

22 December 2021





# TROPICAL CYCLONE RAI-21

## PRELIMINARY SATELLITE-DERIVED BUILDING DAMAGE ANALYSIS



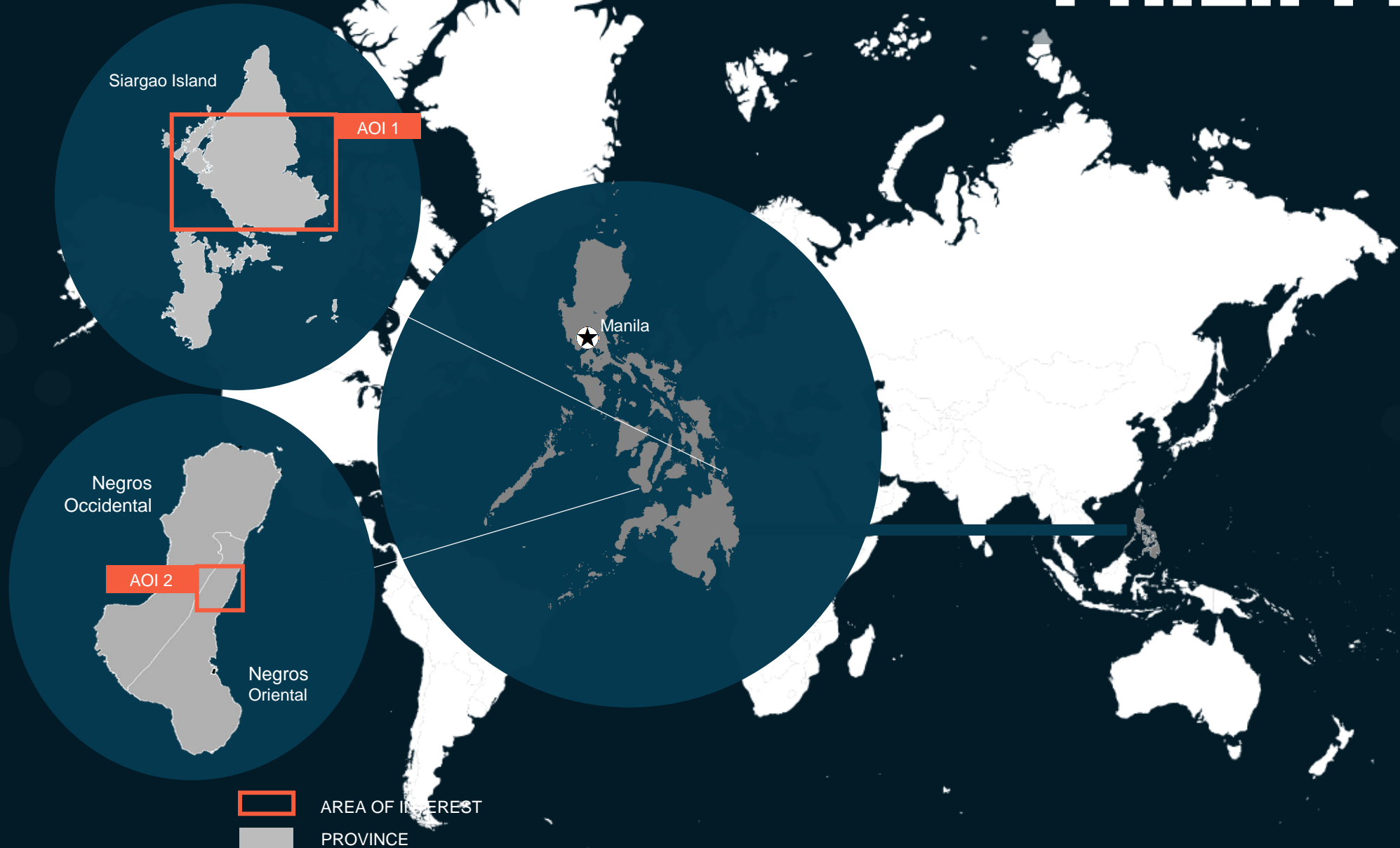
Siargao Island of Region XIII (Caraga) and Negros Oriental Province of Region VII (Central Visayas) ;Philippines

 Status: Widespread damaged structures including damaged health and education facilities observed.

