

**ASIAN DISASTER REDUCTION CENTER**

**VISITING RESEARCHER  
FINAL PRESENTATION**



Presented by:

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Department of National Defense  
**Office of Civil Defense – Region 3**  
Regional Disaster Risk Reduction Management Council - 3  
City of San Fernando, Pampanga, Philippines

**KALINGA LUZON**  
HELP US TO BUILD 40,000 HOMES FOR THE  
LUZON TYPHOON VICTIMS



### Scope of Presentation

**I. GENERAL INFORMATION**

- *Profile of Philippines*
- *Profile of Japan*

**II. PHILIPPINE DISASTER MANAGEMENT SYSTEM**

- *Legal Basis*
- *Organization*
- *DRM Act of 2010*

**III. JAPAN DISASTER MANAGEMENT SYSTEM**

- *Legal Basis*
- *Organization*
- *Disaster Counter Measures Act*

**IV. FLOOD SITUATION IN CENTRAL LUZON**

- *Profile of Central Luzon*
- *Causes of Flood in Central Luzon*

**V. RESEARCH STUDY IN JAPAN**

- *Field Visits*
- *Orientation/Training/Seminars*
- *International Meeting/Symposium/Workshop*
- *Visit to Museum/Institutions of Learning*
- *Others*

**VI. ACTION PLAN**

## General Information

Large mountainous terrain, narrow coastal plains and interior valleys and plains make up the country's topography.

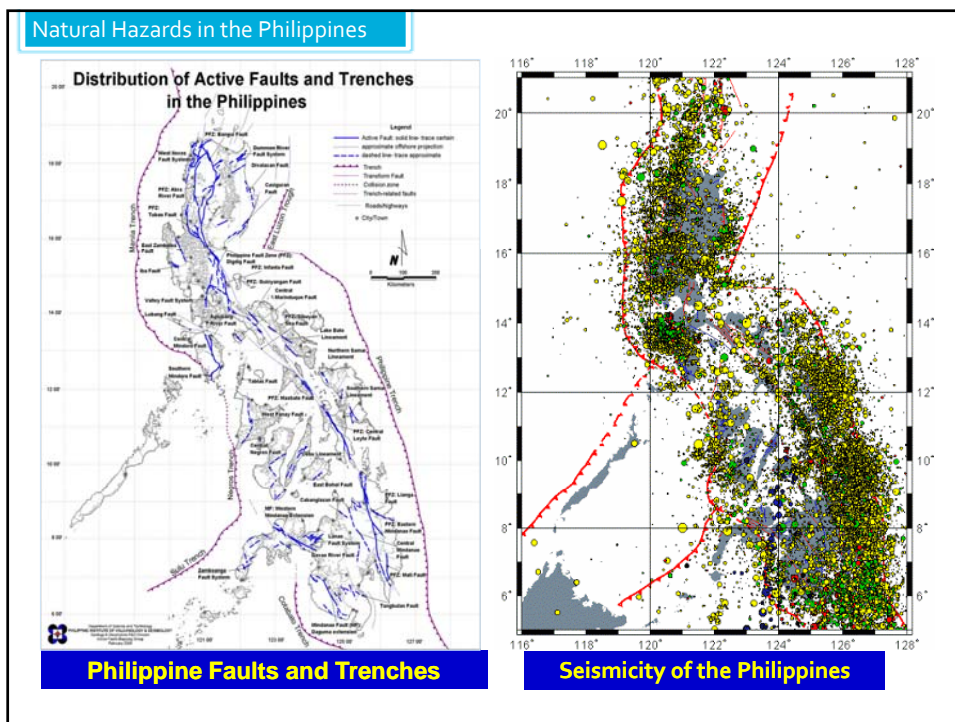
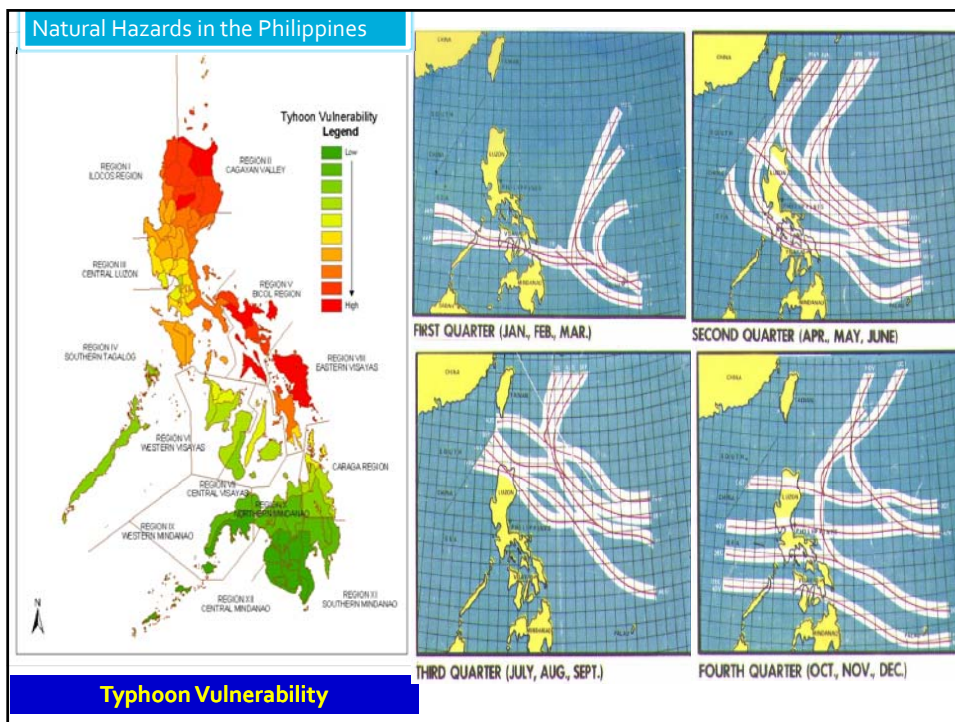


- Total area: 300,000 sqm
- Coast line: 36,289 (5<sup>th</sup> longest)
- Estimated Population: 94.01m
- Three major island groups:
  - Luzon - largest island group with 141,000 sq. kms.
  - Mindanao - second with 102,000 sq. kms.
  - Visayas - third with 57,000 sq. kms.
- 17 Regions
- 80 Provinces
- 1,613 City/Municipality
- 42,025 Barangays

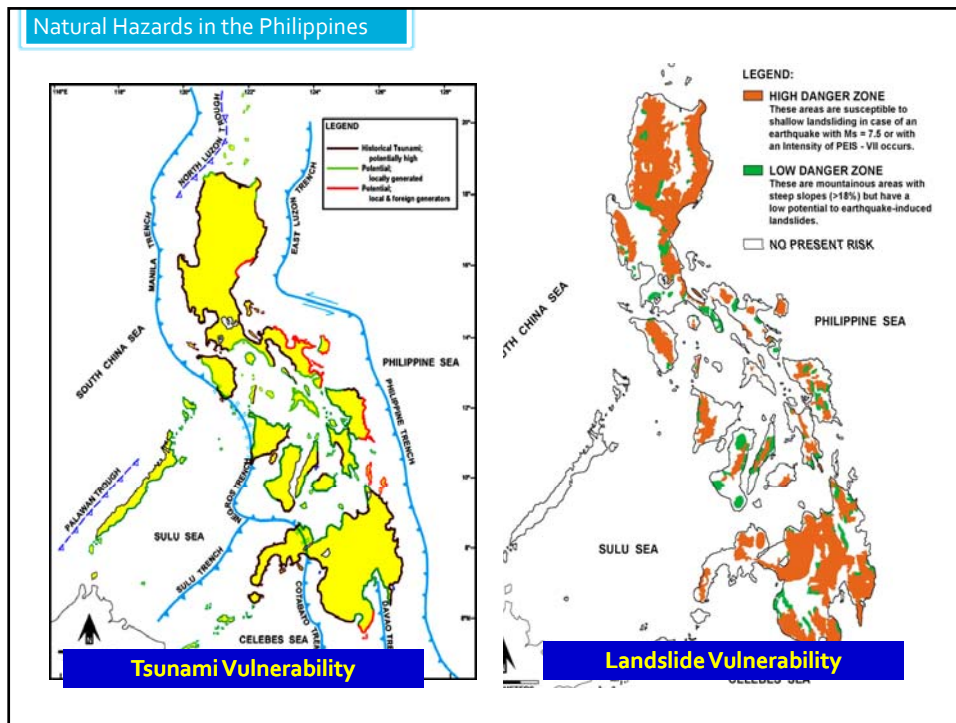
## Climate

- Tropical marine climate (hot and humid)
- Dominated by two major seasons: wet and dry seasons
- "Habagat" (Southwest monsoon) May to October
- "Amihan (Northeast monsoon) November - April
- Mean annual temperature is 26.6°C (79.88)
- 28.3°C during summer months
  - "Tag -init" summer (Hot and dry season) March to May
  - "Tag-ulan" (rainy season) June to November
  - "Tag-lamig" (cool dry season) December - February













**LANDSLIDES**



Taloy Sur, Marcos Highway Tuba, Benguet



SALACOP BRIDGE  
KALIBAK, KAPANGAN, BENGUET

**LANDSLIDE  
BUYAGAN, LA TRINIDAD**

**LANDSLIDE  
STO. NINO, TUBLAY**



**LAND SLIDE  
LOACAN, ITOGON**



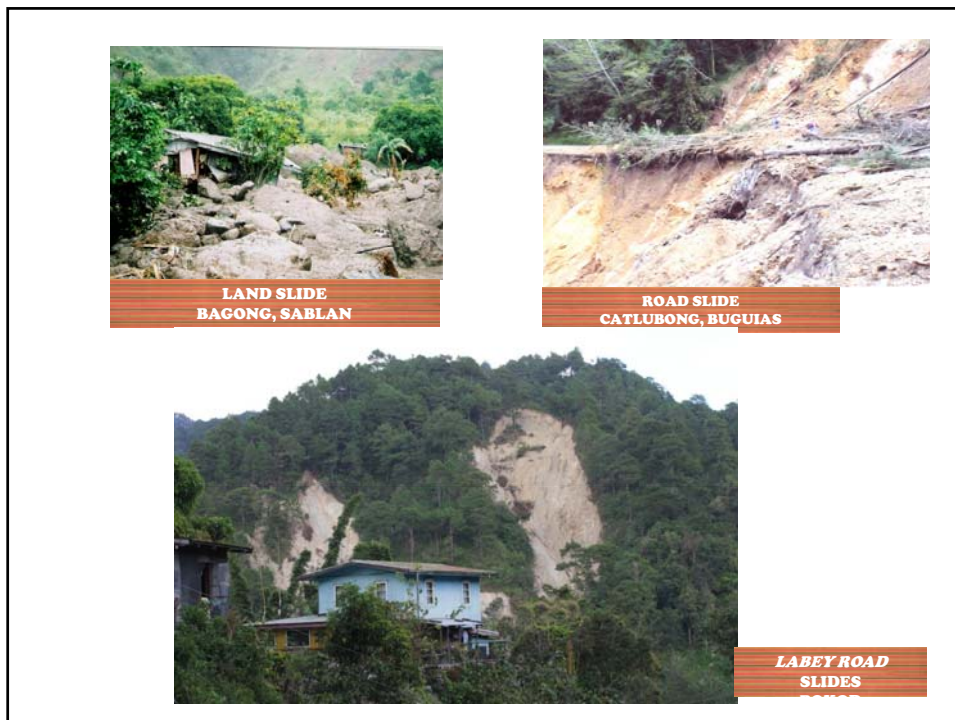
**LAND SLIDE  
MT. DILAN, TUBA**



**LABEY ROAD SLIDES  
BOKOD**

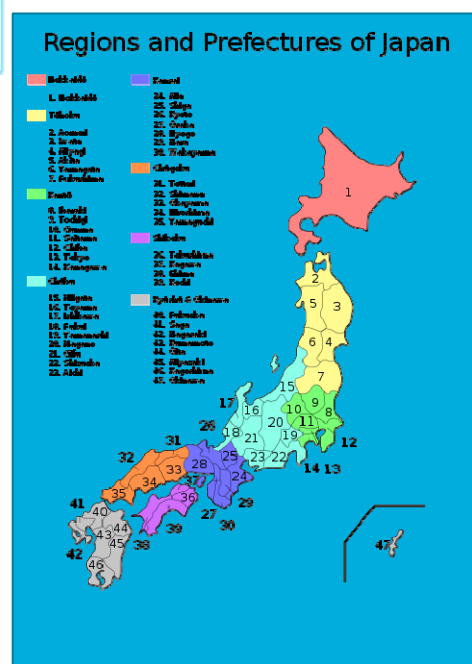






## General Profile: Japan

Land Area : 378,000 sqkm  
 Population : 127.77 million  
 Regions : 4  
 Prefectures : 47  
 Municipalities : 1,800  
 Capital : Tokyo  
 Climate : 4 seasons  
 (Winter, Spring, Autumn and Summer)





