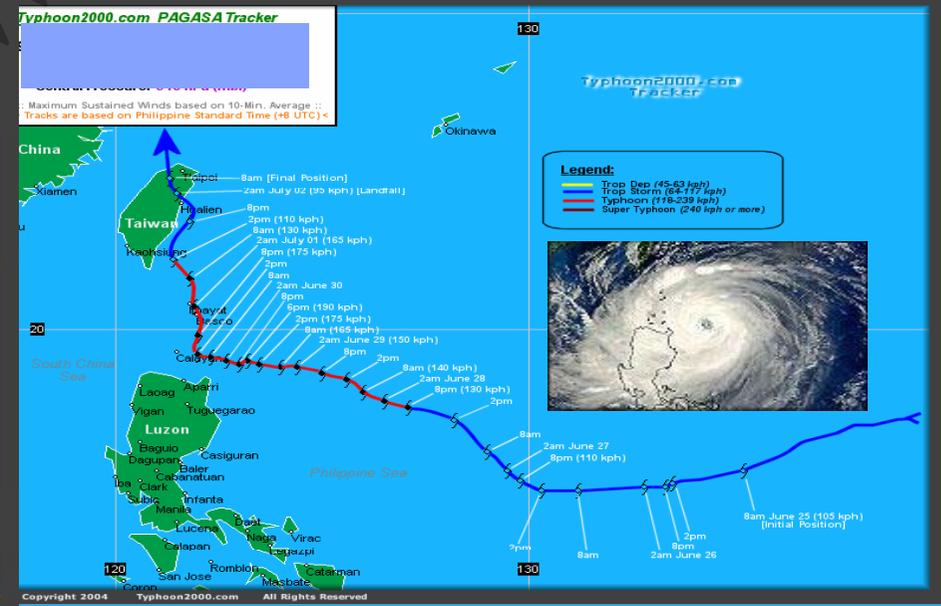
**Damage Cost: 110 million**

**Damaged/Under water houses: No record**

**\*Sources: PDCC**

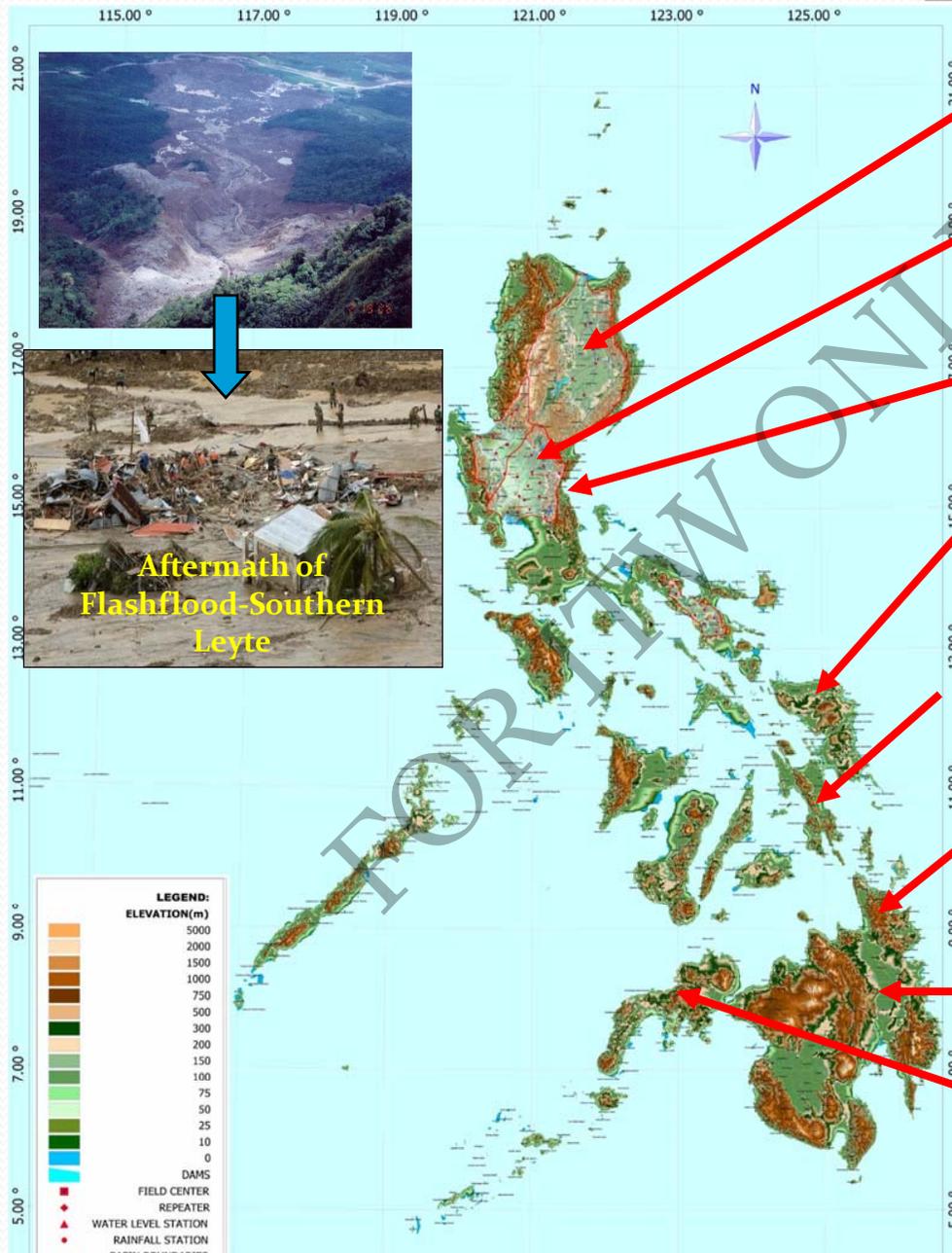


**Typhoon Igme – June 2004**



**Typhoon Labuyo – September, 2005**

# Flood and Landslide Events in 2006



1. Flood in Isabela-Cagayan Area Jan. 26-28

2. Flood in Bongabon-Gabalton Jan. 25-27

3. Flood in Aurora-Quezon Area Jan. 25-26

4. Flood & Landslides in Samar – Leyte Area Feb. 10-12

5. Southern Leyte Landslide in Feb.17, Flood – May 11-12

6. Flood in CARAGA Reg. Feb. 10-12

7. Landslide in Taragona, Davao Oriental Feb. 12

8. Landslide in Bayog, Zambo del Sur (Feb. 18, 2006)



Aftermath of  
Flashflood-Southern  
Leyte



## RIVER BASIN CONTROL OFFICE, ITS CREATION AND MANDATES

- **Executive Order 510, 2006 the president created the River Basin Control Office under the Department of Environment and Natural Resources with the mandates to rationalize various river basin projects and programs in the Philippines and formulate the country's Integrated River Basin Development and Management Framework Plan**



## **RIVER BASIN CONTROL OFFICE, ITS CREATION AND MANDATES**

- **Executive Order No. 816 issued by the President of the Philippines in July 06, 2009. It strengthens the mandates and functions of the RBCO. These includes the following:**
  - **Serves as the lead government agency for the integrated planning, management , rehabilitation and development of the country's river basins**



