



Logistics of Natural Disasters: The Case of the Philippine Typhoons

Alexis M. Fillone, Ph.D
Associate Professor
Civil Engineering Department
De La Salle University
Manila, Philippines



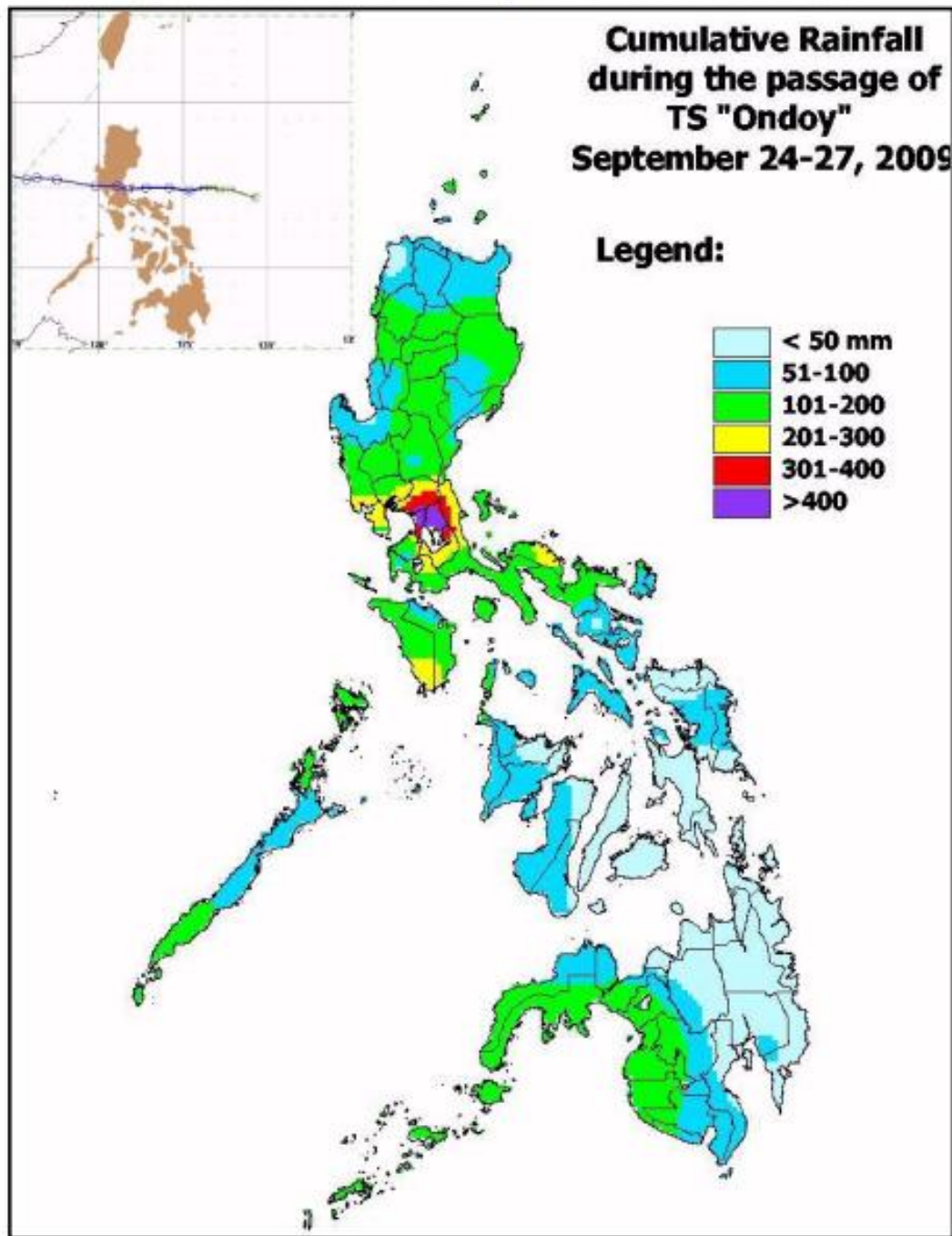
Facts about Natural Disasters and Typhoons in the Philippines

- The Philippines ranks 12th among 200 most at-risk for tropical cyclones, floods, earthquakes, and landslides in the 2009 Risk Index of the UN International Strategy for Disaster Reduction.
- Around 20 typhoons visits the country each year, usually from July to November
- Typhoon account for up to 40% of the annual average rainfall.
- NDCC (National Disaster Coordinating Council) records show that out of the many typhoons and tropical storms that hit the Philippines between 1990 and 2008, a total of 158 destructive typhoons results to 13,491 deaths (**710 deaths/year**).

