

Mapping the Typhoon Haiyan Using Geospatial Data and Very High Resolution Satellite Images

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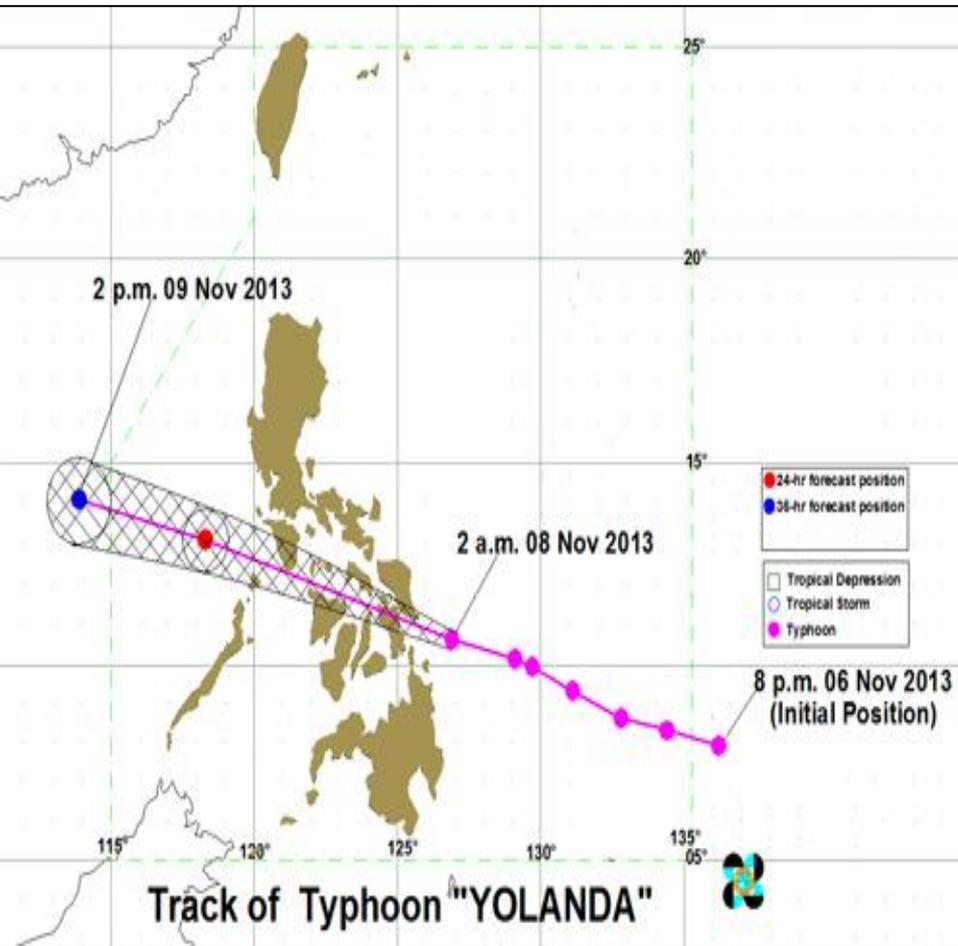
Outline of Presentation

- **Background**
- **Unified Mapping Project of NAMRIA**
- **Mapping of Typhoon-Affected Areas**
- **Final Output**
- **Conclusion**



Background

Typhoon Haiyan (local name Yolanda) the deadliest most destructive typhoon in recorded history



Typhoon Haiyan Yolanda caused 6,300 lives and affected 1.5 million families; more than \$ 2 billion in damages



Unified Mapping Project

- aims to produce of 1:10,000 large scale topographic and maps for the entire country;
- Coverage: 30 million hectares
11,000 map sheets
- will serve as common base maps of the government for various thematic applications

