



Nationwide Operational Assessment of Hazards

Project NOAH and OpenStreetMap: The Role of Science and Crowdsourced Mapping in Disaster Risk Reduction

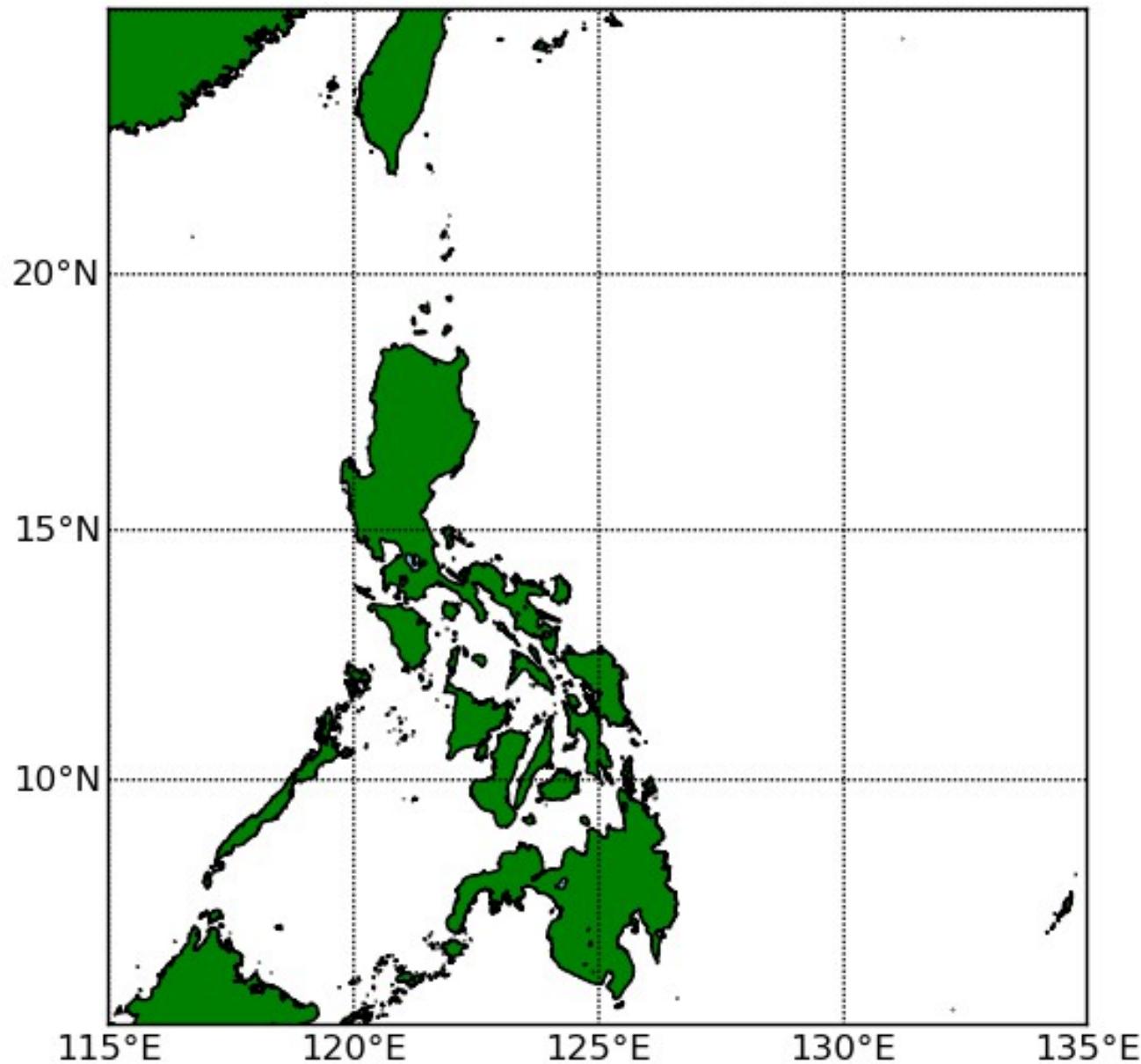
Ervin Malicdem

Chief Science Research Specialist

Feye Andal
Science Research Specialist II



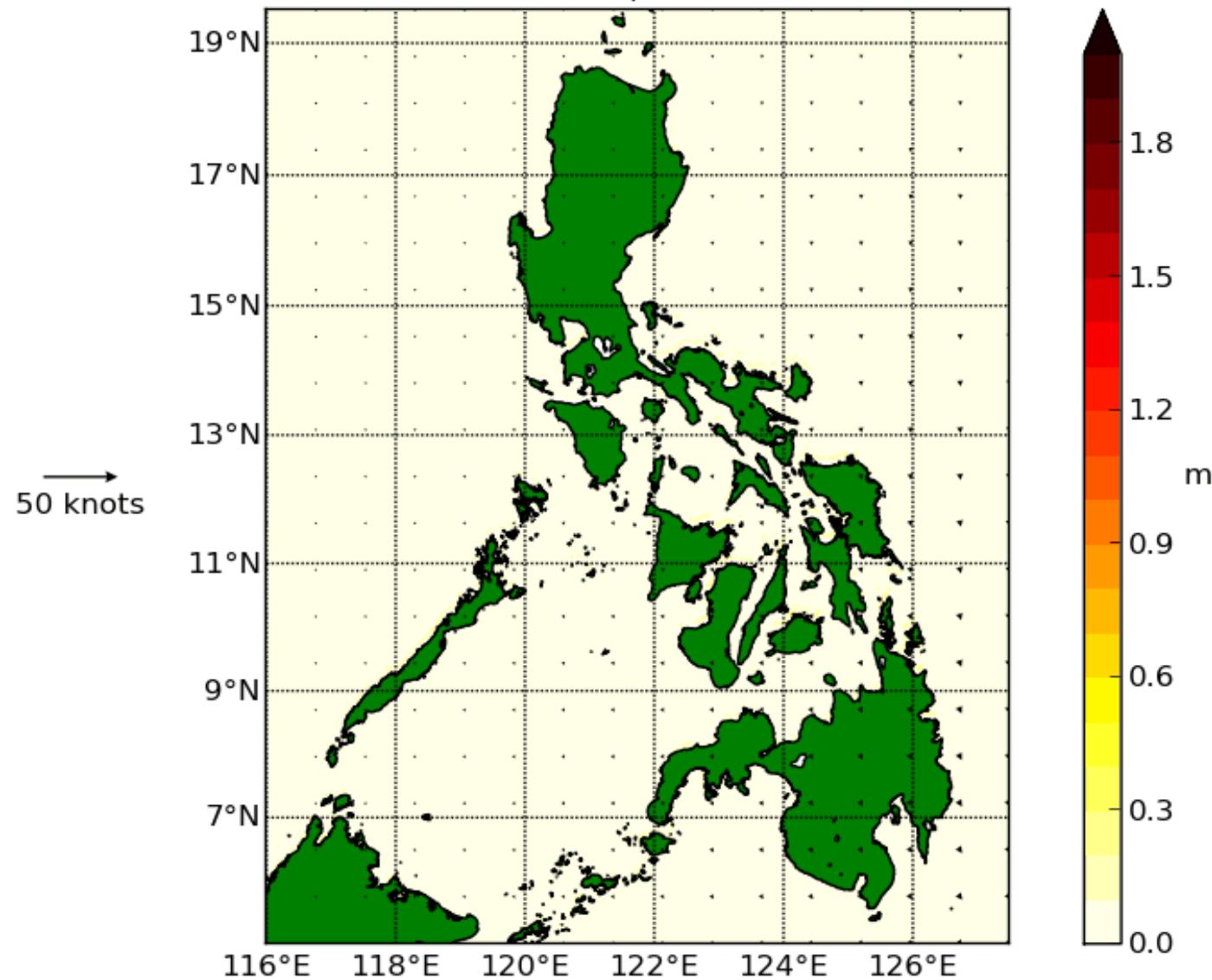
1951

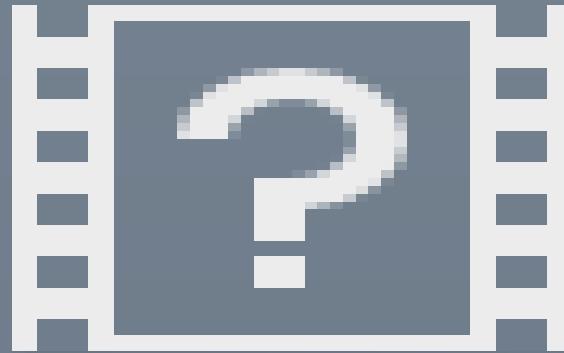


Tracks of Philippine Typhoons (1951 - 2013)

Extreme weather events

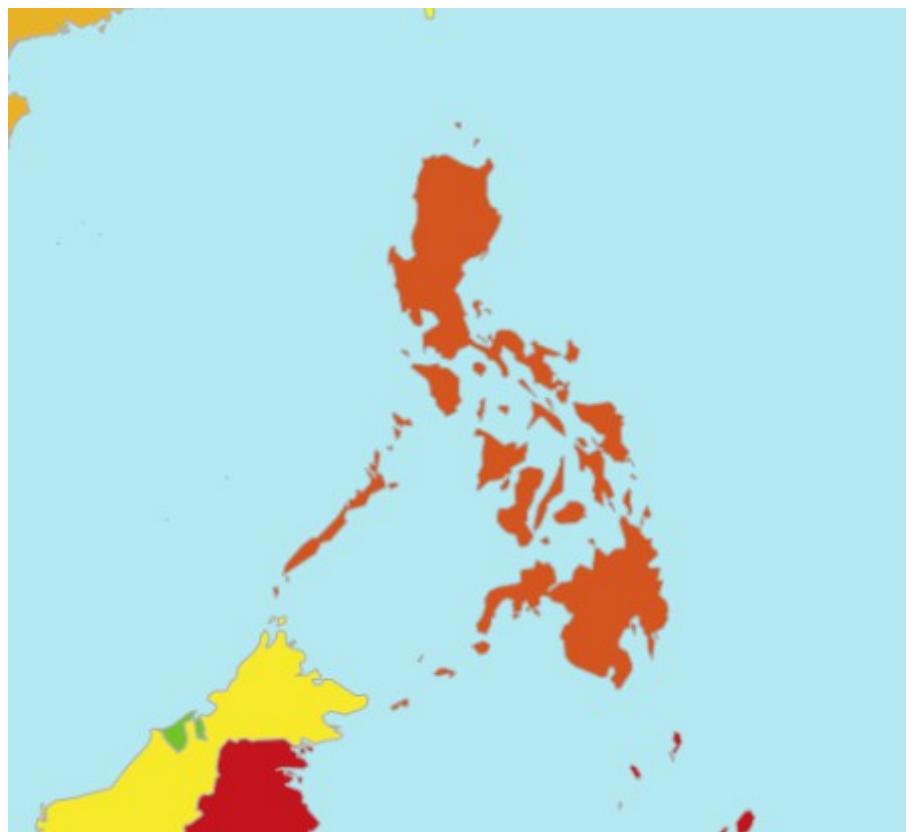
Yolanda Nov 06, 2013 08:00 AM





On 8 November 2013, Typhoon Haiyan, local name Yolanda, made landfall in the central Philippine islands region. Considered one of the most powerful typhoons ever to make landfall in recorded history, the 600 km-diameter typhoon Haiyan crossed the Philippine archipelago, bringing widespread devastation in its path. Strong winds, heavy rainfall, and storm surges caused extreme loss of lives and widespread damage to property.

Philippines has the **5th** longest coastline in the world
36,289 km.

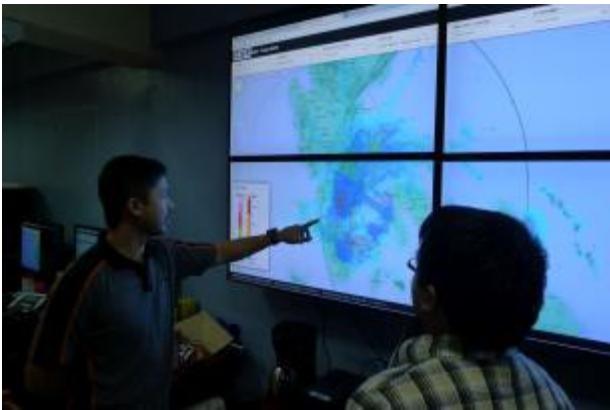


WorldRiskIndex		
Rank	Country	Risk (%)
1.	Vanuatu	36.72
2.	Tonga	28.45
3.	Philippines	27.98
4.	Guatemala	20.10
5.	Solomon Islands	19.29
6.	Bangladesh	19.26
7.	Costa Rica	17.17
8.	Cambodia	16.82
9.	Papua New Guinea	16.82
10.	El Salvador	16.80
11.	Timor-Leste	16.23
12.	Brunei Darussalam	16.15
13.	Mauritius	14.66
14.	Nicaragua	14.63
15.	Guinea-Bissau	13.78

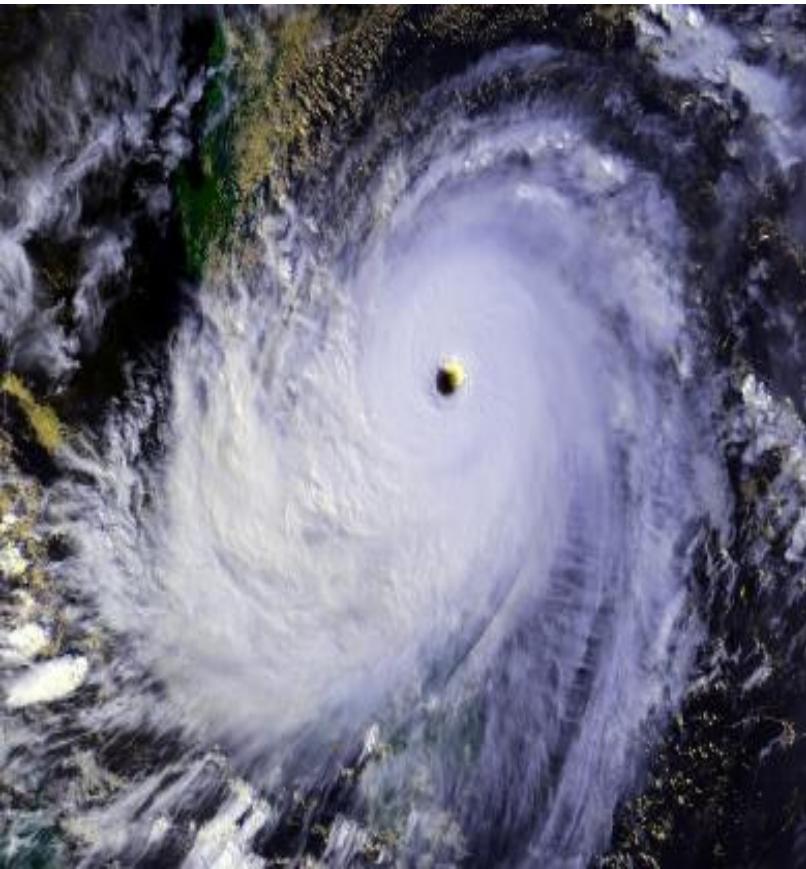
- World Risk Index Report 2015

What is Project NOAH?