Four Major Typhoons during the last five years in the Philippines

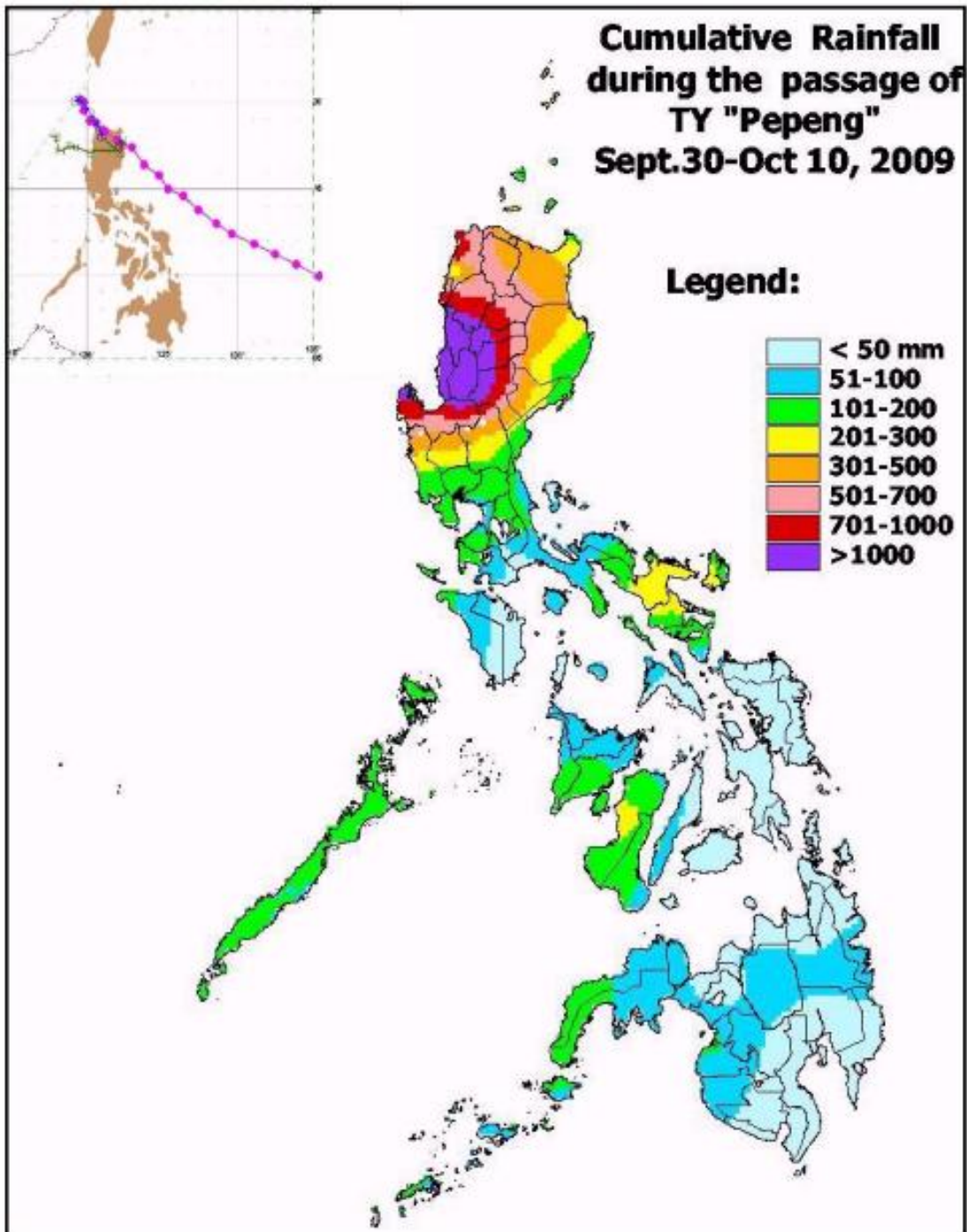
Typhoon Name	International Name	Date of Visit
Ondoy	Ketsana	Sept. 26, 2009
Pepeng	Parma	Oct. 3-9, 2009
Sendong	Washi	Dec. 16-17, 2011
Pablo	Pobha	Dec. 3, 8-9, 2012