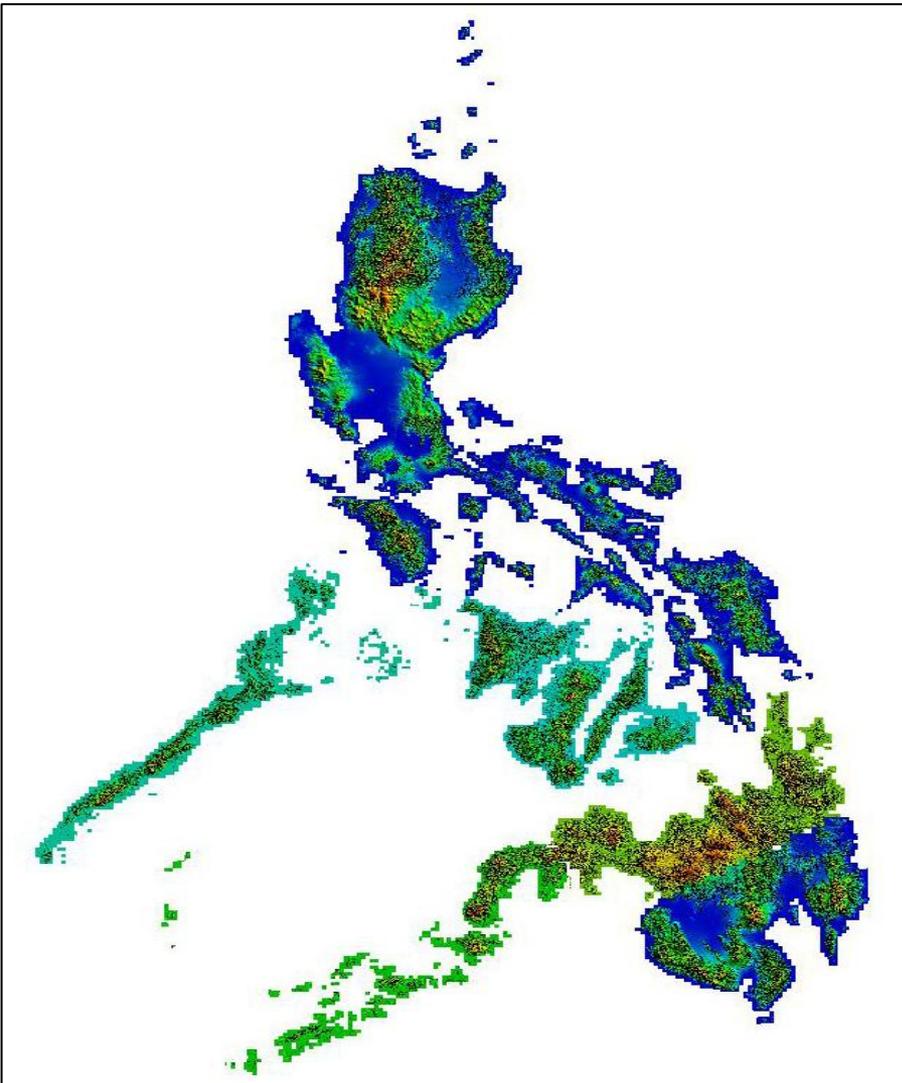


Unified Mapping Project



In the implementation of the UMP, Very High Resolution Satellite Images (VHRSI) consisting of World View-2 and GeoEye

Unified Mapping Project



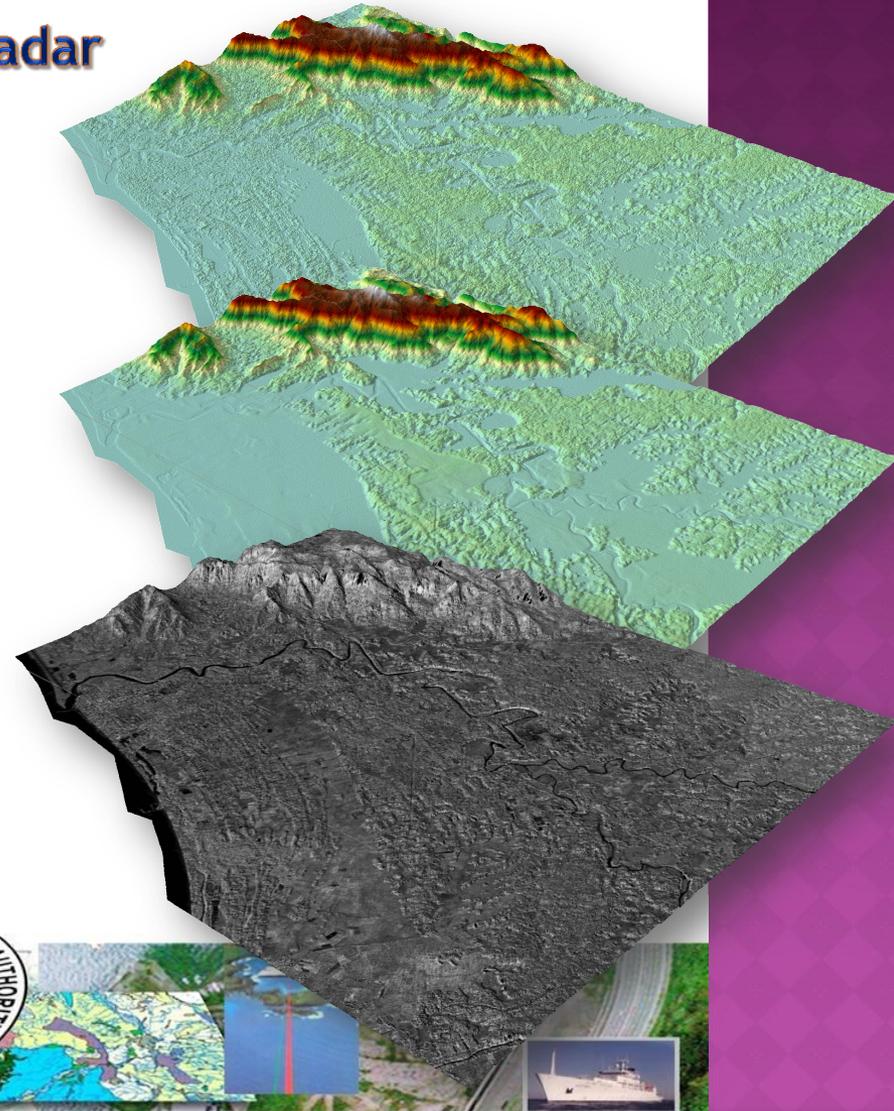
DTM derived from IfSAR

For elevation data,
Interferometric
Synthetic Aperture
Radar (IfSAR) would be
utilized

