



## 2013 International Training Workshop on Earth Sciences

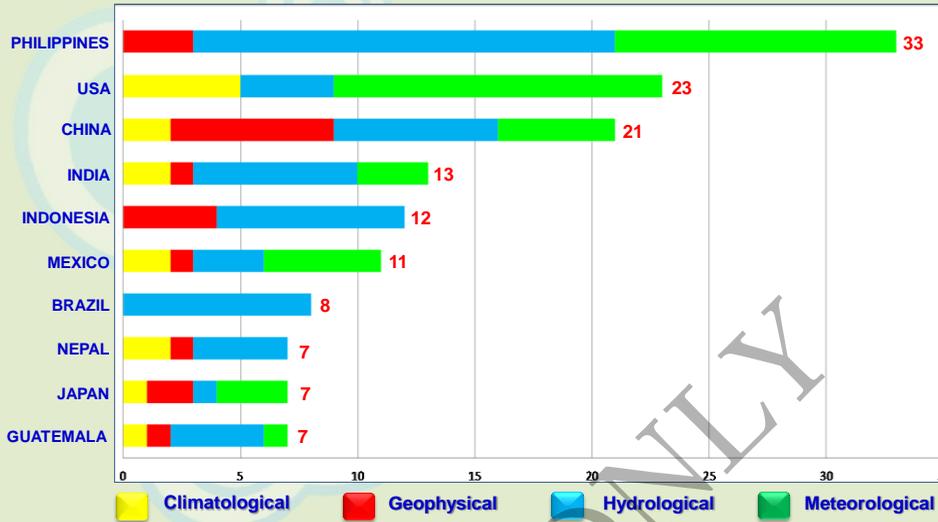
**Presented by:**  
**National Disaster Risk Reduction and Management Council - Office of Civil Defense**

**National Science and Technology Center for Disaster Reduction, Taiwan, R.O.C.**  
**31 October 2013**

### *Scope of Presentation*

- I. Background
- II. Legal Bases: PD 1566 & RA 10121
- III. DRRM Efforts
- IV. National Disaster Emergency Operations Center
- V. The MMEIRS
- VI. 7.2 Magnitude Earthquake in Bohol

## No. 1 in number of reported events in 2011



Annual Disaster Statistical Review 2011 (USAID/OFDA <http://reliefweb.int/sites/reliefweb.int/files.pdf>)

## No. 2 in terms of disaster mortality in 2011

Country	Disaster distribution	No. of deaths	Country	Disaster distribution	Deaths per 100 000
Japan		19 975	Japan		15.7
Philippines		1 933	Namibia		4.7
Brazil		978	New Zealand		4.2
Thailand		896	Cambodia		2.2
India		852	Philippines		2.1
United States		809	Thailand		1.3
China P Rep		746	Lesotho		1.2
Turkey		655	Turkey		0.9
Pakistan		511	Lao P Dem Rep		0.8
Colombia		313	Angola		0.7

■ Climatological 
 ■ Geophysical 
 ■ Hydrological 
 ■ Meteorological

Annual Disaster Statistical Review 2011 (USAID/OFDA <http://reliefweb.int/sites/reliefweb.int/files.pdf>)

## No. 3 in terms of exposure to hazards, 2012



### WorldRiskIndex

Rank	Country	Risk (%)
1.	Vanuatu	36.31
2.	Tonga	28.62
3.	Philippines	27.98
4.	Guatemala	20.75
5.	Bangladesh	20.22
6.	Solomon Islands	18.15
7.	Costa Rica	17.38
8.	Cambodia	17.17
9.	Timor-Leste	17.13
10.	El Salvador	16.89

World Risk Report 2012 (<http://www.ehs.unu.edu/file/get/10487.pdf>)