## **RIVER BASIN CONTROL OFFICE, ITS CREATION AND MANDATES**

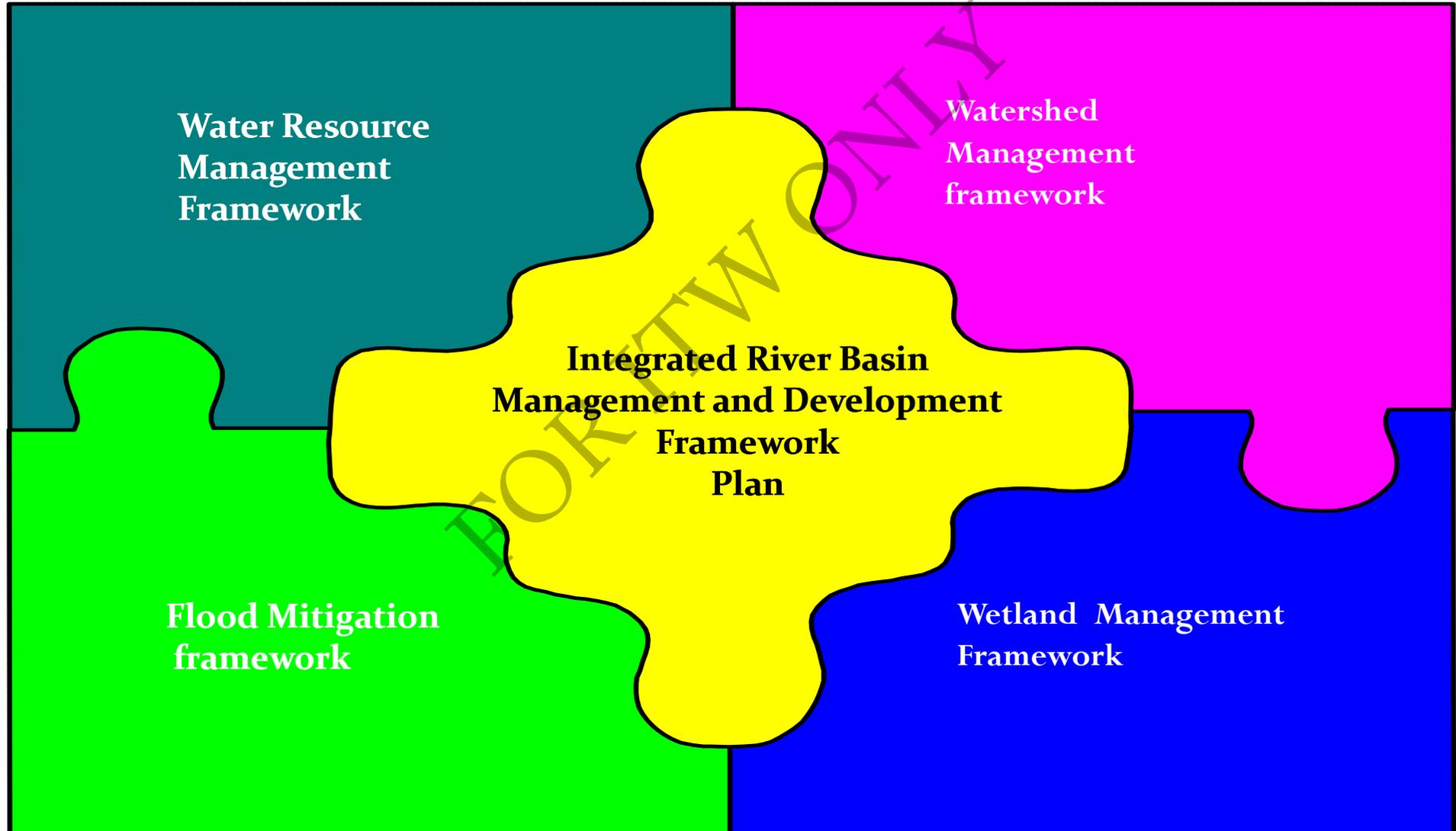
- Serves as oversight office in the implementation of IRBM/IWRM plans, projects and programs;**
- National Policy coordination for Local Government Units and Non-government Organizations in the development and sustainability of river basins, and shall recommend the approval and funding thereof;**



## **RIVER BASIN CONTROL OFFICE, ITS CREATION AND MANDATES**

- Serves as central fund administrator for the river basins appropriations provided under the DENR budget.**