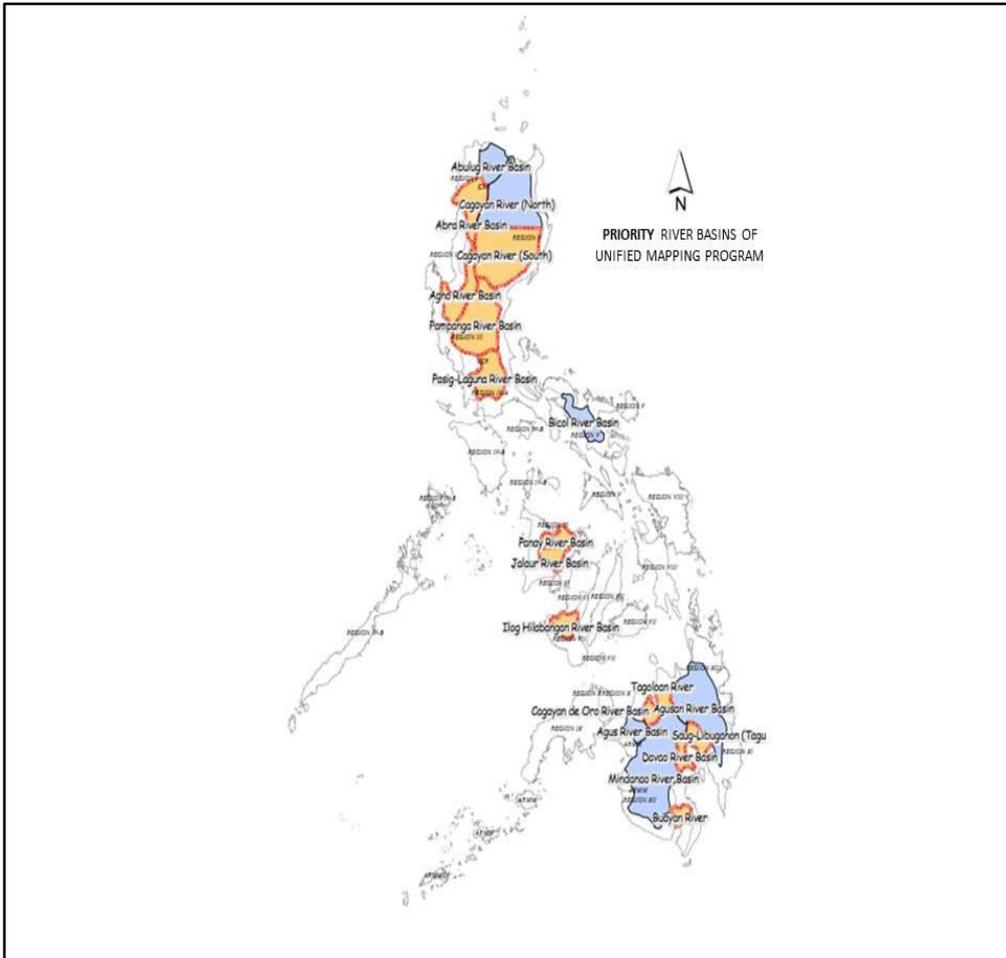
Unified Mapping Project

Interferometric Synthetic Aperture Radar (IfSAR) Data

- Acquired 2013
- Nationwide Coverage
- High Resolution Digital Elevation Model
 - Digital Surface Model (DSM)
 - Digital Terrain Model (DTM)
- Orthorectified Radar Image (ORI)
- 5.0m Resolution DEM
- 0.625m Resolution ORI
- 1.0m RMSE Vertical Accuracy
- 2.0m RMSE Horizontal Accuracy