## Legal Bases

**PD 1566**  
June 11, 1978

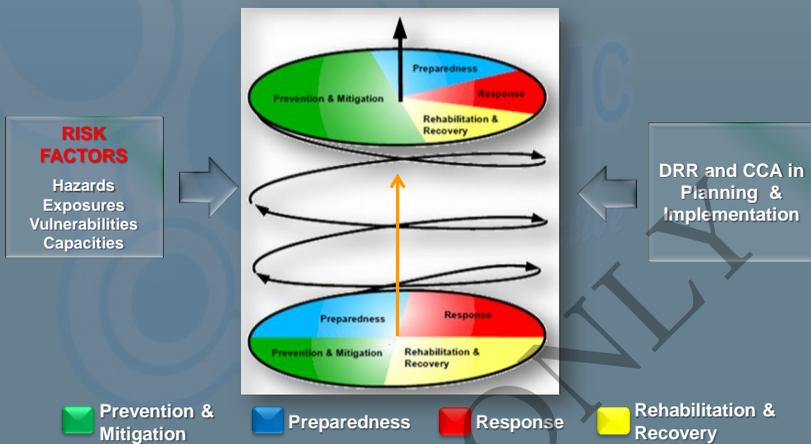
- *Strengthens the Philippine Disaster Control Capability*
- *Establishes the National Program on Community Disaster Preparedness*

**RA 10121**  
May 27, 2010

- *Strengthens the PDRRM System*
- *Provides for the NDRRM Framework*
- *Institutionalizes the NDRRM Plan*
- *Appropriates Funds*

# NDRRM Framework

Safer, adaptive and resilient Filipino communities toward sustainable development

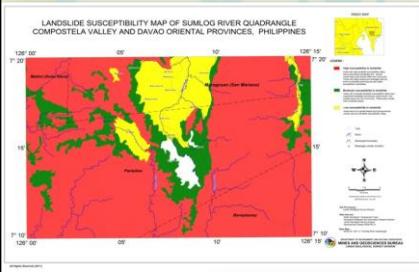


## DRRM Efforts: Prevention & Mitigation



- Dev't of alarm & early warning systems
- Nationwide flood forecasting & monitoring
- Geo-hazard mappings
- Comprehensive land use planning, building & safety standards
- Engineering interventions
- Flood control structures

# DRRM Efforts: Prevention & Mitigation

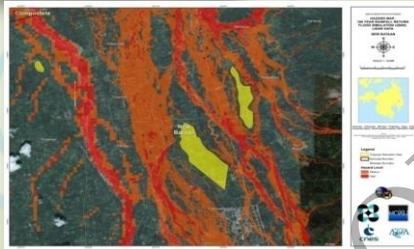


**Landslide Susceptibility Map (MGB-DENR)**



**Active Faults & Trenches (PHIVOLCS)**

**Rainfall Return Flood Simulation (PAGASA)**



# DRRM Efforts: Prevention & Mitigation

## DOST Project NOAH

## DRRM Efforts: Preparedness



- Contingency planning
- Prepositioning of equipment & supplies
- Enhancement of operation & coordination centers
- Organizing, training & equipping responders
- Organizing & mobilizing community volunteers
- Conduct of disaster trainings & drills

## DRRM Efforts: Response

- Search, rescue & retrieval operations
- Humanitarian aid, relief and health services
- Provision for temporary shelter, water, sanitation & hygiene
- Financial assistance to calamity victims
- Management of evacuation centers