 Further action(s): Continue monitoring



# PHILIPPINES

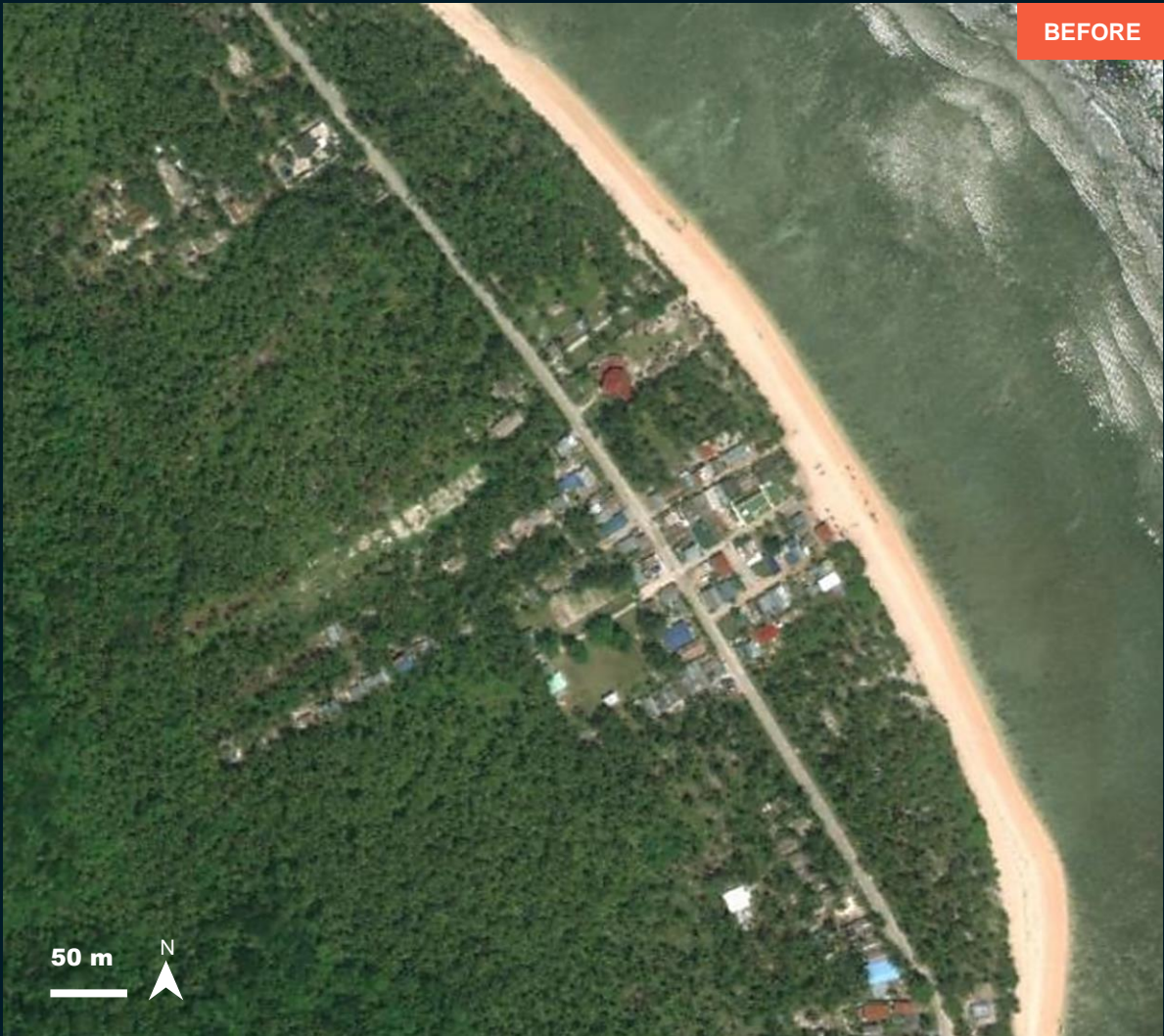




# AOI 1-1: PACIFICO VIILAGE, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Damaged structures along the shoreline

Image center:  
126°6'4.633"E  
9°56'50.109"N

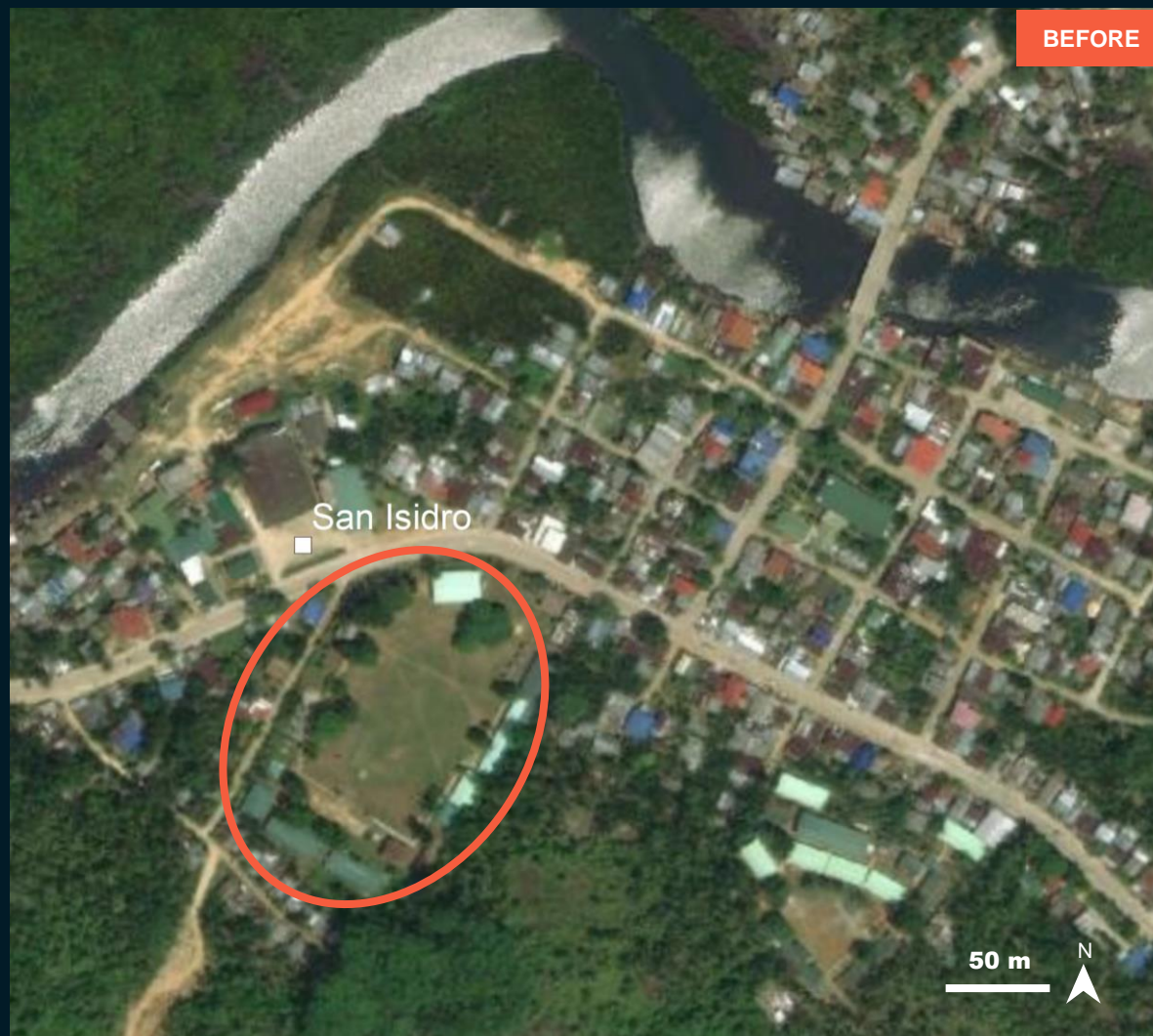