Unified Mapping Project

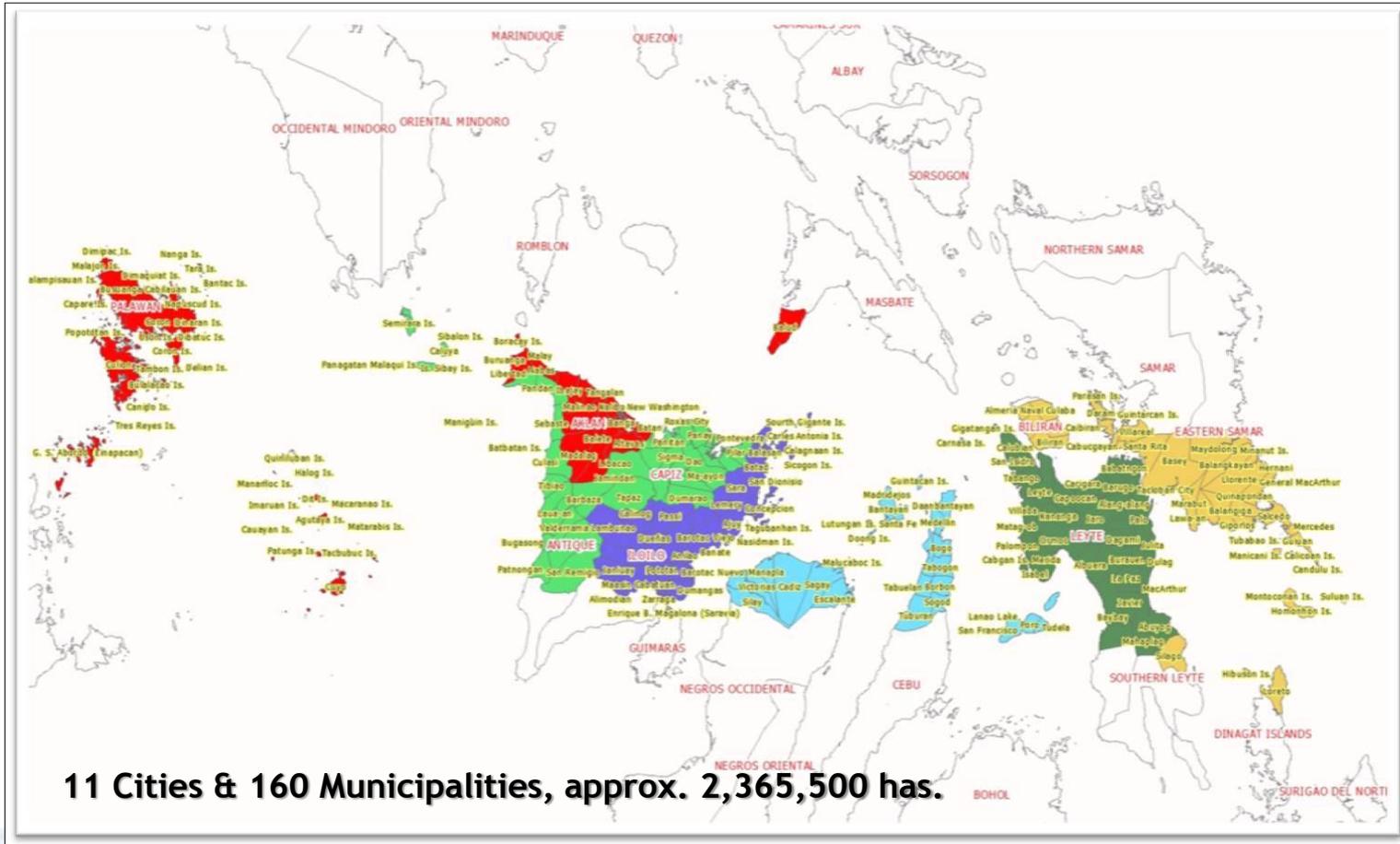


Priority areas for the UMP were the 18 major river basins area: 11 million hectares



Unified Mapping Project

After Yolanda, disaster-affected area became top priority for the Unified Mapping Project