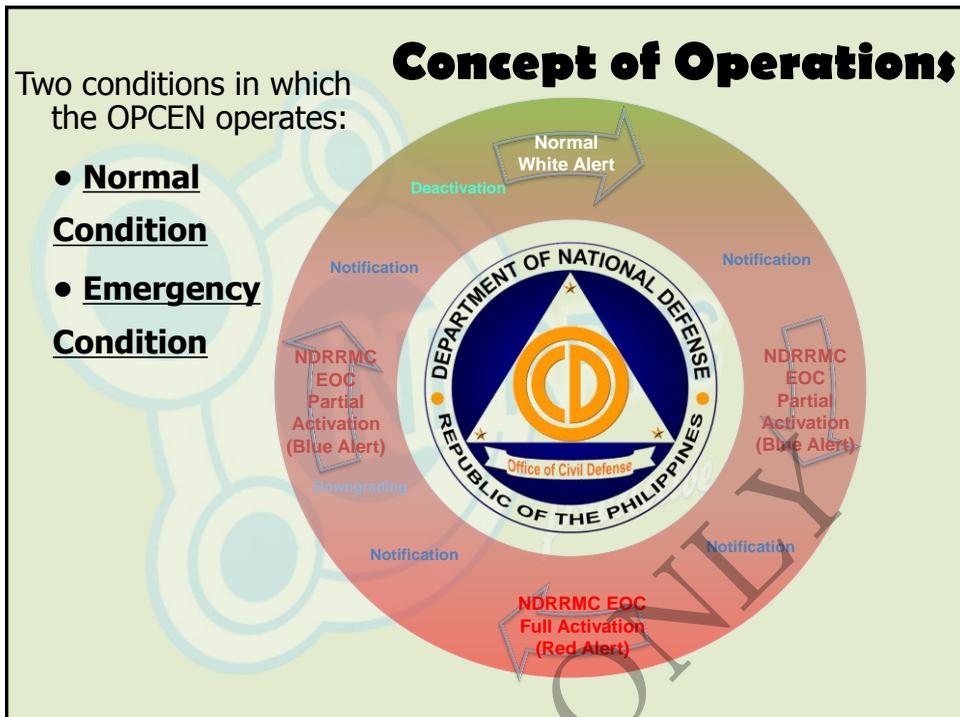


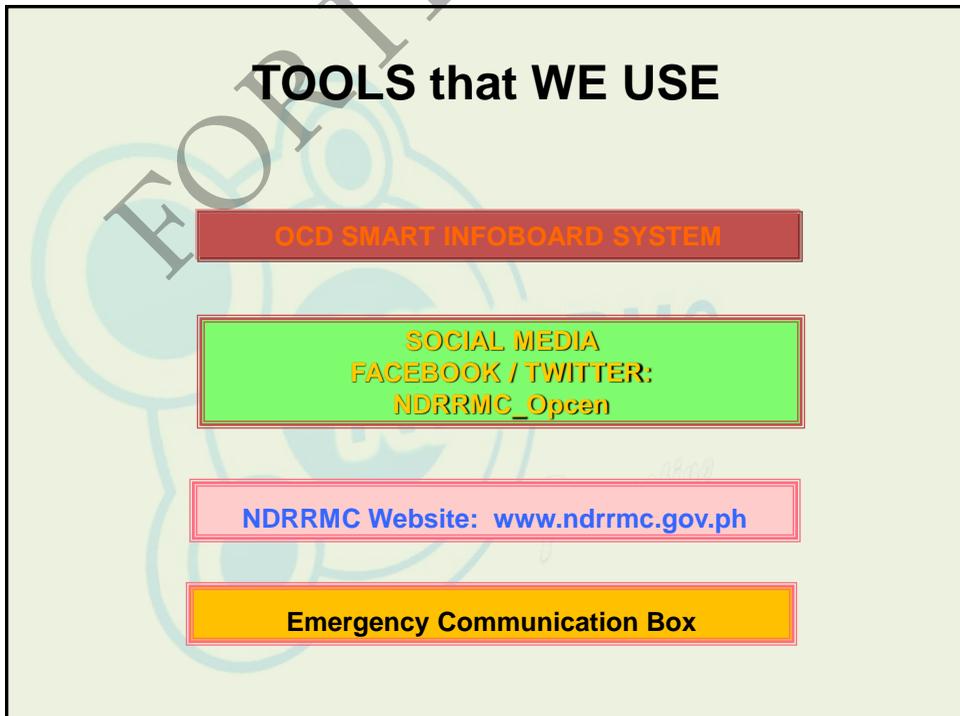
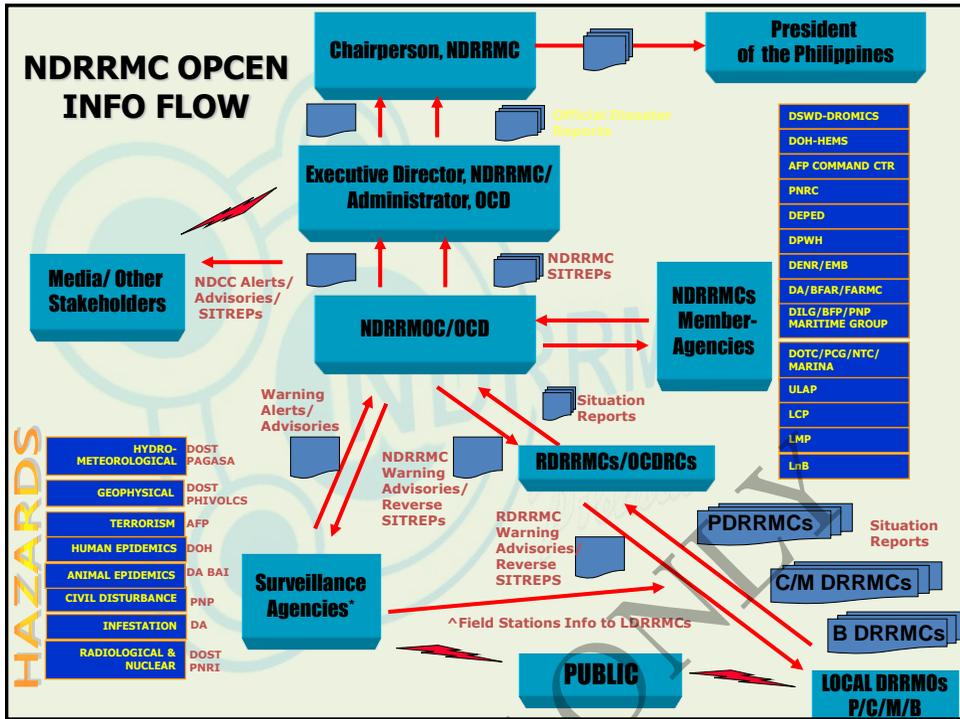
## DRRM Efforts: Recovery & Rehabilitation