# AOI 1-2: SAN ISIDRO TOWN, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged structures and damaged school

Image center:  
126°5'17.956"E  
9°56'12.496"N



ESRI Basemap / Worldview-3 / 24 September 2019



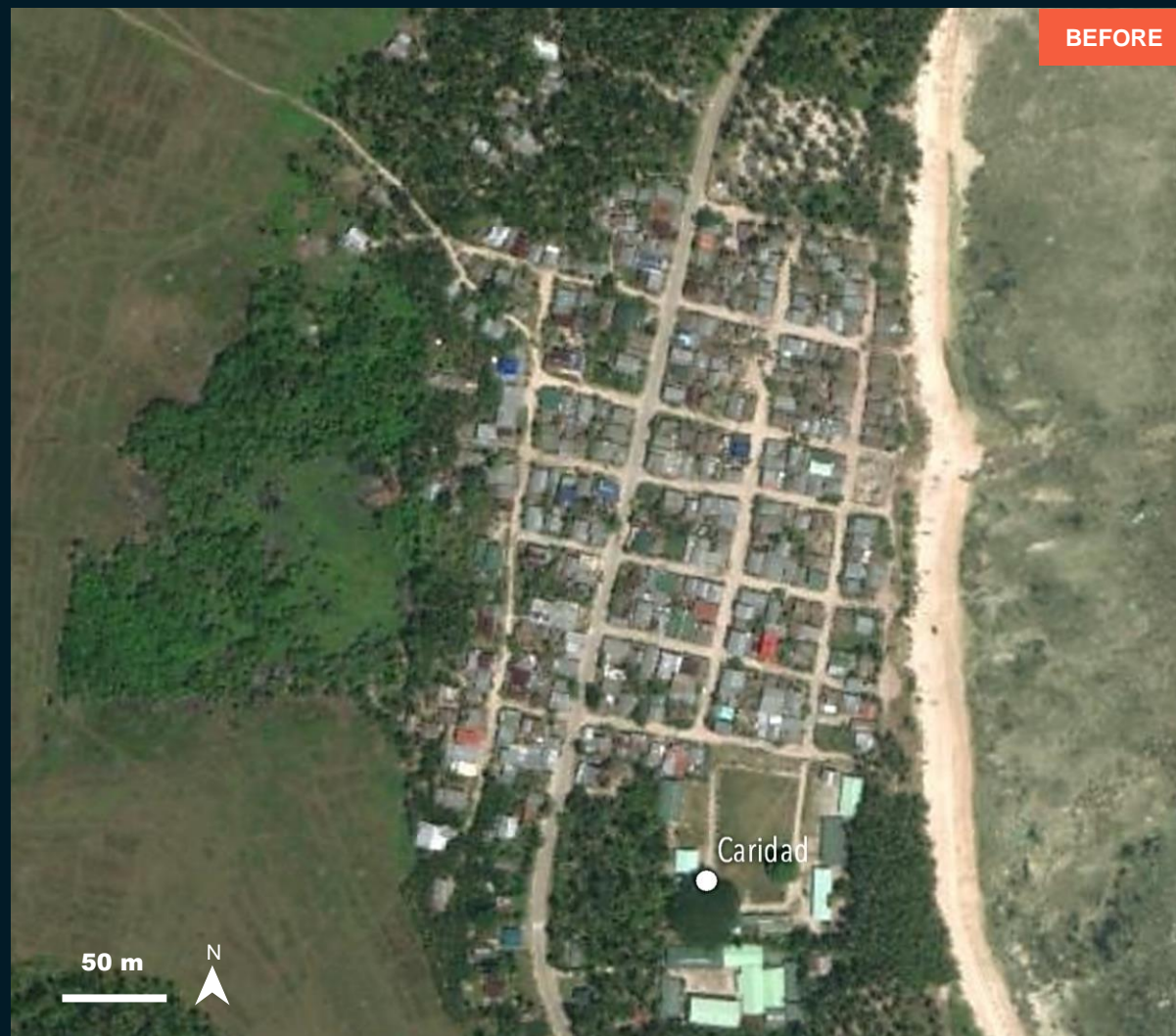
GeoEye-1 / 19 December 2021



# AOI 1-3: CARIDAD VILLAGE, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged structures along the shoreline and damaged school