Project NOAH is a nationwide disaster management program that aims to improve the government and the Filipino people's capacity to respond against the impact and effect of extreme weather conditions



The presence of Hazards do NOT always lead to Disaster.



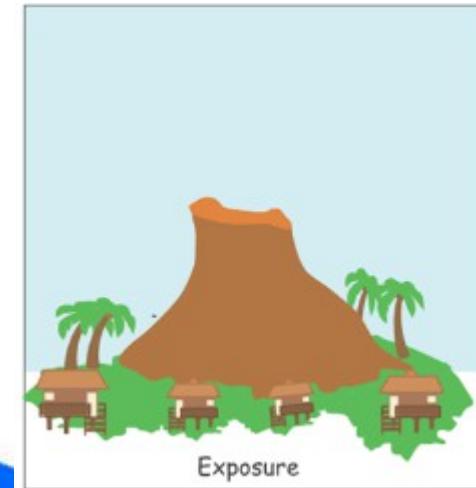
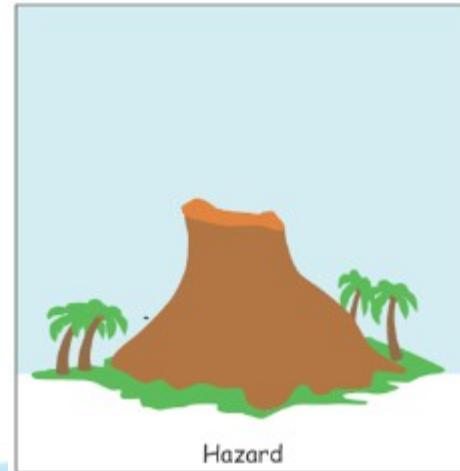
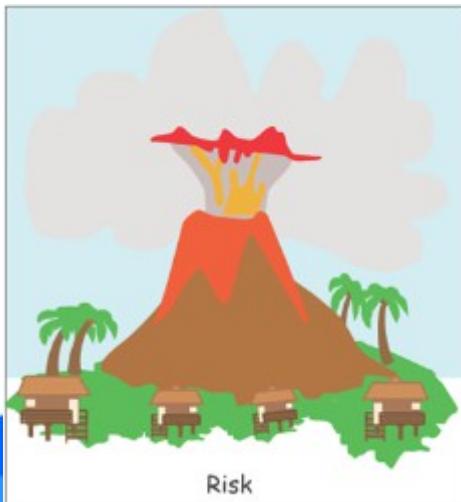


Disaster Risk

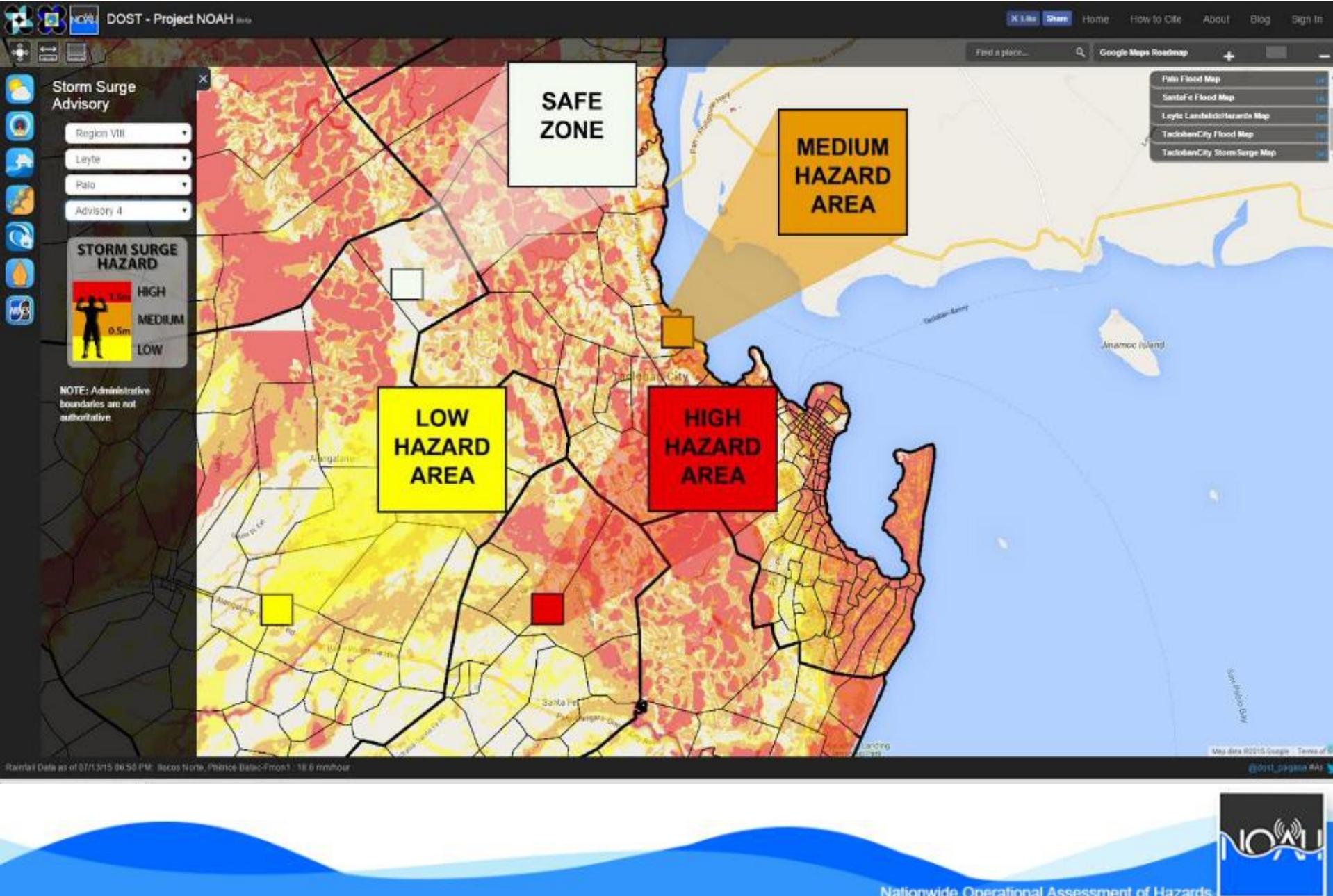
“A country’s risk of becoming the victim of a disaster is not determined solely by its exposure to natural hazards, but to a crucial extent also by the society’s state of development.”

- World Risk Index Report 2013

Risk = f (Hazard, Exposure, Vulnerability , Capacity)



Multi Hazard Maps of Project NOAH



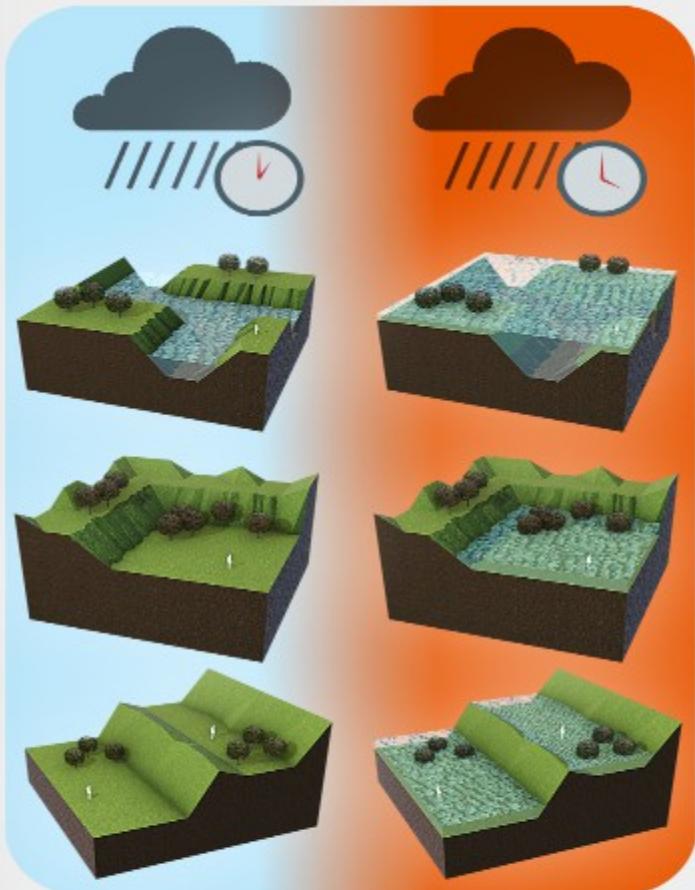
FLOOD



Flooding is the overflow of water from a river or other body of water due to **heavy rainfall**.

Water flows downstream from higher areas to lower areas.

This leads to a community becoming **submerged** in water.



- HAS THERE BEEN **CONTINUOUS HEAVY RAINFALL** IN YOUR AREA?

- ARE YOU ON A **FLOODPLAIN** NEAR A **RIVER, STREAM, OR LAKE**?

- ARE YOU SITUATED ON A **LOW-LYING AREA**?

- ARE YOU ON AN AREA THAT **NATURALLY COLLECTS WATER**?

Visit <http://noah.dost.gov.ph> and view the Flood Hazard Maps to know the hazards that your community faces.



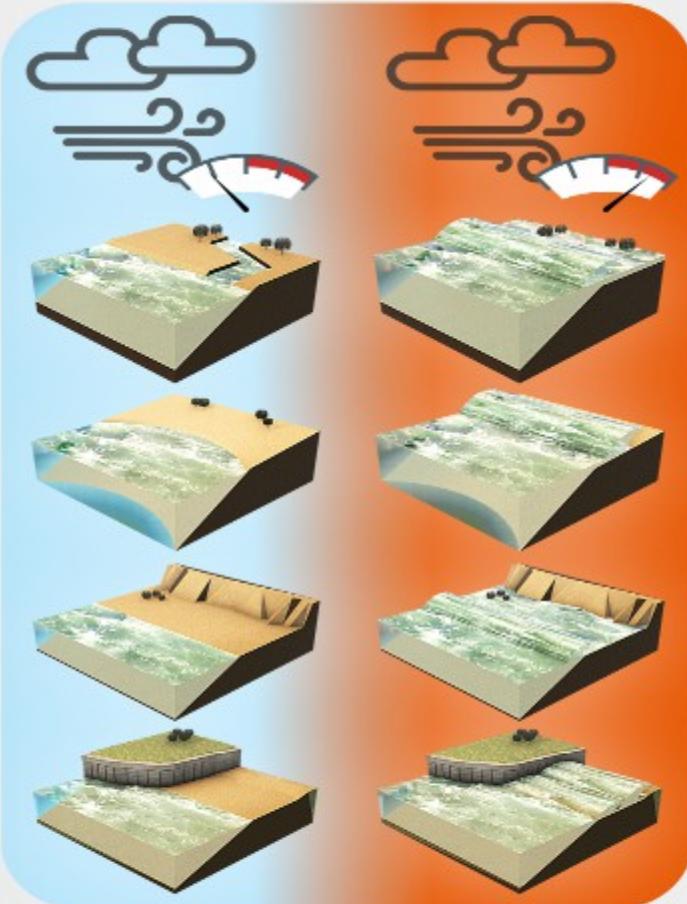
"Residents try to cross the flooded Macanhan road in Barangay Carmen leading towards Barangay Balulang as flood waters caused by Typhoon "Pablo" blocked the main road as the Cagayan de Oro River overflowed"

Source: INQUIRER.net Photo by: Bobby Lagsa

STORM SURGE



A **Storm Surge** is a **rise of sea level** due to an incoming typhoon over the normal tide. **Multiple surges** can occur during the duration of a storm.