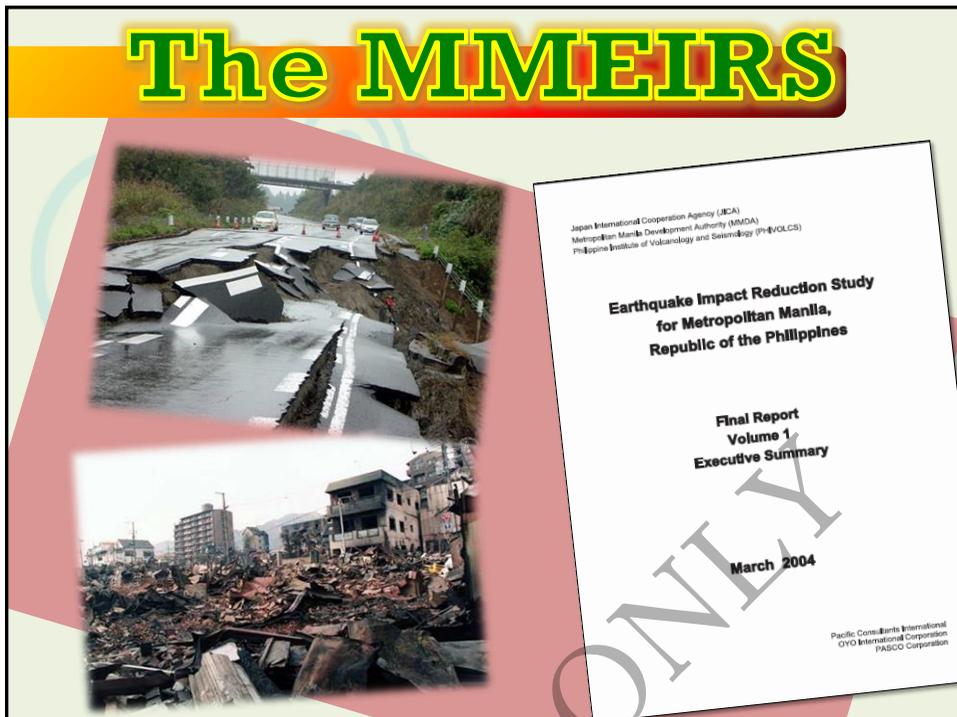


- Early recovery & rehabilitation
- Reconstruction of damaged houses & buildings
- Resettlement
- Provision for livelihood
- Restoration & improvement of destroyed facilities

**National Disaster  
Emergency  
Operations Center**







## EARTHQUAKE IMPACT REDUCTION STUDY FOR METROPOLITAN MANILA (MMEIRS) 2002-2004

### Conducted and implemented by:

Japan International Cooperation Agency (JICA)  
Metropolitan Manila Development Authority (MMDA)  
Philippine Institute of Volcanology and Seismology (PHIVOLCS)

### Goals:

- 1) Evaluate seismic hazards, damages and vulnerability of Metro Manila
  - considered 18 earthquake scenarios
  - evaluated potential effects to buildings, lifeline, population
- 2) Prepare framework of master plan for earthquake disaster management