Every year there is a great loss of peoples lives and property in Japan due to natural disasters, up until the 1950's numerous large-scale typhoons and earthquakes caused extensive damage and thousands of casualties. However the development of disaster management system, promotion of national land conservation, improving weather forecasting and technologies, and upgrading disaster communications systems damages have been decreased except for the 1995 Great Hanshin-Awaji earthquake where 6,400 people perished and in 2004 10 typhoons crossed over Japan. There is also a possibility that another large scale earthquake might happen again which post a threat to the safety and security of the country.

Tormenting Rain - Nagasaki City 1982

Hokkaido Nansai-oki earthquake

Ise-wan typhoon 1959 Gifu Prefecture

Mount Usu volcanic eruption

Great Hanshin Awaji earthquake in 1995

## Recent Flood in Hyogo

### Damage to Maruyama River area caused by

Dead 5	Injured 51
Affected buildings 4033 inundated buildings 7944	

Maruyama Riv.

Inundated hospital

出石川片間地区

Recent Flood in Hyogo  
Damage to Maruyama River area caused by typhoon in 2004



# PHILIPPINE DISASTER RISK REDUCTION MANAGEMENT SYSTEM



## **LEGAL AUTHORITY**

# **RA 10121 Philippine Disaster Risk Reduction and Management (PDRRM) Act of 2010**

**Signed on May 27, 2010  
by Her Excellency President Gloria Macapagal - Arroyo**



**"AN ACT STRENGTHENING THE  
PHILIPPINE DISASTER RISK  
REDUCTION AND MANAGEMENT  
SYSTEM, PROVIDING FOR THE  
NATIONAL DISASTER RISK  
REDUCTION AND MANAGEMENT  
FRAMEWORK AND  
INSTITUTIONALIZING THE NATIONAL  
DISASTER RISK REDUCTION AND  
MANAGEMENT PLAN,  
APPROPRIATING FUNDS THEREFOR  
AND FOR OTHER PURPOSES"**





**RA NO. 10121**

- 21 years in the making
- 7 Congresses
- 4 Administration
- Signed into Law on May 27, 2010

## Republic Act No. 10121



### Salient Features

- **Policy Statements and Terminologies on DRRM (Secs. 2 & 3)**
- **Institutional Mechanisms (Secs. 5 – 12)**
  - DRRMCs (National, Regional, Provincial, City, Municipal and Barangay Levels)
  - Office of Civil Defense
  - Permanent Office on DRRM at the LGU Level
- **Operational Mechanisms (Secs. 15 – 18)**
  - Coordination during Emergencies
  - Declaration of a State of Calamity
  - Remedial Measures
  - Mechanism for the IHAN

## Republic Act No. 10121

### Salient Features

- Participation, Accreditation, Mobilization, Protection and Development of Disaster Volunteers
- Training and Education in DRR
- Funding
- Prohibited Acts
- Penal Provisions

### RA No. 10121 - Salient Features

#### I. Policy Statements on DRRM (Sec. 2)

- Upholding people's rights to life and property and adherence to internationally accepted principles, norms and standards for capacity building in DRRM and humanitarian assistance **(Sub-Sections a – c)**
- Adoption of a holistic, comprehensive, integrated, proactive and multi-sector approach in addressing the impacts of disasters, including climate change **(Sub-Section d)**
- Development, promotion and implementation of a comprehensive National Disaster Risk Reduction and Management Plan (NDRRMP) **(Sub-Section e)**
- Mainstreaming DRR and Climate Change in national and local development plans and development processes (e.g. policy formulation, socio-economic development planning, budgeting and governance) **(Sub-Sections f, g and h)**

## RA No. 10121 - Salient Features

### i. Policy Statements on DRRM (Sec. 2) – con't.

- - Mainstreaming DRR into the peace process and conflict resolution **(Sub-Section i)**
  - Ensuring DRR and CC-Gender responsive measures, sensitive to indigenous knowledge and respect to human rights **(Sub-Section j)**
  - Strengthening capacity building of –
    - LGUs on DRR (e.g. decentralized powers, responsibilities and resources) **(Sub-Sections k and l)**
    - Vulnerable and marginalized groups **(Sub-Section n)**
  - Engaging the participation of CSOs, private sector and volunteers in DRR **(Sub-Section m)**
  - Promotion of breastfeeding before and during a disaster or emergency **(Sub-Section o)**
  - Ensuring maximum care, assistance and services to affected individuals and families **(Sub-Section p)**

## RA No. 10121 - Salient Features

### II. Scope (Sec. 4)

- - **Provision for the development of policies and plans and implementation of actions and measures pertaining to all aspects of DRRM, including-**
    - **Governance**
    - **Risk assessment and early warning**
    - **Knowledge building and awareness raising**
    - **Reducing underlying risk factors**
    - **Preparedness for effective response and early recovery**



## RA No. 10121 - Salient Features



### III. Institutional Mechanisms (Secs. 6 – 13)

- There are four (4) major institutional mechanisms for DRRM provided for under the new law:
  1. DRRMC Networks from the national, regional, provincial, city and municipal level, and BDRRM Committees at the barangay level;
  2. Local Disaster Risk Reduction and Management Offices;
  3. Office of Civil Defense, and
  4. Disaster Volunteers



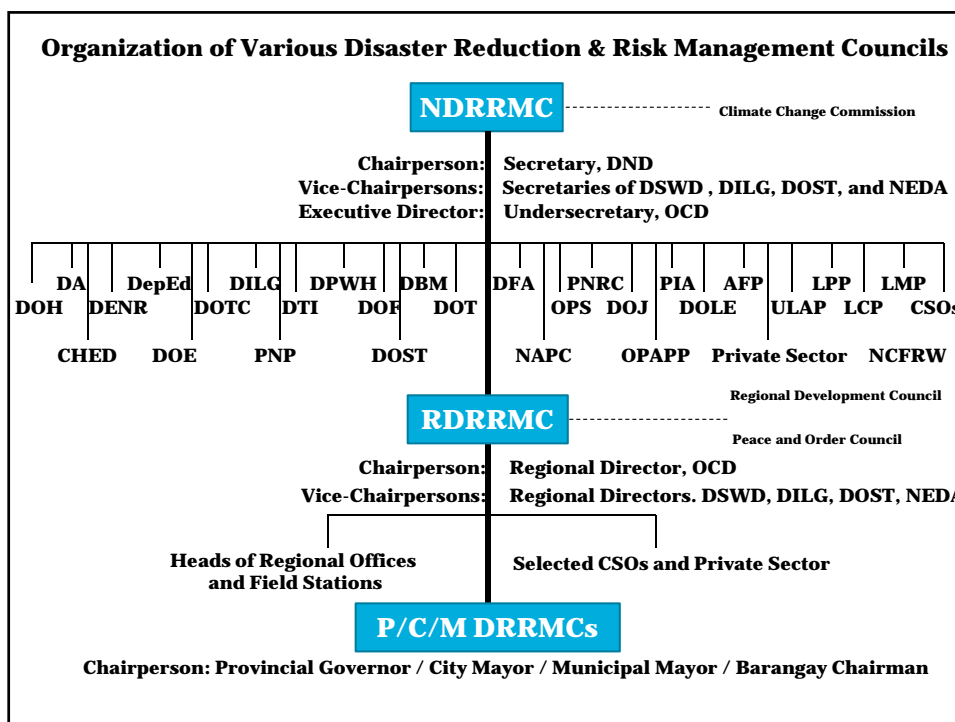
## RA No. 10121 - Salient Features



### Section 6. Powers and Functions of the NDRRMC

- NDRRMC empowered with policy-making, coordination, integration, supervision, monitoring and evaluation functions to be carried out through seventeen (17) tasks / responsibilities






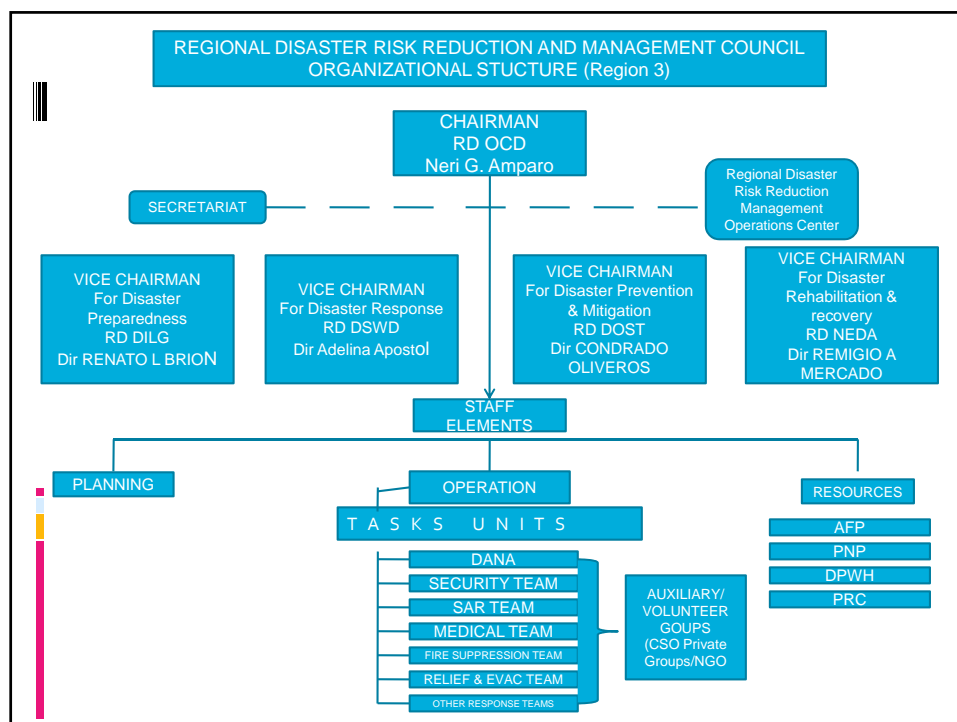
**NATIONAL DISASTER RISK REDUCTION  
MANAGEMENT COUNCIL (NDRRMC)**

**Chairperson: Secretary, National Defense**

**Vice chairpersons:**  
 Disaster Preparedness-Secretary, DILG  
 Disaster Response–Secretary, DSWD  
 Disaster Prevention & Mitigation-Secretary, DOST  
 Disaster Rehabilitation & Recovery-DG, NEDA