- DOES THE INCOMING TYPHOON HAVE STRONG WINDS OF AT LEAST **62km/h** (SIGNAL #2 OR HIGHER)?**

- IS YOUR HOUSE NEAR THE COAST OR A WATER FORMATION SUCH AS A RIVER THAT MIGHT AGGRAVATE FLOODING?**

- IS THE COASTLINE CURVED INWARD, E.G., A COVE?**

- DOES THE COASTLINE HAVE LOW ELEVATION AND IS IT GENTLY SLOPING?**

- IS THERE AN ABSENCE OF PROTECTIVE COASTAL STRUCTURES, SUCH AS SEAWALLS OR MANGROVES?**

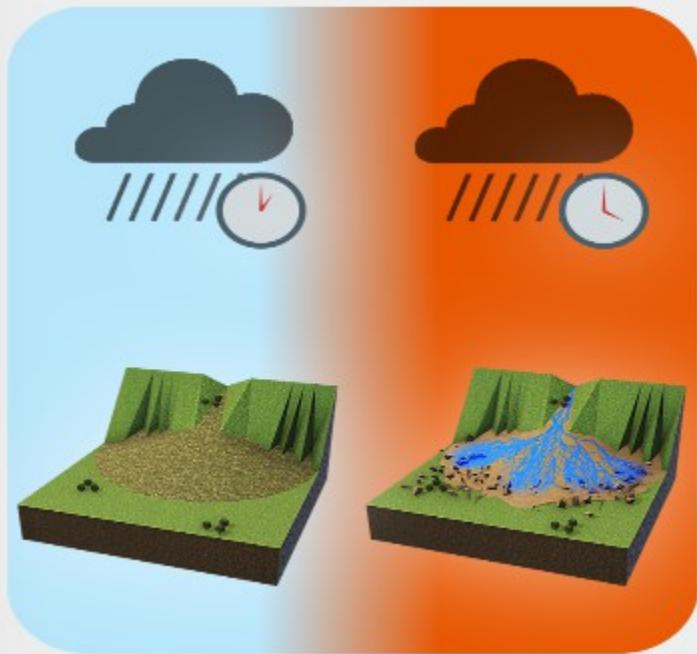
Visit <http://noah.dost.gov.ph> and view the Storm Surge Hazard Maps to know the hazards that your community faces.



DEBRIS FLOW



A **Debris Flow** is rapid movement of **sediment** that flows along a slope, river, or channel, usually towards an **alluvial fan**.



HAS THERE BEEN **CONTINUOUS HEAVY RAINFALL** IN YOUR AREA?

ARE YOU SITUATED ON OR NEAR AN **ALLUVIAL FAN**?

An **alluvial fan** is a fan-shaped deposit of soil and rocks. It forms where a rapidly-flowing river spreads out over a flat plain. Alluvial fans are typically found in between or at the end of mountain ranges, such as the mouth of a canyon. If there is continuous heavy rainfall, the fan area will usually be flooded with **water and sediment**.

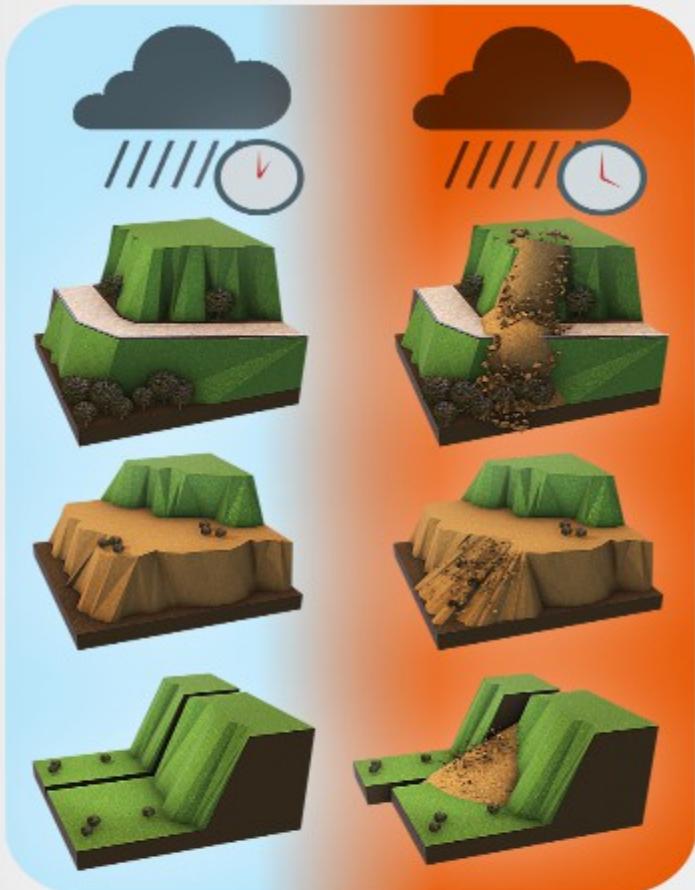
Visit <http://noah.dost.gov.ph> and view the **Landslide-Alluvial Fan Maps** to know the hazards that your community faces.

LANDSLIDE



A **landslide** is a movement of earth, rock, or debris due to gravity.

Landslides can be caused by **continuous heavy rainfall**,
strong earthquakes, or **human activities**.



- HAS THERE BEEN **CONTINUOUS HEAVY RAINFALL** IN YOUR AREA?

- IS YOUR HOUSE, BUILDING, OR STRUCTURE NEAR A **STEEP SLOPE** OF A **MOUNTAIN, HILL, OR HIGHWAY**?

- IS THE SOIL IN YOUR AREA **LOOSE AND LIGHT**?

- IS YOUR HOUSE, BUILDING, OR STRUCTURE ON TOP OF OR NEAR A **FAULT, JOINT, OR DISCONTINUITY**? ARE THERE **BIG CRACKS** IN THE ROCKS?

Visit <http://noah.dost.gov.ph> and view the **Landslide-Alluvial Fan Maps** to know the hazards that your community faces.



Guinsaugon
Population = 1,857



Project NOAH is DOST's flagship DRRM response to put in place a responsive disaster prevention and mitigation program.

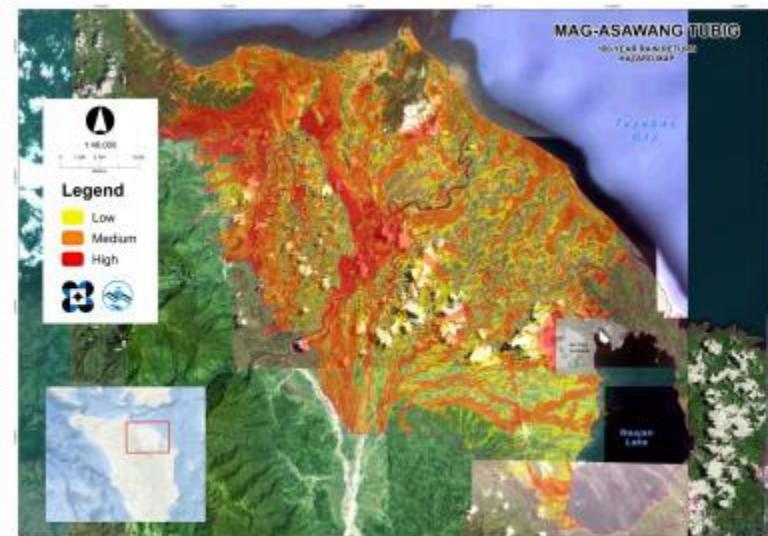
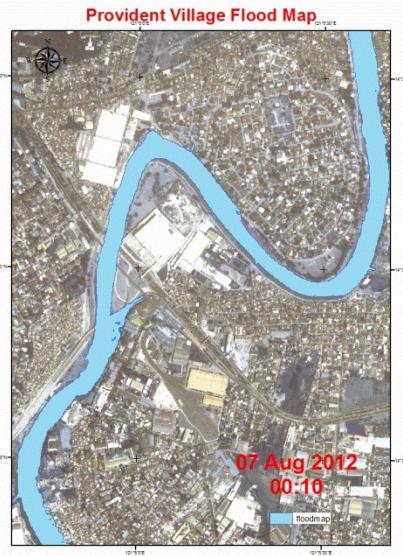
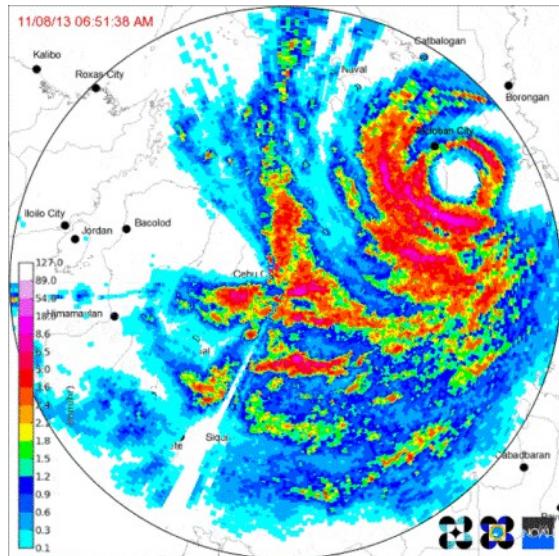
We do this by:

- Providing high-resolution hazard maps for Floods, Landslides and Storm Surges
- Delivering a near real-time warning system for floods for communities living along 18 major river systems



How do we do this?

- ✓ Advanced Disaster Science Research
- ✓ Multidisciplinary Assessment of Hazards



- ✓ Development of Accessible tools that enable Prevention & Mitigation of Disasters
(LGUs, planners, policy makers, communities, individuals, families)

Technologies Used by Project NOAH



Automated
Rain Gauge

function
ture
idity
sure

- Rain amount,
duration &



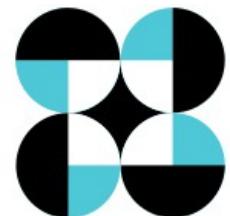
Automated
Weather
Station



Doppler Radar

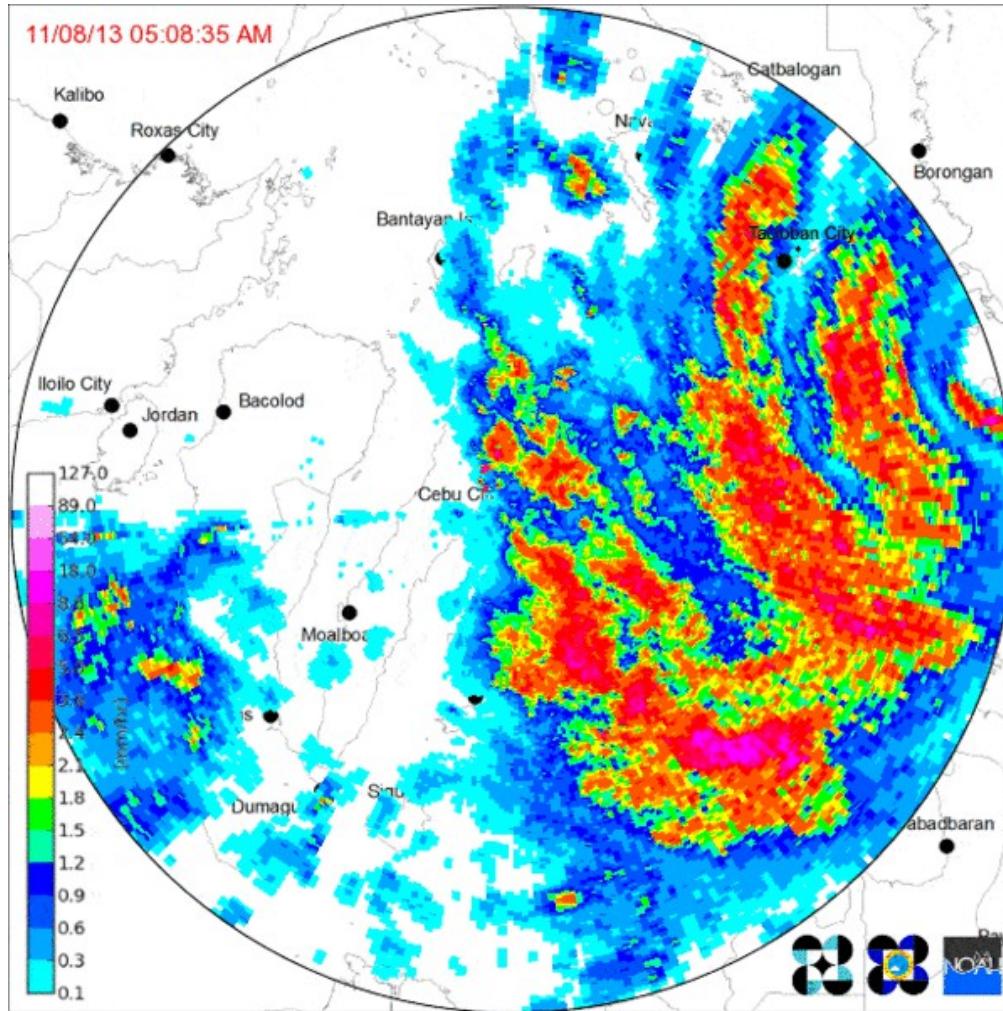


Stream Gauge

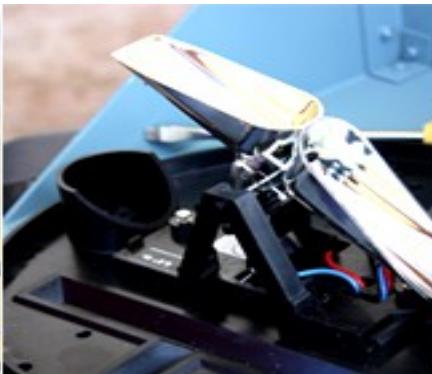
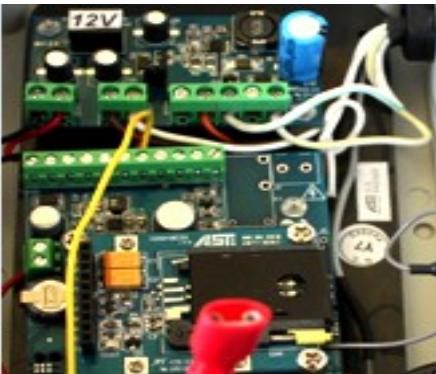