Map 1: Storm Path of Ondoy and Cumulative Rainfall

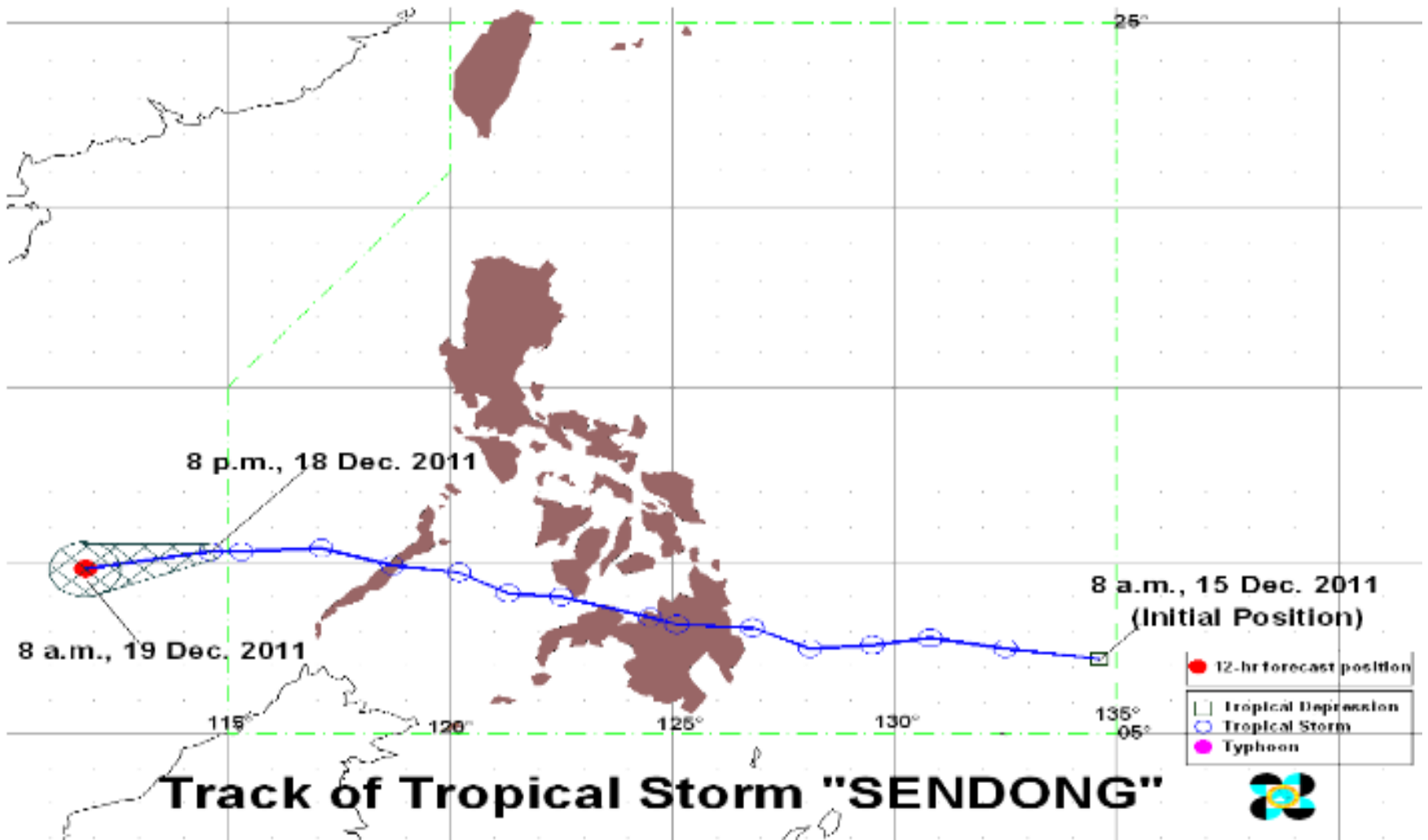


-Average rainfall for the 12-hr period is around 450mm, statistically speaking occurrence is once every 180 years.

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- Brought an extended period of heavy rain , stalled in the northern part of Luzon then reversed its track.
- The highest cumulative rainfall amounts (exceeding 1,000mm) were experienced along the west coast of Northern Luzon



- the deadliest typhoon to hit the country in the last 12 years
- the 19th tropical storm that entered the country in 2011



- Strongest typhoon to ever hit the southern Philippine island of Mindanao, making landfall as a Category 5 [super typhoon](#) with winds of 175 mph (280 km/h).

