FLOOD/FLASHFLOOD HAZARD MAPPING ACTIVITIES IN THE PHILIPPINES

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Flood Forecasting Branch
PAGASA-DOST

East and SoutheastAsia Regional Seminar on Flood Hazard Mapping
February 17-19, 2009
Shangrila Hotel, Metro Manila
Philippines

MANDATED AGENCIES

- Phil. Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
  DOST

Mines and Geo-sciences Bur. (MGB)
DENR

Completed Project Areas

1:50,000

PAGASA-UNDP
OCHA
QUEZON PROVINCE
.Real
.Infanta
.General Nakar

PAGASA-CARE PHIL.
Aurora Province
. Dingalan

PAGASA-LOCAL GOVERNMENTS

.QUEZON CITY
.TAGUIG CITY
.DAVAO CITY
.BUTUAN CITY
.ILOILO CITY
.BATAAN

Target Project Areas

PAGASA-UNDP READY PROJECT

1:10,000

- Leyte
- Zambales
- Ilocos Sur
- Laguna
- Pampanga
- Iloilo
- Cavite
- Rizal
- Benguet
- Antique
- Bohol
- Aurora
- Southern Leyte
- Northern Samar
- Zamboanga City
- Ilocos Norte
- Zamboanga Sibuguey
- Nueva Viscaya
- Agusan del Sur

Target Project Areas

PAGASA-Gov't. of the Philippines (GOP)

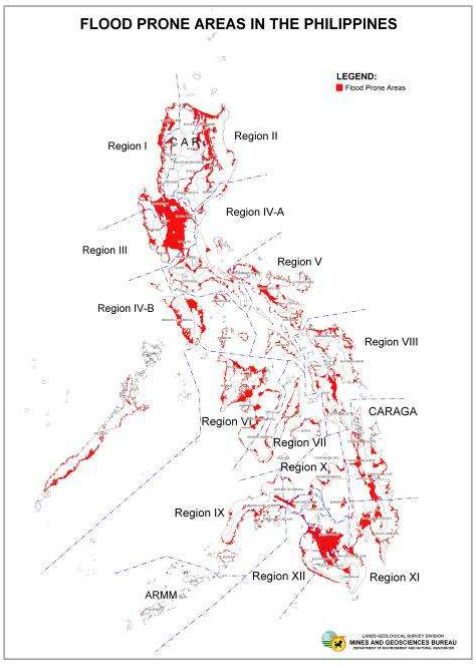
1:10,000

- Pangasinan
- Bulacan
- Agusan del Norte
- Western Samar
- Gen. Santos
- Cam. Norte
- Quezon
- Or. Mindoro
- Aklan
- Batanes
- Zamboanga del Norte
- Bukidnon
- Davao
- Mt. Province
- Lanao del Sur
- Cebu

Inventory Map of Flood-prone areas in the Philippines

Mines and Geo-Sciences Bur.

DENR



Mines and Geo-Sciences Bur. (MGB-DENR)

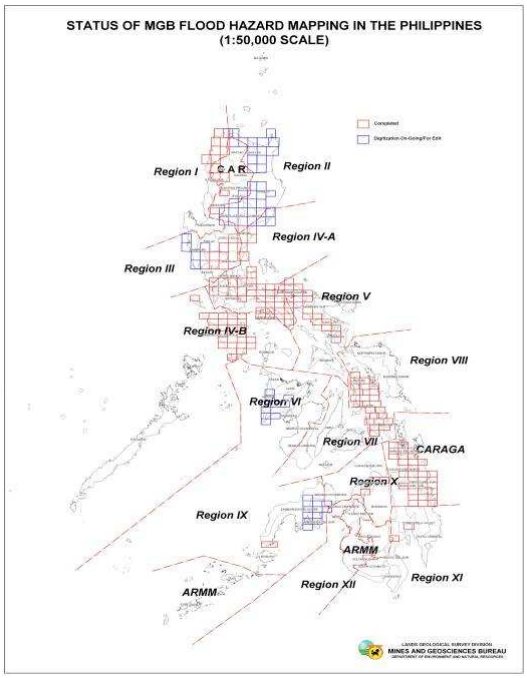
JICA assisted Proj.

Scale 1:50,000

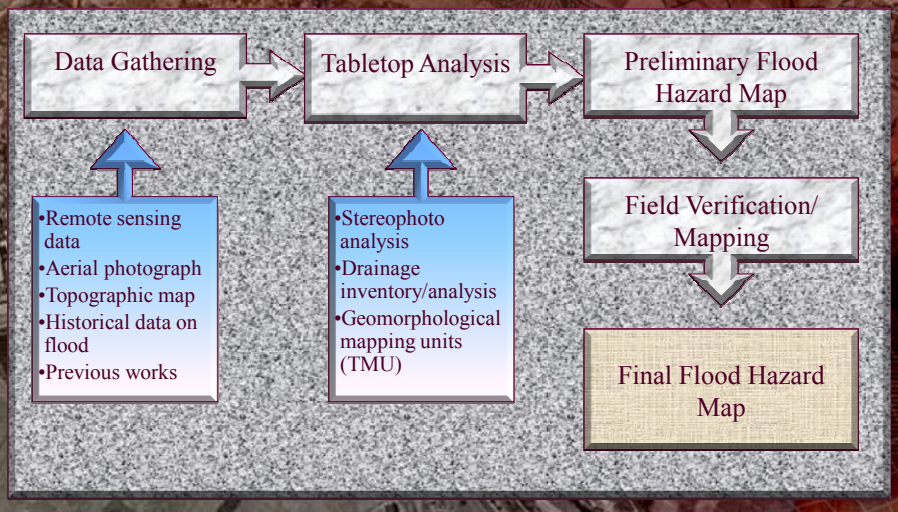
236 quadrangles

165 completed (1:50,0000)

71 quadrangles processing



Methodology for Geomorphological Flood Hazard Mapping



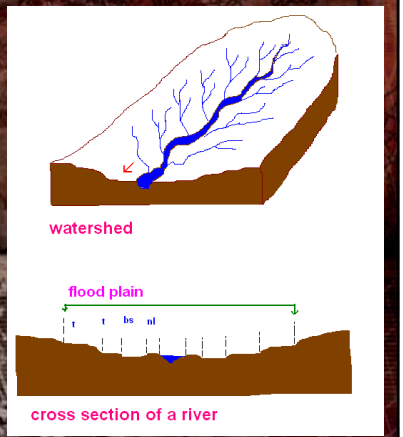
Methodology

- Geomorphological
  - *Landform analysis*
  - *Terrain mapping*
  - *Historical research/verification*
  - *Field mapping and interviews*