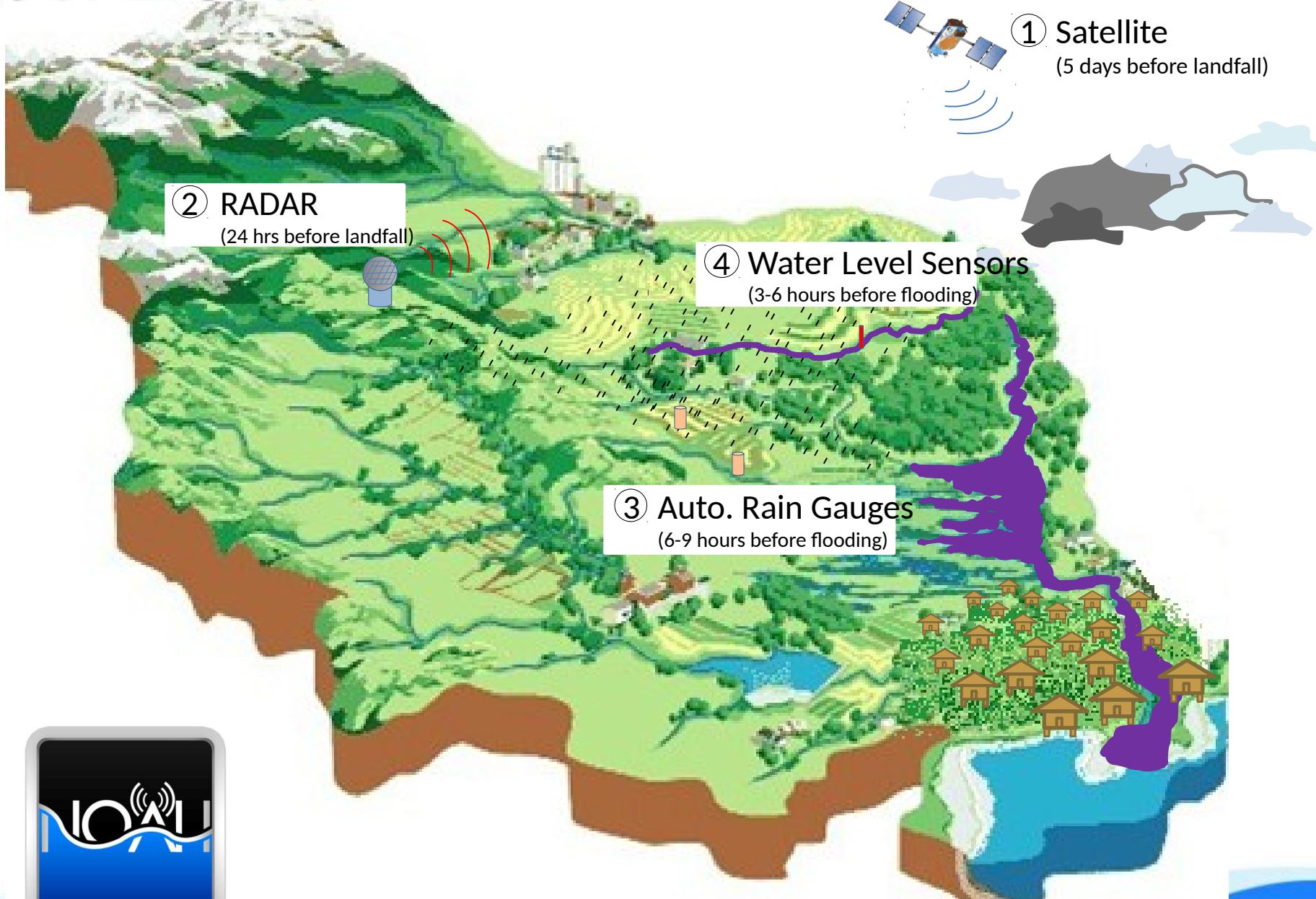
DOPPLER RADAR

Project NOAH and Yolanda



Yolanda Doppler Radar image as it traverses the central Philippines region



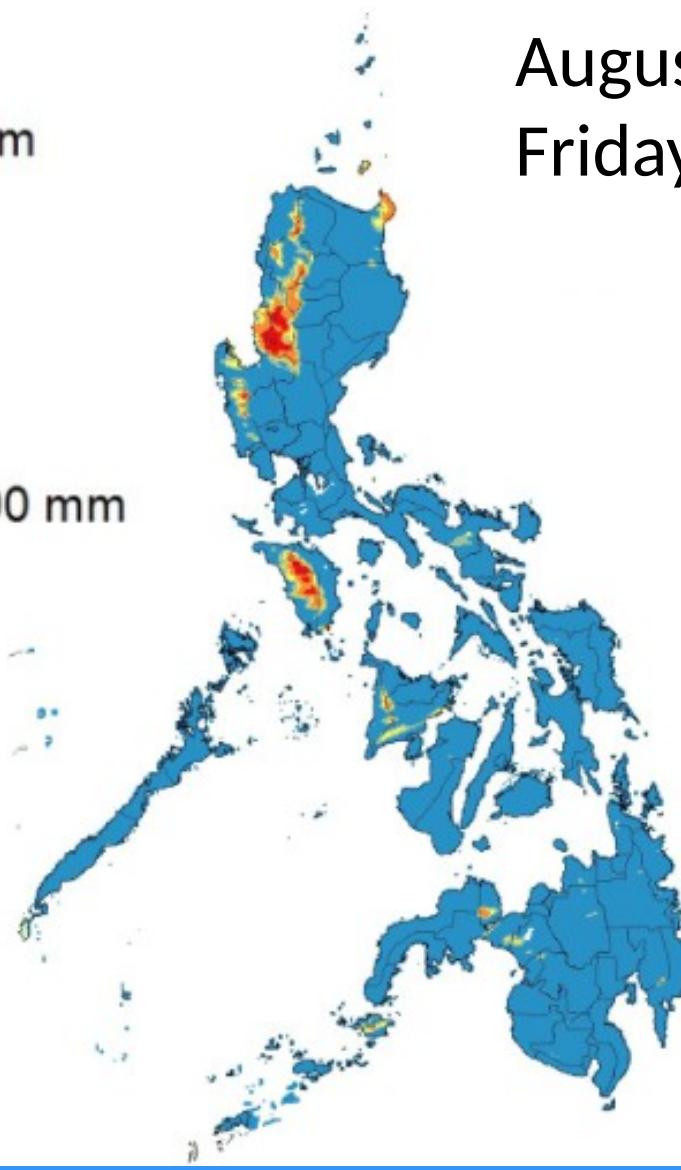


PAGASA WRD

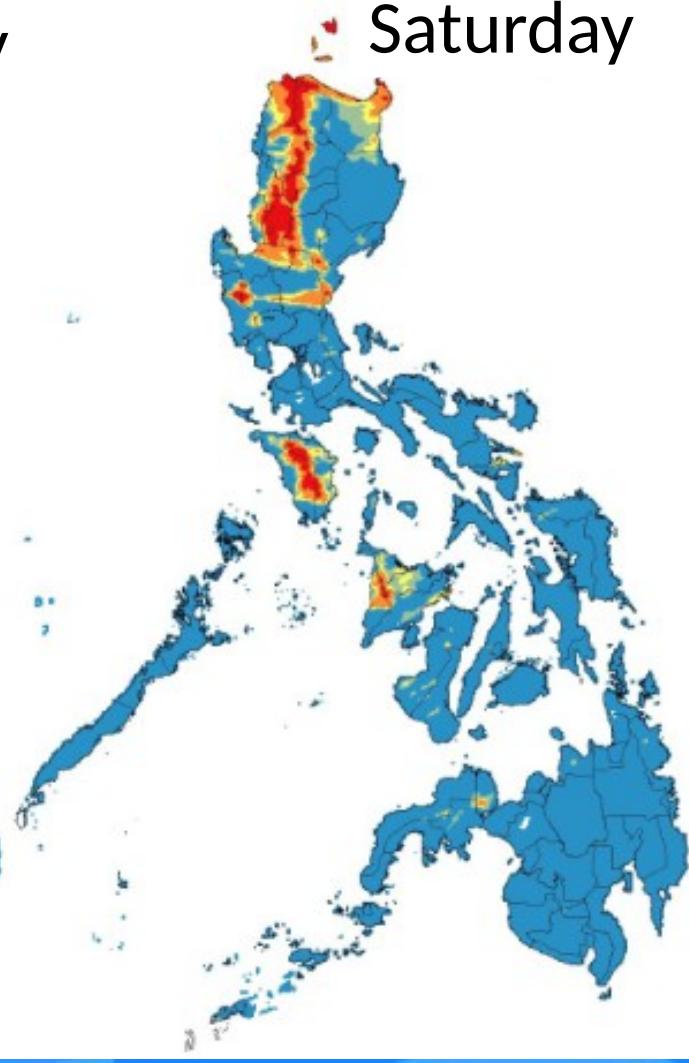
Accumulated Rainfall Forecast

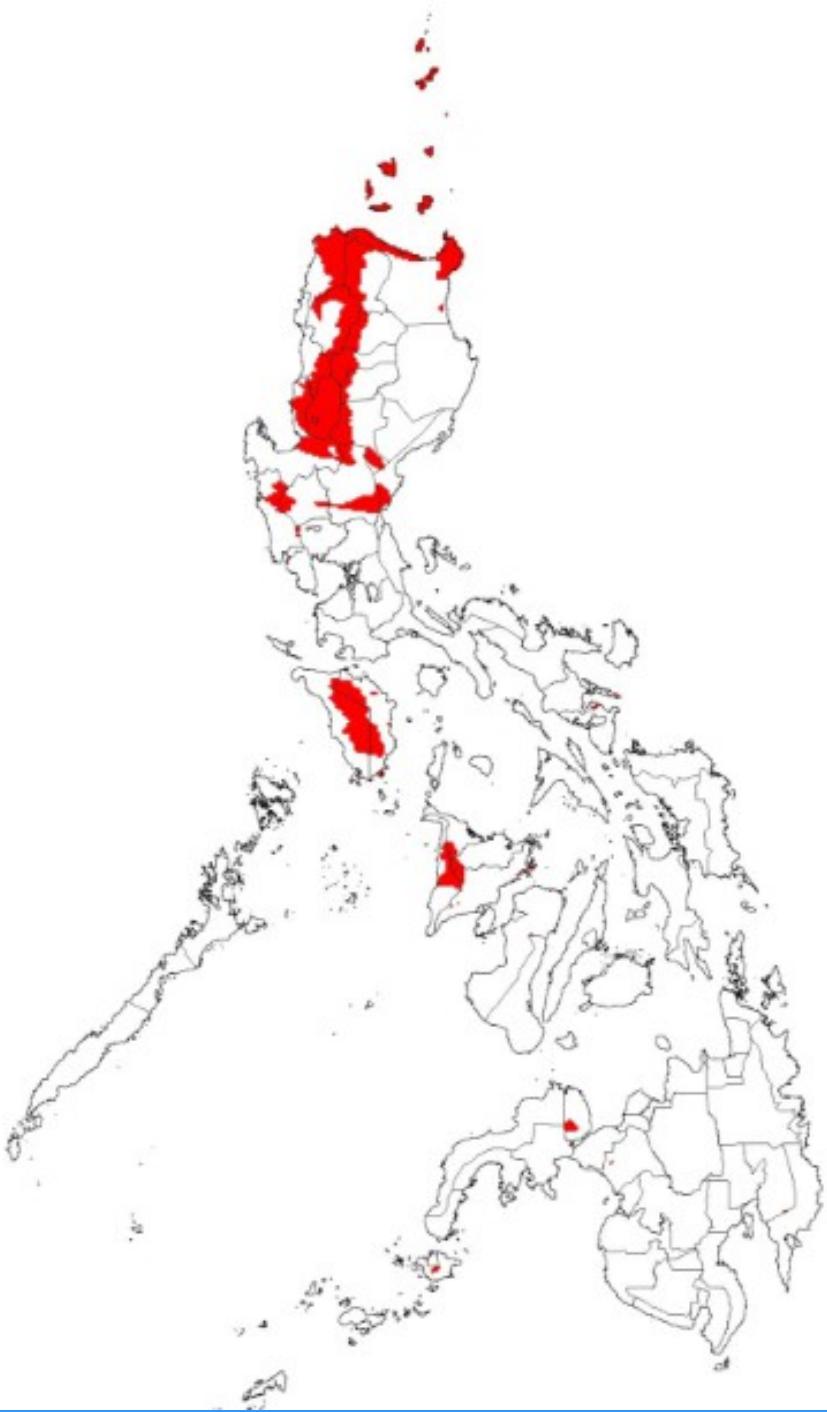


August 21
Friday



August 22
Saturday

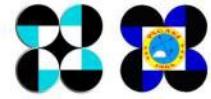




AREAS WITH ≥ 100 mm OF RAIN THAT MAY TRIGGER LANDSLIDES & FLOODS

Based on
PAGASA WRF

231
Municipalities in