Mapping of Typhoon-Affected Areas



a. Other Image Sources -

➤ JICA

Pleiades images from JICA covering coastlines of Leyte and Eastern Samar



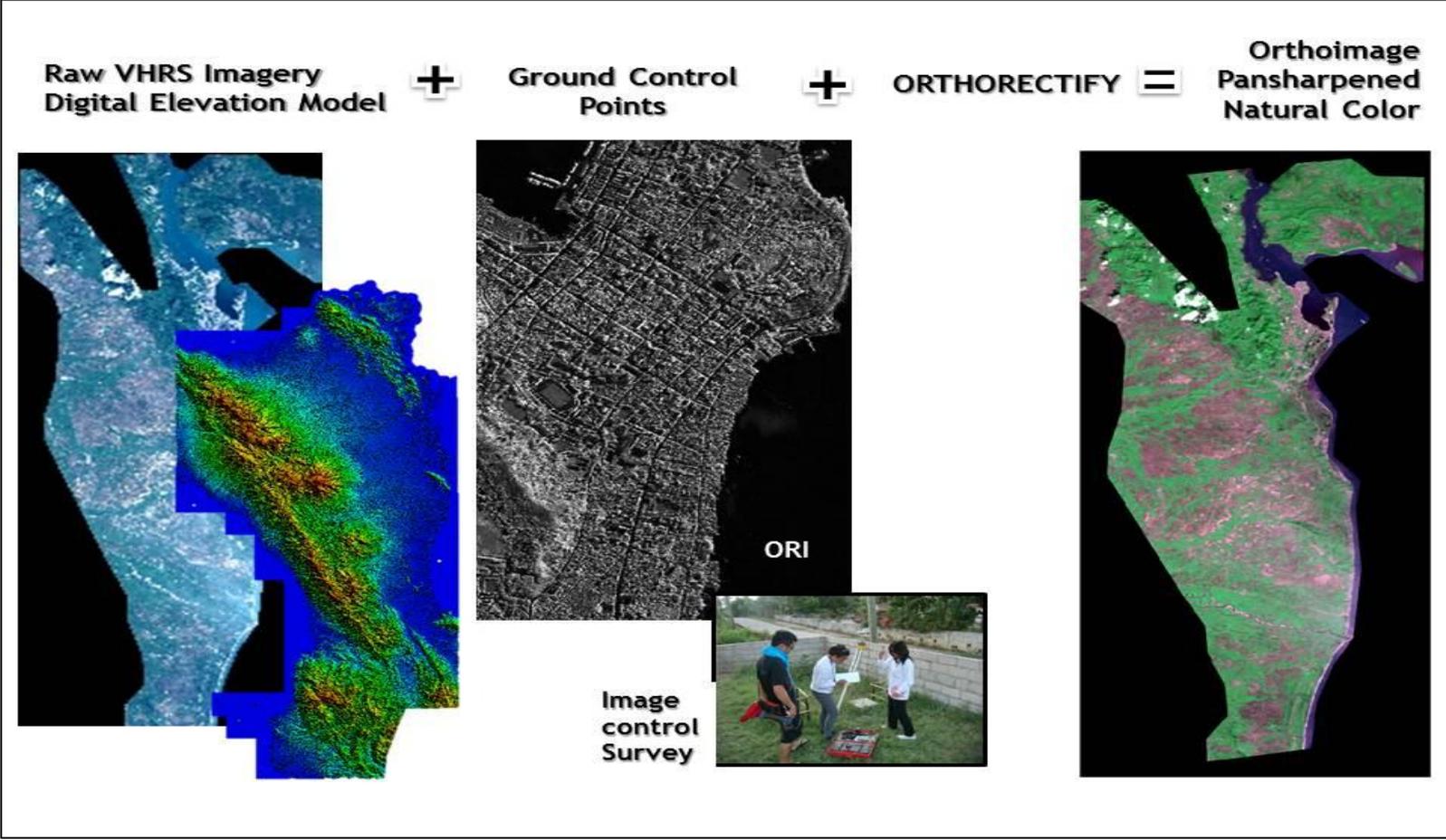
Mapping of Typhoon-Affected Areas

b. Image Control Point (ICP) Survey



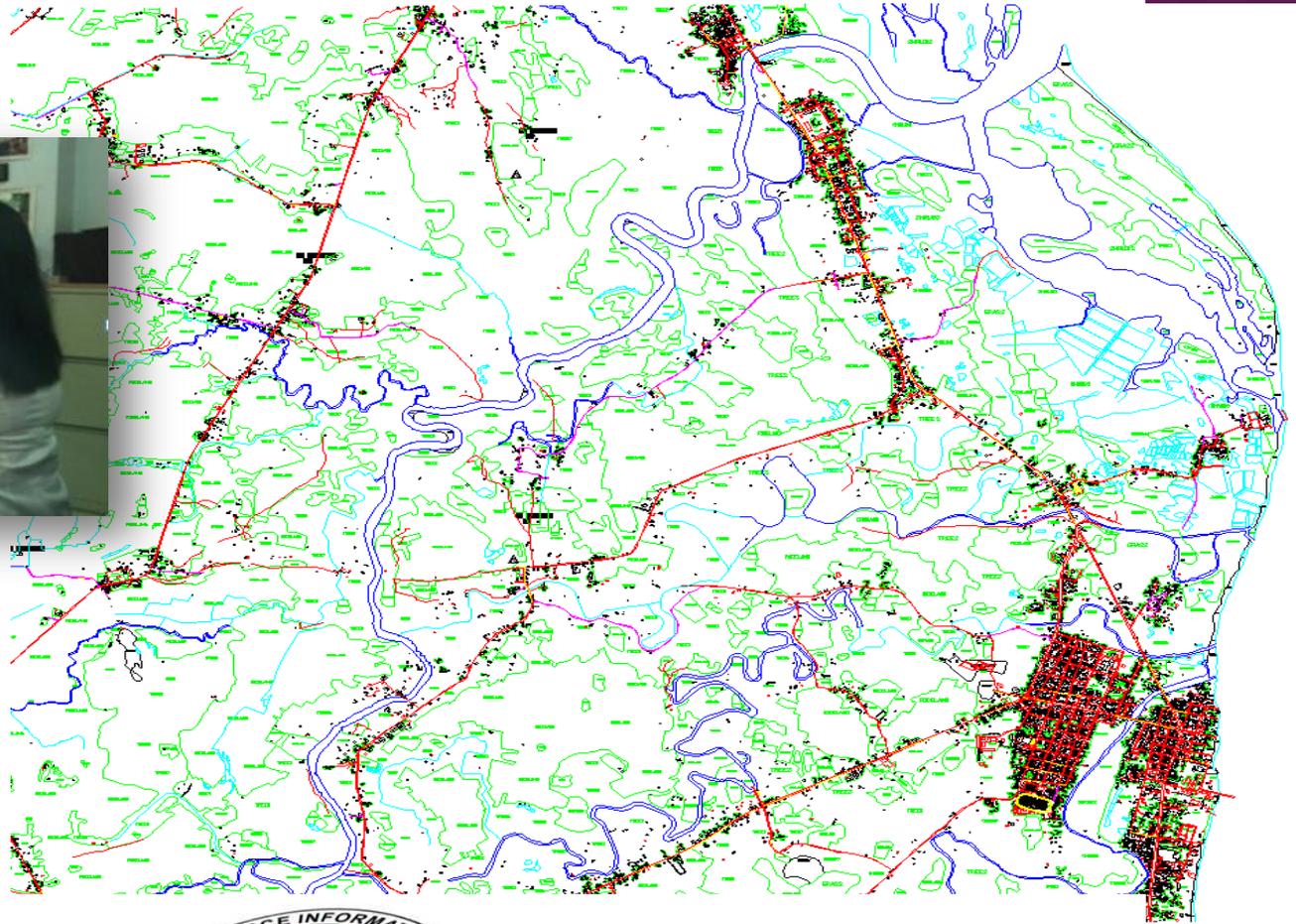
Mapping of Typhoon-Affected Areas

c. Image Processing



Mapping of Typhoon-Affected Areas

d. Feature Extraction



- Road Network
- River Network
- Buildings / Houses
- Land Cover



Mapping of Typhoon-Affected Areas

e. Field Verification and Validation

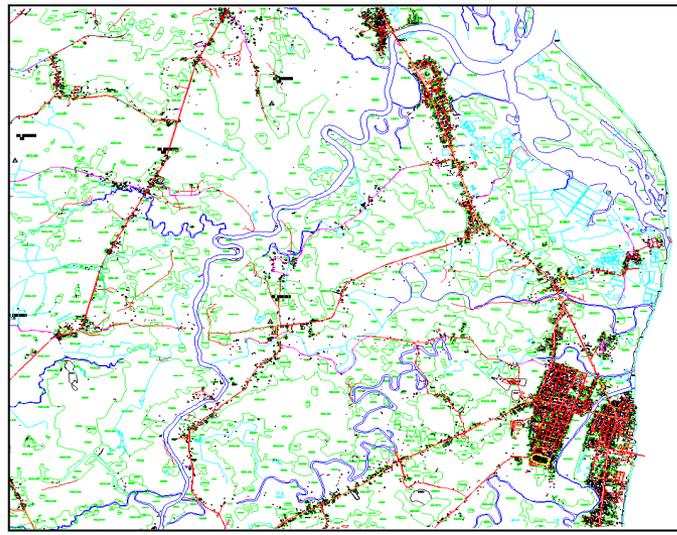


ROAD / TRANSPORTATION	
Names of roads/street names, railways, railway stations	
Road surface classification as to: Concrete, Asphalt, Earth or Gravel	
WATER AND ASSOCIATED FEATURES	
Name of river, creek, canal, and lagoon	
Name of lake, other water bodies	
BRIDGE / TUNNEL	
Name of bridges / tunnels	
BUILDING	
School / University / College	
Barangay Hall / Health Center	
Church / Chapel / Mosque / Mission / Other religion	
Hospital	
Police station / military camp - reservation	
Other government agencies	
Prominent Building / Establishment / Commercial / Industrial	
Gasoline Station	
Lighthouse	
SUBDIVISION / VILLAGE	
Name of subdivision / Village / Sitio / Settlement	