Terrain mapping units (TMU)

The ordering of degree of susceptibility is subjective and depends on the scale and expert judgement

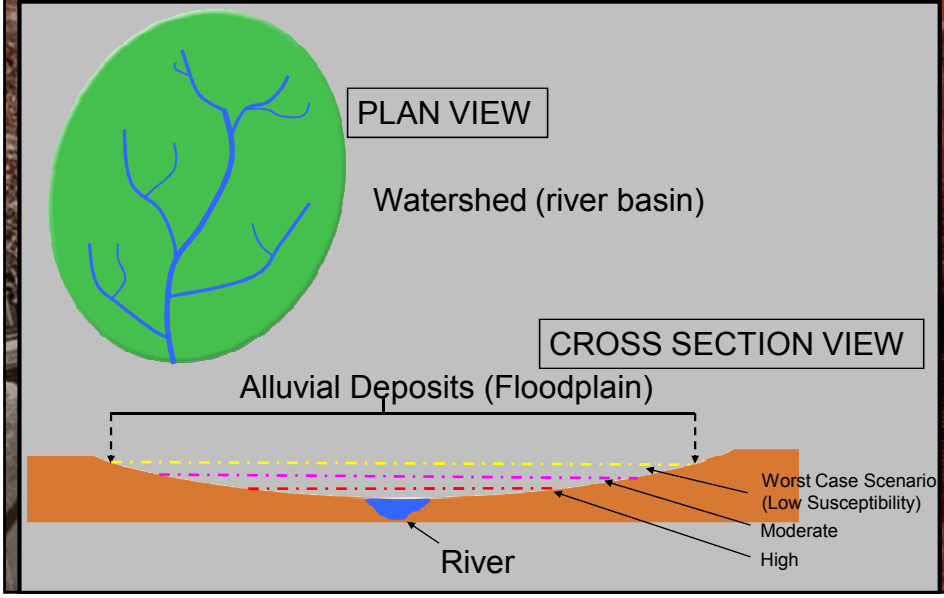
- 1st order= high susceptibility active channel, backswamp, oxbow, paleochannel, swales, mudflats, etc
- 2nd order = mod susceptibility natural levee, point bar, sandbar, lower terrace, beach ridges,etc.
- 3rd order = low susceptibility upper terrace, talus slope, etc.



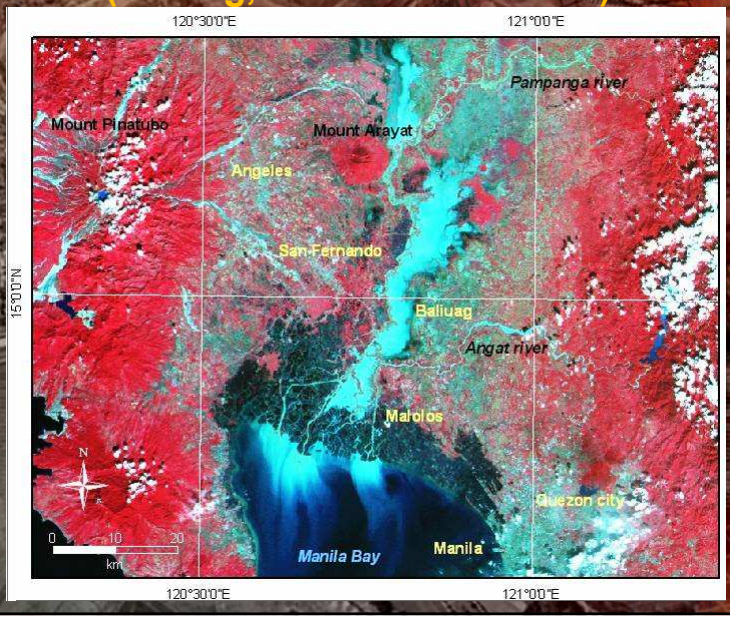
Rainfall records of Historical Floods

Year	Month	Day	Monthly Normal value	Max. monthly record	Total Rainfall				num. of days of ant.rainfall	num. of rainy days in a month
					24 hr	return per.	6 hr	return per.		
2000	January	29	728.2	1212.3	228.0	2	98.2	2	3	25
1999	March	11	446.7	913.5	174.4	2	134.4	2	1	26
1999	January	10	728.2	1644.2	374.0	25	208.0	10	3	28
1997	March	9	446.7	669.9	236.4	5	111.2	2	13	18
1996	February	6	516.3	983.2	250.6	5	177.0	5	14	26
1993	February	5	516.3	889.2	298.6	10	182.0	5	6	21
1992	December	17	539.1	830.2	194.4	2	126.0	2	2	27
1990	March	7	446.7	678.8	267.6	5	146.4	2	5	23
1988	November	29	389.9	517	173.8	2	112.4	2	1	25
1986	November	28	389.9	663.4	321.6	15	307.2	50	5	19
1986	March	5	446.7	786.8	190.6	2	132.0	2	4	26
1986	January	22	728.2	1144.2	252.3	5	245.0	15	21	30
1985	December	17	539.1	539.2	226.8	2	191.6	5	2	21
1985	January	1	728.2	484.6	203.7	2	158.5	2	10	10
1982	January	30	728.2	1195.3	250.6	5	98.7	2	15	28
1981	January	31	728.2	1377.2	248.9	5	165.1	5	10	29
1981	January	12	728.2	1377.2	315.9	10	143.0	2	19	29
1979	December	18	539.1	564.8	151.7	2	127.8	2	1	24