# INTEGRATED RIVER BASIN MANAGEMENT AND DEVELOPMENT FRAMEWORK PLAN

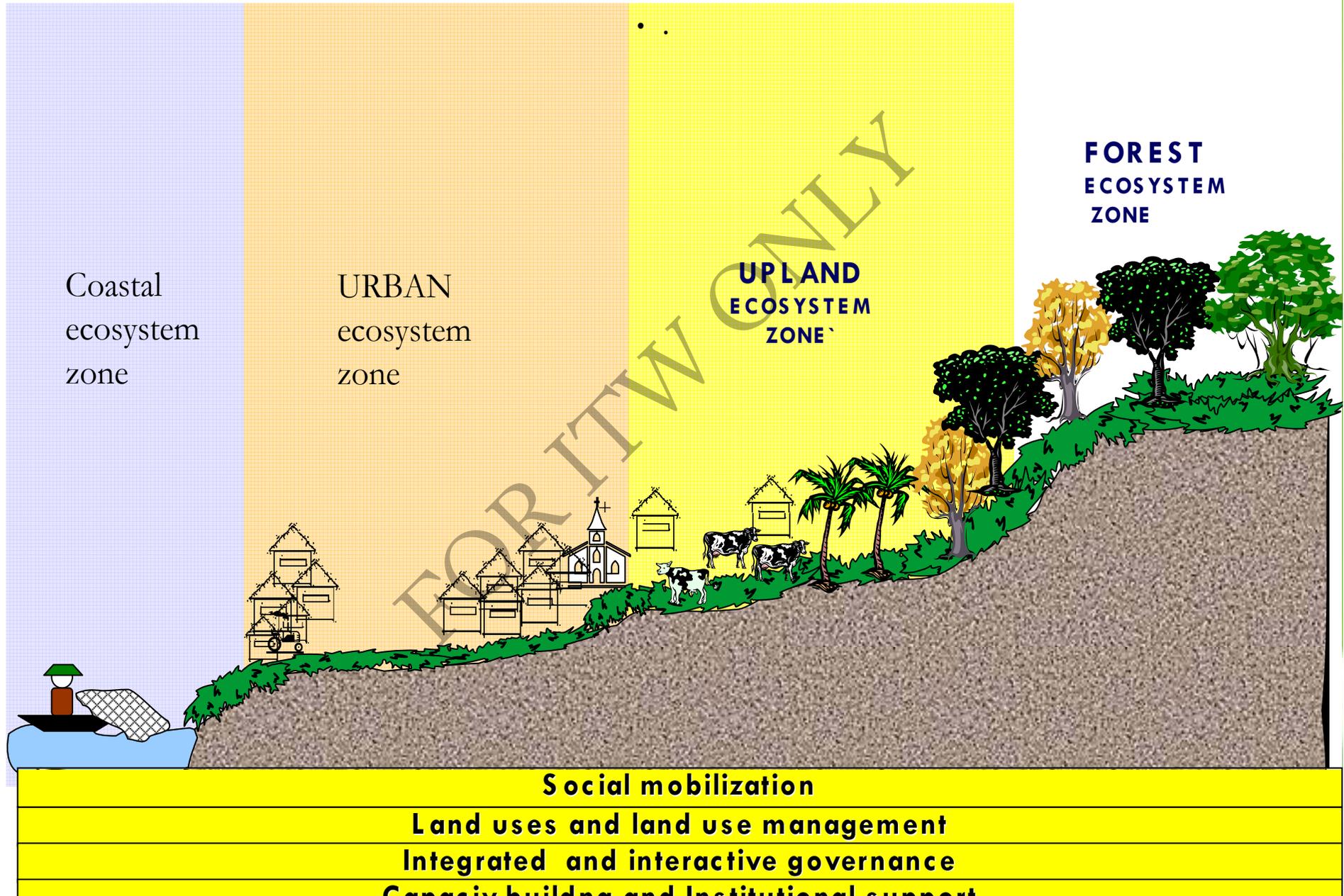




**The framework are strengthened by supplemental component-framework, namely:**

- **Water quality protection and monitoring framework**
- **Information and decision support systems**
- **River and coastal area protection and rehabilitation framework**
- **River Basin Organization and governance**

# Strategies:





## **INTEGRATED RIVER BASIN MANAGEMENT AND DEVELOPMENT FRAMEWORK PLAN**

**The framework identifies essential aspects of river basin sustainable development and their corresponding management regimes, which represent one or more priorities depending on environmental conditions as follows:**



**1. Natural and human-made disaster prevention and response Management.**

**2. Water use and supply management**

**3. Water Pollution and waste reduction management**

**4. Water security and livelihood management**

**5. Creation and mobilization of river basin organizations**



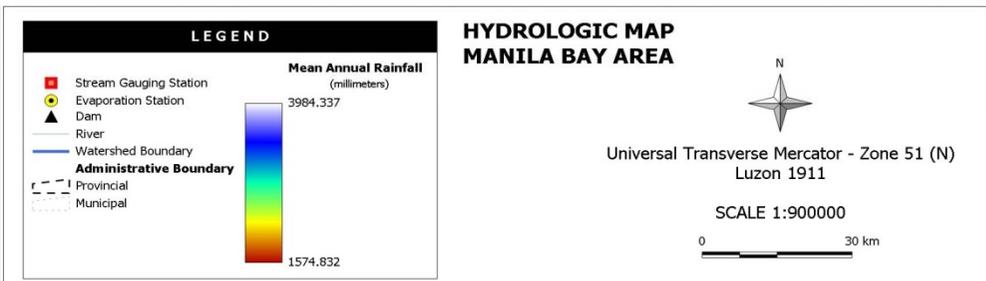
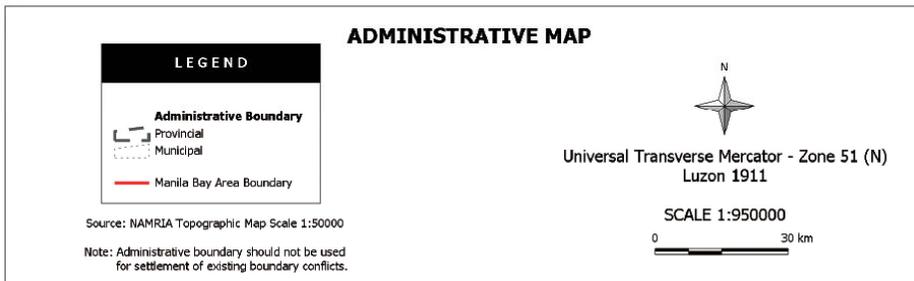
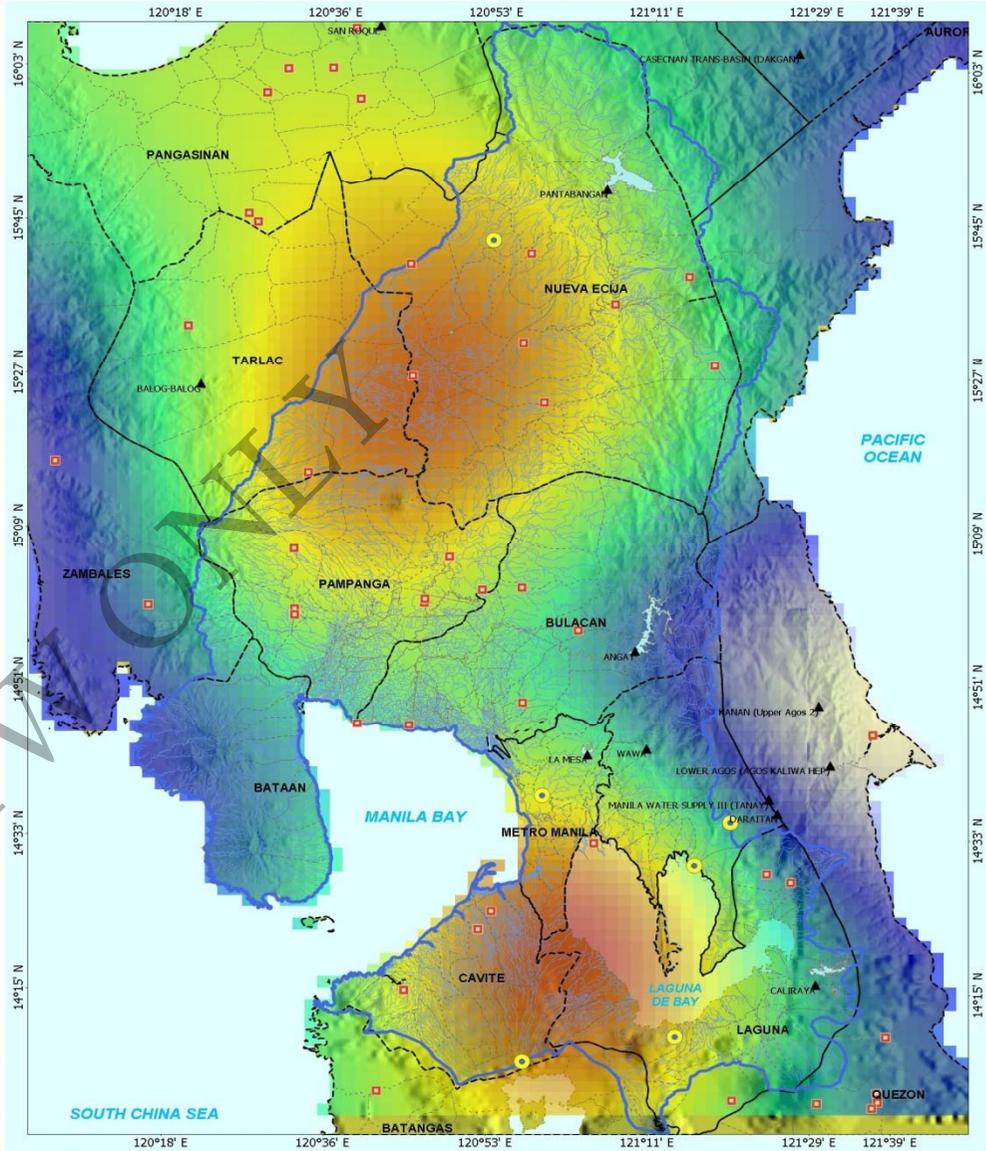
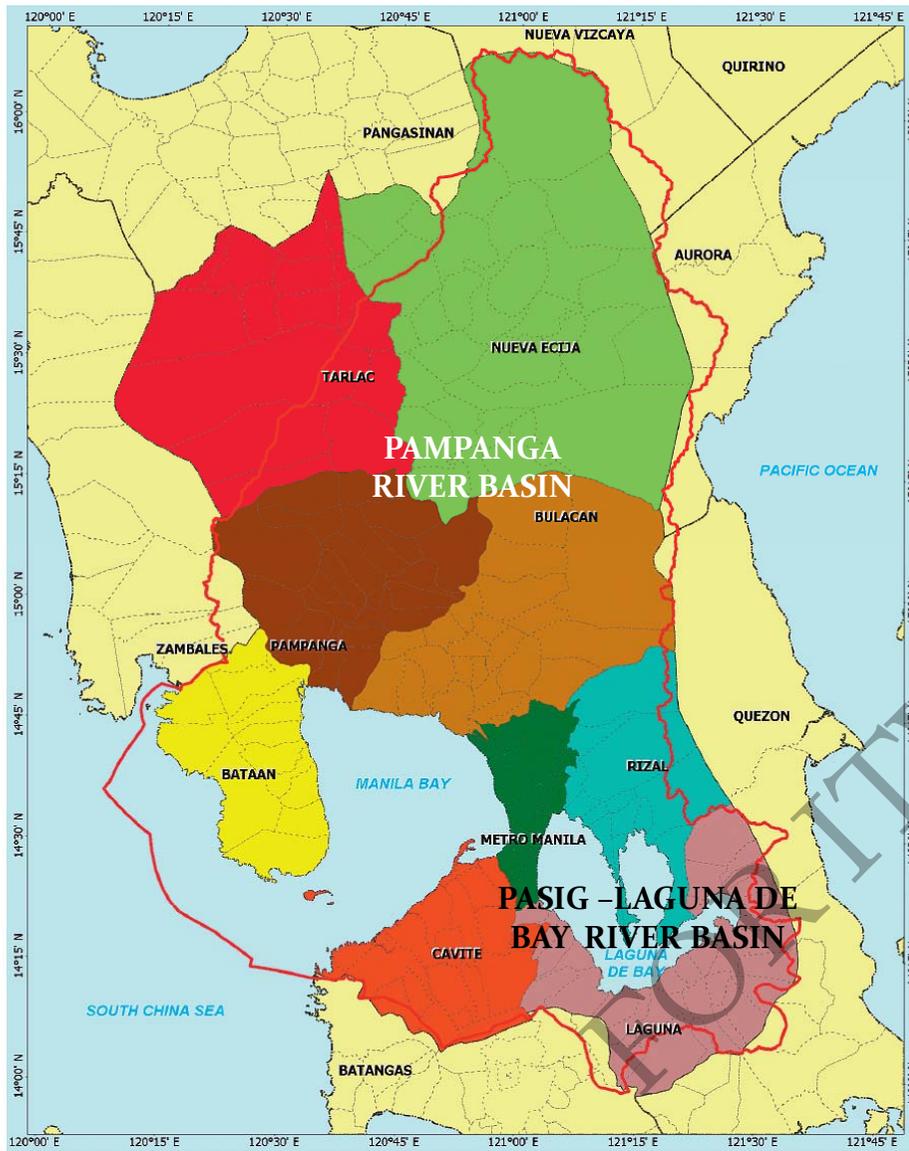
the Framework has become a  
very useful guide for national  
and local governments, and  
stakeholders to promote river  
basins sustainable development  
initiatives and program.