Four Destructive Typhoons in the last five years:

Casualties:

Tropical Storm	Date of Occurrence	Casualties		
		Dead	Injured	Missing
Ondoy (Ketsana)	Sept. 26, 2009	464	529	37
Pepeng (Parma)	Oct. 3-9, 2009	465	207	47
Sendong (Washi)	Dec. 16-17, 2011	1,268	6,071	181
Pablo (Pobha)	Dec. 3, 2012	1,067	2,666	834

Cost of Damages (excluding humans)

Tropical Storm	Damages (Billion pesos)		Total (Billion pesos)
	Infrastructures	Agriculture	
Ondoy (Ketsana)	4.229	6.669	10.898
Pepeng (Parma)	6.799	20.495	27.294
Sendong (Washi)	1.759	0.309	2.068
Pablo (Pobha)	10.423	26.527	36.95

- Combined damage of both Ondoy and Pepeng is equivalent to 2.7% of GDP

LOGISTICS

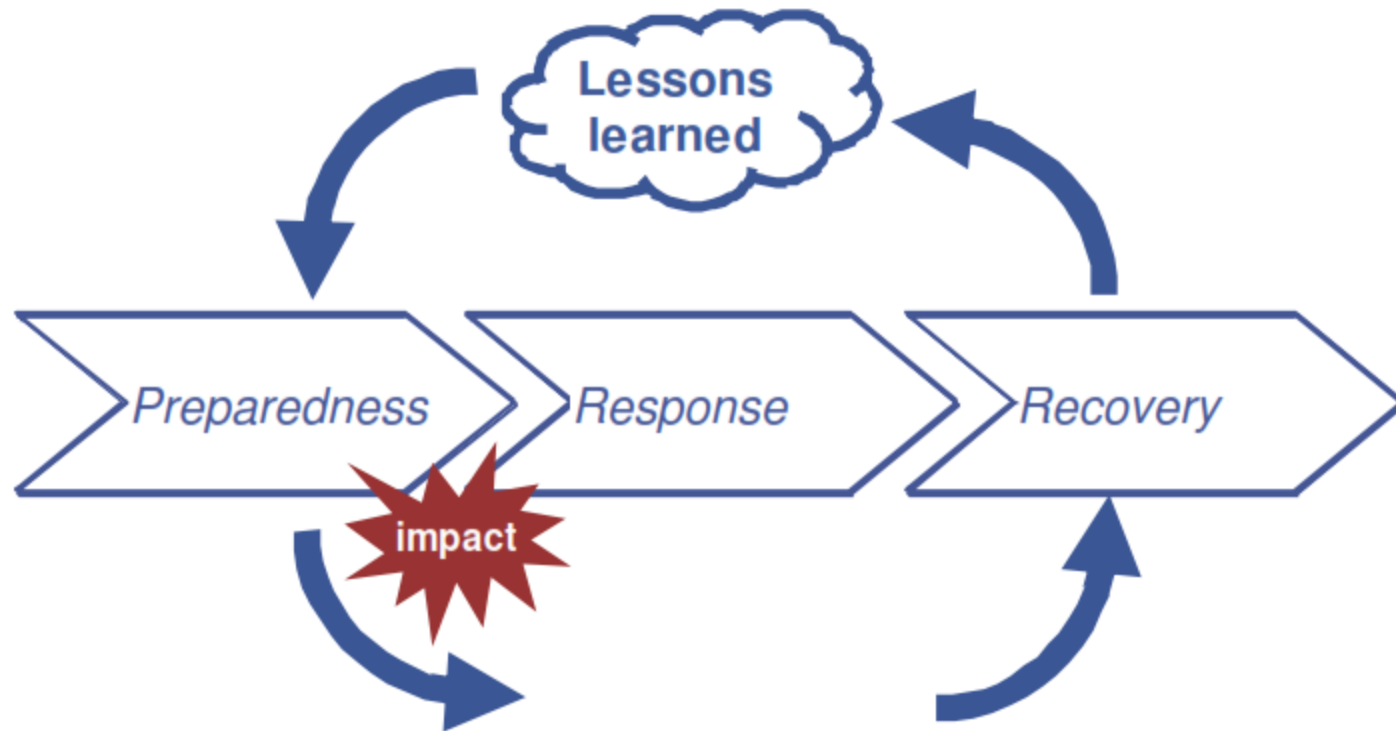
The overall management of the way resources are obtained, stored and moved to the locations where they are required

The resources can include physical items, such as food, materials, equipment, liquids, and staff, as well as abstract items, such as time, information, particles, and energy.