<b>MEMBERS OF THE NDRRMC</b>	
<ul style="list-style-type: none"> <li>• Secretary, DOH</li> <li>• Secretary, DENR</li> <li>• Secretary, DA</li> <li>• Secretary, DepEd</li> <li>• Secretary, DOE</li> <li>• Secretary, DOF</li> <li>• Secretary, DTI</li> <li>• Secretary, DOTC</li> <li>• Secretary, DBM</li> <li>• Secretary, DPWH</li> <li>• Secretary, DFA</li> <li>• Secretary, DOJ</li> <li>• Secretary, DOLE</li> <li>• Secretary, DOT</li> <li>• The Exec. Secretary, OP</li> <li>• Secretary, OPAPP</li> <li>• Chairman, CHED</li> <li>• Chief of Staff, AFP</li> </ul>	<ul style="list-style-type: none"> <li>• Chief, PNP</li> <li>• The Press Secretary</li> <li>• Sec-Gen., Phil. Red Cross (PRC)</li> <li>• Commissioner, NAPC</li> <li>• Chairperson, NCRFW</li> <li>• Chairperson, HUDCC</li> <li>• Exec. Director, CC Office of the CCC</li> <li>• President, GSIS</li> <li>• President, PhilHealth</li> <li>• President, ULAP</li> <li>• President, LPP</li> <li>• President, LCP</li> <li>• President, LMP</li> <li>• President, LMB</li> <li>• Four (4) reps from the CSOs</li> <li>• One (1) rep from the Private Sector</li> </ul>
<b>Administrator, Office of Civil Defense – Member &amp; Executive Director</b>	

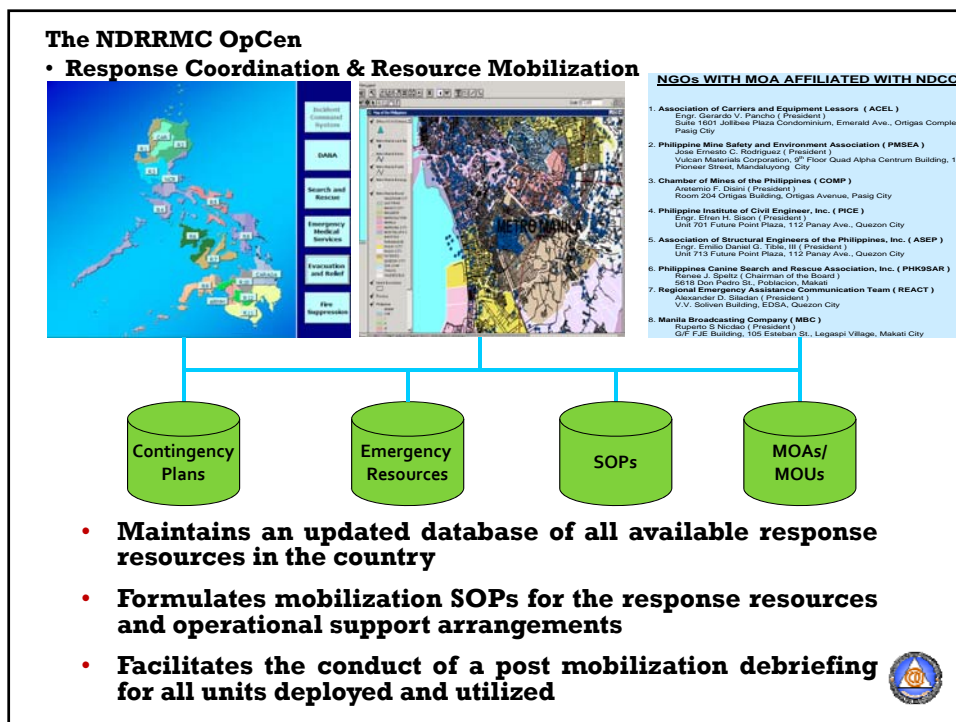
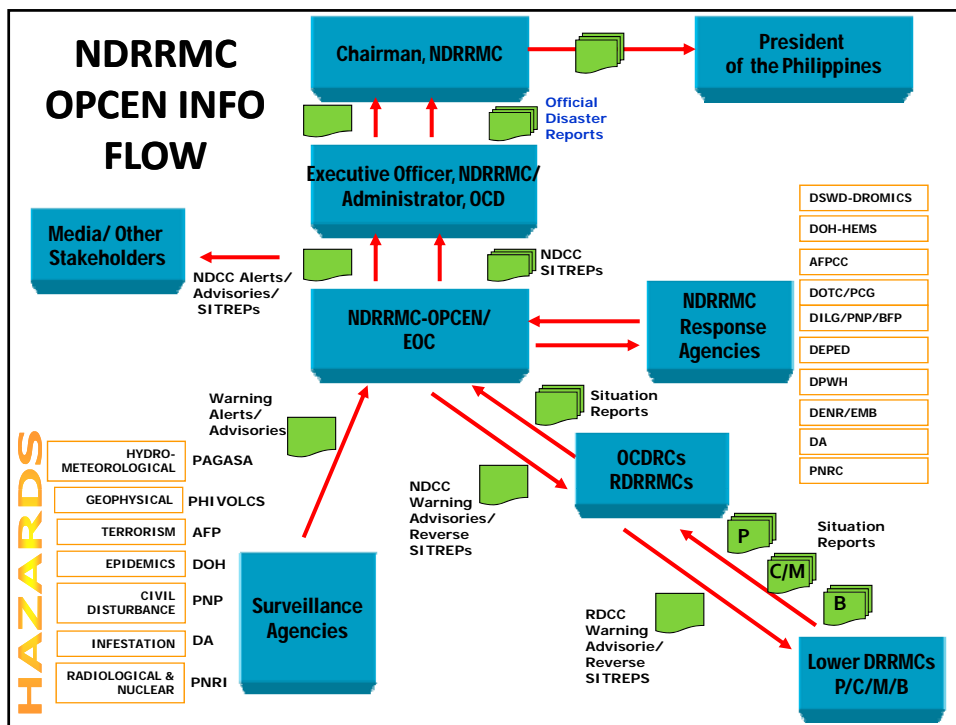
<b>Office of Civil Defense</b>	
<p>DRM Bill 10121 May 27, 2010 IRR September 27, 2010</p>	<p><b>DRM Section 8. and IRR Rule 7 Section 1</b></p> <p><b>OFFICE OF CIVIL DEFENSE</b></p> <p><b>Mandate</b> – The Office of Civil Defense (OCD), as the implementing arm of the National Council, shall have the primary mission of administering a comprehensive national civil defense and disaster risk reduction and management program by providing leadership in the continuous development of strategic and systematic approaches as well as measures to reduce the vulnerabilities and risks to hazards and manage the consequences of disasters.</p>
	



• **The P/C/M Disaster Risk Reduction and Management Councils (LDRRMC)**

- **Chairperson:** Governor / Mayor
- **Members: Eighteen (18) -**
  - Local Planning and Development Officer;
  - Head of the LDRRMO,
  - Head of the Local Social Welfare and Development Office,
  - Head of the Local Health Office,
  - Head of the Local Agriculture Office,
  - Head of the Gender and Development Office,
  - Head of the Local Engineering Office,
  - Head of the Local Veterinary Office,
  - Head of the Local Budget Office,
  - Division Head / Superintendent of Schools of the DepEd,
  - Highest-ranking Officer of the Armed Forces of the Philippines assigned in the area, Provincial Director/City/Municipal Chief of the Philippine National Police (PNP),
  - Provincial Director/City/ Municipal Fire Marshall of the Bureau of Fire Protection (BFP), President of the Association of Barangay Captains (ABC),
  - Philippine National Red Cross (PNRC), Four (4) accredited CSOs
  - One (1) private sector representative



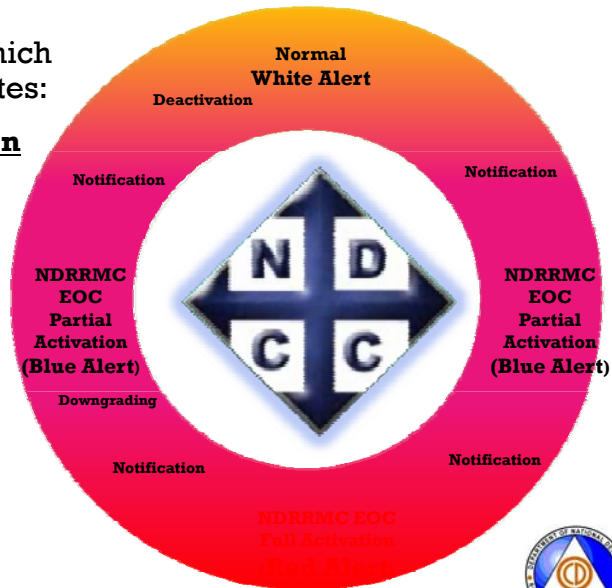


## Concept of Operation

Two conditions in which the OPCEN operates:

**1. Normal Condition**

**2. Emergency Condition**



**JAPAN'S DISASTER  
MANAGEMENT SYSTEM**

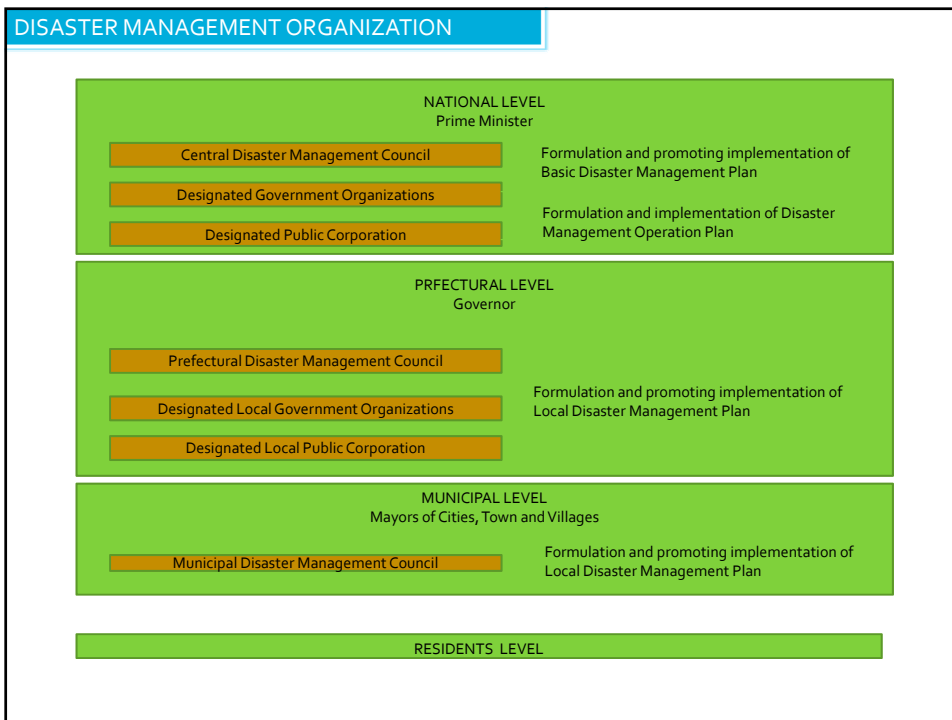
DISASTER MANAGEMENT ACTS		
Events	Disaster Management Acts	Disaster Management Plans and Systems
1844 66 - Nankai Earthquake	47 - Disaster Relief Act	
40 - Fubai Earthquake	49 - Flood Control Act	
1850 60 - Typhoon Ito wcn	40 - Existing Standard Law	
1860 61 - Heavy Snowfalls	60 - Soil Conservation and Flood Control Urgent Measures Act 61 - Disaster Countermeasures Relief Act	61 - Designation of Disaster Reduction Day 62 - Establishment of Disaster Management Fund 63 - Basic Disaster Management Plan
64 - Niigata Earthquake	62 - Act on Special Financial Support to Deal with Continuously Serious Disasters 64 - Act on Special Measures for Heavy Snowfall Areas	
1870 75 - Mt. Hakusanjima Eruption 76 - Seismological Society of Japan's report about the possibility of Tsunami 78 - Miyagi-ken-ki Earthquake	75 - Act on Special Measures for Active Volcanoes 76 - Act on Special Measures for Large-scale Earthquakes	75 Tsunami Earthquake Countermeasures Basic Plan
1900 80 - Great Hanshin-Kaiju Earthquake	80 - Act on Special Financial Measures for Urgent Earthquake Countermeasures Improvement Projects in Areas for Intensified Measures 81 - Amendment of Building Standard Law	
90 - Terrestrial Tsune in Minamino - JCO Nuclear Accident	90 - Act on Special Measures for Earthquake Disaster Countermeasures 91 - Act on Promotion of the Earthquake-proof Retrofit of Buildings 92 - Amendment of Disaster Countermeasures Basic Act 93 - Amendment of Act on Special Measures for Large-scale Earthquakes 94 - Act on Special Measures for Preservation of Rights and Profits of the Victims of Specified Disasters 97 - Act on Promotion of Disaster Resilience Improvement in Densely Inhabited Areas 98 - Act on Support for Livelihood Recovery of Disaster Victims 99 - Act on Special Measures for Nuclear Disasters	95 - Amendment of Basic Disaster Management Plan Disruption of Disaster Reduction and Volcano Day
2000 06 - Terrestrial Tsune in the Tokai Region 04 - Niigata-ken-Chuetsu Earthquake 05 - Typhoons and Terrestrial Rains 010 typhoons (the largest number in a single year on record, landed in Japan) (an average of 2.6 typhoons per year)	06 - Act on Promotion of Sediment Disaster Countermeasures for Sediment Disaster Prone Areas 02 - Act on Special Measures for Prevention of Tsunami and Nankai Earthquake Disaster Management 03 - Specified Urban River Inundation Countermeasures Act 04 - Act on Special Measures for Promotion of Disaster Management for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 05 - Amendment of Act on Promotion of the Earthquake-proof Retrofit of Buildings Amendment of Flood Control Act Amendment of Act on Promotion of Sediment Disaster Countermeasures for Sediment Disaster Prone Areas	01 - Establishment of the Cabinet Office 03 - Policy Framework for Tsunami Earthquake Policy Framework for Trench-type and Nankai Earthquakes 04 - Tsunami and Nankai Earthquake Countermeasures Basic Plan 05 - Tsunami and Nankai Earthquake Countermeasures Basic Plan 06 - Tsunami and Nankai Earthquake Countermeasures Basic Plan 07 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 08 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 09 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 10 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 11 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 12 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 13 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 14 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 15 - Policy Framework for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches 16 - 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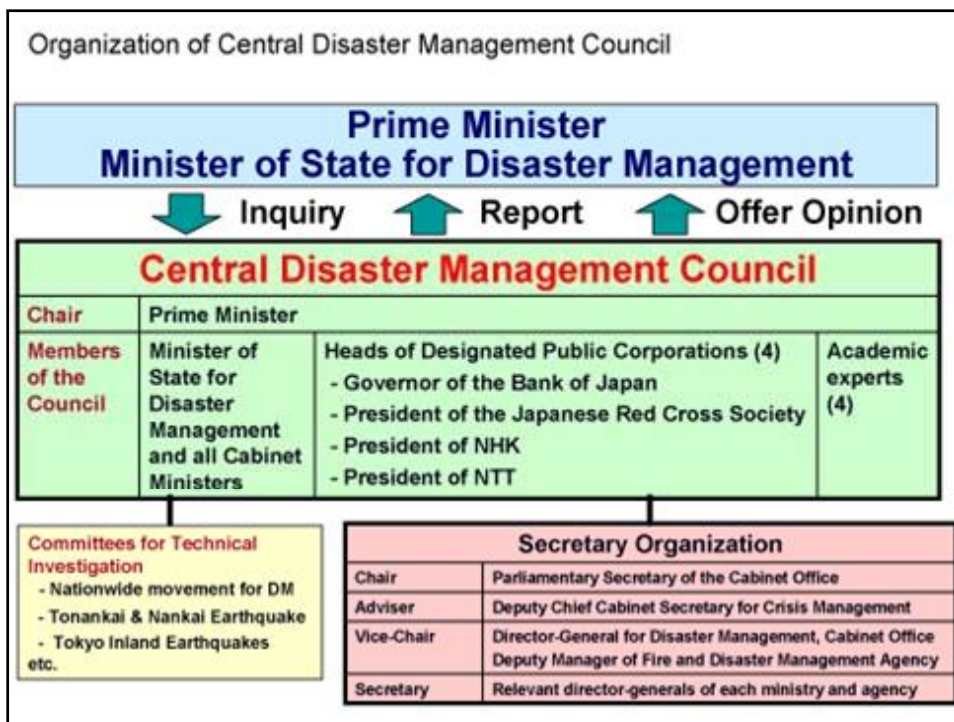
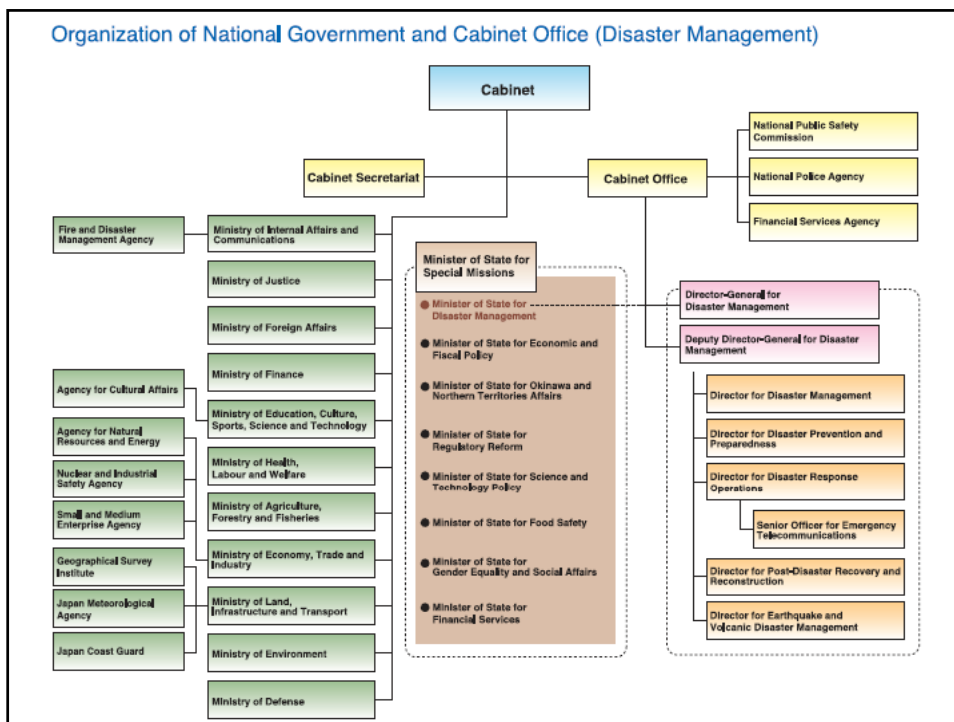


Sea-view Typhoon, 1950  
Photo: Gifu Prefecture



Tsunami Tsune in Nagasaki, 1962  
Photo: Nagasaki City







Comprehensive Disaster Management System  
Disaster Counter Measures Basic Act

- ❖ To protect national land as well as citizens' lives and livelihood and property from natural disasters
- ❖ Formulates a comprehensive disaster management system
- ❖ Addresses all of the disaster phases of prevention, mitigation and preparedness, emergency response, recovery and rehabilitation.
- ❖ Establishes roles and responsibilities of the national and local governments the relevant stakeholders of the public and private sectors

Contents of the Disaster Countermeasures Basic Act

- Definition of responsibilities for disaster management
- Disaster management organizations
- Disaster management planning
- Disaster preventing and preparedness
- Disaster Emergency response
- Disaster recovery and rehabilitation
- Financial measures
- State of Disaster Emergency

Mission of the Cabinet Office

- ❖ To integrate and coordinate disaster reduction policies and measures of ministries and agencies.
- ❖ To secure cooperation and collaboration among related government organization
- ❖ To undertake planning of basic disaster management policies and response to large-scale disasters
- ❖ To strengthen risk management function to address emergencies such as large-scale disasters and serious accidents

#### Central Disaster Management Council

- Chairperson – Prime Minister
- Members – 17 Head of all ministers  
 – Head of all Designated Public Corporations  
 – Governor of the Bank of Japan  
 – President of Japanese Red Cross Society  
 – President of Nippin-Hoso Kyokai  
 (Japan Broadcasting Corporation)  
 – NTT  
 – President of Nippon Telegraph and Telephone Corporation  
 – Experts

#### Duties

- ❖ Formulate and promote implementation of the Basic Disaster Management Plan and Earthquake Countermeasures Plans.
- ❖ Formulate and promote implementation of the urgent measures plan for major disasters
- ❖ Deliberate important issues on disaster reduction according to request from the Prime Minister or Minister of State for Disaster Management (basic disaster management policies)
- ❖ Other opinions regarding important issues on disaster reduction to the Minister and Minister of State for Disaster Management

#### Disaster Management Planning System

Basic Disaster Management Plan – This plan is a basis for disaster reduction activities and is prepared by the Central Disaster Management Council based on the Disaster Countermeasures Basic Act.

Disaster Management Operation Plan – This plan is made by each designated government organization and designated public corporations based on the Basic Disaster Management Plan.

Local Disaster Management Plan – This plan is made by each prefectural and municipal disaster management council, subject to local circumstances and based on the Basic Disaster Management Plan.

### DISASTER MANAGEMENT SYSTEM

#### Disaster Management Budget

The national budget for disaster management is approximately 4.5 trillion yen which is approximately 5% of the budget for general accounts

Scientific and Technology Research	1.3%
Disaster Prevention and Preparedness	23.6%
National Land Conservation	48.7%
Disaster Recovery and Rehabilitation	26.4%

#### Disaster Counter Measures

##### Research and Development

- Scientific technology research in disaster reduction
- Utilization of earthquake early warning information

##### Disaster Prevention and Preparedness

- National land conservation
- Observing, forecasting and warning of disaster risk
- Information and communication system
- Integrated disaster management information system
- Development of disaster management bases
- Issuing of evacuation orders and instruction
- Measures for people requiring assistance during disasters
- Disaster reduction drills and exercises

##### Disaster Emergency Response

- Outline of disaster emergency response
- Wide-area support system

##### Disaster Recovery and Rehabilitation

- Outline of Recovery and Rehabilitation
- Disaster victims livelihood recovery support system



#### Earthquake Disaster Countermeasures

- Earthquakes in Japan
- Observation system
- Outline of countermeasures against large-scale earthquake
- Countermeasures against Tokai earthquake
- Countermeasures against Tonankai and Nankai Earthquakes
- Countermeasures against trench-type earthquake in the vicinity of Japan and Chishima trenches
- Countermeasures against Tokyo inland earthquake
- Earthquake-proofing of houses and buildings
- Tsunami countermeasures

#### Volcano Disaster Countermeasures

- Volcano disaster in Japan
- Observation system
- Countermeasures based on the act on special measures for active volcanoes
- Volcano hazard maps

#### Storm and Flood Countermeasures

- Storm and flood damage in Japan
- Observation system
- Comprehensive storm and flood countermeasures
- Large-scale flood countermeasures