# **THE MANILA BAY RIVER BASINS**

**(SELECTED TYPHOON-RELATED DISASTER EVENTS)**

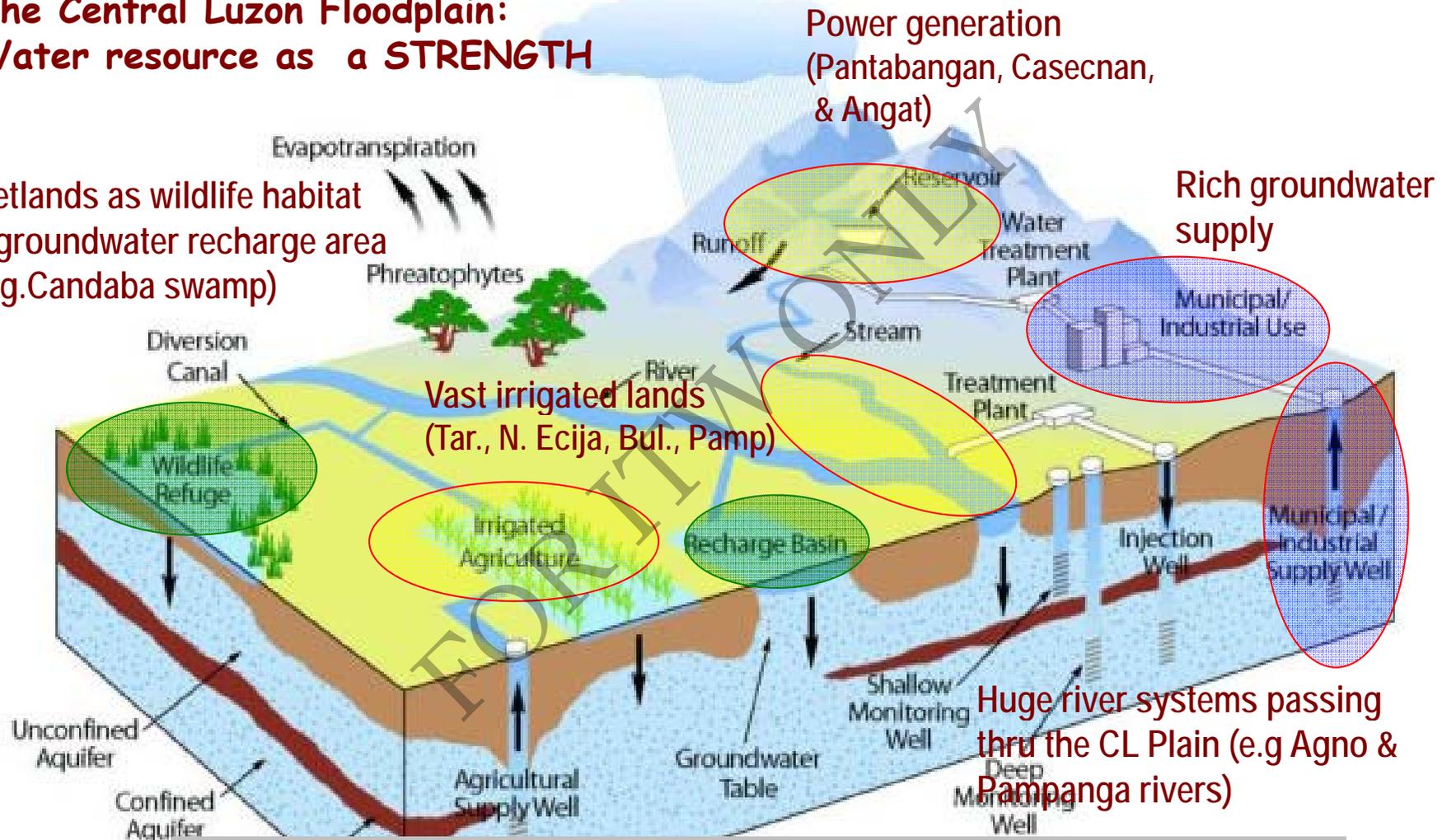
- ❖ **Pampanga River Basin**
- ❖ **Laguna de bay River Basin**