The logistics of physical items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and also security.

Stage of Logistical Needs in Disaster Relief

1. Preparedness
2. Response, and
3. Recovery (Immediate and Early Recovery)



1. Preparedness Measures

National/Local Gov't/NGOs Involved	Activities	Logistical Needs
NDCC-EOC	Continuously disseminated weather bulletins and gale warning advisories to regions	Use of SMS, facsimile, and website
PNP (Philippine National Police), BFP (Bureau of Fire Protection), AFP (Armed Forces of the Phil.)	On heightened preparation and alert for rescue and evacuation readiness	Identified resources - rescue vehicles, boats, and dedicated personnel, among others
PCG (Philippine Coast Guard)	Monitoring and assistance for the security of passengers and movement of vessels	Communications and boats on all affected ports
DSWD (Department of Social Welfare and Development)	Prepare the mobilization of volunteers for repacking of goods and food packs - Forewarned local SWD officials thru text and e-mail	Use of SMS, facsimile and website to local SWD officials that will be affected by the typhoon

Preparedness Measures (Continued...)

National/Local Gov't Involved	Activities	Logistical Needs
DOH-HEMS (Department of Health)	Places all Centers for Health Dev't on code white alert and prepositioned medicines and medical supplies to regions affected	Use of SMS, facsimile and website to local Health officials that will be affected by the typhoon - Readies medicines and medical supplies for dispatch to areas that will be affected
BFP (Bureau of Fire Protection)	Identify and prepare escape route to high ground in their area of responsibility to serve as safe refuge or evacuation center in case of flood	Prepare fire trucks and other vehicles for rescue and evacuation purposes
RDCC of regions to be affected	Undertake close monitoring, precautionary measures and implement preemptive evacuation as situation warrants	-Prepare vehicles for evacuation -Coordination with other gov't agencies regarding rescue and evacuation plans

Preparedness Measures (Continued...)

National/Local Gov't Involved	Activities	Logistical Needs
PDCC (Provincial Dev't Coordination Council)	-Joinr meeting between Dept of National Defense Secretary, NDCC Chairman and other provincial government agency heads regarding the conduct of rescue, evacuation and relief plans	Preparation of rescue vehicles/boats, relief goods for distribution, among others
OCD Regional Centers	Inventory of resources for rescue, evacuation and relief	Involvement of several national, regional, provincial and local government offices in the preparation

- pre-typhoon preparation are mostly done by government (both local and national) units and agencies

2. Response: Rescue, Evacuation and Relief Operations

National/Local Gov't Involved	Activities	Logistical Needs
<p>NDCC-OPCEN (Operation Center)</p>	<ul style="list-style-type: none"> -Serves as the central command that receives distress calls from private citizens and government staff in the field -Depending on the call, for rescue efforts these were relayed to the NCRCOM, AFP Command Center (PAF, PA and PN) – Phil. Air Force, Phil. Army, Phil. Navy -Give instructions of how to go about with the rescue and evacuation efforts -Briefs the President of the actions undertaken and status of emergency operations - Coordinates with Power and Water providers regarding their status 	<p>Use of handheld radios, SMS, facsimile, and website and other communication tools</p>
<p>Philippine National Police (PNP)</p>	<ul style="list-style-type: none"> -All PNP and CSAFP's WASAR assets and all available resources to conduct emergency rescue and evacuation of people calling for help, - provide traffic management along the major streets flooded, and rescue teams to assist motorists caught in the floods 	<p>- Large no. of personnel and resources like trucks, helicopters, rescue boats are deployed to affected areas</p>

Rescue, Evacuation and Relief Operations (Continued...)

National/Local Gov't Involved	Activities	Logistical Needs
Local NDCC command posts	<ul style="list-style-type: none"> - Establishment of local command posts in the areas affected - Local government directly involved since they are familiar with their area and people - Personnel, resources needed for rescue and relief efforts are localized to speed up rescue and distribution of goods to affected families 	<ul style="list-style-type: none"> - Full package of logistical needs from personnel, rescue and evacuation resources, and relief efforts come into full swing
PAF (Philippine Air Force)	<ul style="list-style-type: none"> - Involvement in rescue and relief efforts using helicopters especially to areas isolated by the flooding brought about by the typhoon - Conducts aerial survey to assess areas affected and areas flooded 	<ul style="list-style-type: none"> - Use of helicopters
Philippine Navy and Philippine Coast Guard	<ul style="list-style-type: none"> - Also involve in rescue and relief efforts using their boats 	<ul style="list-style-type: none"> - Use of their boats