Image center:  
126°6'35.968"E  
9°53'50.499"N

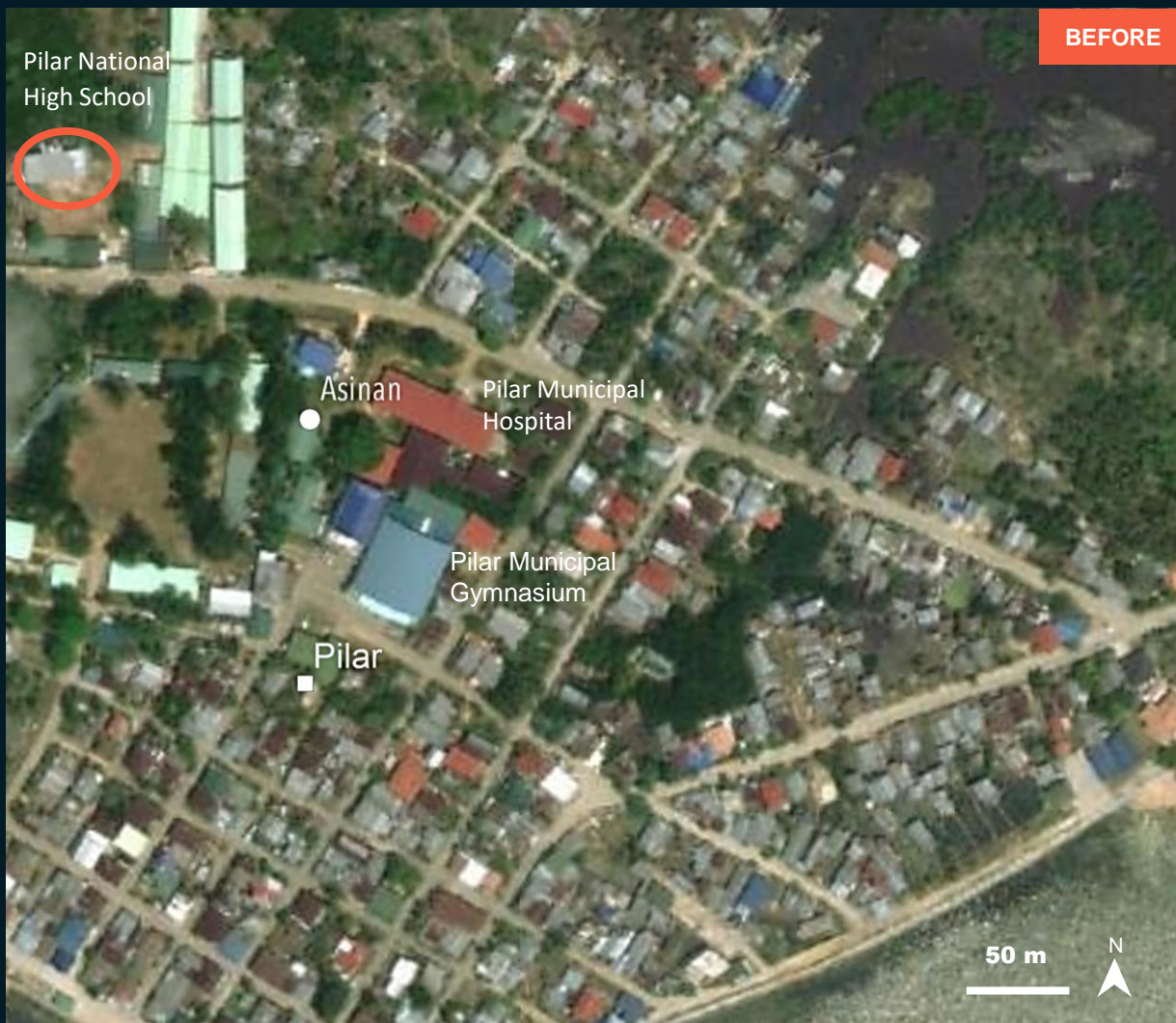




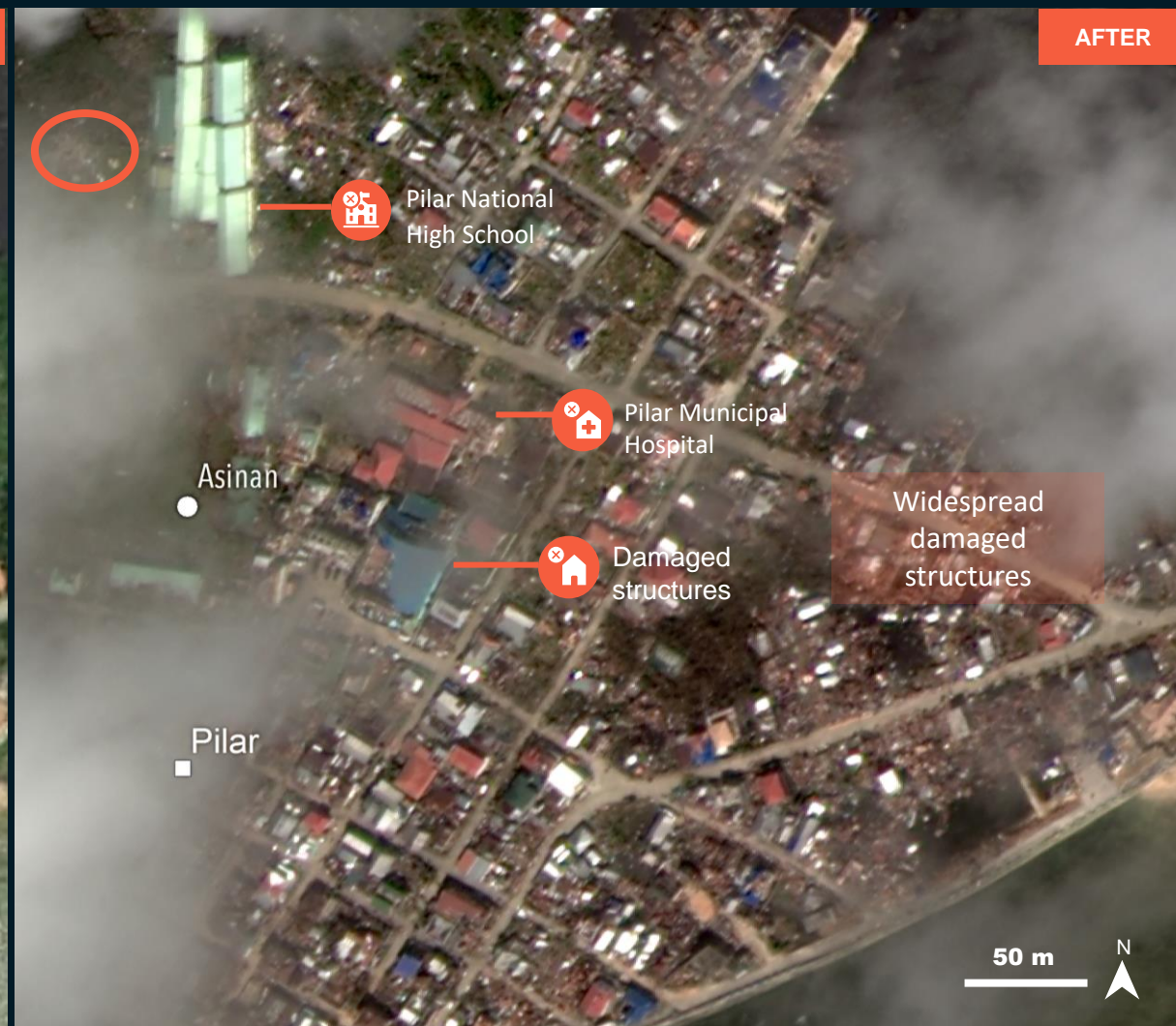
# AOI 1-4: PILAR TOWN, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged structures, damaged hospital and damaged school