# Pampanga River Basin

**The Central Luzon Floodplain:  
Water resource as a STRENGTH**

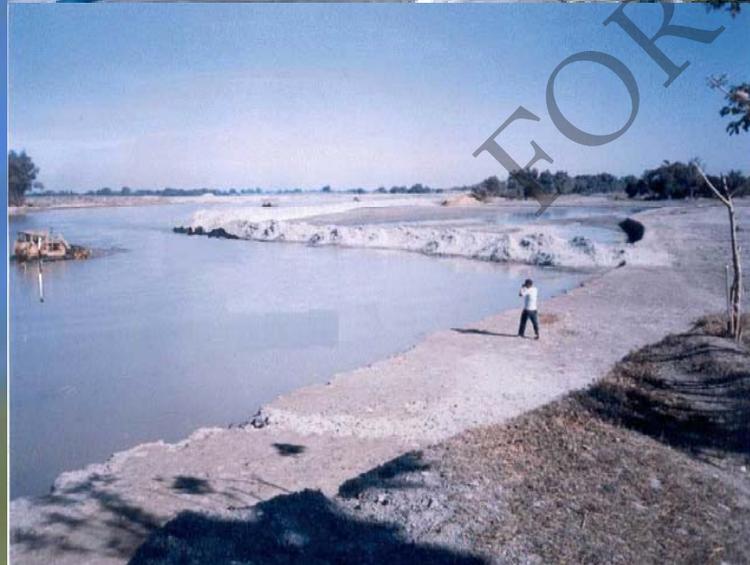
Wetlands as wildlife habitat  
& groundwater recharge area  
(e.g. Candaba swamp)



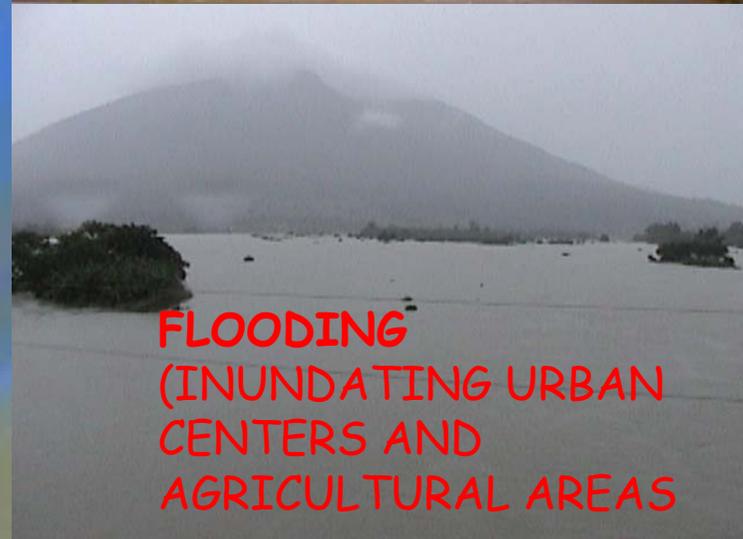
... These things have contributed significantly in transforming Central Luzon into a food basket, an industrial heartland, and a sprawling residential region.

However, the situation is different during peak of dry or wet season!!!

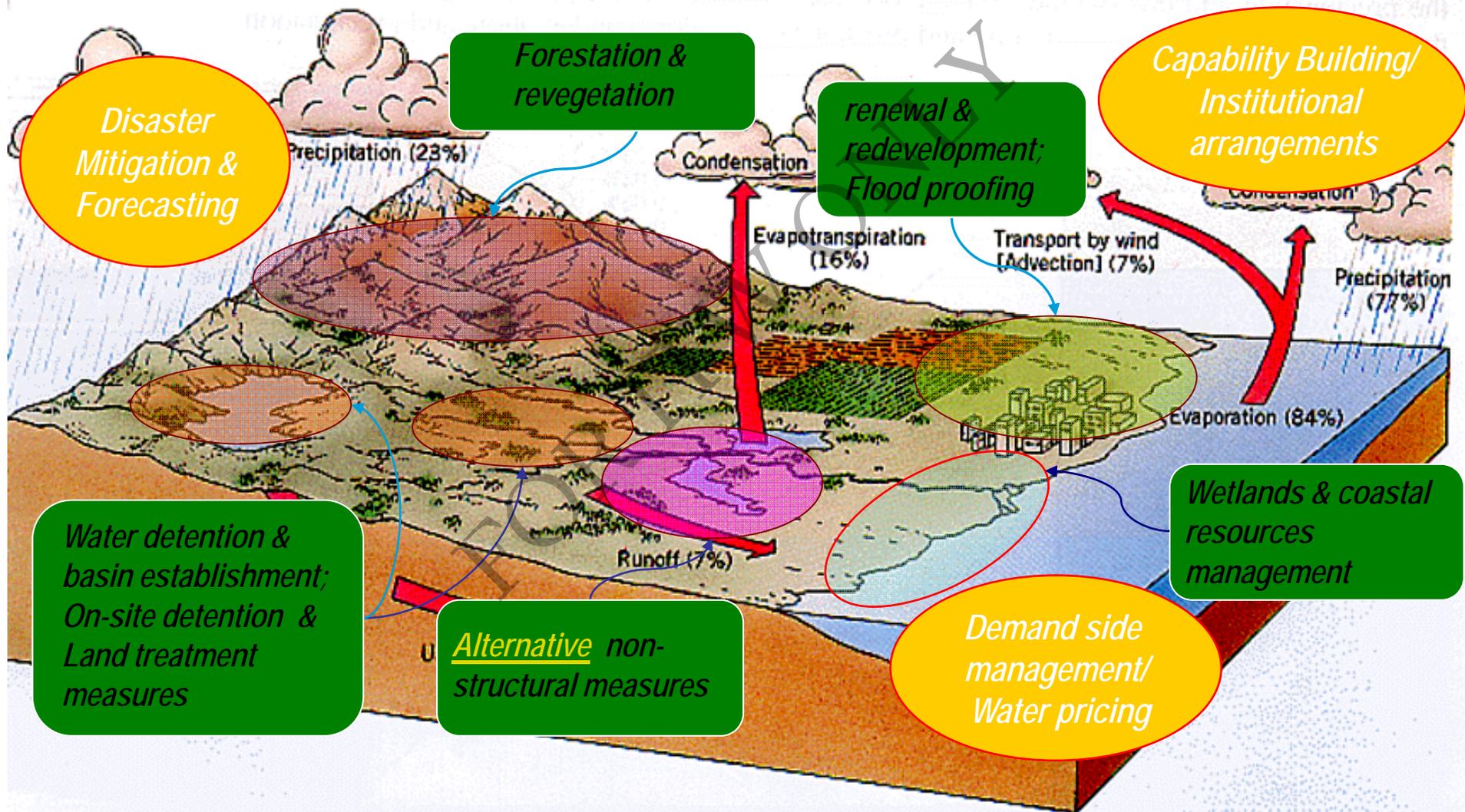
Too much water during wet season aggravated by la niña leads to...