C. Recovery (a. Immediate, b. Early Recovery)

National/Local Gov't Involved	Activities	Logistical Needs
NG, LGU, NGO, GOs, NFIs	<ul style="list-style-type: none"> -Relief and goods distribution - Early recovery assistance through clean up and repair of minor damages to infrastructures - Provision of temporary shelter 	<ul style="list-style-type: none"> - Full package of logistical needs from personnel and resources needed in the relief and repair and rehabilitation of affected infrastructure efforts depending on agency involved
NDCC	<ul style="list-style-type: none"> -Rice assistance 	<ul style="list-style-type: none"> -Use of trucks in the distribution of rice to affected regions
DSWD	<ul style="list-style-type: none"> - Preparation and distribution of relief goods in the form of food (rice, bread, canned goods, noodles, etc) and non-food items (mats, blankets, clothing, water jugs, etc) 	<ul style="list-style-type: none"> -Use of vehicles in the distribution of these relief goods to affected areas -Gov't offices/warehouses are usually use to store these goods
PAGCOR, OPLAN SAGIP BAYAN, NFA	<ul style="list-style-type: none"> -Distribution of relief packs -Provided bottled water, canned goods and assorted relief supplies - Rolling stores released thousand of kilos of rice at discounted price 	<ul style="list-style-type: none"> - Vehicles and personnel used in the distribution of relief goods

C. Recovery (a. Immediate, b. Early Recovery)

National/Local Gov't Involved	Activities	Logistical Needs
NGO (World Vision, UN, ICRC,)	<ul style="list-style-type: none">-Provided food and non-food relief packs equivalent to two-weeks ration to affected provinces-Establish child-friendly space for psychosocial intervention and distribution of school supplies-Distribution of rice to affected areas-Provide household kits for relief operations with each kit containing kitchen sets, tarpaulins, blankets, jerry cans, plastic basins, buckets, mosquito nets, hygienic items	<ul style="list-style-type: none">- personnel and vehicles in the distribution of these relief goods- materials used for the child-friendly facility

B. Early Recovery Efforts (Cash for work, relocation, return to the province, financial assistance)

National/Local Gov't Involved	Activities	Logistical Needs
DSWD	-Cash/Food-for-Work (CFFW) projects, is a short intervention to provide temporary employment to affected families by participating in the cleaning of waste/debris; dredging of canals/waterways and rehab projects -Relocation of affected households – transfer of families to safer relocation sites including relief and monetary packages	- Use of trucks to haul garbage collected - Use of support equipment like backhoe and loaders
NHA (National Housing Authority)	-allocated housing units to affected households under easy payment terms	- Paper work
PhilHealth	- Three months advance disbursement to all hospitals affected by the typhoon	- Distribution of medicines to hospital
HUDCC (Housing and Urban Dev't Coordinating Council)	-helped identify areas for resettlement of affected households	-Paper work requirements - site visits

National/Local Gov't Involved	Activities	Logistical Needs
PAG-IBIG	-provides calamity and housing repair loan	- paper work
DOLE	- Undertakes project proposal evaluation for emergency employment of displace workers and for more permanent long-term livelihood projects	-Paper work - site visits
DA –Department of Agriculture	-helped identify relocation sites for displace families	- Site visits
Balik Probinsya Program (Return to the province)	-Identification of families to be returned to their province of origin - Continuous coordination with LGUs for the identification of affected families who will opt to avail of the program	- Site visits - Paper work - Monetary support

Findings

- Most affected are living in high risk areas like rivers banks, under bridges, and flood plains



- Transport infrastructures, especially bridges are not disaster-resilient



Findings

- Lack of standard definition of who are affected . Is there a need to provide categories in terms of degrees of being affected?
- Standardize the methods of estimating the cost of damage

Findings

- Poor preparation in terms of pre-positioning rescue equipment at strategic locations as well as relief materials



Findings

- Lack of an effective flood early warning system
- Ineffective early warning announcement of the coming typhoon especially to fishermen



23 fishermen missing, 42 safe in wake of 'Labuyo'

(philstar.com) | Updated August 12, 2013 - 12:54pm

MANILA, Philippines - At least 23 fishermen were reported missing in two Luzon provinces as Typhoon "Labuyo" barreled through the island mass, the state disaster response agency reported Monday.