Image center:  
126°6'6.888"E  
9°51'53.148"N



ESRI Basemap / Worldview-3 / 24 September 2019



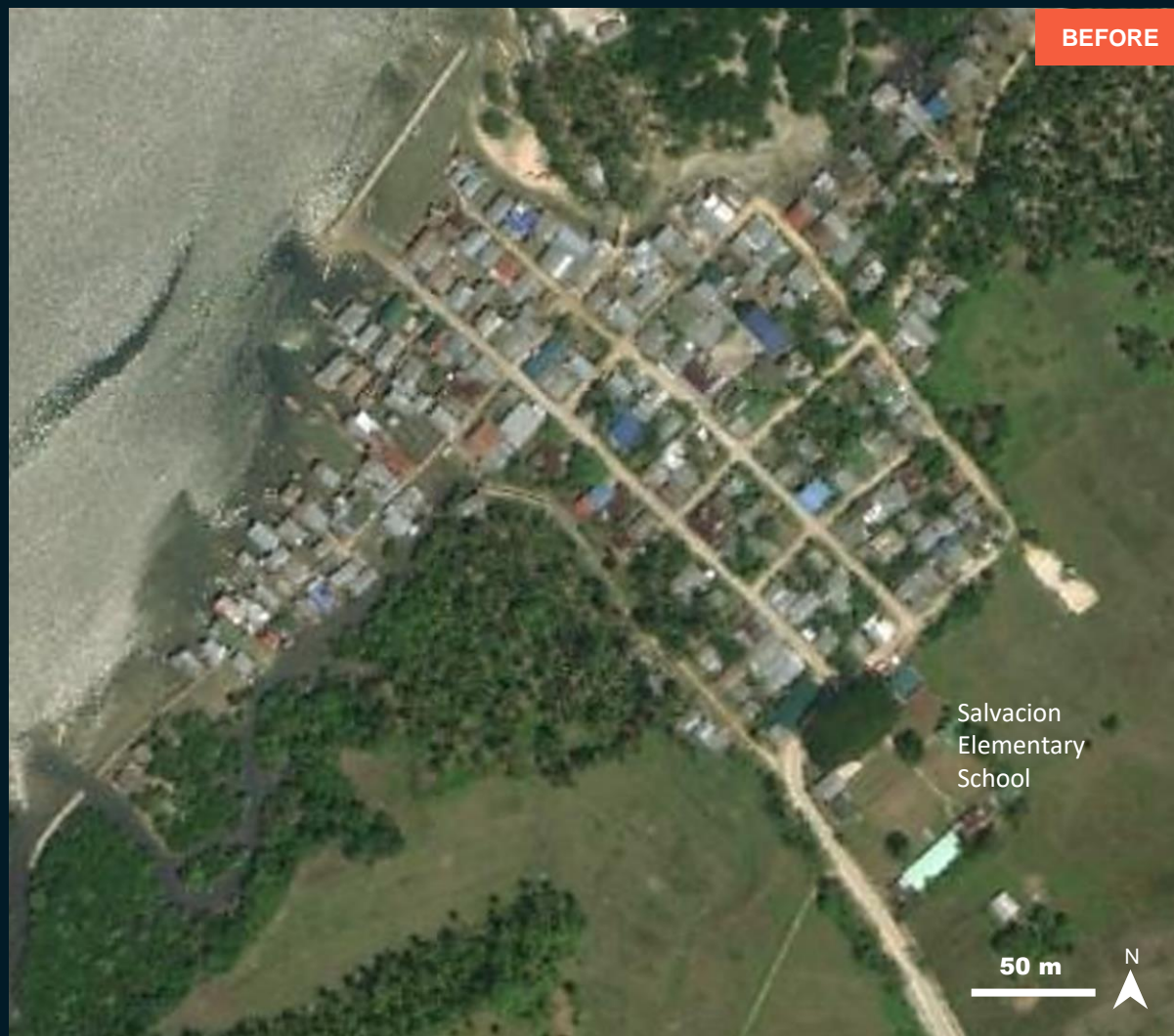
GeoEye-1 / 19 December 2021



# AOI 1-5: SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged and damaged school

Image center:  
126°6'36.825"E  
9°50'48.631"N



ESRI Basemap / Worldview-3 / 24 September 2019



GeoEye-1 / 19 December 2021



**AOI 1-6: MABUHAY VILLAGE, SIARGAO ISLAND,  
SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)**

Widespread damaged and damaged school

Image center:  
126°6'35.011"E  
9°49'38.855"N



Google Earth/ September 2019

GeoEye-1 / 19 December 2021



# AOI 1-7: SANTA CRUZ VILLAGE, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged and damaged school

Image center:  
126°7'28.592"E  
9°50'11.162"N



ESRI Basemap / GeoEye-1 / 17 May 2019



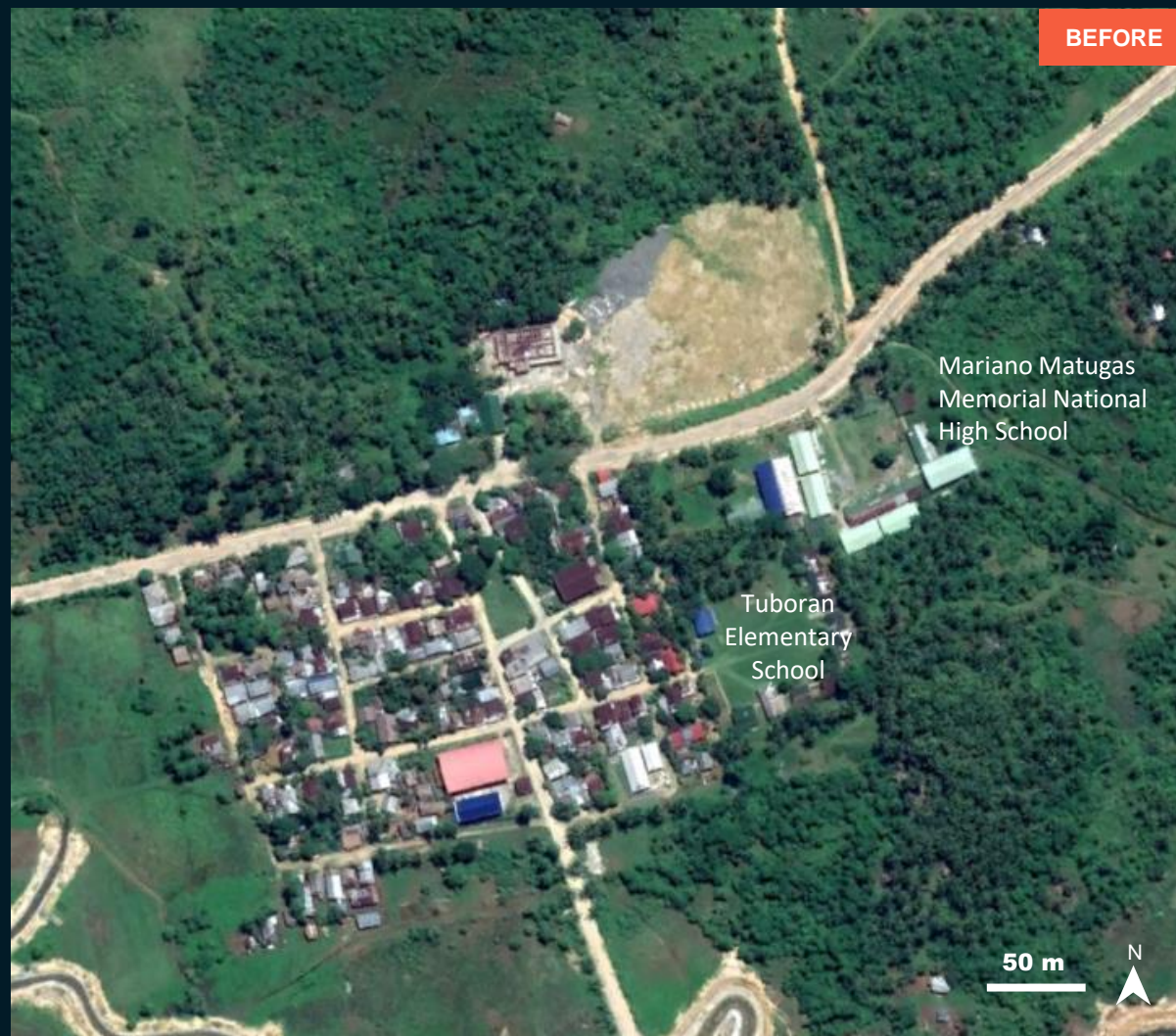
GeoEye-1 / 19 December 2021



# AOI 1-8: TUBORAN VILLAGE, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged and damaged schools

Image center:  
126°2'40.233"E  
9°49'35.248"N



Google Earth / June 2019



GeoEye-1 / 19 December 2021



# AOI 1-9: SAYAK VILLAGE, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged and damaged schools

Image center:  
126°1'16.696"E  
9°51'14.871"N



Google Earth / May 2021



GeoEye-1 / 19 December 2021



# AOI 1-10: DEL CARMEN TOWN, SIARGAO ISLAND, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged, damaged schools, and damaged hospital