# EARTHQUAKE SCENARIO

Some Scenario Earthquakes			
<i>Model</i>	<b>Model 08</b>	Model 13	Model 18
<i>Magnitude</i>	<b>7.2</b>	7.9	6.5
<i>Generator</i>	<b>West Valley Fault</b>	Subduction along Manila Trench	Offshore Fault in Manila Bay
<i>Seismic Intensity (PEIS)</i>	<b>VIII - for most of MetroManila, IX - alongside Marikina River and Manila Bay</b>	VIII - West of Metromanila VII - other areas	Almost VIII, VII in Quezon City
<i>Tsunami possibility</i>	<b>NONE</b>	<b>Maximum 4m average 2m alongside Manila Bay</b>	Small effect

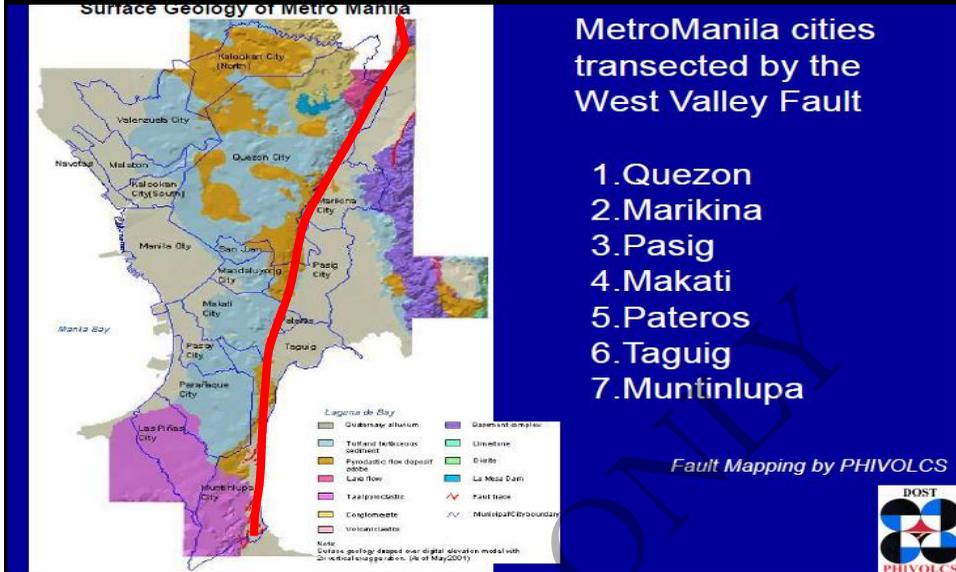


## HOW STRONG IS SCENARIO 8?

- A magnitude 7.2 is similar to 50 Megatons of TNT; equivalent to that of [Tsar Bomba](#) (50 megatons), the largest thermonuclear weapon ever tested
- Haiti case: epicenter some 10km from Port-au-Prince
- Scenario 08: Epicenter WITHIN MetroManila.

The West Valley Fault is right in our backyard. NDRRMC Operations Center is about 1.8km away from fault; PHIVOLCS only 3kms away

# WEST VALLEY FAULT



MetroManila cities transected by the West Valley Fault

1. Quezon
2. Marikina
3. Pasig
4. Makati
5. Pateros
6. Taguig
7. Muntinlupa

# DAMAGE SCENARIO

## Residential Building Damage and Human Casualties

Scenario Earthquake	Model		Model 08	Model 13	Model 18
	Magnitude		7.2	7.9	6.5
Residential Building 1,325,896	Damage	Heavily	168,300 (12.7%)	1,900 (0.1%)	14,200 (1.1%)
		Partly	339,800 (25.6%)	6,600 (0.5%)	52,700 (4.0%)
Population 9,932,360	Casualty	Dead	33,500 (0.3%)	100 (0.0%)	3,100 (0.0%)
		Injured	113,600 (1.1%)	300 (0.0%)	9,500 (0.1%)

## Fire Damage

Scenario Earthquake	Model		Model 08	Model 13	Model 18
	Magnitude		7.2	7.9	6.5
Fire	Outbreak		500	-	-
	Burnt area and building	Wind Speed 3m/s	798 ha 42,100 buildings	-	-
		Wind Speed 8m/s	1,710 ha 97,800 buildings		
	Casualty	Wind Speed 3m/s	7,900 (0.1%)		
		Wind Speed 8m/s	18,300 (0.2%)	-	-

## WHEN WILL IT HAPPEN?

- NO one knows
- What science knows is, the return period of this earthquake is estimated at about 200 - 400 years and that no large earthquake has happened in the West Valley Fault since the 1700s. The last significant event was in 1658 (350+ years ago)