12 regions

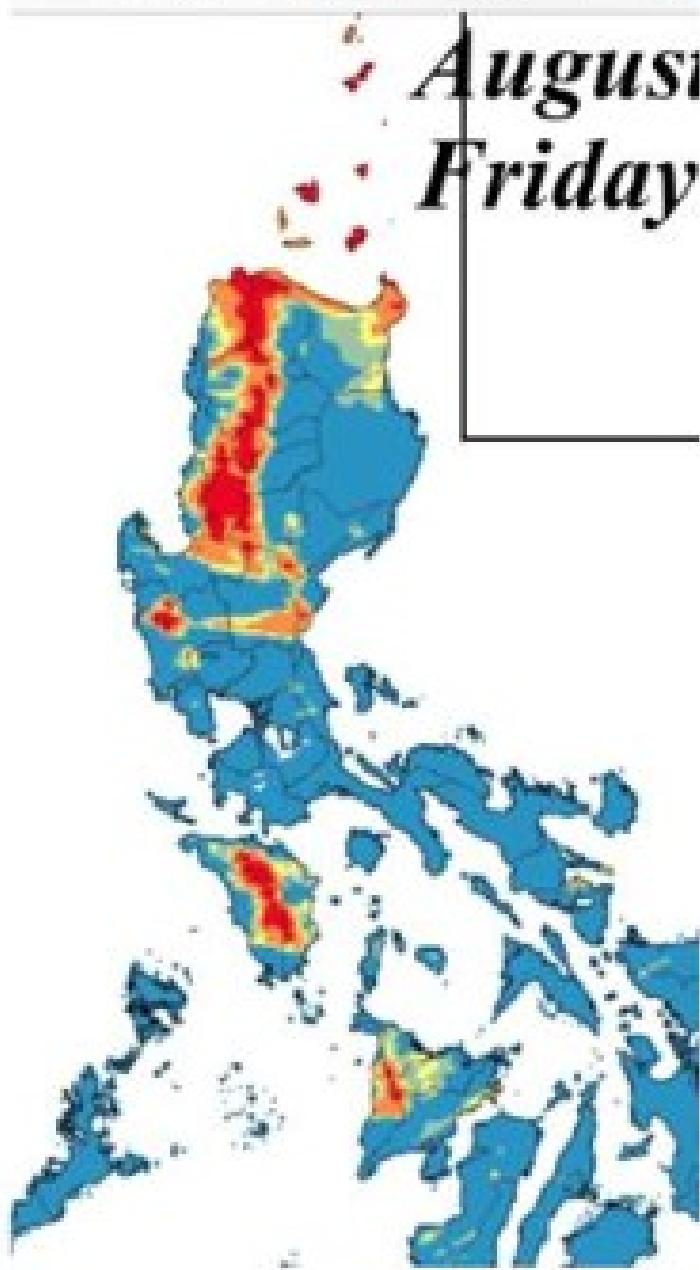


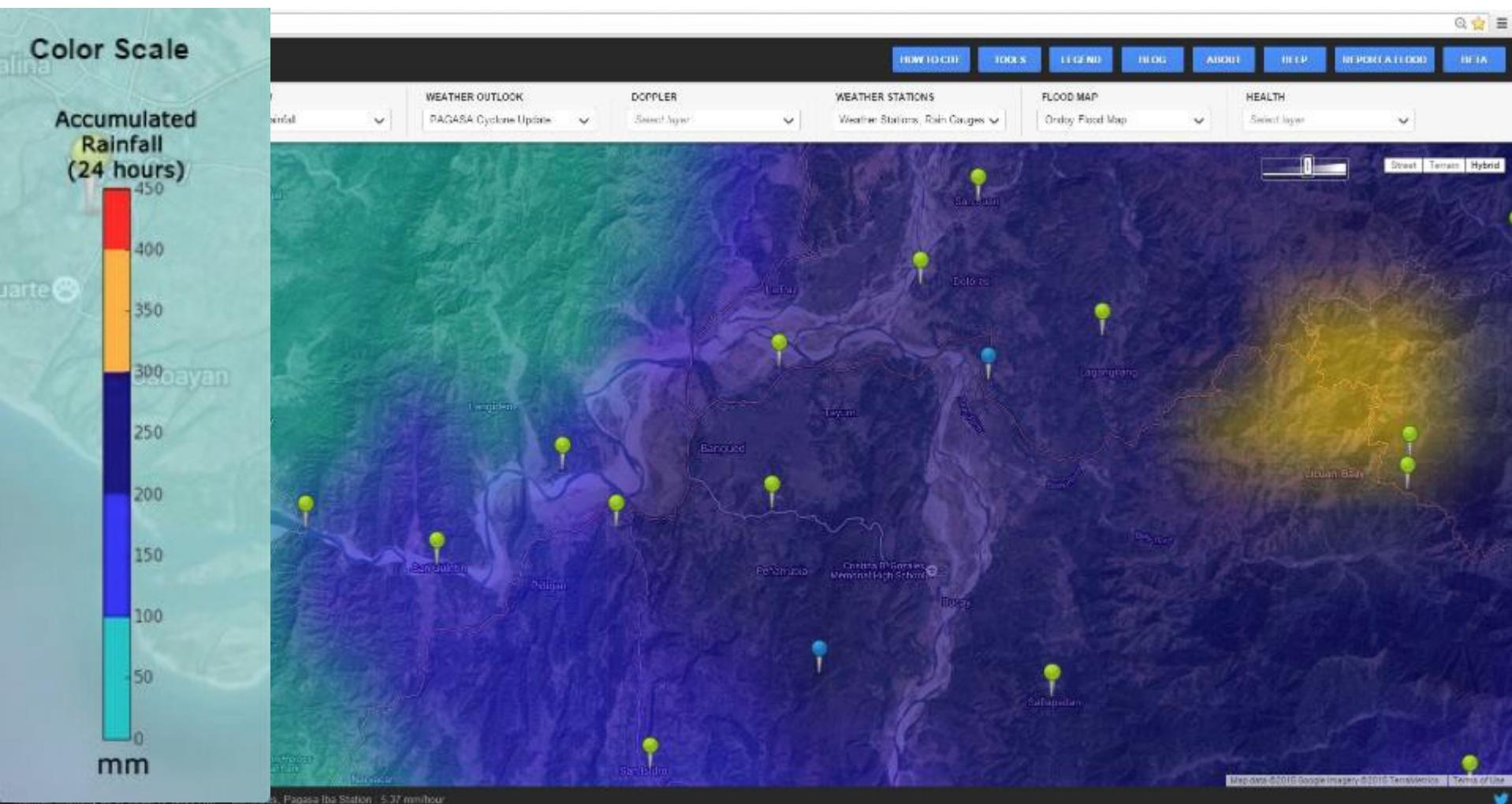
Globe 3G

9:24 AM



Ineng_PDRA_2015August...





<http://noah.dost.gov.ph>



1- Homepage; 2- Twitter Feed; 3- Menu Bar; 4- Tool Bar; 5- Search Bar; 6- Base Map; 7- Zoom Options; 8- Rainfall Data



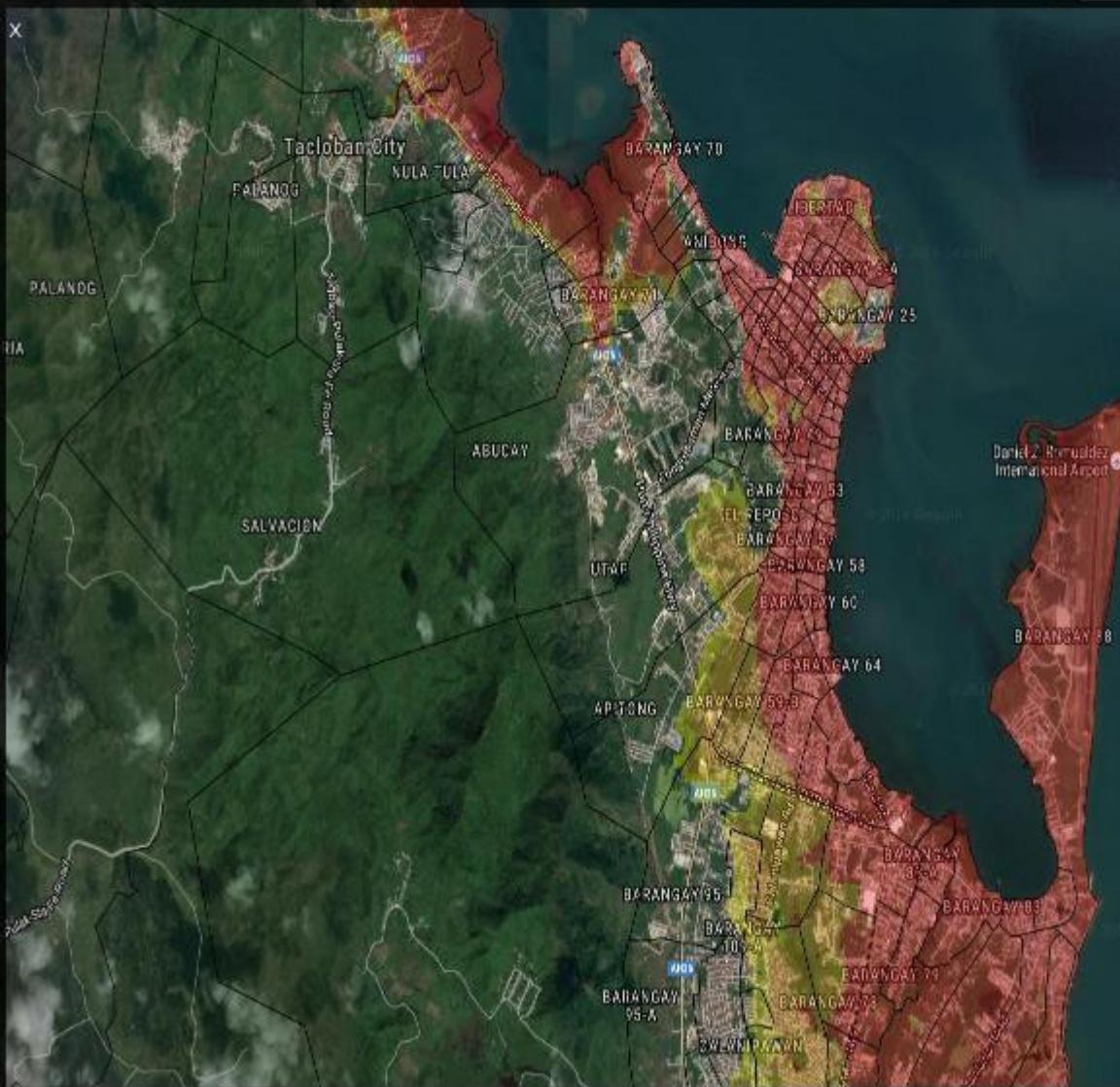
Storm Surge
Advisory 4

STORM SURGE HAZARD



Storm Surge Hazard maps
based on predicted storm
surge height, SSA 4.5m
storm surge height

NOTE: Administrative
boundaries are from NSO
(2015).