And



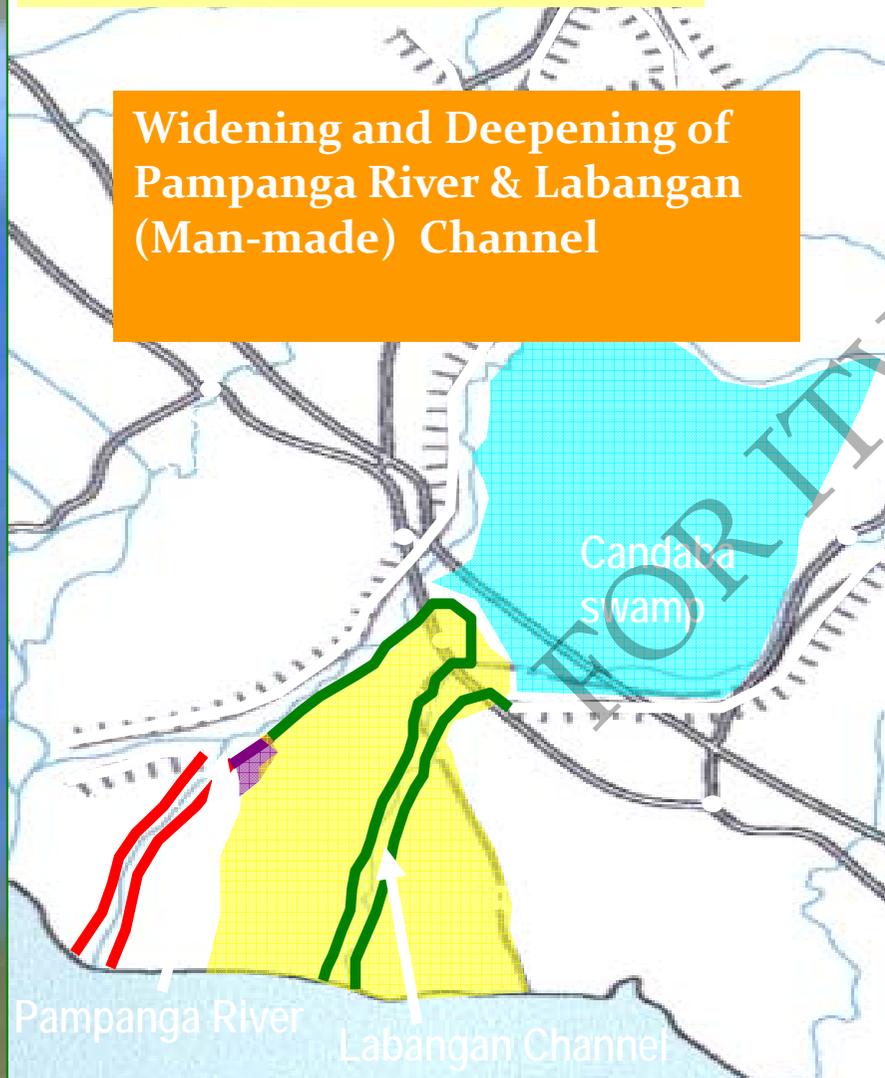
# Strategic Interventions



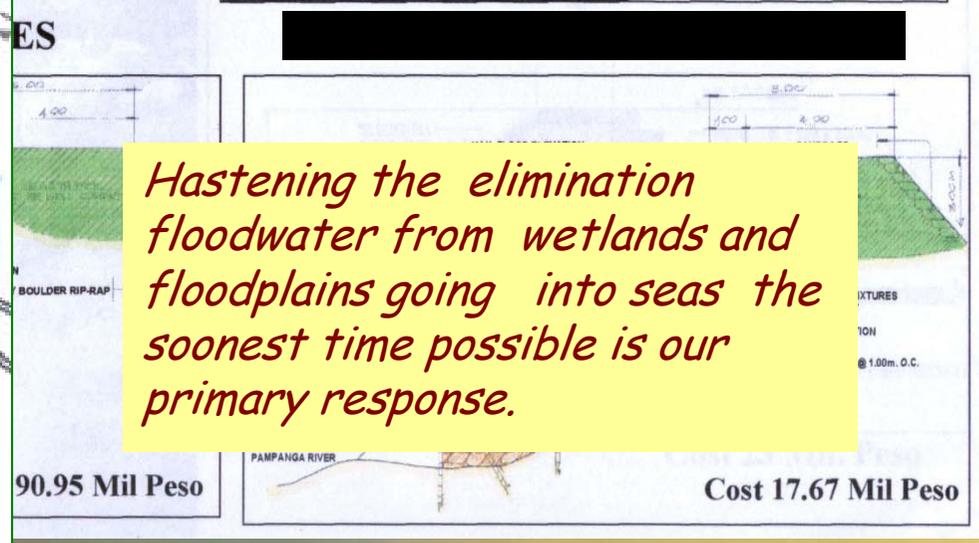
What are some of our ..river channels are modified to accelerate the flow of flood water. interventions?

**Pampanga Delta Development Project**

**Widening and Deepening of Pampanga River & Labangan (Man-made) Channel**



**DIKE IN Arnedo Dike Rehabilitation (Pampanga)**



*Hastening the elimination floodwater from wetlands and floodplains going into seas the soonest time possible is our primary response.*