ADMINISTRATIVE AND GEOGRAPHICAL NAMES, ADMINISTRATIVE BOUNDARIES	
Provincial boundary / Province name	
City or Municipal boundary / City or Municipal name	
Barangay boundary (if available) / Barangay name	
VEGETATION	
Vegetation Cover, i.e. rice field, crop land / agricultural land, orchard, mangrove, broadleaf, mixed scrub & broadleaf, grass, swamp / marsh, coconut, bushes / scrub	
Others	
Cemetery / Memorial Park	
Pier / Jetty / Port	
Bus Terminal / Airport	
Monument name / Landmark / Park / Recreation Areas	
Mountain Name	
Agriculture Farm / Hatchery	
Tower / Radio / Communication / Cell Site Name	

Mapping of Typhoon-Affected Areas

f. Geodatabasing

Extracted Features



+ Field Data =

Geodatabase



Process Flow

- Data Conversion (from .dwg to .gdb)
- Quality Control (Visual and Topology Check)
- Data Validation (from field data)



Mapping of Typhoon-Affected Areas

f. Geodatabasing



Table

ObjectID*	F_CODE	Existence Category	Location Category	Name	Transportation Use Categ	Weather Type Category	Material Composition Category
2	Road	Operational	On Ground Surface	RIDGEDALE VILL RD.	Road	All Weather	Concrete
5	Road	Operational	On Ground Surface	SUNFLOWER DRIVE	Road	All Weather	Concrete
9	Road	Operational	On Ground Surface	ML QUEZON ST.	Road	All Weather	Asphalt