Findings

- Inadequate evacuation centers and warehouses to store relief goods/materials



Gymnasium



Church

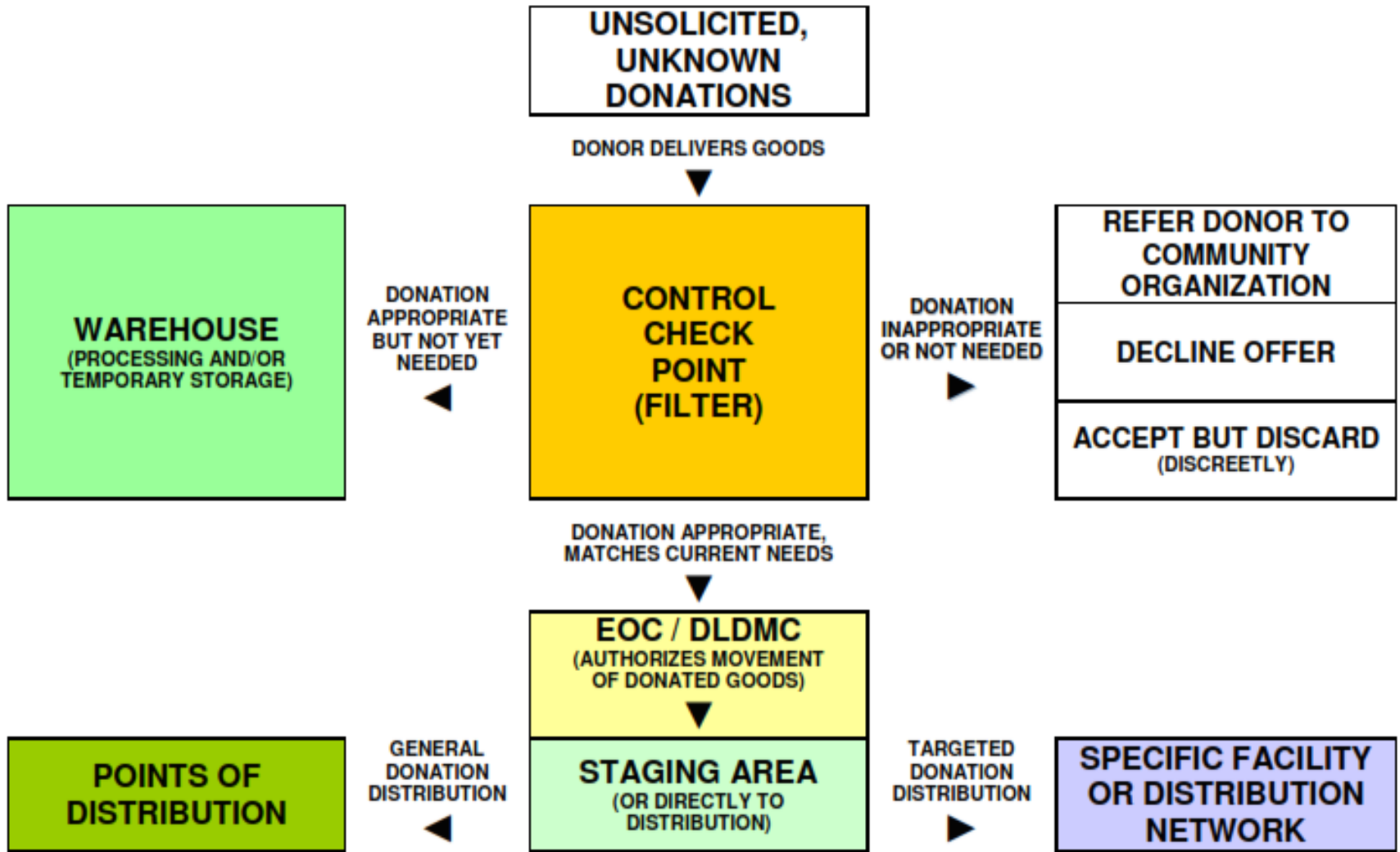
- Since most staff are volunteers, staff skills are inadequate in disaster logistics