#### Snow Disaster Countermeasures

- Snow disasters in Japan
- Snow disaster countermeasures

#### Disaster Reduction Activities

- Disaster reduction awareness enhancement and disaster knowledge dissemination
  - Nationwide movement for disaster reduction
  - Disaster reduction week campaign
  - Disaster Education
- Improvement of environment for disaster reduction volunteer activities
  - Community voluntary disaster reduction organizations
  - Volunteer Firefighting teams
  - Volunteer flood-fighting teams
- Disaster reduction activities of corporation
  - Business continuity plan
  - Evaluation of corporate disaster reduction activities

### International Cooperation in Disaster Reduction

Disasters throughout the world

UN World Conference on Disaster Reduction and International Strategy for Disaster Reduction

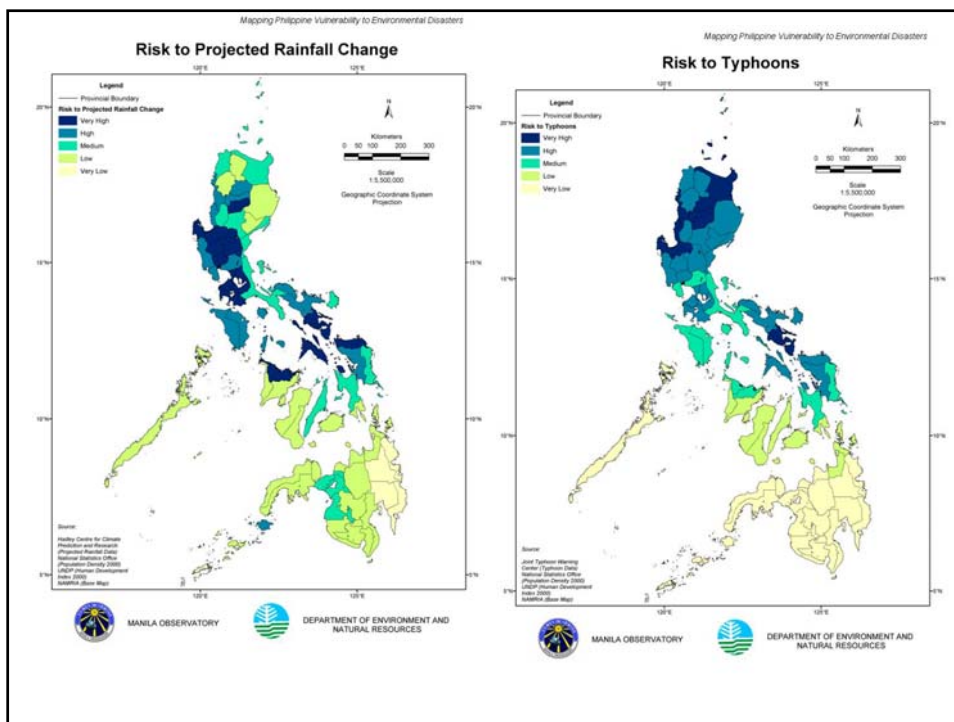
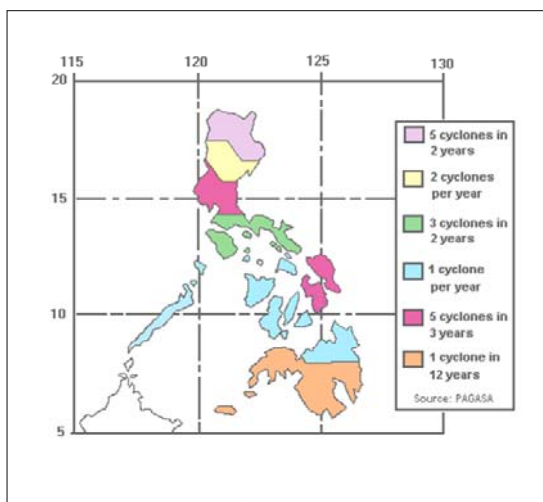
Japan's International Cooperation in Disaster Reduction

- Initiative for disaster reduction through Official Development Assistance (ODA)
- International Emergency assistance
- Regional cooperation through Asian Disaster Reduction Center (ADRC)
- Indian Ocean Tsunami Warning and Mitigation System (IOTWS)
- International Recovery Platform (IRP)
- Bilateral Cooperation with Indonesia

### **This Research Study aims to:**

Mainstream disaster risk reduction management at all levels. With participation of non-government organization, local and international who extends their assistance through technical and financial support.

*Frequency of Tropical Cyclones  
Passage over each Geographical Zones in the Philippines*





## DAM's IN Central Luzon

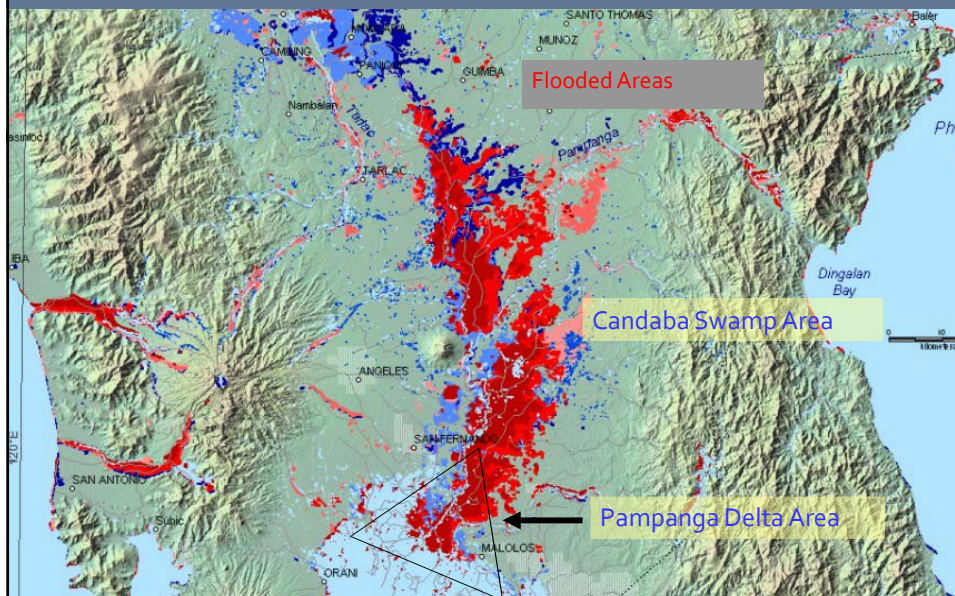
The Pampanga River Basin covers a big portion of Central Luzon. Within the CL are Four (4) dams: Pantabangan, Angat, Ipo and Bustos.

While the dams serve as structural flood mitigating structures, unfortunately, though, during inclement weather situation, excess waters from the hinterlands on the east and from other river resource from the north simultaneously comes down and inundates vast areas of the provinces of Pampanga, Bulacan and Tarlac.

Built along the Pampanga River, the multi-purpose dam serves as a hydroelectric plant (with power generation of 100 MW) supplying additional energy for Luzon; as reinforcement against flood (with flood control capability of 330 MCM); and as water supply for irrigation (covering about 106,400 hectares of rice lands).

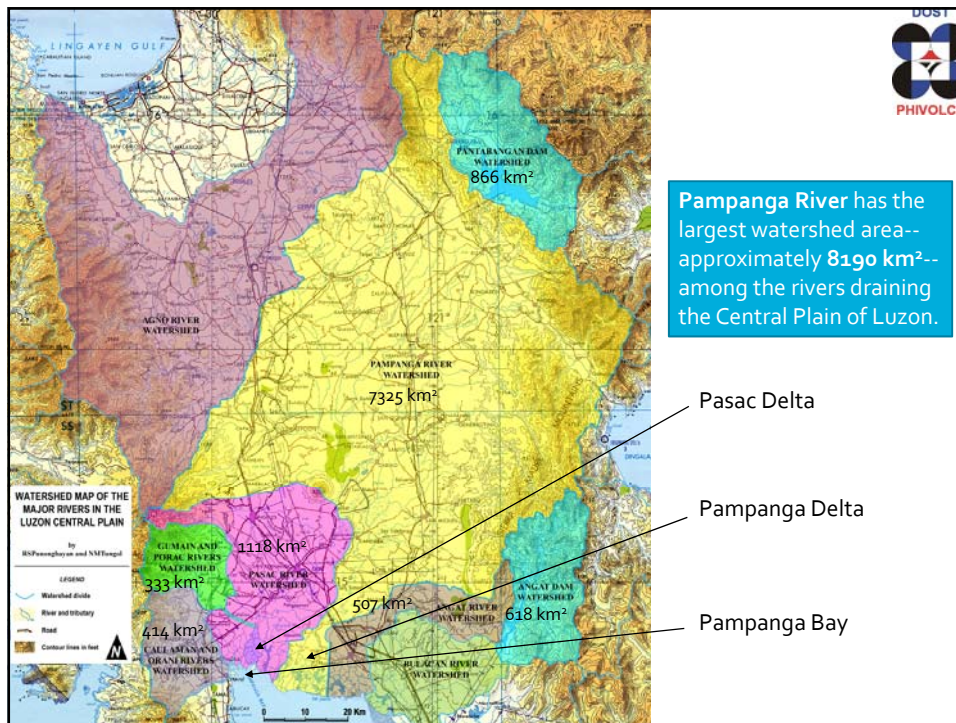


### Hazard Mapping base on past floods



Partial to complete burial of river segments, tributaries and distributaries





**IDENTIFIED POPULATION AND AREAS AT RISK**

Province	No. of Municipality at Risk	No. of Barangay at Risk	Farms at Risk	Population at Risk
Aurora	8	112	28,178	136,371
Bataan	9	86	34,514	170,333
Bulacan	18	133	33,577	160,504
Nueva Ecija	27	238	32,217	163,338
Pampanga	21	275	89,546	591,351
Tarlac	14	156	41,857	260,086
Zambales	7	57	13,748	64,631

Regional Disaster Risk Reduction Council

## Flooding in the Pampanga Delta and Pampanga Bay Area

- Considerations for Hazards Mitigation



### Understanding the (some) Types of FLOODS

- RIVER FLOODS
- FLOODS due to Rainwater
- DAM SPILL FLOODS / DAM Break
- COASTAL FLOODS – High Tide, Storm Surge, Tsunami
- FLASH FLOODS

## Flooding in the Pampanga Delta and Bay Area: Natural Causes



- Large watershed size
- Low elevation
- Gentle ground slope
- Vegetation loss
- Land subsidence
- Storm surge, tsunami
- Eruption and lahars of Pinatubo Volcano

## Flooding in the Pampanga Delta and Bay Area: Man-Made Causes



- Constriction of waterways
- Increase in runoff due to pavements
- Siltation of rivers by agricultural, industrial, commercial and household wastes
- Groundwater extraction?
- Non-integrated flood-control projects

### **Net Effects of Short- and Long-Term Lahars on the Lower Reaches of River Systems**

1. Partial to complete burial of river segments by lahar deposits.
2. Heavy siltation along river segments of tributaries and distributaries upstream and downstream of the lahar deposits of the Porac-Gumain and Pasig-Potrero river systems
3. Sediment-choking of man-made and natural drainage systems

**NET RESULT = LONG-TERM FLOODING**

### **1991 Pinatubo Eruption: PRIMARY CAUSE OF LONG-TERM FLOODING IN THE PROVINCES OF PAMPANGA, BULACAN AND BATAAN**

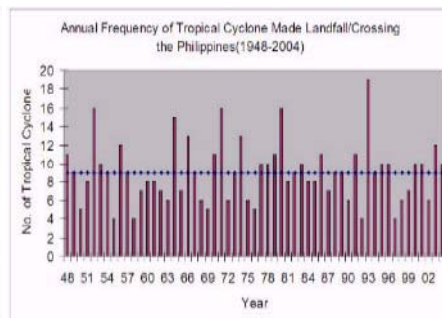
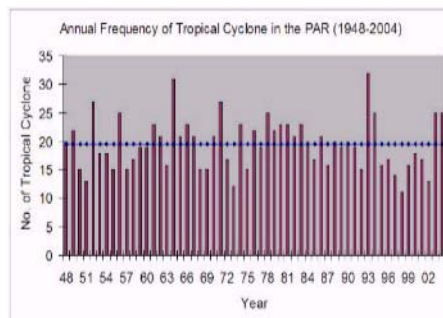