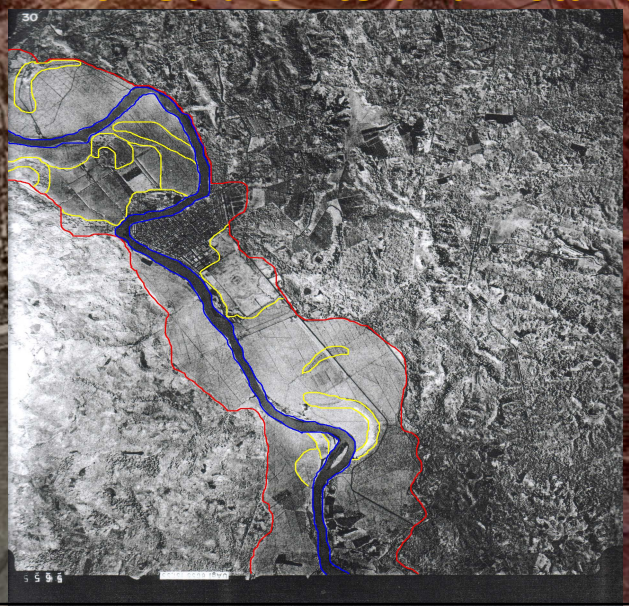
Flood susceptibility vs geomorphic units



Flooding in Central Luzon, 30 Nov. 2004 (Unding, Violeta and Winnie)



Geomorphological Mapping System with Sub-Units and Details



Stereophoto-Interpretation on aerial photograph

Dingalan town

airphoto

2005

Preliminary Interpretation Flood/flashfloodHazard Map

2005 aerial photo

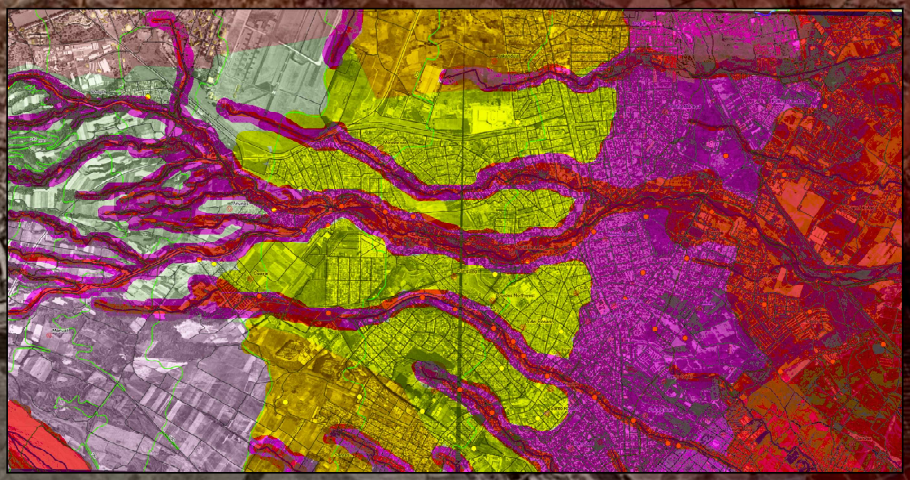
Approx scale:

1:25,000

Source: ICDAI

Ortho Photomap of Angeles City and Vicinity, Pampanga, 10k

Preliminary tabletop analysis

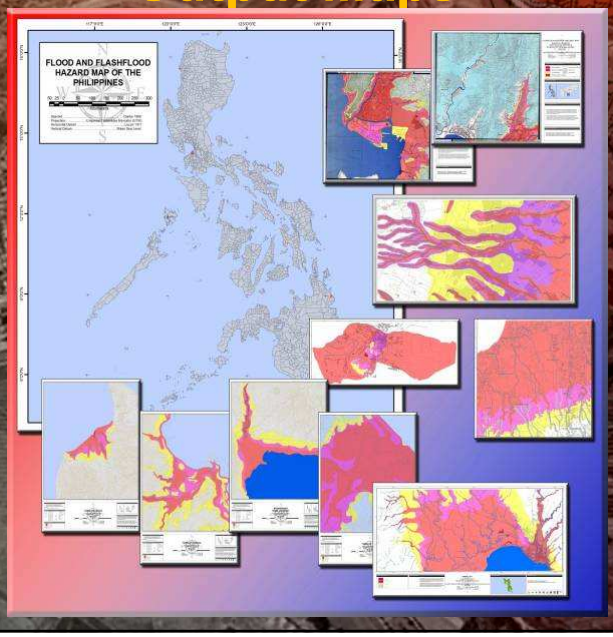


Field verifications and mapping

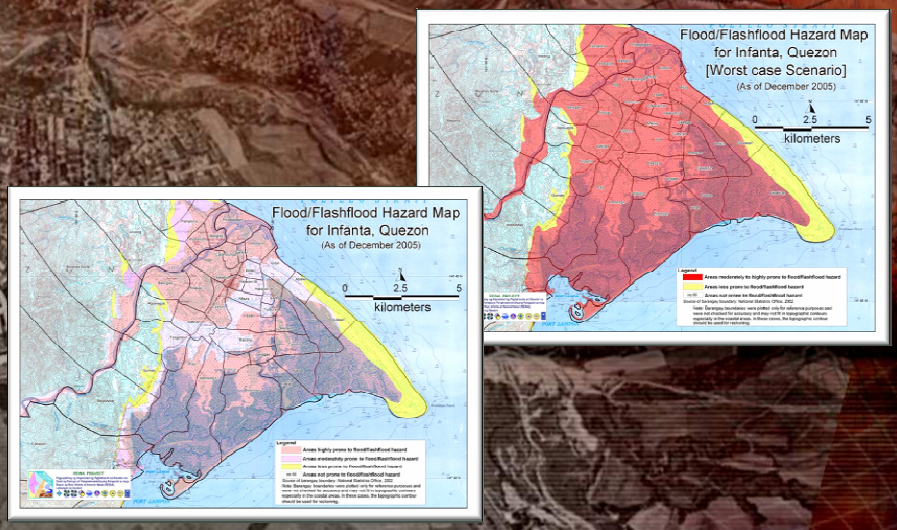
Field Interviews

Output Maps

Output Maps

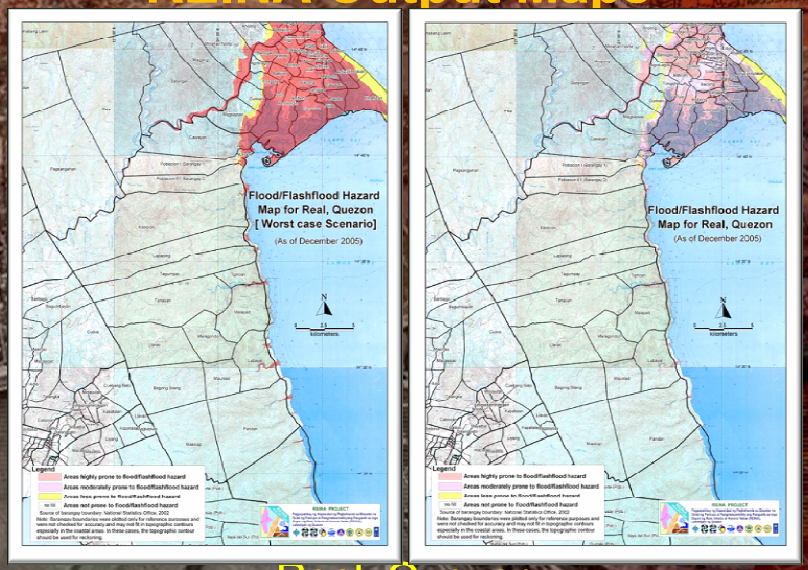


REINA Output Maps



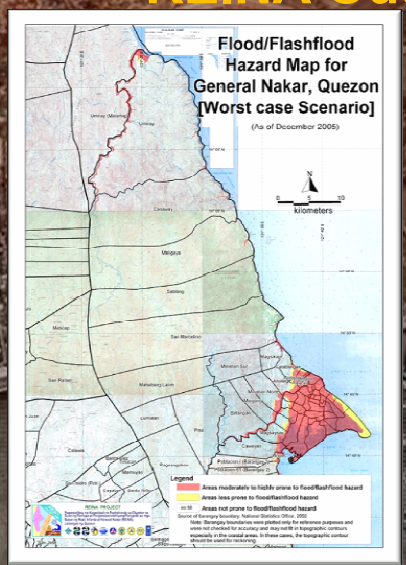
Infanta, Quezon

REINA Output Maps



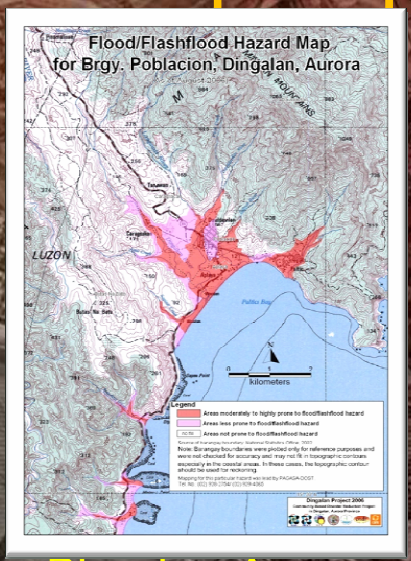
Real, Quezon

REINA Output Maps



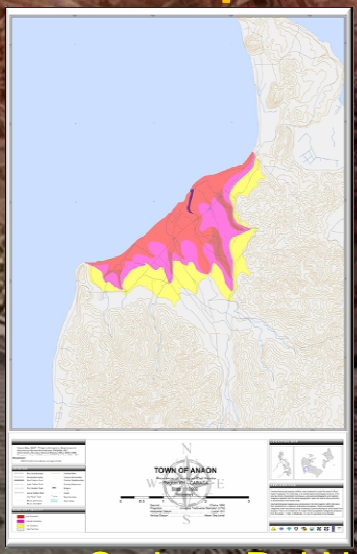
Nakar, Quezon

CARE Output Maps



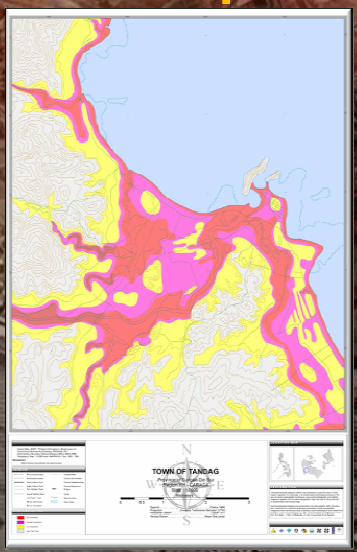
Dingalan, Aurora

READY I Output Maps