Google

Rainfall Data as of 09/20/16 11:45 AM: Antique, Anini-Y: 5.334 mm/hour

Map data ©2016 Google Imagery: 62216 / CNES / Aerialum, DigitalGlobe, Landsat /

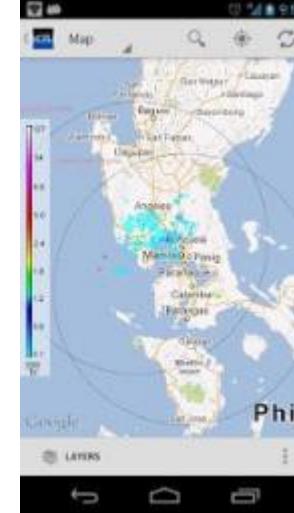
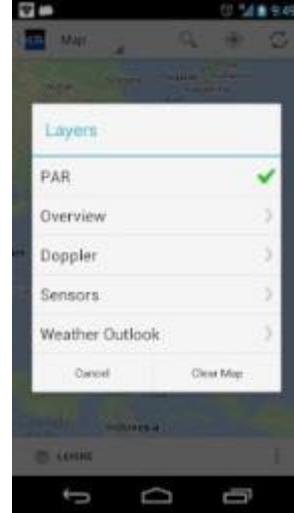


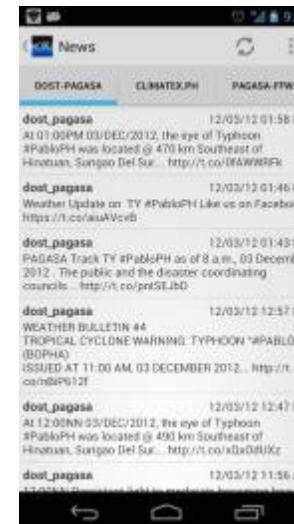
our mobile applications



Available at Google Play: <https://play.google.com/store/search?q=DOST%20NOAH&c=apps&hl=en>

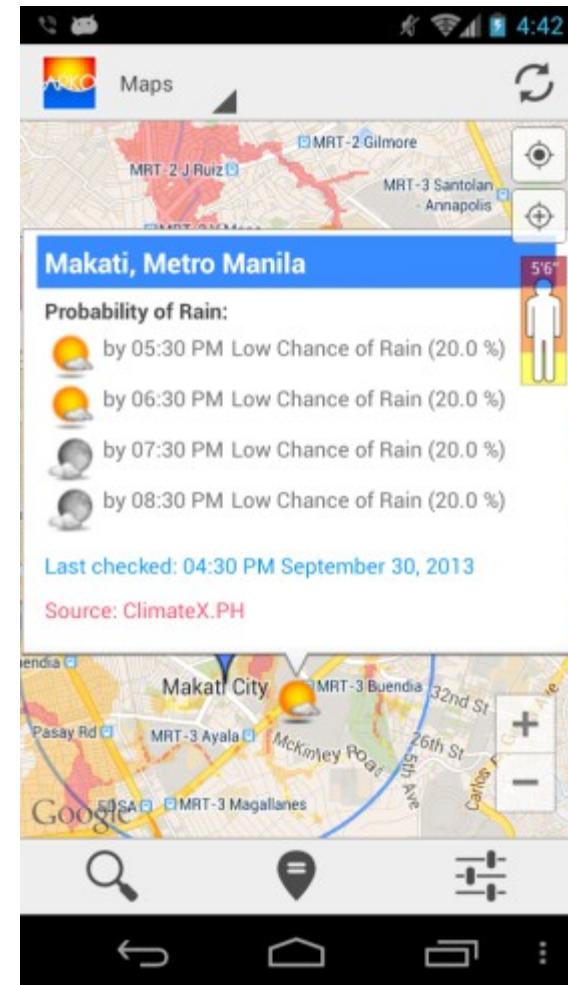
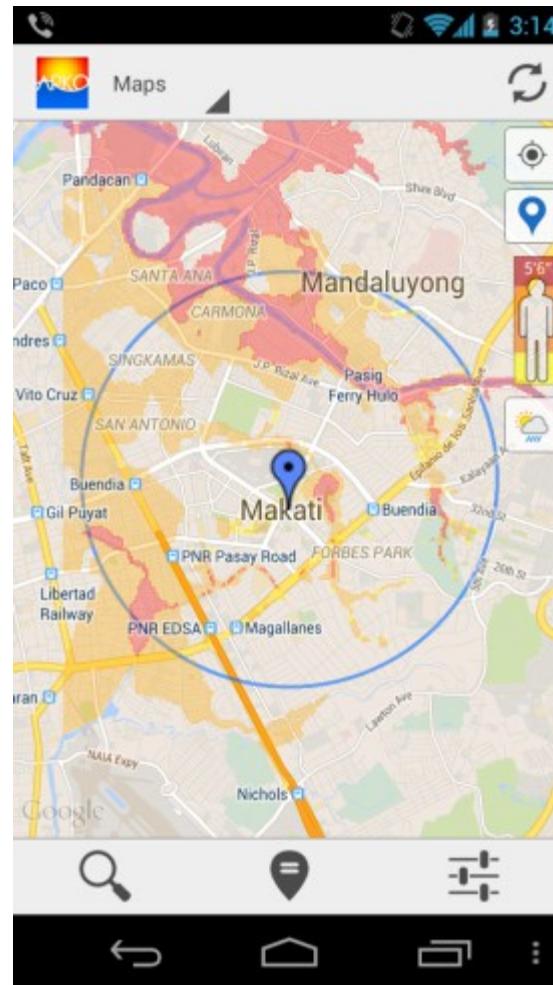
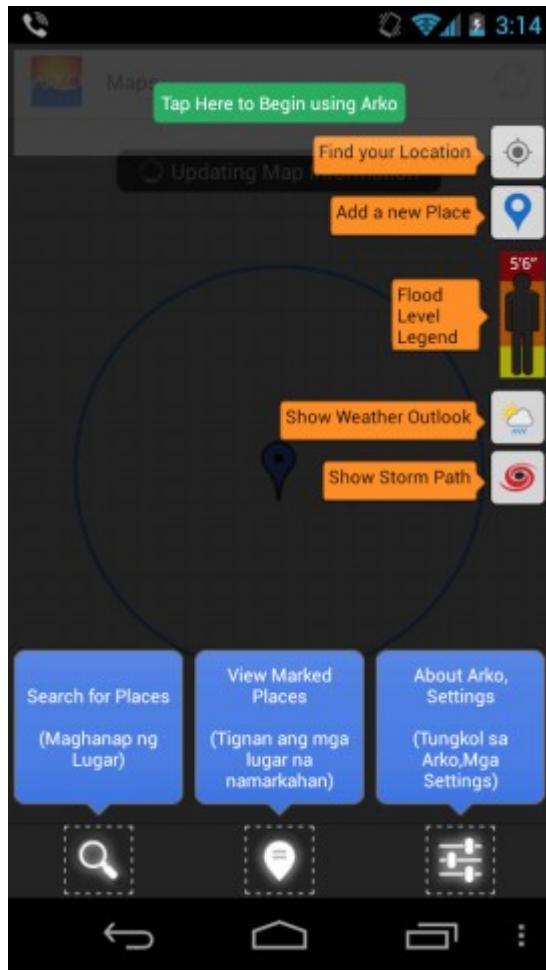
NOAH (for Android)



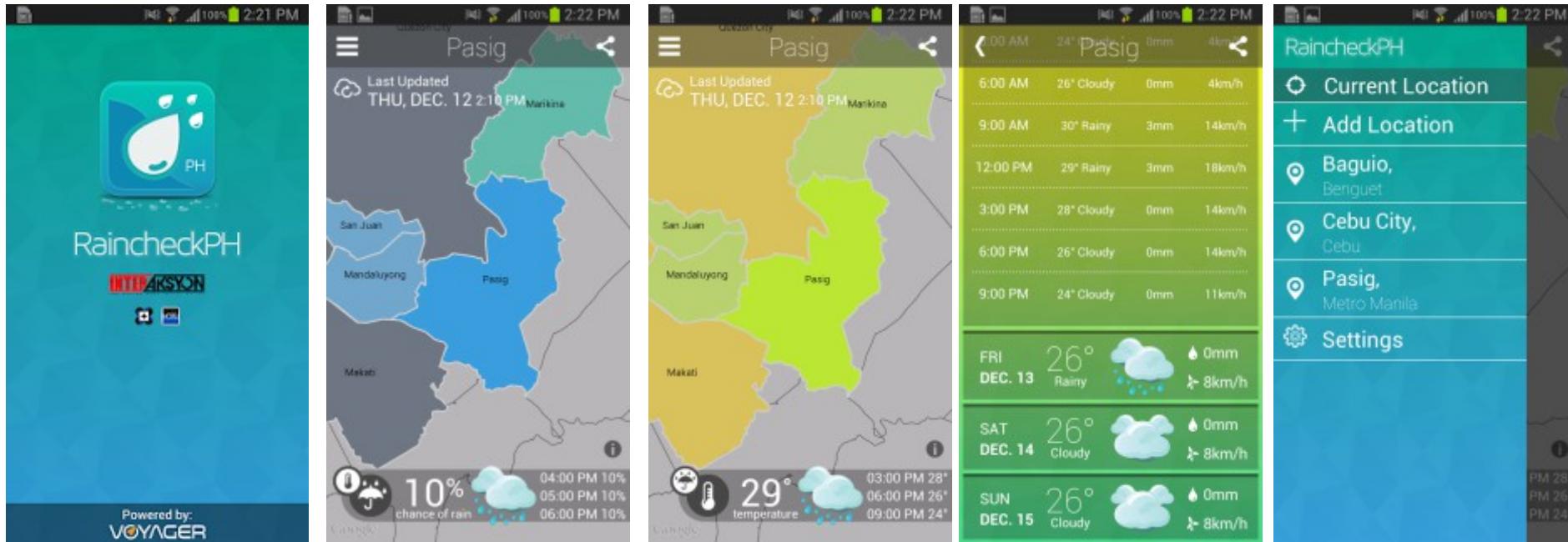
- 
- A news feed from the official account of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA). The feed includes several tweets about Typhoon Pablo (Bopha) and its impact, along with links to news articles and weather bulletins.
- dost_pagasa 12/03/12 01:58 PM At 01:09PM 03/DEC/2012, the eye of Typhoon #PabloPH was located at 470 km Southeast of Hinanaw, Sanga Del Sur... <http://t.co/0AWWBFk>
- dost_pagasa 12/03/12 01:46 PM Weather Update on TV #PabloPH Like us on Facebook <https://t.co/auVcrtB>
- dost_pagasa 12/03/12 01:43 PM PAGASA Track TV #PabloPH as of 8 a.m., 03 December 2012. The public and the disaster coordinating councils... <http://t.co/prSEjBD>
- dost_pagasa 12/03/12 12:37 PM WEATHER BULLETIN #4 TROPICAL CYCLONE WARNING: TYPHOON "#PAIBO" (Bopha) ISSUED AT 11:00 AM, 03 DECEMBER 2012. <http://t.co/cmnbPG12f>
- dost_pagasa 12/03/12 12:47 PM At 12:00NN 03/DEC/2012, the eye of Typhoon #PabloPH was located at 490 km Southeast of Hinanaw, Sanga Del Sur... <http://t.co/kxuM8Xz>
- dost_pagasa 12/03/12 11:56 AM #PabloPH Reached Landfall in Hinanaw, Sanga Del Sur, Davao del Sur, Philippines. <http://t.co/0JLQHg>



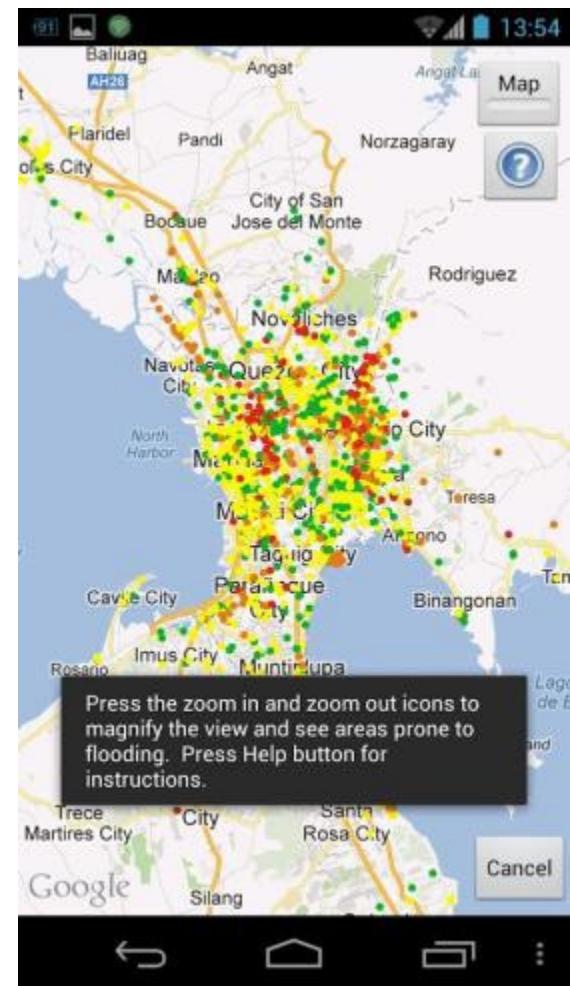
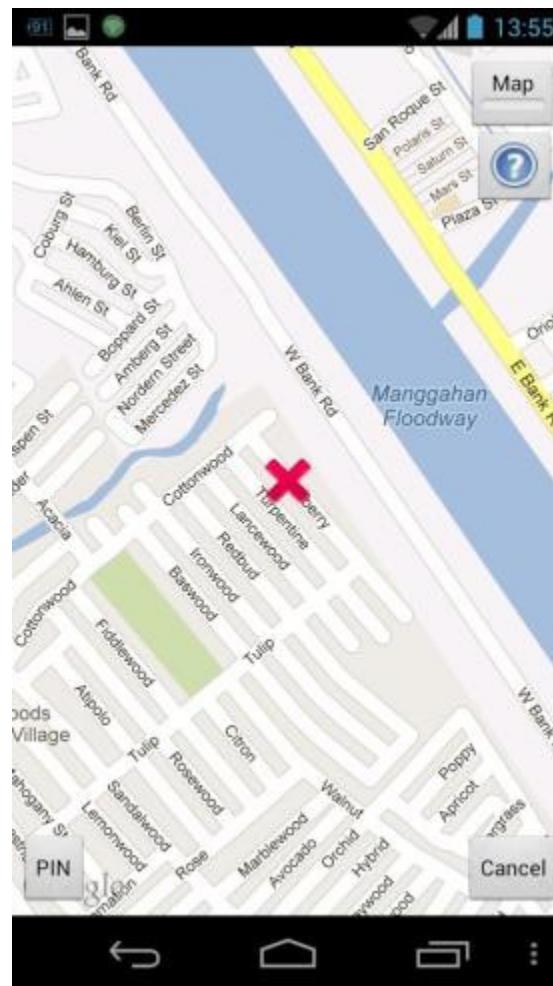
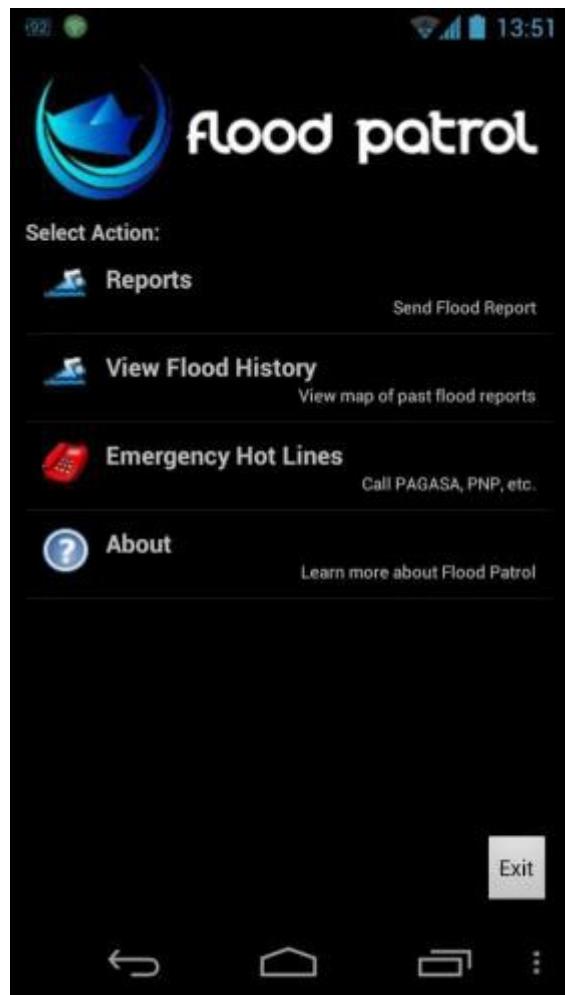
ARKO