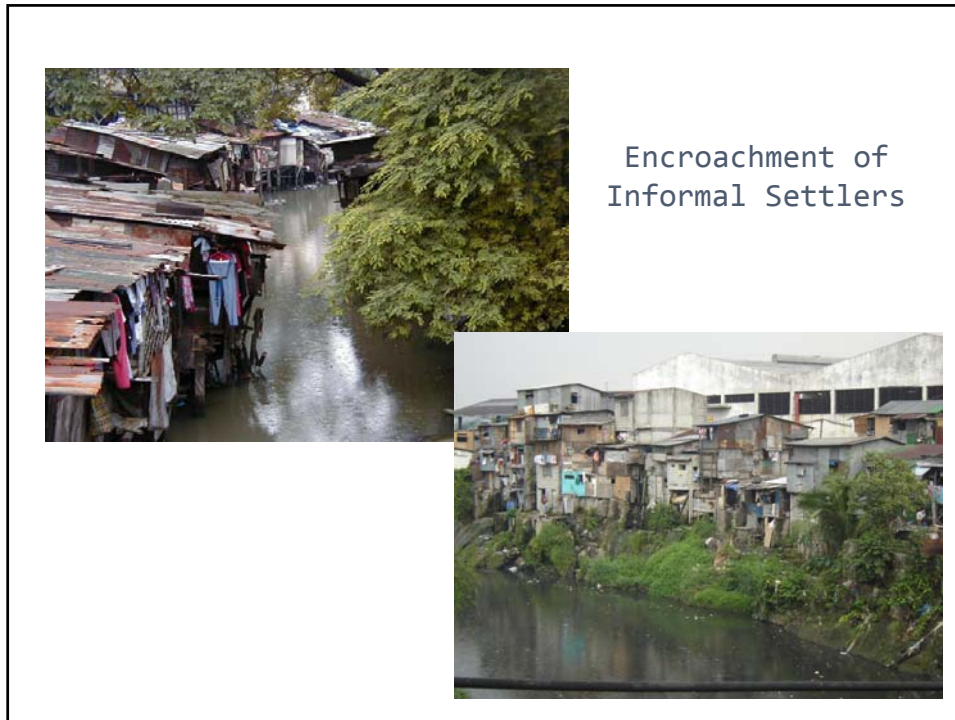
1. Remobilization in 1991 of ashfall and pyroclastic-flow deposits within the watershed of the Porac-Gumain River as short-term lahars.
2. Remobilization in 1991 of ashfall deposits within the watershed of the Caulaman-Orani River as short-term lahars.
3. Remobilization of ashfall and pyroclastic-flow deposits within the watershed of the Pasig-Potrero River as long-term lahars from 1991 to 1997.
4. Stream flow avulsion from the Sacobia to the Pasig-Potrero River in 1993.
5. Short-term lahars along the Abacan River from 1991-1992.



## OTHER CAUSES OF FLOODING:

1. Improper disposal of dredging spoils
    - a. along river banks
    - b. along river channels
  2. Construction of fishponds along river channels
  3. Extension of fishpond structure into river channels
  4. Westward growth of Barangay Malusac
  5. Natural accumulation of sediments at river mouths
- NET EFFECT:** Reduced carrying capacity of river channels  
**NET RESULT =** Flooding







Floods due to accumulation of Rainwater (Ponding)

Breaching of river structures



Siltation & Sedimentation



## Current initiatives in DRR

A Locally-based Flood Warning  
System



Structural Flood Mitigating Measures  
(some examples)

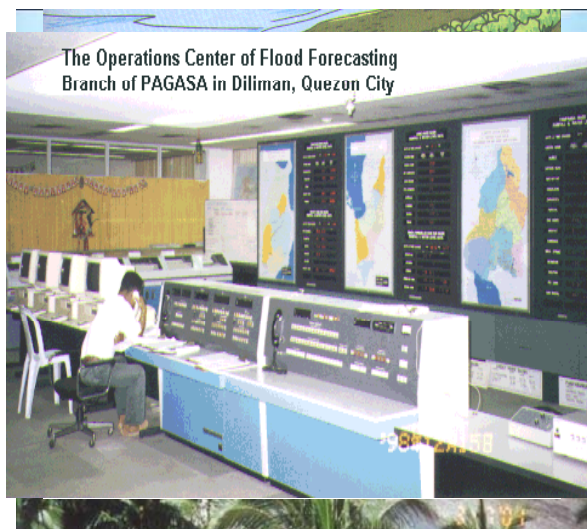
**Dam**

**Widening &  
Straightening**

**Bank  
Protection**



(Some) Non-Structural mitigating  
measures



**Zoning**  
**Reforestation**  
**FFWS**



## Flood Forecasting & Warning Systems



### Arayat



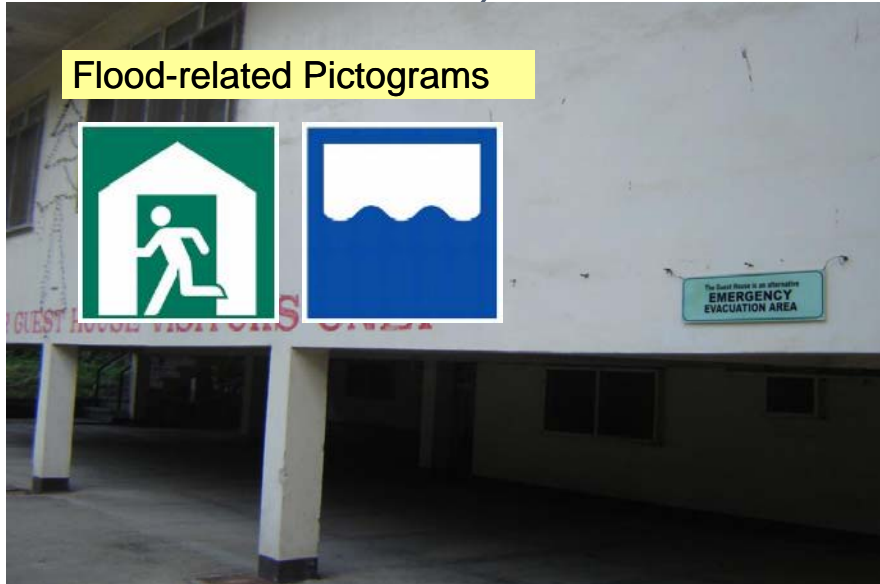






Flood warning signs (Ubiquitous FHM)

Flood-related Pictograms



Communities that are prone and vulnerable to flood disasters are particularly the main target areas.



The Community-based Flood Warning System concept









# OPERATION ALERT CODES

for Evacuation for Flooding Incidents and Release  
of Water from Dams

**OBJECTIVES:**

1. To have a uniform warning and alert system for evacuation during flooding incident caused by inclement weather conditions and release of water from dam;
2. For officials of every local government units or local disaster coordinating councils to formulate their respective plans for action during every alert levels; and
3. Heighten the level of awareness of the community on when to be ready, get set and evacuate in case of flooding in their respective areas.

Unfortunately, Early Warning (System) & Disaster awareness sell themselves only **AFTER** a disaster strikes a community!!



**ALERT LEVEL No. 1**

Represented by a long siren. This is the alert level where people are advised that there will be a release of water from the dam and to prepare for possible evacuation.

The fire trucks from BFP, LGUs and volunteer groups in the area will be utilized to give the warning signals.

**ALERT LEVEL No. 2**

Represented by two (2) long sirens. This alert level signifies get ready for evacuation and wait for further instructions coming from authorities.





**ALERT LEVEL No. 3**

Represented by a continuous siren or continuous ringing of bells. This alert signifies the community to evacuate immediately to designated evacuation centers. No person should be left behind and bring only important things.



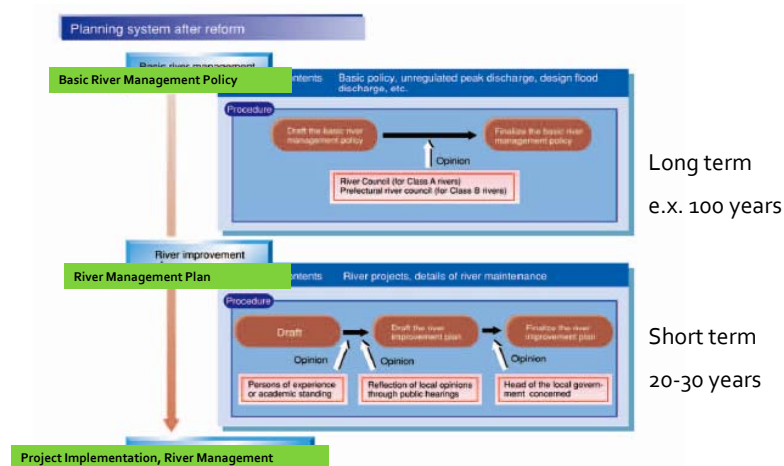
## Research Study in Japan

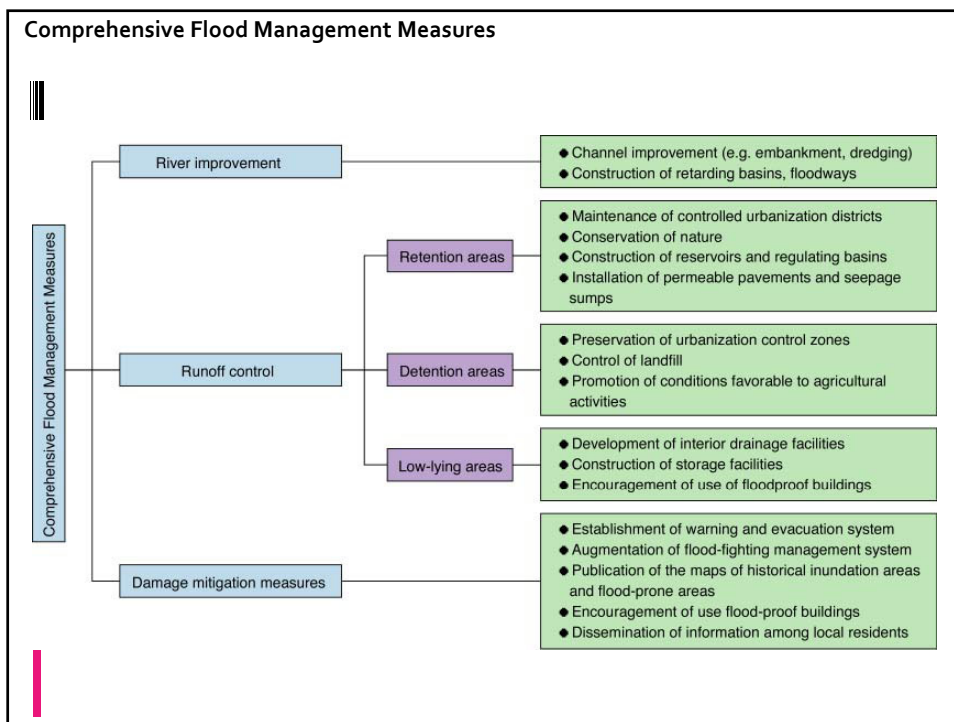
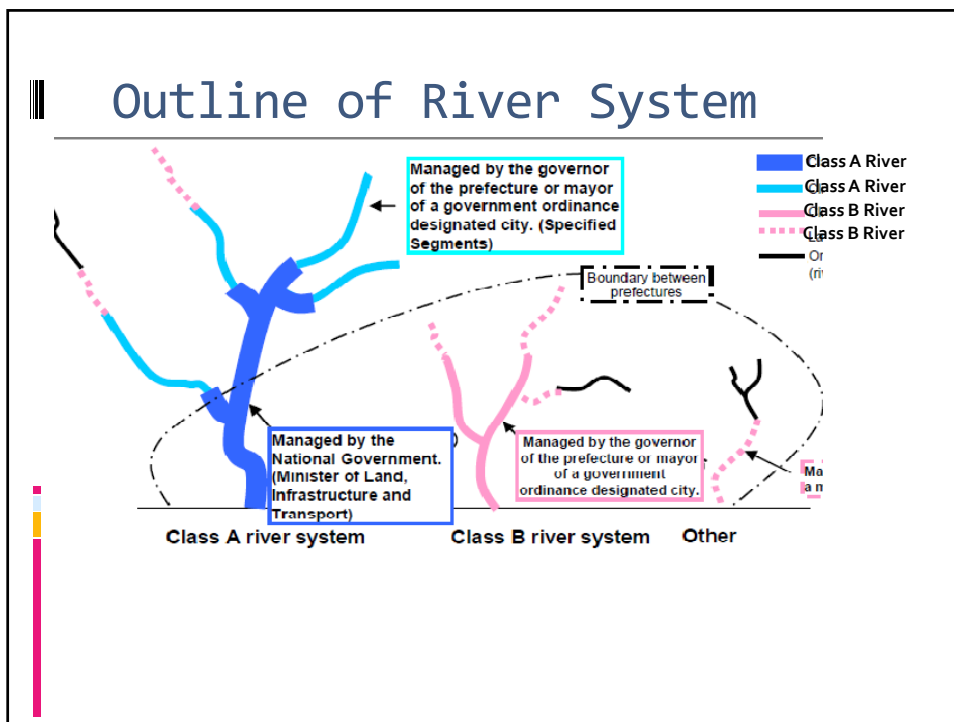