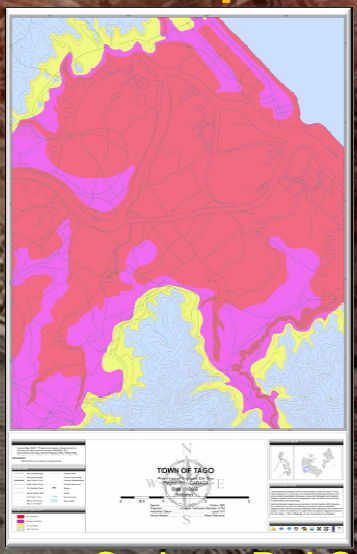
Anaon, Surigao Del Norte

READY I Output Maps



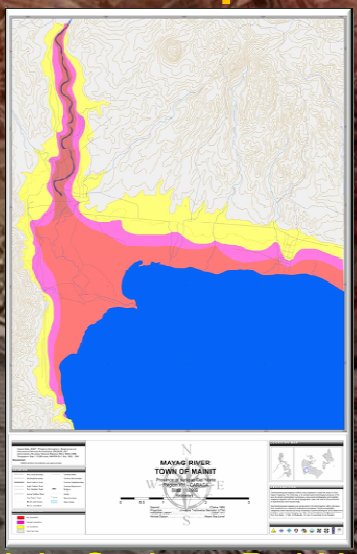
Tandag, Surigao Del Sur

READY I Output Maps



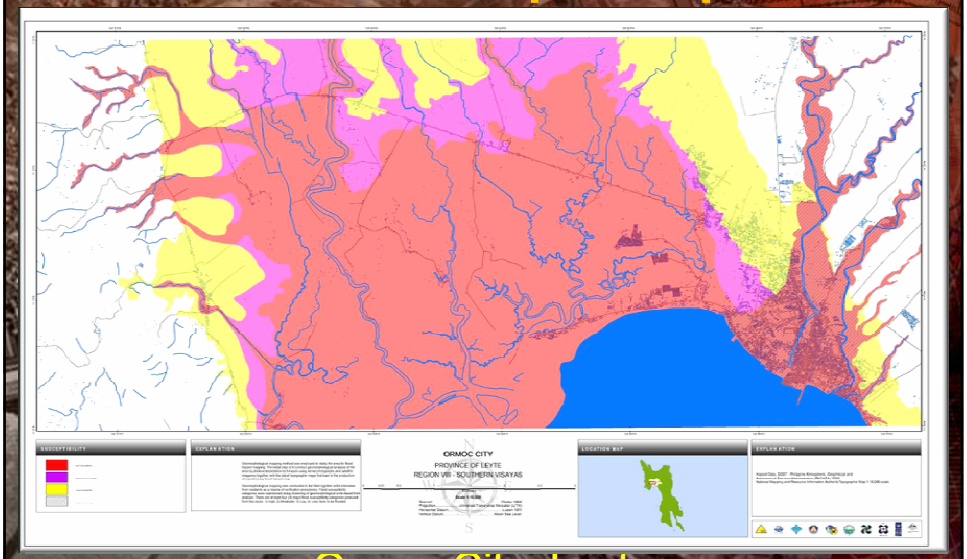
Tago, Surigao Del Sur

READY I Output Maps



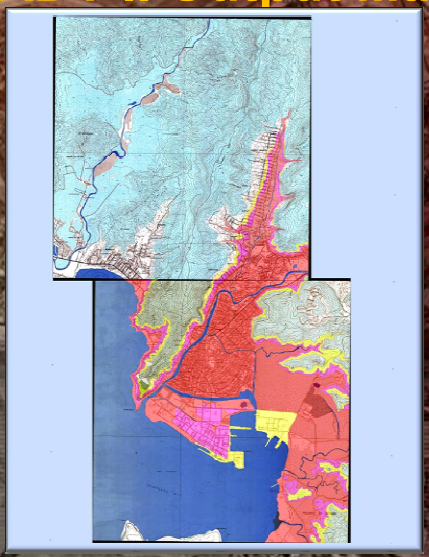
Mainit, Surigao Del Norte

READY II Output Maps



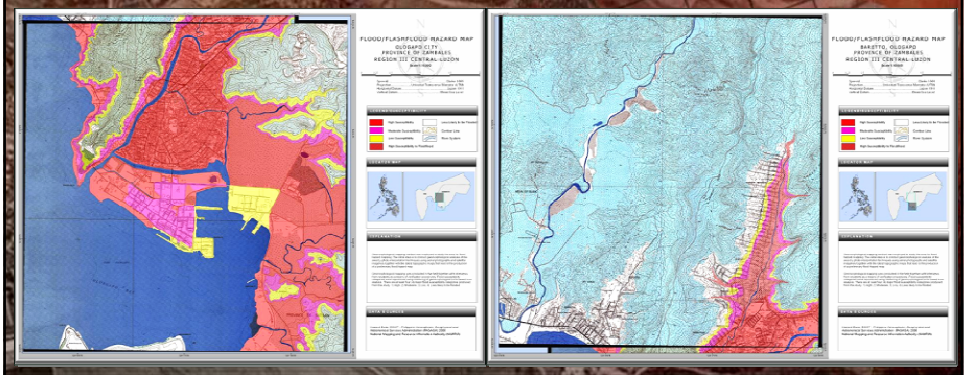
Ormoc City, Leyte

READY II Output Maps



Olongapo and Baretto Zambales

READY II Output Maps



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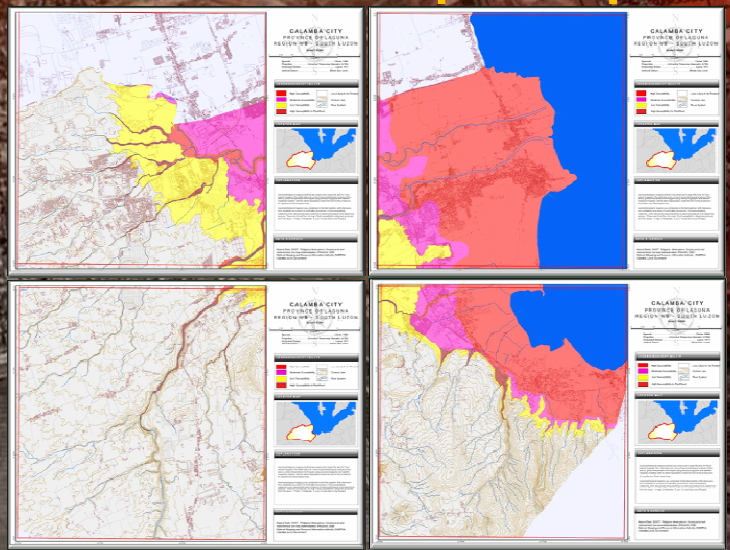
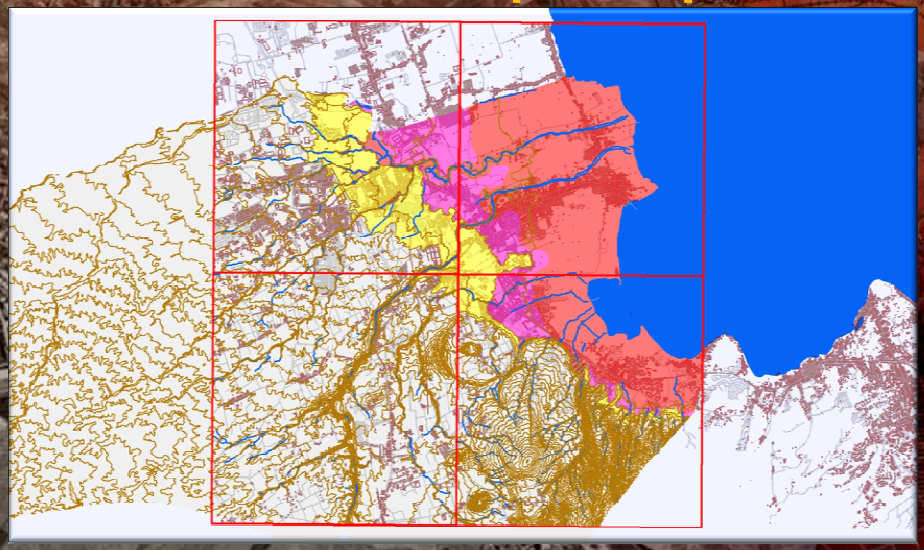