**TEMPORARY SOLUTION: SANDBAGGING BY BAYANIHAN IN BARANGAY MAPANIQUI. SACKS PROVIDED BY THE NDCC, NFA AND PDCC.**

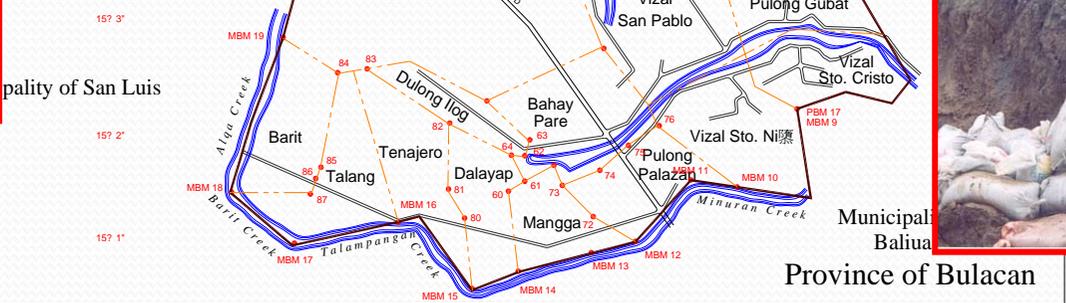
CANDABA, PAMPANGA

# ARNEDO DIKE 2004 FLOOD

Municipality of Candaba  
Province of Nueva Ecija



## REPAIRED ARNEDO DIKE



FOR ITW ONLY

# CANDABA, PAMPANGA

## GENERAL DISASTER PREPAREDNESS



Municipality of Candaba  
Province of Nueva Ecija



**INFRASTRUCTURE BUILT  
OR ACQUIRED THAT  
COULD BE USED  
DURING CALAMITIES  
AND EMERGENCIES**



Municipality of Baliuag  
Province of Bulacan

# CANDABA, PAMPANGA

## GENERAL DISASTER PREPAREDNESS

**HEAVY EQUIPMENT  
READY FOR EMERGENCY  
SITUATION**



# CANDABA, PAMPANGA

## GENERAL DISASTER PREPAREDNESS



**TRAINED AND EQUIPPED CANDABA EMERGENCY RESPONSE TEAM**

# CANDABA, PAMPANGA

## GENERAL DISASTER PREPAREDNESS



**WATER SEARCH AND RESCUE CAPABILITY**

CANDABA, PAMPANGA

# GENERAL DISASTER PREPAREDNESS



Provi

157 1"

157 0"

PBM 1  
MBM 35



**GOOD ROADS TO ALLOW QUICK RESPONSE AND REHABILITATION**



Municipality of San Luis

157 3"

157 2"

MB

157 1"

Municipality of Baliuag  
Province of Bulacan

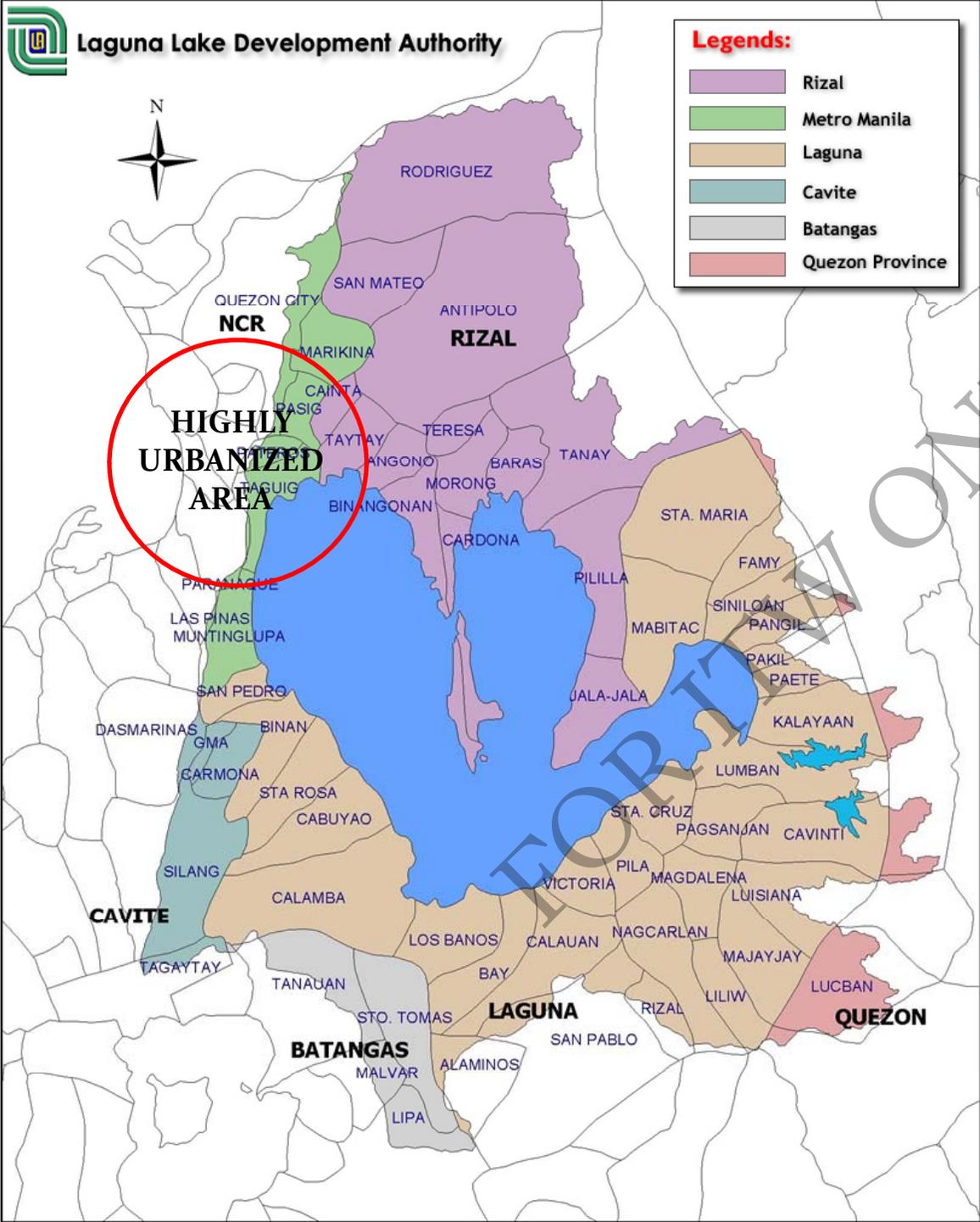


Laguna Lake Development Authority



**Legends:**

- Rizal
- Metro Manila
- Laguna
- Cavite
- Batangas
- Quezon Province



# PASIG-LAGUNA DE BAY RIVER BASIN

(SELECTED DISASTER EVENTS)

## DAMAGES DURING TYPHOON ONDOY (International name Ketsana)



TULYAHAN RIVER



MARIKINA RIVER

**Ondoy brought unprecedented rainfall in the metropolis of 341 millimeters in the first six hours alone, breaking the record for the highest 24-hour rainfall of 334 mm in Metro Manila in June 1967.**