## Legislation on River Administration

- ❑ The first River Law in 1896: focusing only on flood control
- ❑ Revised in 1964: water resources usage added
- ❑ The latest River Act made in 1997
  - Ecological factors were added
  - obliged managers to make
    - Basic river management plan
    - River improvement plan

## River Planning System

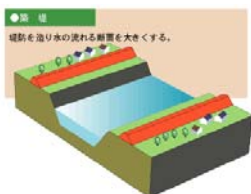




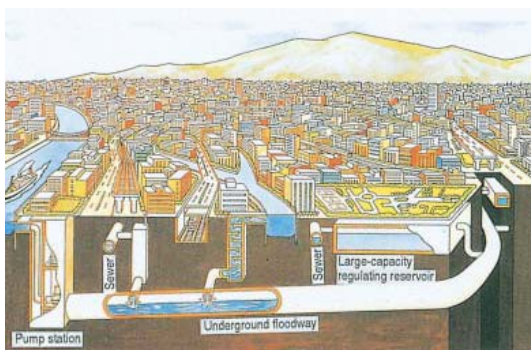
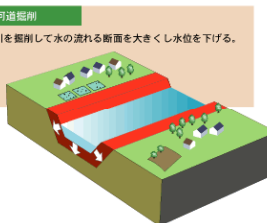
**Traditional flood control measures:  
River improvement and Dam Construction**

Excavation of channel  
Excavating channel to increase flow capacity and lower the water level.

Building of embankments  
Widening embankments to increase flow capacity .



Dam  
Flood waters are stored in the dam to reduce the quantity of flood flow to be transported downstream and to lower the water level.



Construction of underground floodways and underground regulating reservoirs is an effective means of solving the problem of urban flooding.



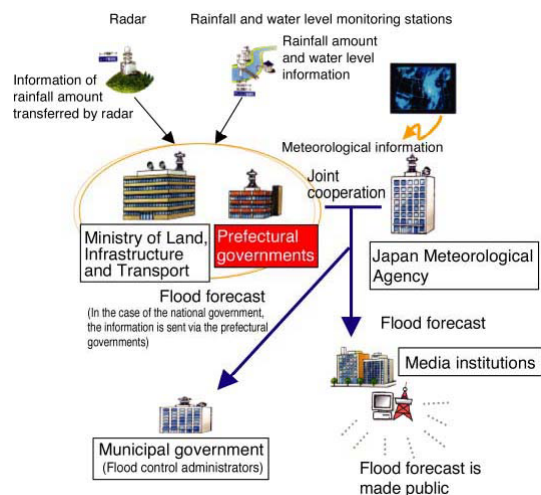
**Tasks of River Administrator**

- Flood management**
- River water use management**
- River environment management**

Activities of River Administration Offices

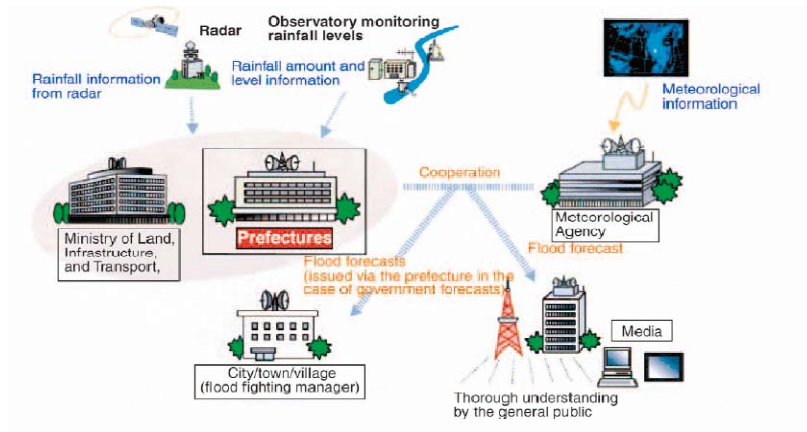
- ☑☑ Observe rainfall, river water level, river water quality
- ☑☑ Research the environment of river and river basin
- ☑☑ Study river improvement and environment
- ☑☑ Plan, design and construct river structures
- ☑☑ Patrol to observe problems of structures, illegal acts
- ☑☑ Administrate use of river area

**Flood Forecasting Network**





## Information Dissemination



## Flood Control and River Management




## Flood Control Facility

Dam



The image contains two photographs of a dam. The left photograph shows a close-up view of the dam's spillway structure, with water visible behind it. The right photograph is an aerial view of the dam, showing the reservoir it creates and the surrounding landscape.

## Slope Protection Facilities



The image contains three photographs illustrating slope protection facilities. The top-left photo shows a concrete structure on a hillside, possibly a retaining wall or a small dam. The bottom-left photo shows a stepped stone structure, likely a check dam or a similar erosion control measure. The right photo shows a waterfall with a wooden fence in the foreground, which may be a natural feature or a controlled flow structure.





## Water Sediment Control



- Orientations/Training/Seminar and Workshop
- Museum and Institutions of Learning
- International Meetings/Symposium/Seminar
- Others

### Orientations/Trainings & Seminars

- Orientation on the Japanese history, culture, customs, religion, art and traditions.
- Orientation on by Japan's Government and Disaster Management System, and the different hazards that affected the country in years 1923, 1945, 1948, 1959, and 1995 – the Great Hanshin Awaji Earthquake that affected Kobe and its surroundings.
- Orientation on Hyogo Prefecture its population 5.6 million, land area of 84,000 sqkm composed of 29 cities and 12 towns with an annual GDP of US\$179.74 billion that its income was derived from containerized transportation also about its world heritage the Himeji Castle and hot springs, the Akashi Kaikayo Bridge as one of the largest hanging bridge in the world.
- Orientation how to prepare and update our country report, ADRC website and to update our country profile.
- Attended presentations of Indonesia Disaster Management System and about Maiko High School, Sensei Mr. Sawa-san explained how the Disaster Management Course was developed and introduced in school.
- Participated in JICA's Training of Trainers' for Public Awareness Method: Twon Watching & Hazard Mapping Workshop with the participants from Central Asia.





## Continuation of Orientations/Trainings &amp; Seminars

• Visited and attended orientation in Maiko High School, Mr. Suwa-san Seiji lectured us about the Japanese Education System which comprise of 6 years elementary, 3 years junior high school, 3 years senior high school and 4 years college. High school students has freedom to choose for a vocational or special course like disaster management course. Disaster Management Course started after the 1995.



• Joined JICA trainees from Central Asian in Kyoto University where we have lectures from the Disaster Research Institute (DRI). Professor Katao of the Disaster Prevention Institute discussed disaster prevention, disaster reduction/mitigation, earthquake/volcano prediction and earthquake engineering. He also explained about the organizational structure of DPRI and research studies for earthquake monitoring and prediction.



## Continuation of Orientations/Trainings &amp; Seminars

• Professor Fukouka explained about landslide, different types and causes of landslide, mitigation and countermeasures, observation and monitoring system of landslide in Japan also the different observation and monitoring equipments for landslide.



- Mr. Sakurai-san Director of Shikoku Mountainous Region Sabo Work Office lectured about Shikoku Island.
- Shikoku has 4 Prefectures and is a mountainous area with steep slopes which makes it prone to landslide during rainy season and has 2 major tectonic.
- Sabo Work Office is promoting prevention and mitigation projects, constructing and monitoring facilities, enhancing embankments, dams and preventive structures, installing drainage wells, tunnels, horizontal pipes and water ditches to drain and stabilize soil subsidence.
- They also have 16 optical cameras, GPS and rain gauges that transmits information for use in warning residents in risk areas.

A lecture about dam construction and operation was presented by Mr. Shozo Miyagawa, Director of Samuera Dam, the dam was built in 1975 for 331 million yen and relocated 387 families. Samuera Dam height 106m, crest length 400m, concrete volume of 1,187,000 cbm and a gross capacity of 316,000,000 cbm. Water were use for household, irrigation, power generation and flood control.



- Orientation on Global Unique Disaster Identifier (GLIDE) as a tool for information sharing of disaster data base among different organization regarding natural disasters. Its purpose is to unite differences in reporting disaster events.
- Orientation on Business Continuity Plan, its company should have their own business continuity plan to insure continuance of their operation after a disaster and also International Standardization of products manufactured for the quality and acceptance of such products in local and international market.
- Orientation of PEER Review which aims to help member countries to identify good practices and methods for disaster risk reduction and to further promote the implementation of the Hyogo Framework for Action (HFA) through exchange of ideas, information and engaging member countries in a face to face discussion.

- Mr. Yasutsugu Fujii of the Department of River Management oriented us about Osaka Prefecture that it has 2,750,000 population, 12 cities and 48.7 trillion yen assets. Due to its geographical location makes the area prone to flooding. It has 6 rivers, heavily populated and concreted resulting to slow water drainage. Osaka has experience many flooding in the past hence the following measures were undertaken improving of river channels, creating underground drainage system, drainage basin, and flood control reservoir. They also use parks, school grounds and private development sites for temporary water retention.



#### Continuation of Orientations/Trainings & Seminars

Attended briefing/orientation at the Hyogo Prefectural Emergency and Fire Training Center. The 5 instructions based on the Hanshin-Awaji earthquake were: 1) provision for natural disasters; 2) setting up a system at the initial stage; 3) collaboration between disaster management organization; 4) capacity building for the community; and 5) Planning/modelling the town against natural disaster. The center includes Hanshin, Awaji, West Harima and Tajima. Aside from training center and E-Defense, the place is 250 hectares with tennis court, football, track and baseball field, a camping site, golf and heliport. Gymnasium that doubles as a disaster prevention hub for emergency preparedness center for storage of relief supplies, rescue equipment and assembly for emergency activity.