Table

ObjectID*	FCSUBTYPE	Building Fun	Category	Educational buil	Existence Categor	Functional Use	House of Worship Typ	Name	Religious Denomination
16604	BuildingArea	Oil / Gas Facili	Utilities	Not Applicable	Operational	Transportation	Not Applicable	Star Oil G.S.	Not Applicable
16976	BuildingArea	School	Schools	Other	Operational	Institutional	Not Applicable	San Isidro parish Church/ San Isidro Parish School	Not Applicable
17952	BuildingArea	Oil / Gas Facili	Utilities	Not Applicable	Operational	Transportation	Not Applicable	Caltex G.S.	Not Applicable
18209	BuildingArea	School	Schools	College	Operational	Institutional	Not Applicable	Cebu Mary Immaculate College	Not Applicable
18281	BuildingArea	School	Schools	Other	Operational	Institutional	Not Applicable	Talamban Nat'l H.S.	Not Applicable
18287	BuildingArea	House of Wor	Places of Worship	Not Applicable	Operational	Other	Church	The Church of Jesus Christ of Latter Day Saints	Christian (undefined)
18288	BuildingArea	Government	Government Buildings	Not Applicable	Operational	Other	Not Applicable	Brgy.Hall- Talamban	Not Applicable
18295	BuildingArea	Health Office	Hospitals	Not Applicable	Operational	Medical	Not Applicable	Brgy. Health Ctr. - Talamban	Not Applicable
18297	BuildingArea	School	Schools	Other	Operational	Institutional	Not Applicable	Talamban E.S.	Not Applicable
18303	BuildingArea	Government	Government Buildings	Not Applicable	Operational	Other	Not Applicable	Brgy. Talamban Sports Ctr.	Not Applicable
18315	BuildingArea	Commercial B	Commercial and industri	Not Applicable	Operational	Commercial	Not Applicable	Talamban Supermarket	Not Applicable
18336	BuildingArea	Oil / Gas Facili	Utilities	Not Applicable	Operational	Transportation	Not Applicable	Star Oil Gasoline Station	Not Applicable
20087	BuildingArea	School	Schools	Other	Operational	Institutional	Not Applicable	Talamban Christian School	Not Applicable
20270	BuildingArea	Oil / Gas Facili	Utilities	Not Applicable	Operational	Transportation	Not Applicable	Petron Gas Station	Not Applicable

Building Area (14 out of 34921 Selected)

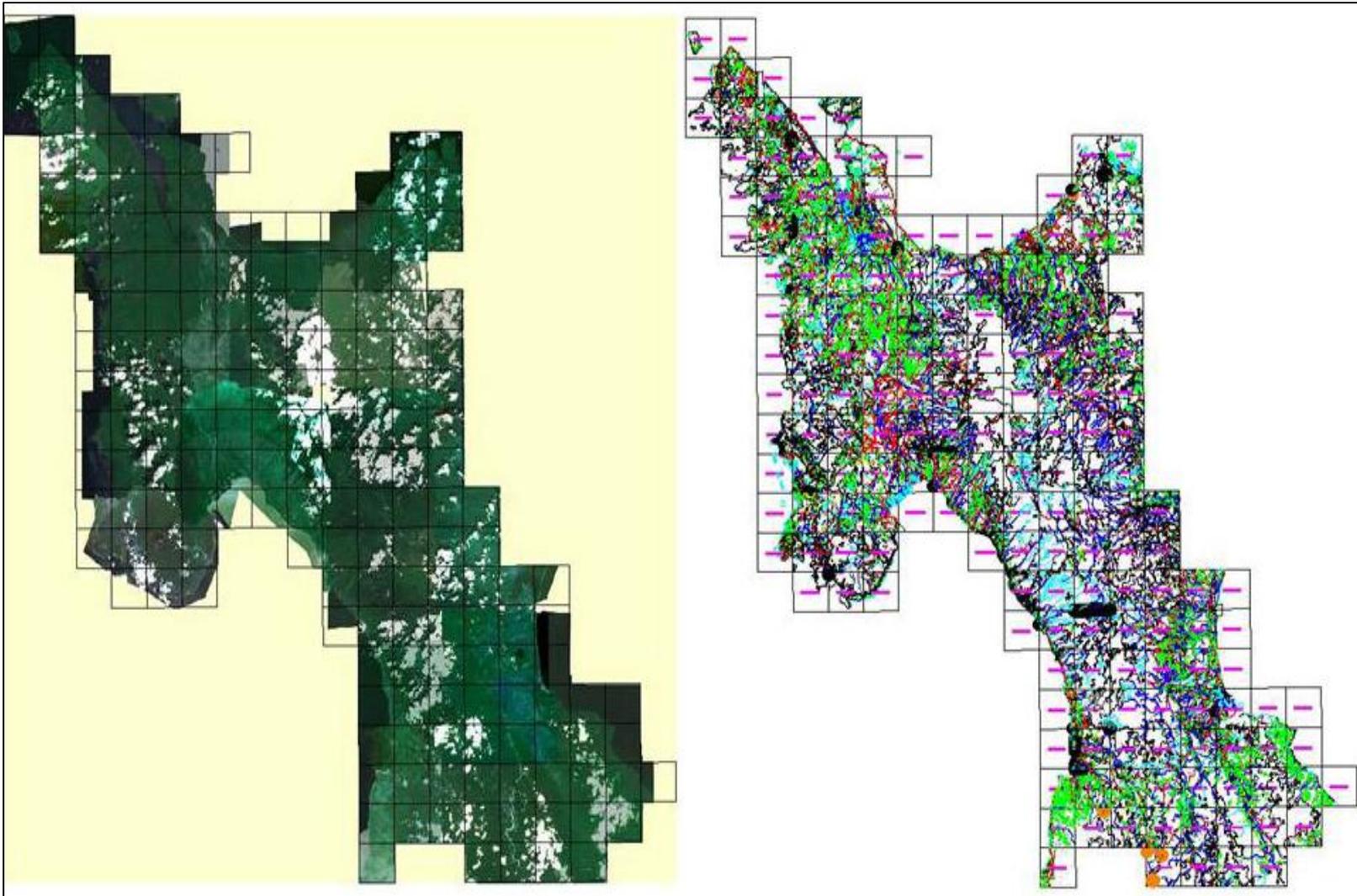
Building Area (74 out of 1390 Selected)