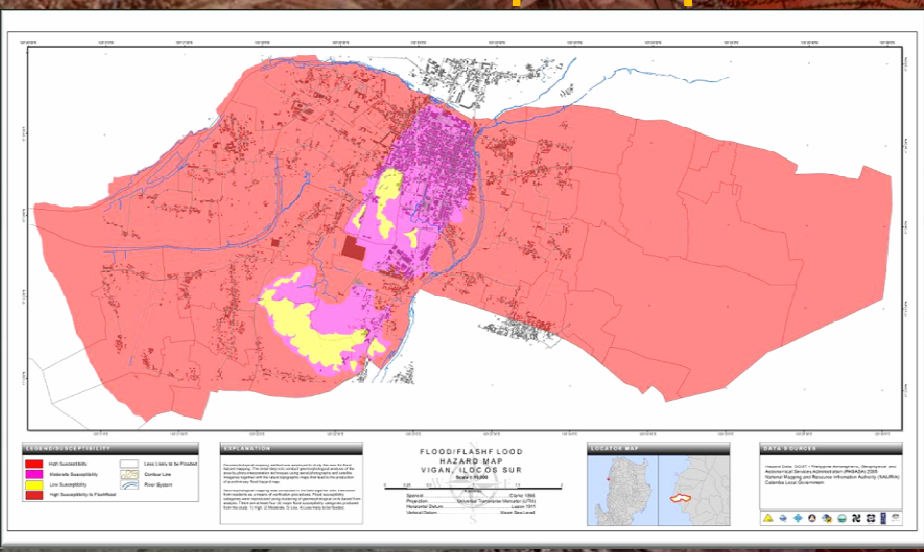
Calamba, Laguna

READY II Output Maps

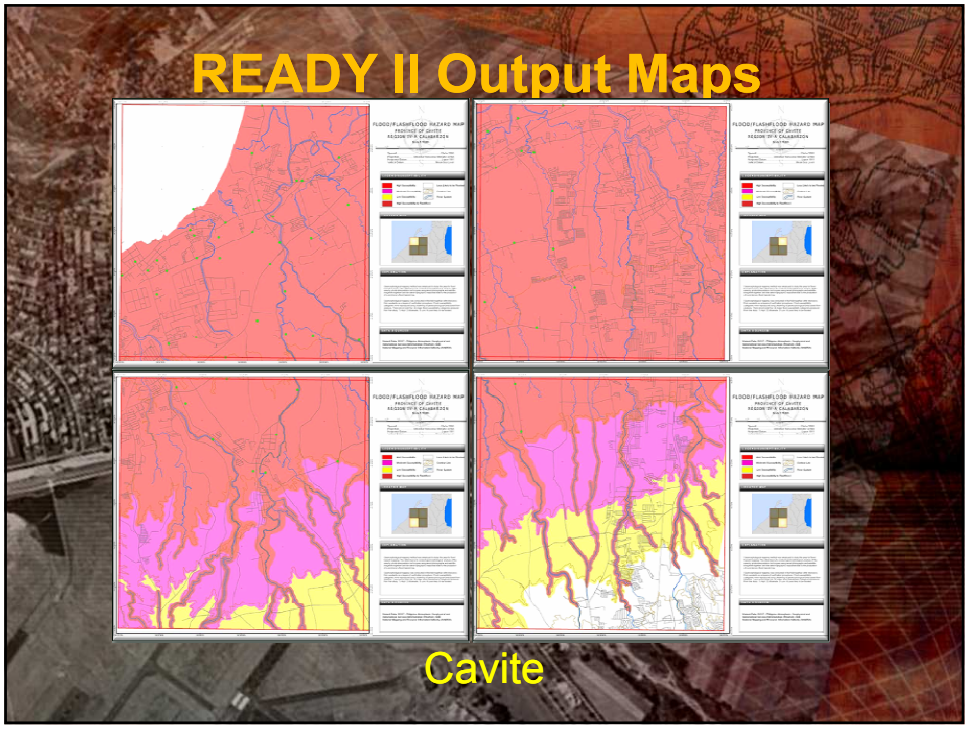


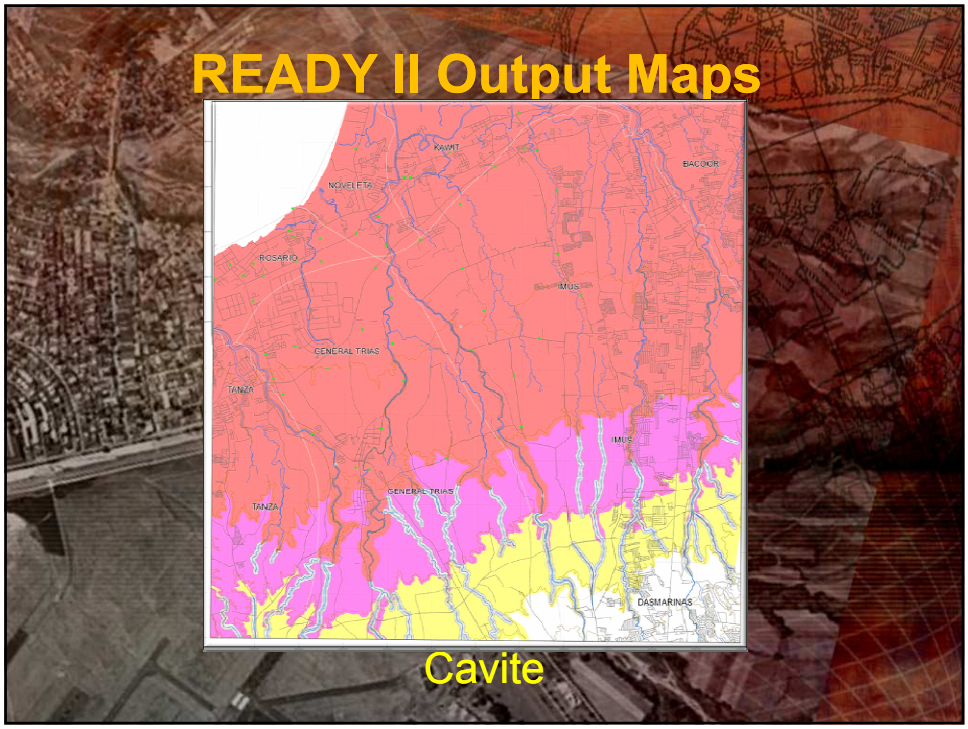
Calamba, Laguna

READY II Output Maps

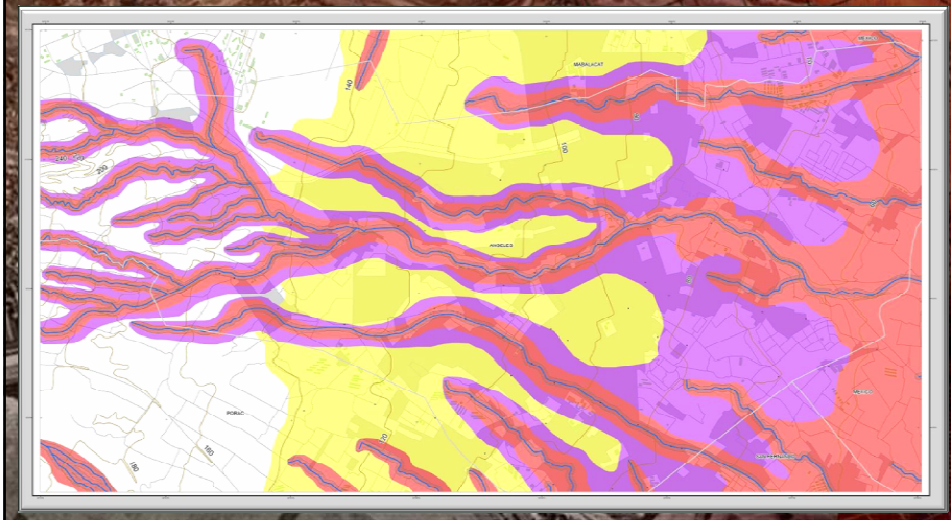


Vigan City, Ilocos Sur


READY II Output Maps
Cavite

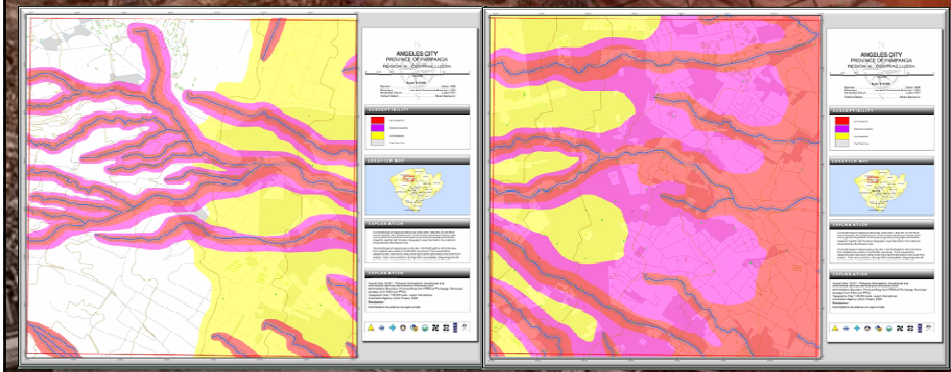

READY II Output Maps
KAWIT
NOVELETA
BACOOR
ROSARIO
IMUS
GENERAL TRIAS
TANZA
IMUS
GENERAL TRIAS
TANZA
DASMARINAS
Cavite

READY II Output Maps

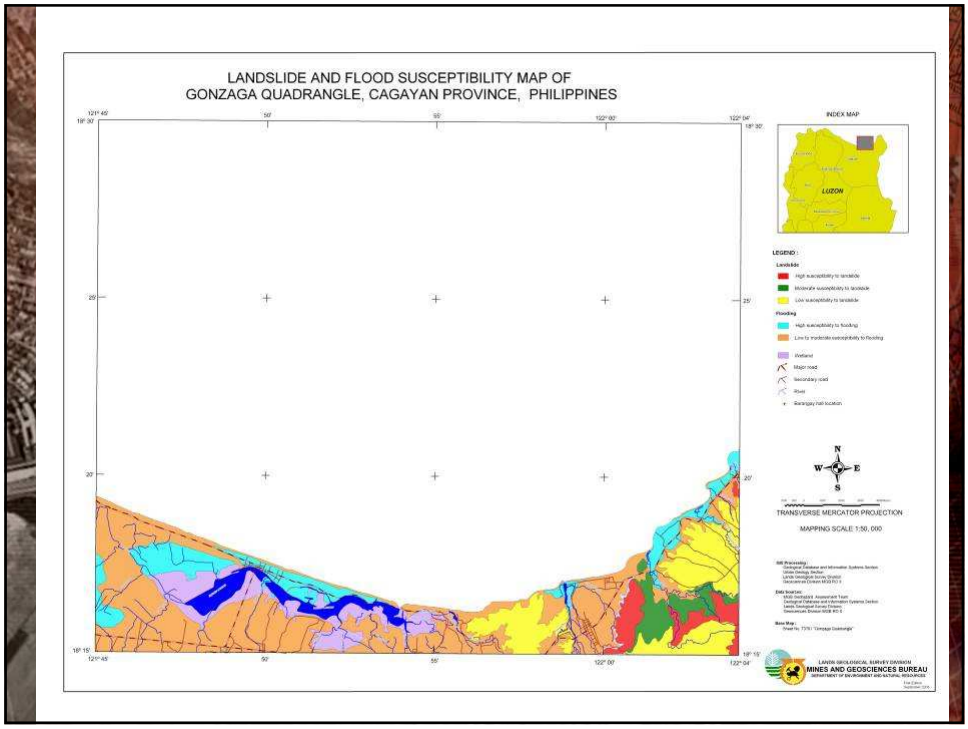


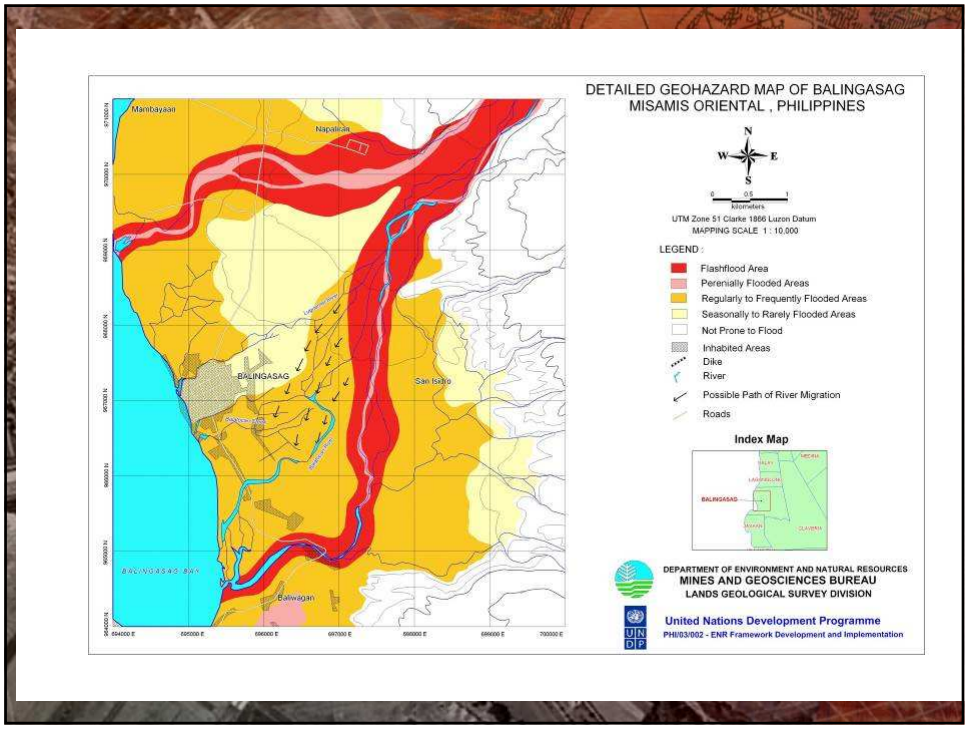
Angeles, Pampanga

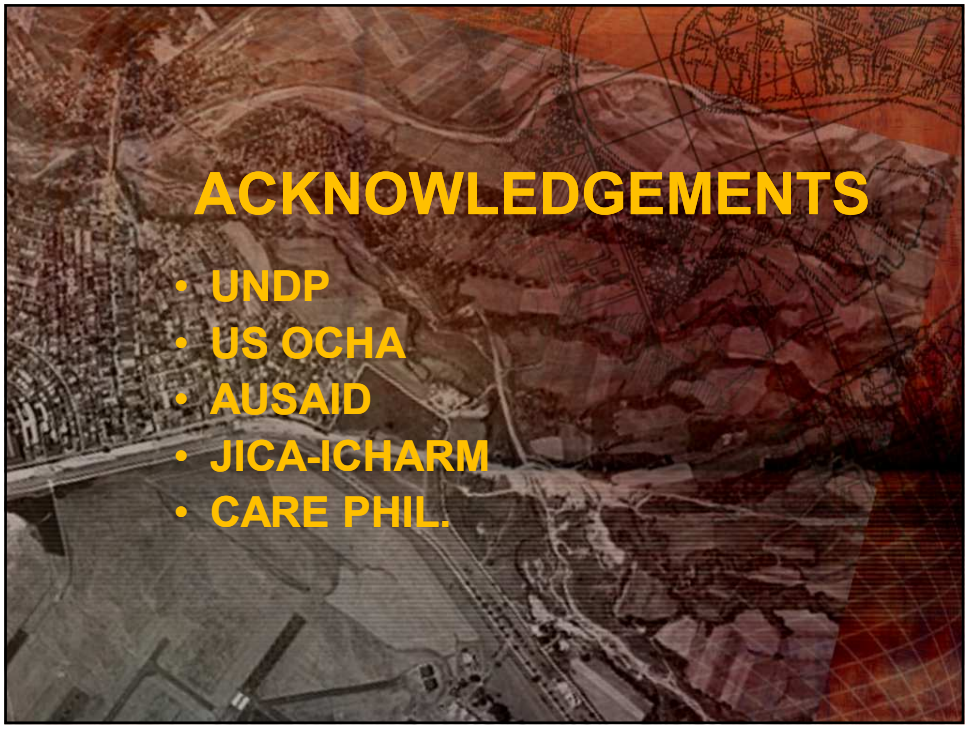
READY II Output Maps