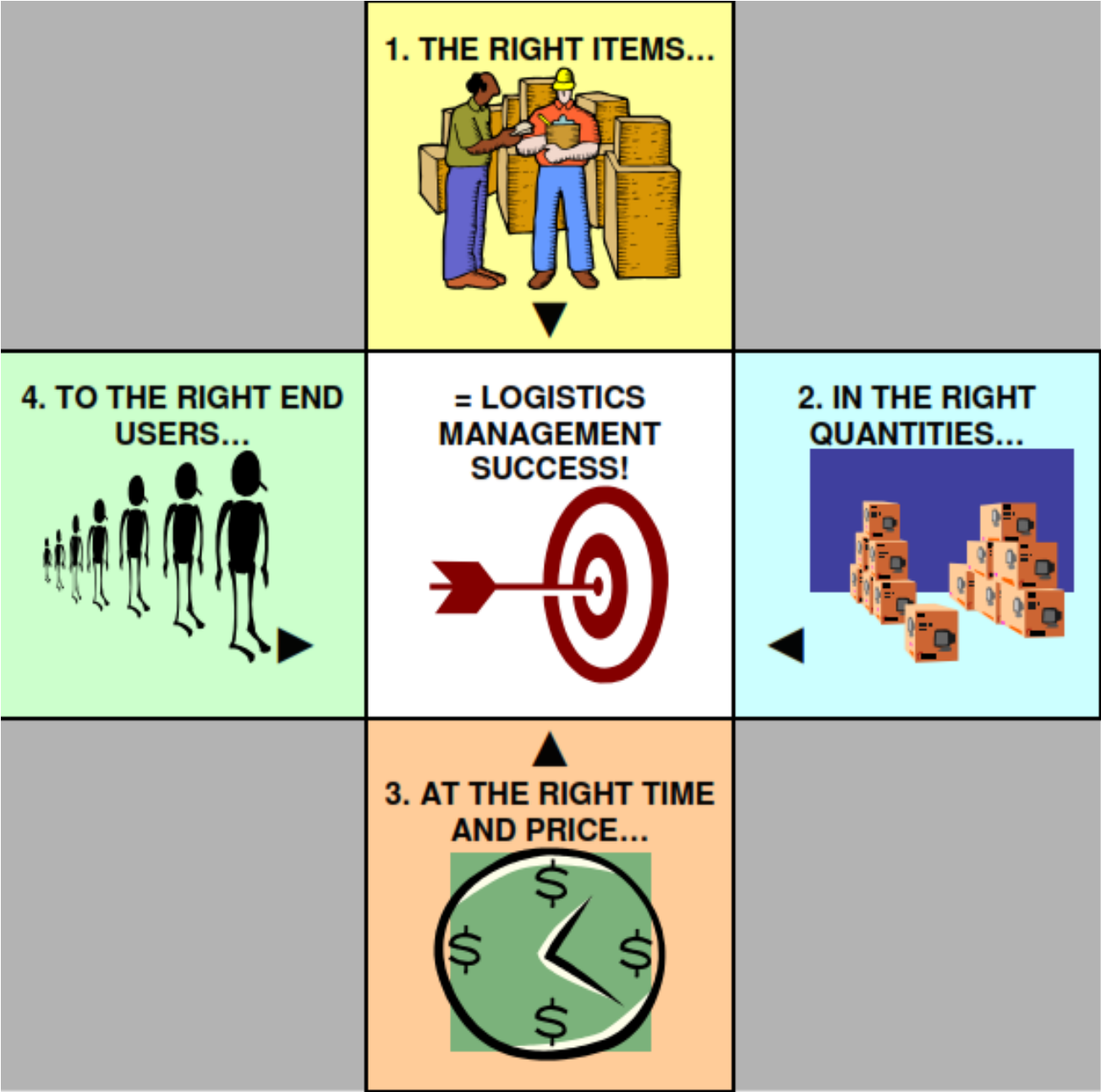
- There is no systematic method of distributing relief goods and materials



Systematic Flow of Accepting/Distributing Unsolicited Donations



To Summarize ...



References:

Humanitarian Logistics: Why logistics is central to disaster management by Jennifer Schwarz and Martin Kessler, Research Associates, Berlin University of Technology, ppt presentation, Oct. 2010

Typhoons Ondoy and Pepeng: Post-Disaster Needs Assessment, Government of the Republic of the Philippines, with ADB, EU, UN, and World Bank, Nov. 2009

Final Report on Tropical Storm Ondoy (Ketsana) and Typhoon Pepeng (Parma) by the National Disaster Coordinating Council, Republic of the Philippines

Local Disaster Logistics and Donations Management Planning Handbook, Michigan Dept. of State Police



Thank you for listening!