Image center:  
125°58'18.998"E  
9°52'20.314"N



Google Earth / June 2019



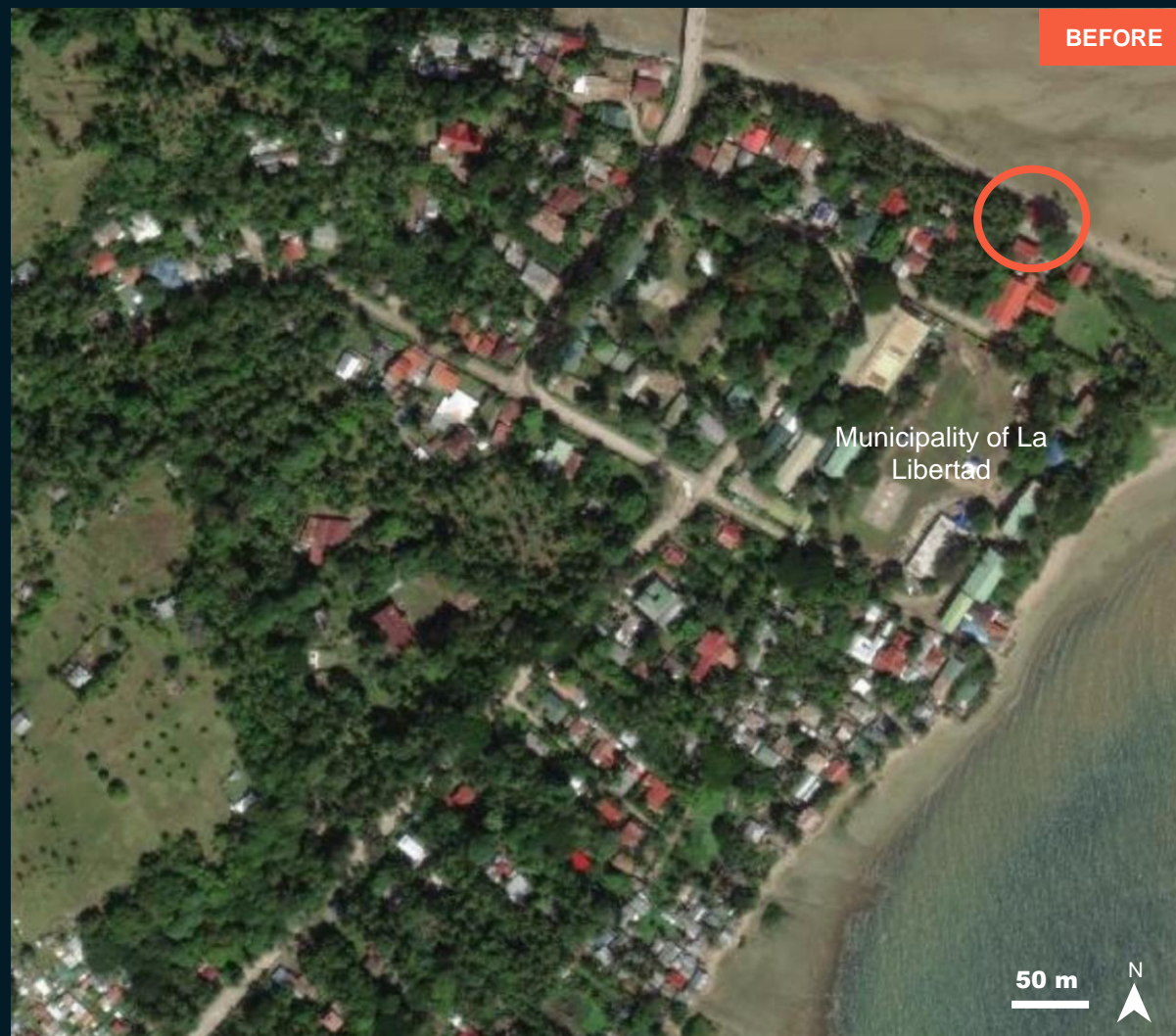
GeoEye-1 / 19 December 2021



# AOI 2-1: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Potentially damaged

Image center:  
123°13'58.057"E  
10°1'33.055"N





# AOI 2-2: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures

Image center:  
123°13'59.139"E  
10°1'53.922"N



BEFORE

ESRI Basemap / Worldview-3 / 16 December 2018



AFTER

Potentially  
Damaged  
structures

Potentially  
Damaged  
structures