## The 7.2 Magnitude Earthquake in Bohol



**AFFECTED POPULATION:**

<b>TOTAL</b>	<b>CITY</b>	<b>MUN</b>	<b>BGRYS</b>	<b>FAMILIES</b>	<b>PERSONS</b>
	<b>6</b>	<b>60</b>	<b>1,527</b>	<b>671,103</b>	<b>3,221,248</b>

**DAMAGED HOUSES:**

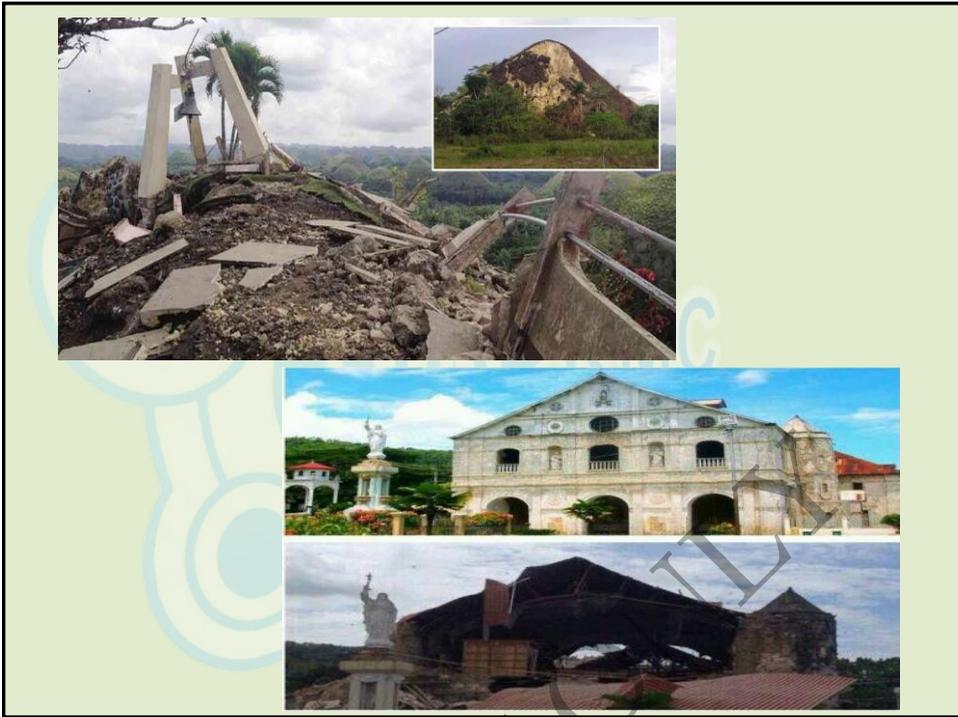
<b>TOTAL</b>	<b>TOTALLY</b>	<b>PARTIALLY</b>	<b>TOTAL</b>
	<b>13,249</b>	<b>53,683</b>	<b>66,932</b>

**COST OF DAMAGE:**

<b>TOTAL</b>	<b>Roads / Bridges</b>	<b>Flood Control</b>	<b>Schools/ Hospitals</b>	<b>TOTAL</b>
	<b>820,583,182.90</b>	<b>18,154,000.00</b>	<b>1,418,600,000</b>	<b>2,257,337,182.90</b>

**CASUALTIES:**

<b>PROVINCE</b>	<b>NO. OF PERSONS</b>		
	<b>DEAD</b>	<b>INJURED</b>	<b>MISSING</b>
<b>CEBU</b>	<b>13</b>	<b>101</b>	
<b>BOHOL</b>	<b>208</b>	<b>692</b>	<b>8</b>
<b>SIQUIJOR</b>	<b>1</b>	<b>1</b>	
<b>NEGROS ORIENTAL</b>		<b>1</b>	
<b>ILOILO</b>		<b>1</b>	
<b>TOTAL</b>	<b>218</b>	<b>768</b>	<b>8</b>





*USec. Eduardo Del Rosario giving relief goods to the affected families in the province of Bohol*



*Filipino coastguard personnel load sacks of relief goods at a port in Manila*

**SOURCE: EPA**

**PHOTOS** *(Actions Taken)*



Transport of water purifier intended for Sagbayan & Calape, Bohol

**Salamat & Mabuhay!!!**  
*(Thank you!)*