## Continuation of Orientations/Trainings &amp; Seminars

•E-Defense is an area for 3-D full scale earthquake testing facility, it has a display of different types of buildings, different construction design and structure it also explains different damages in case of an earthquake based on its construction, structure and design. The is also utilized for earthquake simulation test exercises.



## Continuation of Orientations/Trainings &amp; Seminars

•Mr. Mashiro Ito-san, Deputy Director for Disaster Preparedness presented the Japan's Disaster Management System and Japan's disaster experiences. The Disaster Management System at the National Level headed by the Prime Minister, Prefectural Level headed by the Governor, Municipal Level headed by Mayor's of the City or Municipality and residential level. The organization consist of 23 ministries and agencies, 63 designated Public Corporations and Bank of Japan, Japanese Red Cross Society, NHK, Electric and Gas Companies o NTT.

•Tokyo Metropolitan Government orientation started TMG's crisis management measures, different disaster it might face such as earthquake, storm and flood, volcanic disaster, large scale accidents, terrorist attacks and Novel Influenza Virus. And the different preparedness and countermeasures for each and conduct of drills and exercises.





Continuation of Orientations/Trainings & Seminars

•Orientation at the Air Asia Survey is an spatial information consultant company its mission is to provide novel state of the art technologies and know-how for acquiring and managing a wide range of spatial information about the natural and social environments – presented the company's organization, corporate profile scope of services in areal mapping such as red relief image map, lake view, land viewer, their global activity and the recent projects of the company. Also the importance and benefits of areal mapping.



•Fire and Disaster Management Agency is the center for the fire defense administration supporting the nation's fire defense forces consisting of 1 million personnel. It formulates various measures to prevent disaster such as fire, earthquake, storm/flood damage and develops necessary legal basis and improve armaments, equipments necessary to minimize damages.



Continuation of Orientations/Trainings & Seminars

•Japan Meteorological Agency (JMA) contributes to the safety of the people in the country by providing a range of meteorological, oceanographic, seismological and volcanic information. It improves its services by incorporating advance technologies and checking the management and performance of its operations continuously with the aim of enhancing effectiveness and efficiency of its activities to cope with new demand. JMA implements its services in compliance to Act for establishment of the Ministry of Land, Transport and Tourism (MLIT) and the Meteorological Service Act: prevention and mitigation of natural disasters; safety of transportation; development and prosperity of industry; and improvement of public welfare. Its efforts is focused on monitoring earth's environment and forecasting natural phenomena related to atmosphere, the ocean, and the earth. It also conduct research and technical development in related fields. It also engages in international cooperation activities in meteorology and seismology.





## Continuation of Orientations/Trainings &amp; Seminars

•NHK as a member of the disaster management system it provides warning information to the general public. The company has 54 broadcasting stations, 14 branch stations and radio stations (AM/FM) with 1,000 reporters and can utilize 10,000 personnel in time of emergency. All programs are cut both on TV and Radio broadcast in times of emergency to provide wide range warning information to the general public.



•Mr. Yuichi Honjo-san of the Institute of Urban Research has discussed lessons learned from the Great Hanshi-Awaji Earthquake, the damages, loss of lives, the city recovery plan and the comprehensive recovery assessments after the 5<sup>th</sup> and 10<sup>th</sup> year from the earthquake. He also talked about social capital as a resource that supports the practice of collaborative and participatory community development based on self-governance and community solidarity. Physical recovery such as housing, infrastructure has been fully achieved by Kobe City and the vitality of community participation in disaster activities after 15 years is decreasing and their memory of the disaster is also fading. Maintaining and sustaining community participation and awareness is a challenge to all disaster management practitioners. There is a need to find new ideas, activities to steer community concern that is acceptable and fitting to the community.

## Continuation of Orientations/Trainings &amp; Seminars

Visit to Unzen Restoration Work Office, Mr. Kodama-san oriented us about Unzen Restoration office which was established in 1993 after the Heisei Eruption. Among their projects were Unzen Sabo Project (erosion control); present condition of lava domes; conditions of developing gullies; occurrences of debris flow; implementation of projects in Mizunshi River Basin, Nakao River Basin and Yue River Basin and creation of communities full of water and verdure



## Continuation of Orientations/Trainings &amp; Seminars

•Unzen Volcanic Geopark, Mr, Shinichi Sugimoto discussed the eruption of Mt Unzen and that it had 44 fatalities most of them were media men and rescuers from Shimabara. The media men have crossed the danger zone line. Mt Unzen last erupted in 1792 and Mt. Mayuyama collapse in a large scale earthquake just after eruption. Lava dome formed during 1990-1995 eruption. Debris avalanche buried nearly half of town and generated a huge tsunami. Mt Unzen is the well-studied volcano in the world. UNESCO has declared Mt. Unzen as a Geo Park, it is also the first national park in Japan, it also have a museum where we can see a house buried by debris flow and an elementary burnt pyroclastic flow. It also has historical sites, a volcano museum, geotours, hot springs and the area is fertile soil around the volcano.



## Continuation of Orientations/Trainings &amp; Seminars

•Mr. Shiraishi Naotsugu of Fukouka City Disaster Management Office oriented us about the disaster management system of Fukouka City. Fukouka City is flood disaster prone area due to its geographical location has 7 rivers which its main source were outside the city. He also discussed their prevention and mitigation measures like preparation and distribution of hazard maps, surveillance camera along river basin, installation of remote controlled sirens in the river basin and information dissemination through mobile phones, advisories, how to protect oneself, evacuation areas and routes, improvements of disaster control, voluntary organization, and their support to anti- disaster and preventive organization.



•Global Warming and Climate Change in Japan discussed by Mr. Nagata Yoji, Deputy Director, he talked about the IPCC fourth assessment report, mechanism of global warming, initiatives to address the issue of global warming by Japan Meteorological Agency (JMA), global warming and climate change in Japan and efforts to reduce emission of greenhouse gases.

## Museums

•Hyogo Prefecture Museum of Art - here we have seen a film depicting Great Hanshin-Awaji Earthquake in 1995 that devastated the City of Kobe and its surrounding areas, walked along the ruins preserved, seen the grief and loss of the communities as they recount what happened that time, how they have help one another and the volunteerism of the community in saving lives of their neighbours, cleaning up debris and also the reconstruction and recovery of roads, railways as well as setting up temporary shelter for evacuation and relief operations.





## Museums

Hokudan-cho Earthquake Memorial Park in Awaji Island in this museum we see photos of the Great Hanshin-Awaji Earthquake a monument of Hanshin expressway, preserve fault zone, a close-up view of change in fault, and an earthquake simulation and a house preserved after the earthquake





Museums

- Tsunami/Storm Surge Disaster Prevention Station - comprises the disaster prevention building and display building. It provides collective for tsunami and tidal surge protection facilities like seawalls and gates administered by Nishi Osaka Flood Control Office. It also entails enhancement of public awareness of disaster prevention among Osaka residents. Display building is open to public to gain knowledge of tidal surges that struck Osaka and Tonankai/Nankai Earthquakes and tsunamis believed to surely hit Osaka.

Museums

- Nigawa-Yurino-cho, Nishinomiya City Landslide Museum – Nigawa-Yurino-cho area suffered the worst mass-movement disaster caused by the Great Hanshin-Awaji Earthquake, a 100m-long hillside on the right bank of the Nigawa River collapsed, approximately 1,00,000m<sup>3</sup> of displaced soil crushed 13 houses and blocked the Nigawa River, killing 34 people. An emergency landslide rehabilitation project was initiated in 1997. At the museum we learn the awesome power of nature what it is like to be in a landslide. A display that explains the structure and mechanics of a landslide, a scale model shows what measures taken to prevent landslide. Using various instruments we can measure small movements of earth in order to know when a landslide is imminent. By removing subterranean water and inserting supports into the ground we can prevent landslide before they occur.





Museums



Mt. Unzen Disaster Memorial Hall also known as "Gamadasu Dorm" was built not only as tourist attraction but also as a facility for people to know and learn about volcanic eruption.



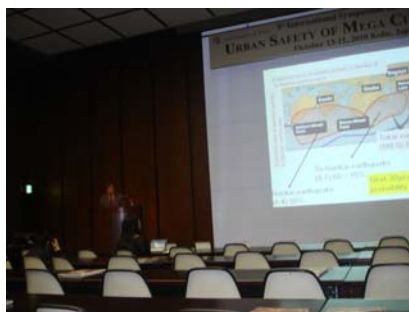


## International Symposium & Global Meeting



- Attended First Global Meeting of the International Search and Rescue Advisory Group (INSARAG).

## International Symposium & Global Meeting



Attended Urban Safety of Mega Cities in Asia

## International Symposium &amp; Global Meeting



Attended the Group Training on “Disaster Risk Reduction Strategy for Urban Earthquake” RCUSS, Kobe University & JICA Hyogo International Training Center.



Visited Nagasaki Atomic Bomb Museum. An atomic bomb was dropped in Nagasaki at around 11:02 am on August 9, 1945 where most of Nagasaki was destroyed and a tremendous lives was lost and a great number have been injured and some of them are still suffering the effects of the bomb up to present. The marks and scars have never been erased form the skins and minds of those who have survived.

#### Others

Visit to Kobe City Resources Recycle Center. Mr. Hagihara Kazuhiro explained about their work at the Center. Indeed the center displays a state-of-the-art recycling facilities which are almost all are automatic and are computer generated machines. He showed us the process and some products they produced out of glass, PET bottles, cans and aluminum waste.

## Action Plan

Proposed Activities	Responsible Agencies	Expected Output	Objectives
1. Presentation of the research study	OCD	Dissemination of learning experience gained in this research study program	To share learning experience here in Japan to RDCC Member Agencies
2. Review of the current flood control and mitigation measure	NEDA/OCD/DPWH/LGUs	An inventory of current flood control and mitigation measure or undergoing projects Assess strengths and weakness of current flood control and mitigation measures Identify future plans or improvement needed to enhance mitigation, monitoring and development measures	To check the current situation of flood mitigation and control plans and programs and identify areas for improvement
3. Analysis of rainfall in respect to climate change	PAGASA/CCA	To assess capability of dams, flood mitigation facilities with the current changing climate and enhance capabilities and resiliency of the community	To determine the amount of rainfall and project its occurrence that could affect the community and plan for community adaptation to Climate change and enhance resiliency

Proposed Activities	Responsible Agencies	Expected Output	Objectives
4. Risk assessment	OCD/DILG/DPWH/NEDA/PAGASA/LGUs/ Community	Generation of digital hazard maps to identify communities at risk Analyze needs	To identify needs and enhance capacity to cope with impact of disaster
5. Capacity assessment		Identify LGUs/communities capacity in coping with disasters	To train the community to respond and react appropriately in times of disaster. To train rescue teams
6. Community vulnerability assessment	OCD/DILG/DSWD	Profiling of communities Flood control and mitigation system its present condition and identification of counter measures	

Proposed Activities	Responsible Agencies	Expected Output	Objectives
7. Institutional Building	OCD/DILG/DSWD	Organization/Re-organization of Disaster Risk Reduction Management Council at the Provincial/Municipal/Barangay and Community level, NGOs, NGAs, Pos, etc	
8. Planning and development	OCD/DILG/DPWH/NEDA/PAGASA/LGUs/ Community	Formulation/updating of disaster risk reduction Management Plans, contingency plans, development plan	
9. Social economic environment	OCD/DILG/DSWD/LGUs	Poverty reduction/Livelihood/Civil Protection	Poverty reduction
10. Research Studies	OCD/LGUs	Research study on the threat of Lahar flow and a comprehensive solution to constant flooding problems (Pampanga, Tarlac, Bulacan, Zambales and Bataan) An additional dam to impound water for agriculture and household use as one possible solution. Part of the lahar quarrying income can be set aside to support river improvement in Pampanga and other areas	

Arigato Gozaimasu  
Sayonara!!!!