Affected vegetation

Damaged  
structure

Damaged  
structure

Pléiades / 22 December 2021



# AOI 2-3: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures and affected area along the shoreline

Image center:  
123°13'24.61"E  
10°0'13.292"N



ESRI Basemap / Worldview-2 / 15 August 2019



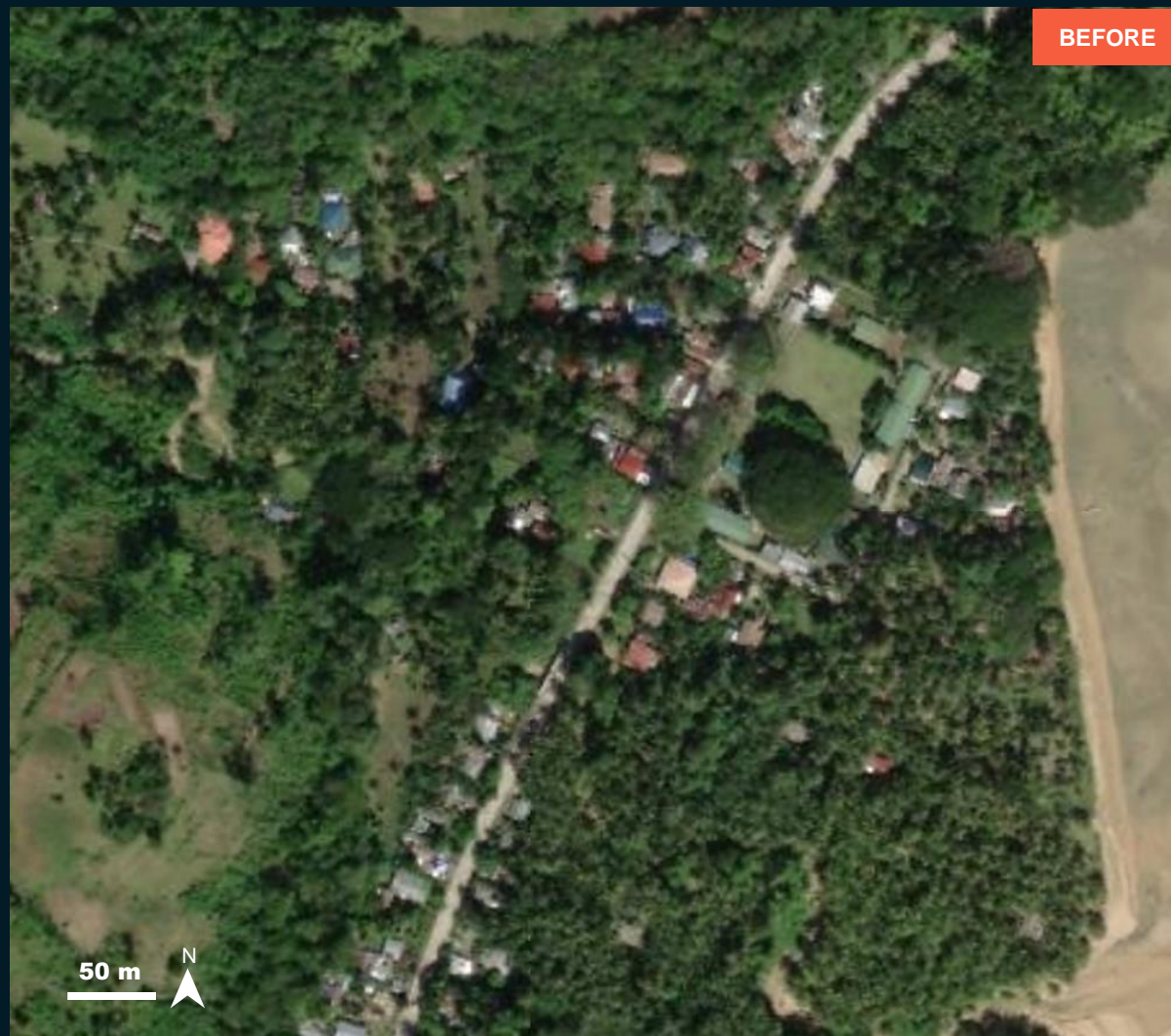
Pléiades / 22 December 2021



# AOI 2-4: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

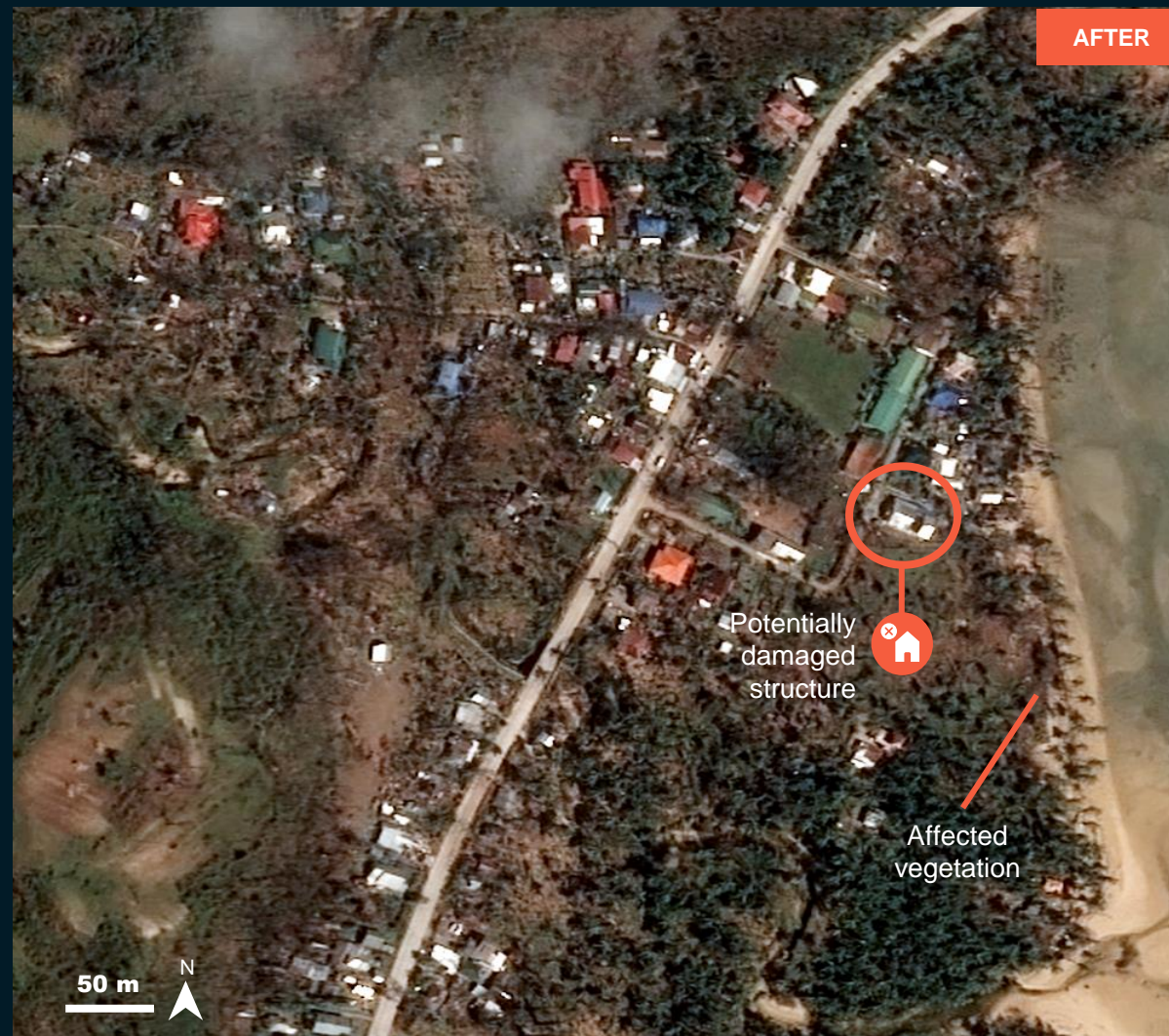
Potentially damaged and affected area along the shoreline