Building Area Road Centerlines

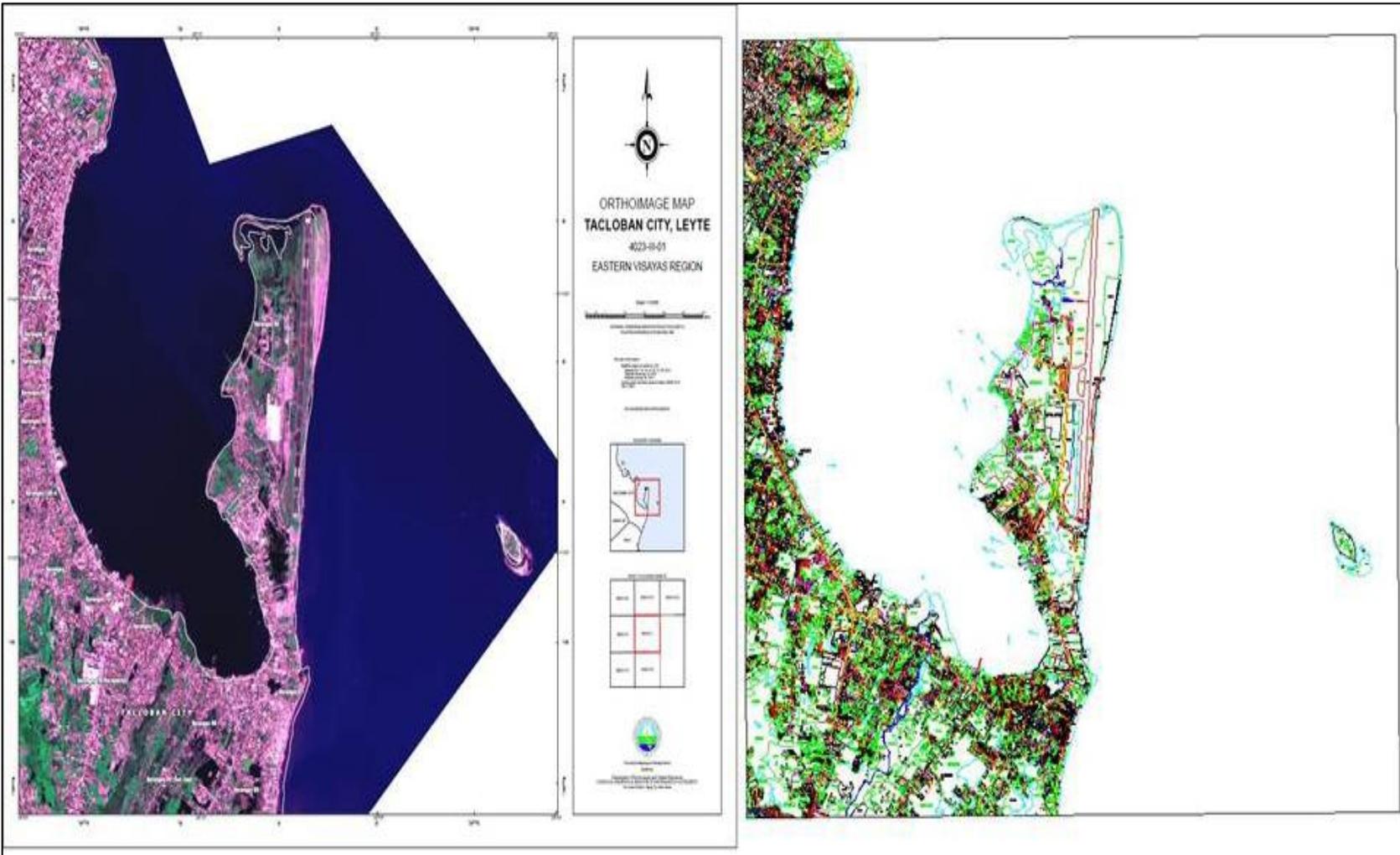
Spatial data with attributes stored in a database



Final Output



Final Output



Conclusions

- The problem of cloud cover for optical satellite data covering tropical regions like the Philippines always persist, which is major constraining factor in the timely production of base maps for disaster risk reduction and management.
- For calamities of the of Yolanda magnitude, multi-lateral agencies that are conducting their own damage assessment, researches and studies in the affected state using earth observation data may consider sharing their raw data with the national geospatial information agency (NGIA) of the said state to be used as additional input in the production of base maps.



Thank you!