RAINCHECK



Flood Patrol

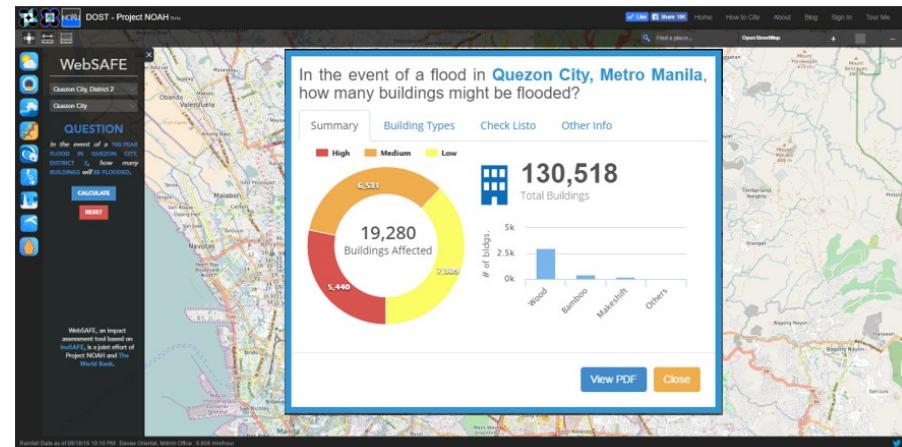
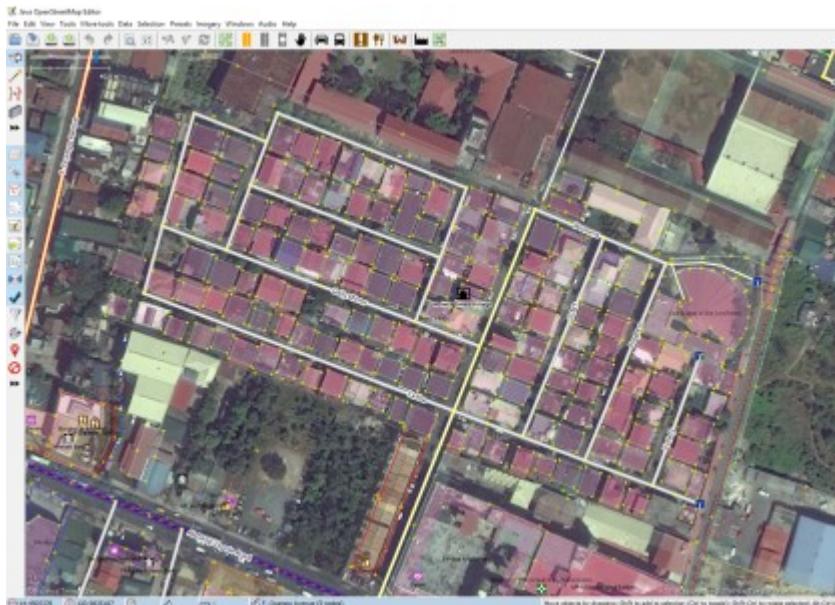


ISAIAH

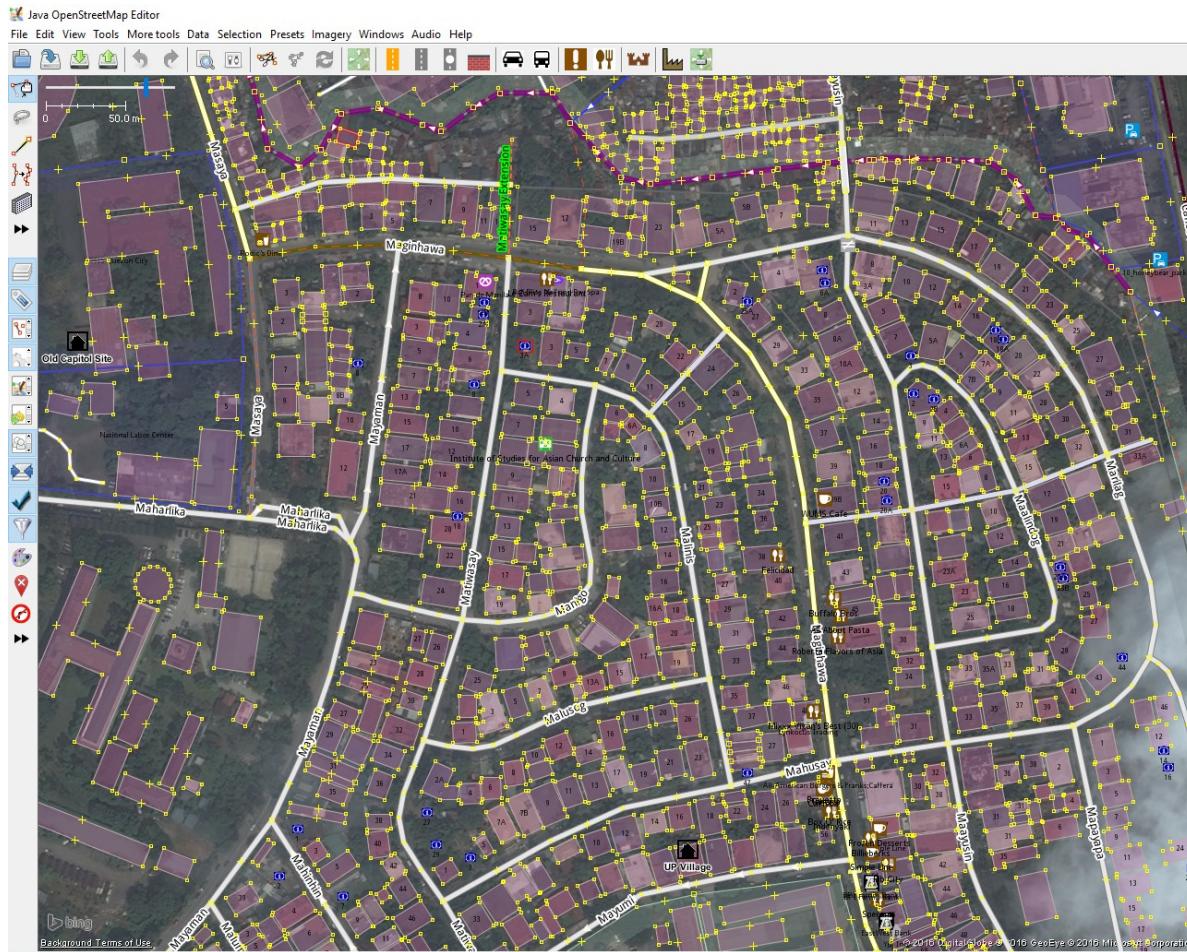
(Integrated Scenario-based Assessment of Impacts and Hazards)

The objectives of ISAIAH are to:

1. Create a municipal level risk assessment, incident reporting, and visualization tool.
2. Map exposure elements, such as population, buildings, and critical facilities.
3. Assess vulnerability to hydrometeorological hazards based on available datasets.
4. Evaluate the Disaster Risk Reduction and Management capacities of local government units.
5. Train and communicate end-users in the use of the NOAH website and its allied tools.
6. Provide data and risk information required by NDRRMC during extreme weather events through the Pre-Disaster Risk Assessment (PDRA) system.



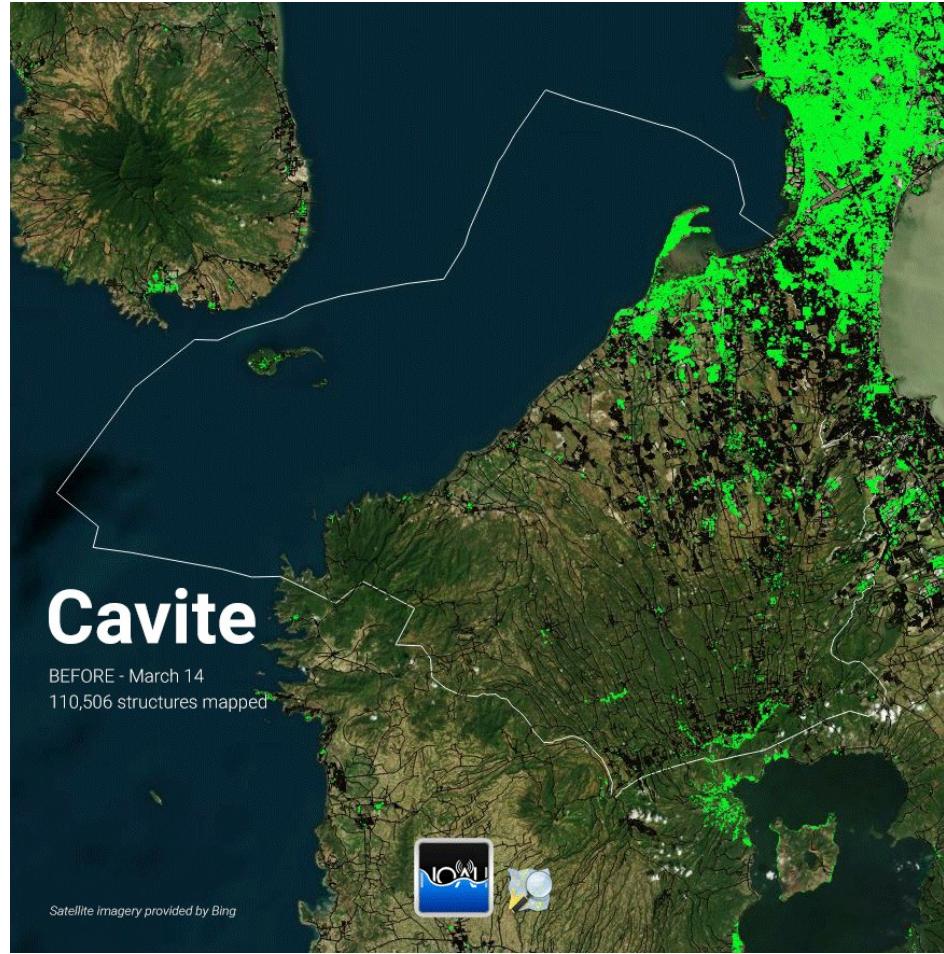
Crowdsourced Mapping in OSM for DRR



Benefits of mapping the buildings in your community:

- Quantify and identify buildings in safe and hazard zones.
- Identify structures that can be effectively used as evacuation centers.
- Identify concentration of population in a city or municipality.
- Quantify specific needs of your community in case a disaster strikes.