**caused an estimated P4.8 billion in damage across the Metro Manila, Central Luzon and Calabarzon regions.**

**The extent of damage was broken down as follows: P1.59 billion for infrastructure and P3.216 for agriculture.**

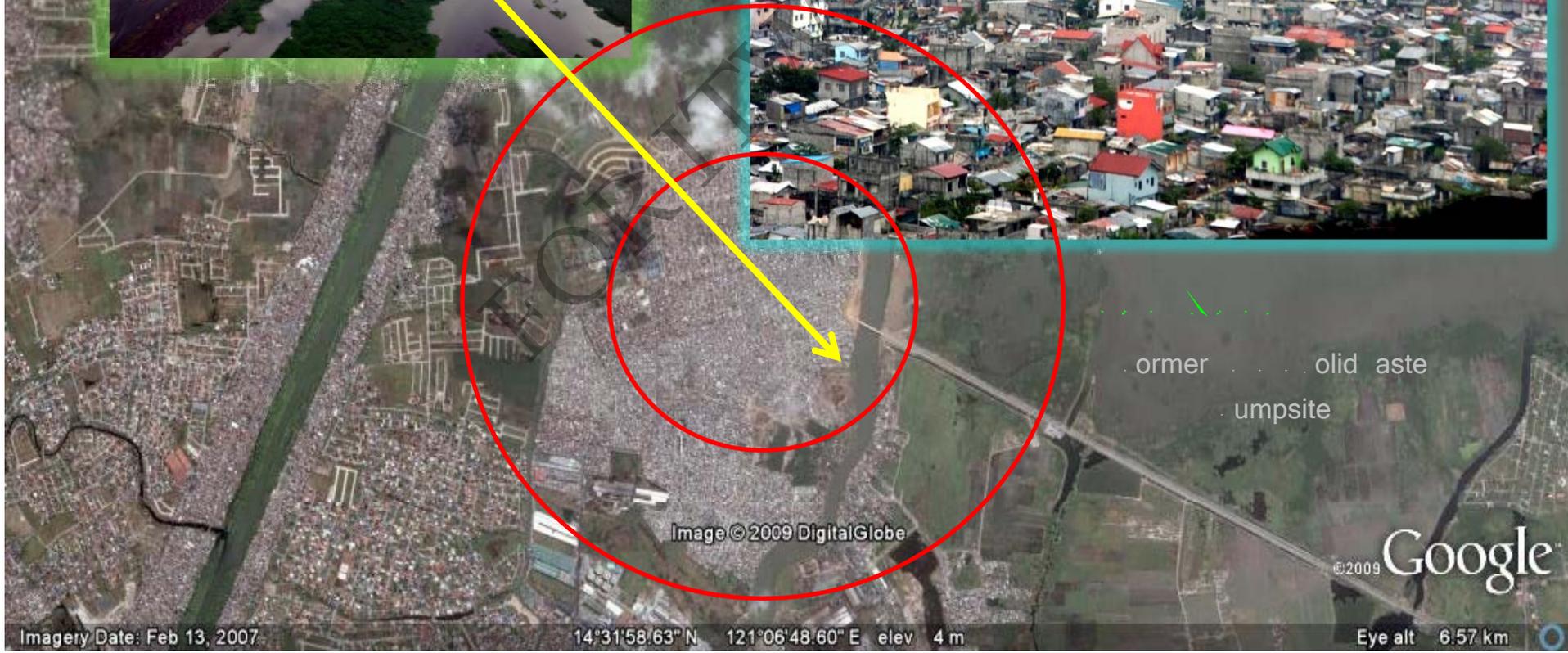
**A total of 4,644 houses were damaged, more than half of them totally destroyed.**

**Source: National Disaster Coordinating Council (NDCC)**

# SATELLITE IMAGE SHOWING THE NAPINDAN CHANNEL CONNECTING LAGUNA DE BAY TO MANILA BAY



# ILLEGAL SETTLEMENTS



# LAKESHORE ENCROACHMENT



# LAKESHORE ENCROACHMENT



©2009 Google

14°31'51.74" N 121°06'13.84" E

Eye alt 1.79 km



## **IDENTIFIED PRIORITY ISSUES THAT NEED TO BE ADDRESSED:**

- **The inadequate river control and drainage facilities,**
- **Pollution of water resources-surface water and ground water as a result of urbanization, industrialization, illegal settlement and inadequate sewerage and sanitation facilities**
- **Indiscriminate land use and land development**



## **IDENTIFIED PRIORITY ISSUES THAT NEED TO BE ADDRESSED:**

- Absence of River Basin Organizations in some of the major and principal river basins**
- The rising trend of flood and other water-induced disasters**
- Water governance concern due to overlapping functions among the various government agencies working on water and water-related projects and programs**

# Priority Actions & Challenges:

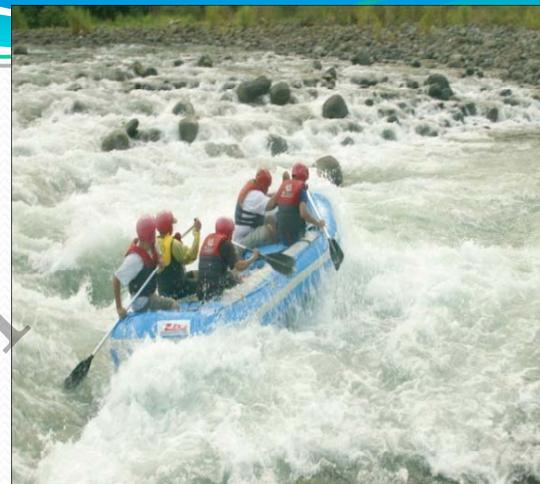
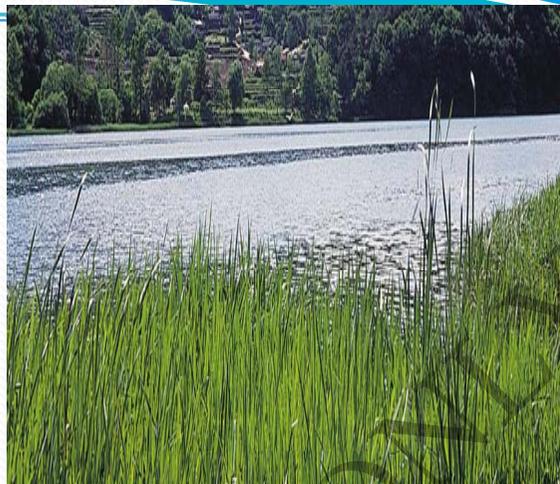
## Mainstreaming Disaster Risk Reduction (DRR) in sub-national development and physical planning in the Philippines

- ✿ Aims to minimize the impact of natural disasters to communities in the Philippines by putting DRR as an integral part of the planning process of regions and provinces
- ✿ Implemented by NEDA, with financial assistance from the UNDP & EC's Humanitarian Aid Department

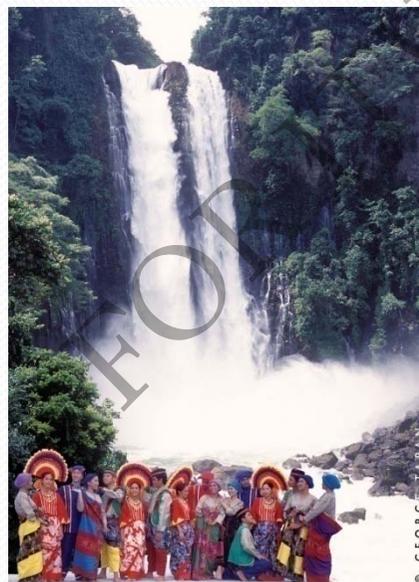


*“Without an Integrated Approach we could face a tangle of problems. Working together we could generate a cascade of progress and leave a lasting legacy for the future.”*

*-Kofi Annan*



## **SAVERIVER, SAVE LIFE**



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**Department of Environment &  
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**THANK  
YOU...**