Angeles, Pampanga


LANDSLIDE AND FLOOD SUSCEPTIBILITY MAP OF
GONZAGA QUADRANGLE, CAGAYAN PROVINCE, PHILIPPINES
INDEX MAP
LUZON
LEGEND :
Landslide
High susceptibility to landslide
Moderate susceptibility to landslide
Low susceptibility to landslide
Flooding
High susceptibility to flooding
Low to moderate susceptibility to flooding
Wetland
Major road
Secondary road
River
Barangay hall location
N
W
E
S
TRANSVERSE MERCATOR PROJECTION
MAPPING SCALE 1:50, 000
MINES AND GEOSCIENCES BUREAU


DETAILED GEOHAZARD MAP OF BALINGASAG
MISAMIS ORIENTAL , PHILIPPINES
Mambayaan
Napalician
BALINGASAG
San Isidro
Balinggan
N
W
E
S
kilometers
UTM Zone 51 Clarke 1866 Luzon Datum
MAPPING SCALE 1 : 10,000
LEGEND :
Flashflood Area
Perenially Flooded Areas
Regularly to Frequently Flooded Areas
Seasonally to Rarely Flooded Areas
Not Prone to Flood
Inhabited Areas
Dike
River
Possible Path of River Migration
Roads
Index Map
BALINGASAG
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
MINES AND GEOSCIENCES BUREAU
LANDS GEOLOGICAL SURVEY DIVISION
United Nations Development Programme
PHI/03/002 - ENR Framework Development and Implementation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• UNDP
• US OCHA
• AUSAID
• JICA-ICHARM
• CARE PHIL.


THANK YOU
END
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