Cavite – 3 months – 500,000 structures mapped



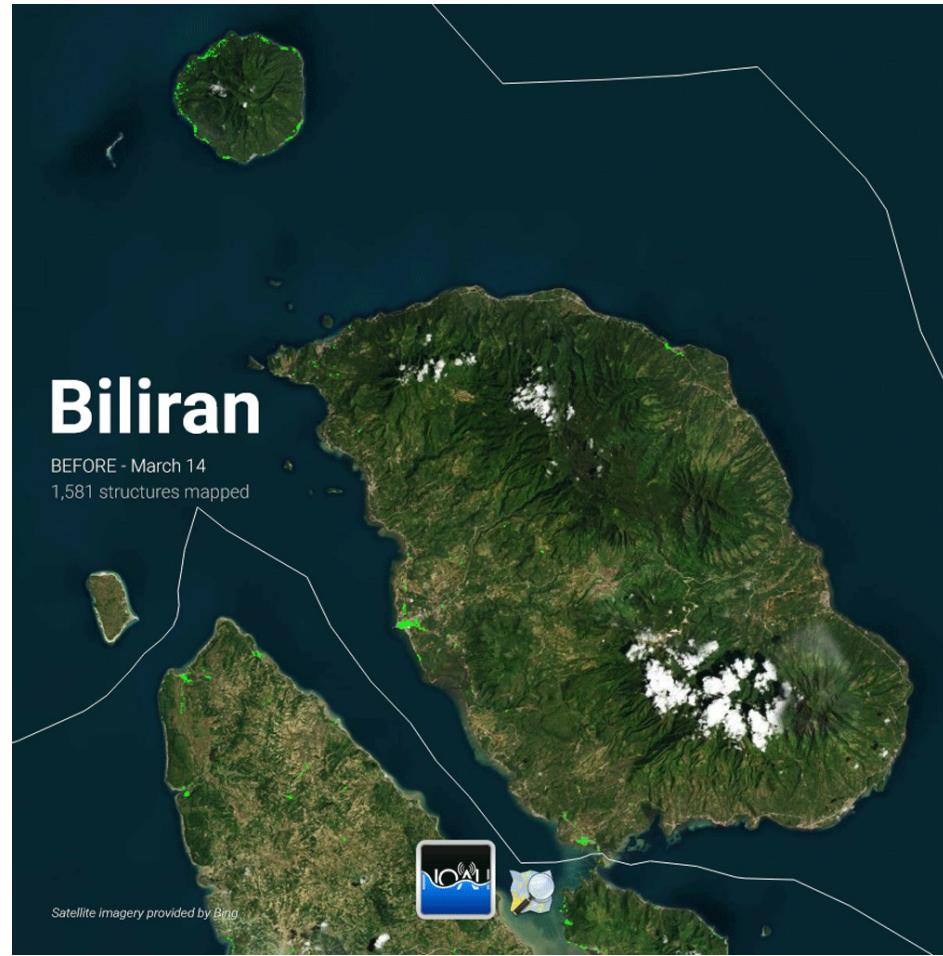
Camiguin – 1 month – 11,000 structures mapped



Zambales – 2 months – 100,000 structures mapped



Biliran - 2 months - 20,000 structures mapped (UP Rockhounds)



Imus

In the event of a flood in Imus City, Cavite, how many

In the event of a flood in **Imus City, Cavite**, how many people might need evacuation?

In the event of a flood in **Imus City, Cavite**, how many people might need evacuation?

DOST - Project NOAH Beta

WebSAFE

Imus City, Cavite

QUESTION

In the event of a 100-YEAR FLOOD IN IMUS CITY, CAVITE, how many BUILDINGS will BE FLOODED.

CALCULATE

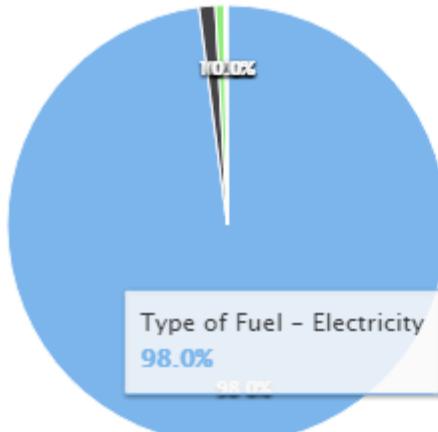
RESET

Rainfall Data as of 09/18/16 10:10 PM. Cebu, San Francisco : 3.2 mm

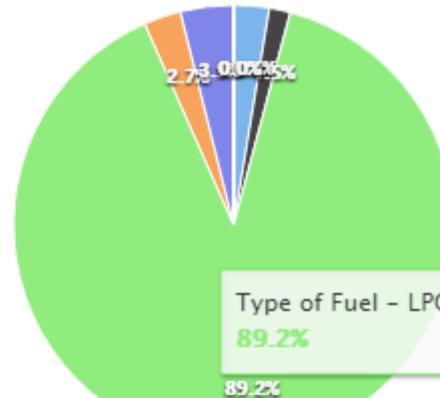
WebSAFE, an impact assessment tool based on InSAFE, is a joint effort of Project NOAH and The World Bank.

Summary Needs Check Listo Census Data ▾

Ratio of Households using Fuel for Lighting



Ratio of Households using Fuel for Cooking

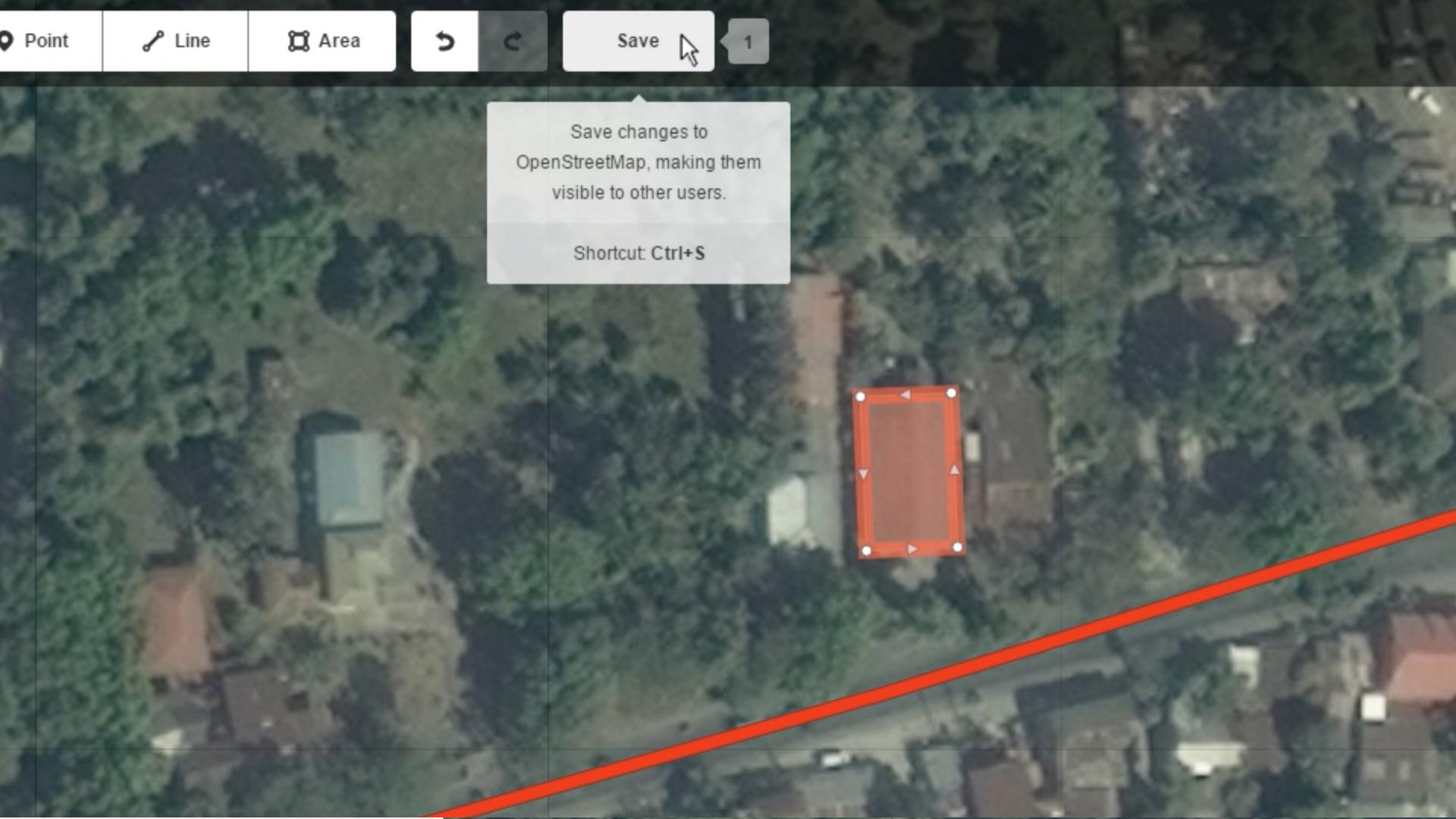


[View PDF](#)

[Close](#)



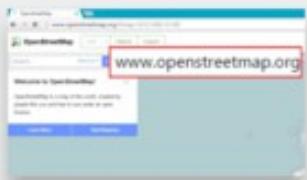
Help us by mapping your area!



<https://www.openstreetmap.org/>



OPENSTREETMAP IN 10 EASY STEPS



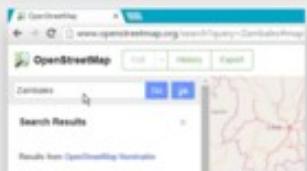
1. Go to www.openstreetmap.org.



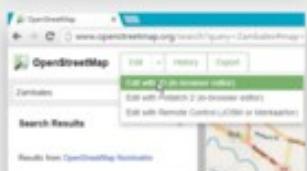
2. Sign up for an account with your e-mail address. Follow the instructions in the confirmation e-mail.



3. Log in to your OSM account.



4. In the search bar, type in the name of your municipality or city, then press 'Go'.



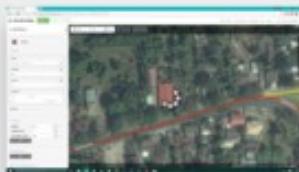
5. Press 'Edit' and choose 'Edit with iD (in-browser editor)'.



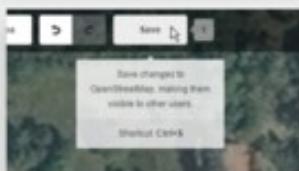
6. Select 'Area' for buildings, then draw the outline of the building/house by clicking on the corners of the structure as seen in the satellite map.



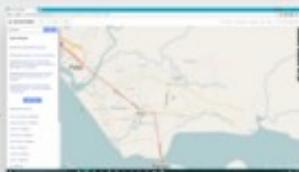
7. Go to the left panel of the screen, and select the type of structure.



8. Fill in more details when possible (e.g. name, address, number of floors, evacuation center).



9. Submit using the 'Save' button. In the changeset comments, add '#ProjectNOAH-ISAIAH Building Trace' and the name of your municipality.



10. Complete it for your community.



HOT Tasking Manager

HOT Tasking Manager About English schadow1 5

#2059 - DOST-Project NOAH (ISAIAH) Structures Map Up Taguig City

Description Instructions Contribute Activity Stats

Contributors Done Assigned

Contributor	Done	Assigned
BasilFlamis	27	-
CaroArvin	15	-
quadz	10	-
feyandal	2	-
jiritz	8	-
jobrianne	6	-
jssilustpas	47	-
kpmontalbo	47	-
krichicalababa	52	-
leald	28	-
Lia_G	71	-
Malem	1	-
recyclelleno_	11	-
NoahRio	3	-
raquel_felix	8	-
Tin To Sawa	16	-
TrialM	37	-
uteringmuth	2	-
391	-	

Contributors Done Assigned

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Aug 14 Aug 21 Aug 28 Sep 04 Sep 11 Sep 18

Done 76% Validated 0%

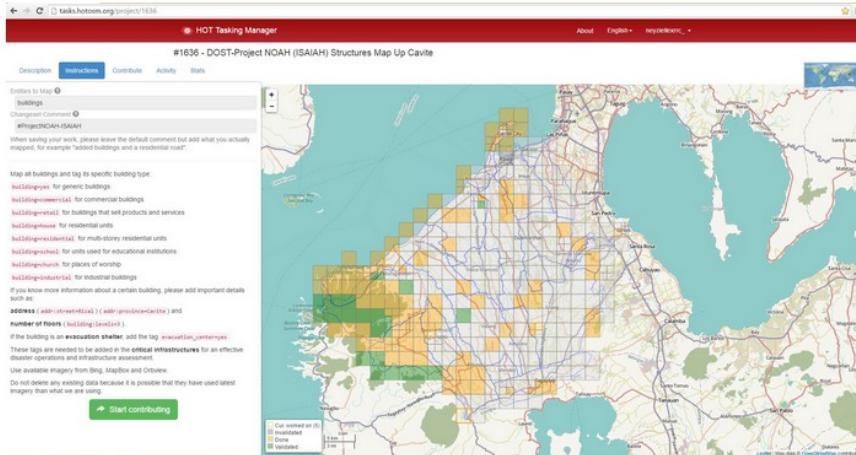
Cur. worked on (4)
In progress (1)
Done (391)
Validated (0)

500 m
3000 s

Leaflet | Map data © OpenStreetMap contributors

For currently active mapping task, refer to Project NOAH Blog

To those who already have their OSM accounts, you can contribute by using the **Humanitarian OpenStreetMap (HOT) Tasking Manager**, an online task manager for a collaborative and seamless mapping manager for OSM contributors.



CURRENTLY RUNNING MAPPING TASK:

- Taguig: <http://tasks.hotosm.org/project/2059>
- Eastern Samar and nearby areas: <http://tasks.hotosm.org/project/2033>
Led by Eastern Samar State University
- Leyte Island (including Provinces of Leyte and Southern Leyte): <http://tasks.hotosm.org/project/2109>
Led by Eastern Visayas State University

CONCLUDED MAPPING TASK:

- Camiguin: <http://tasks.hotosm.org/project/1684>
- Cavite: <http://tasks.hotosm.org/project/1636>
- Zambales: <http://tasks.hotosm.org/project/1966>
- Pateros: <http://tasks.hotosm.org/project/2038>
- Biliran: <http://tasks.hotosm.org/project/1887>

- <http://blog.noah.dost.gov.ph/2016/04/08/map-your-community-in-osm-with-project-noah/>

<http://noah.dost.gov.ph>

<http://blog.noah.dost.gov.ph>

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**It wasn't raining
when NOAH built
the ark.**

Howard Ruff

- <http://noahcost.gov.ph> -

No amount of accurate
warning will work if
hazard maps are wrong.

**Dr. Alfredo Mahar
Lagmay, PhD**

Thank You!