Image center:  
123°15'1.497"E  
10°4'7.751"N



BEFORE

ESRI Basemap / Worldview-3 / 16 December 2018



AFTER

Pléiades / 22 December 2021



# AOI 2-5: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Standing water in agricultural area

Image center:  
123°12'52.67"E  
10°2'56.984"N



BEFORE

ESRI Basemap / Worldview-3 / 12 November 2014



AFTER

Pléiades / 22 December 2021



## AOI 2-6: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

No damage structures

Image center:  
123°13'35.138"E  
10°2'10.302"N



BEFORE

ESRI Basemap / Worldview-3 / 16 December 2018



AFTER

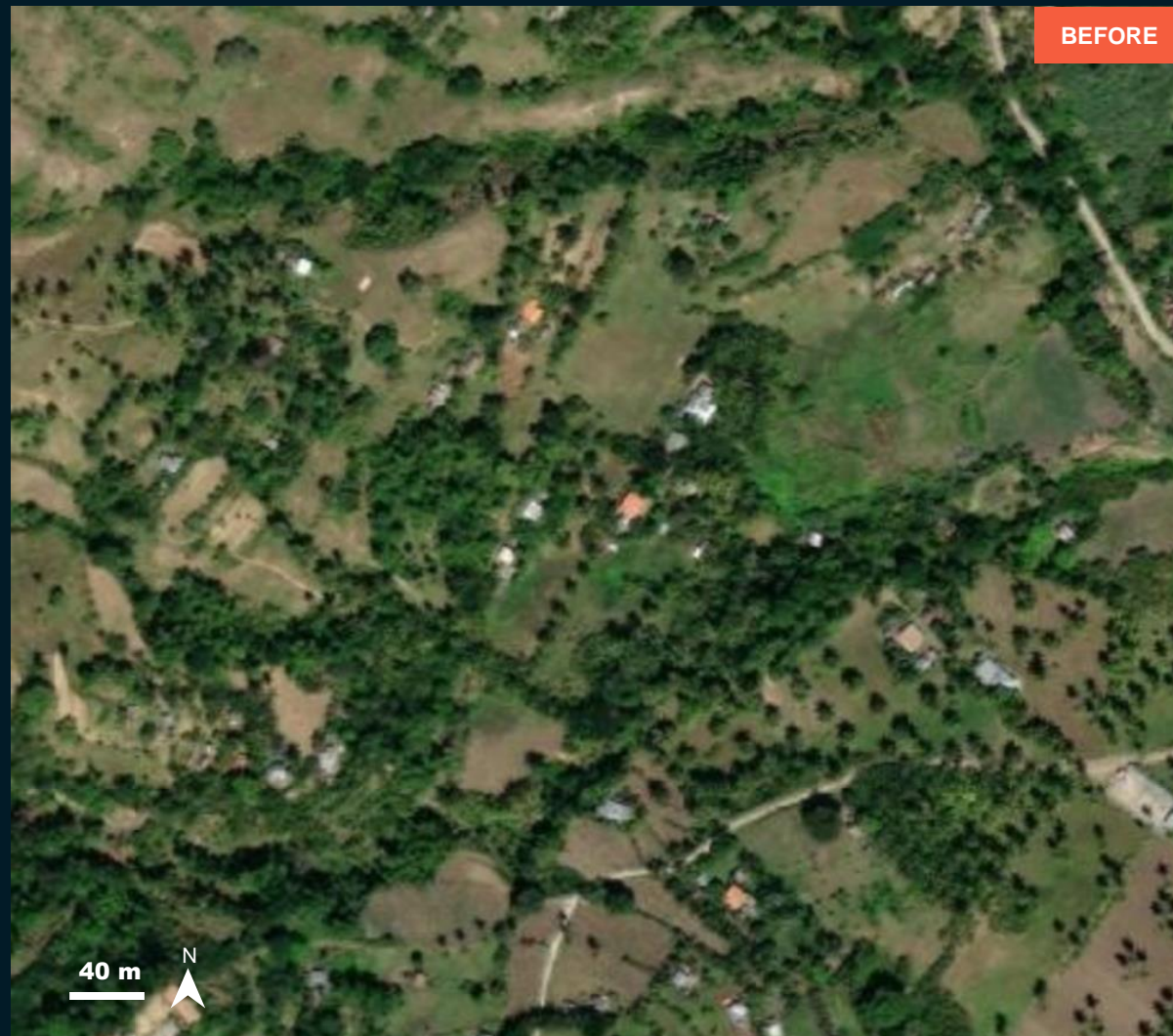
Pléiades / 22 December 2021



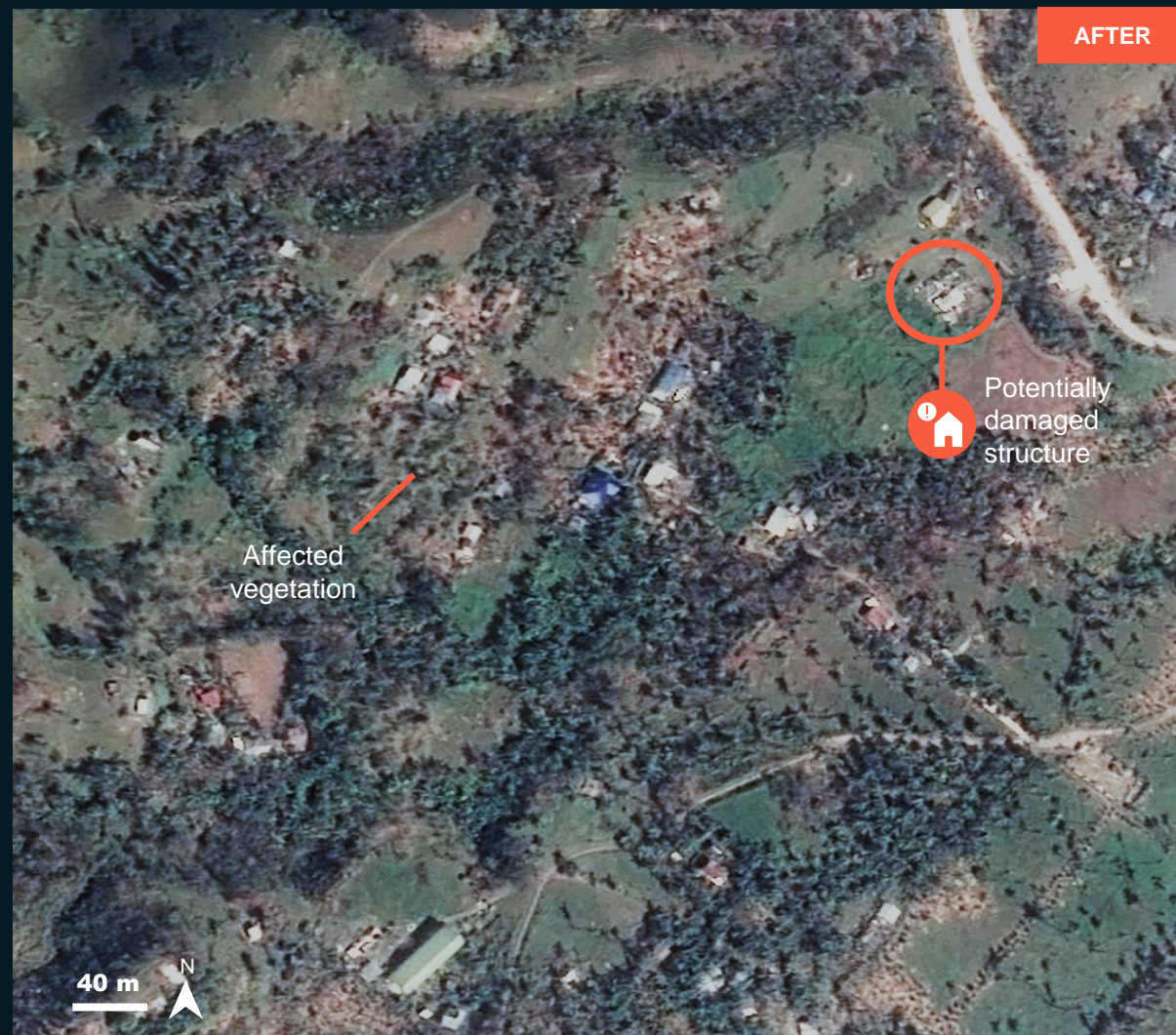
# AOI 2-7: LA LIBERTAD TOWN, NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Potentially damaged structures

Image center:  
123°12'19.434"E  
10°2'34.951"N



ESRI Basemap / Worldview-3 / 12 November 2014



Pléiades / 22 December 2021



# AOI 2-8: NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures

Image center:  
123°12'19.434"E  
10°2'34.951"N



Google Earth / October 2021



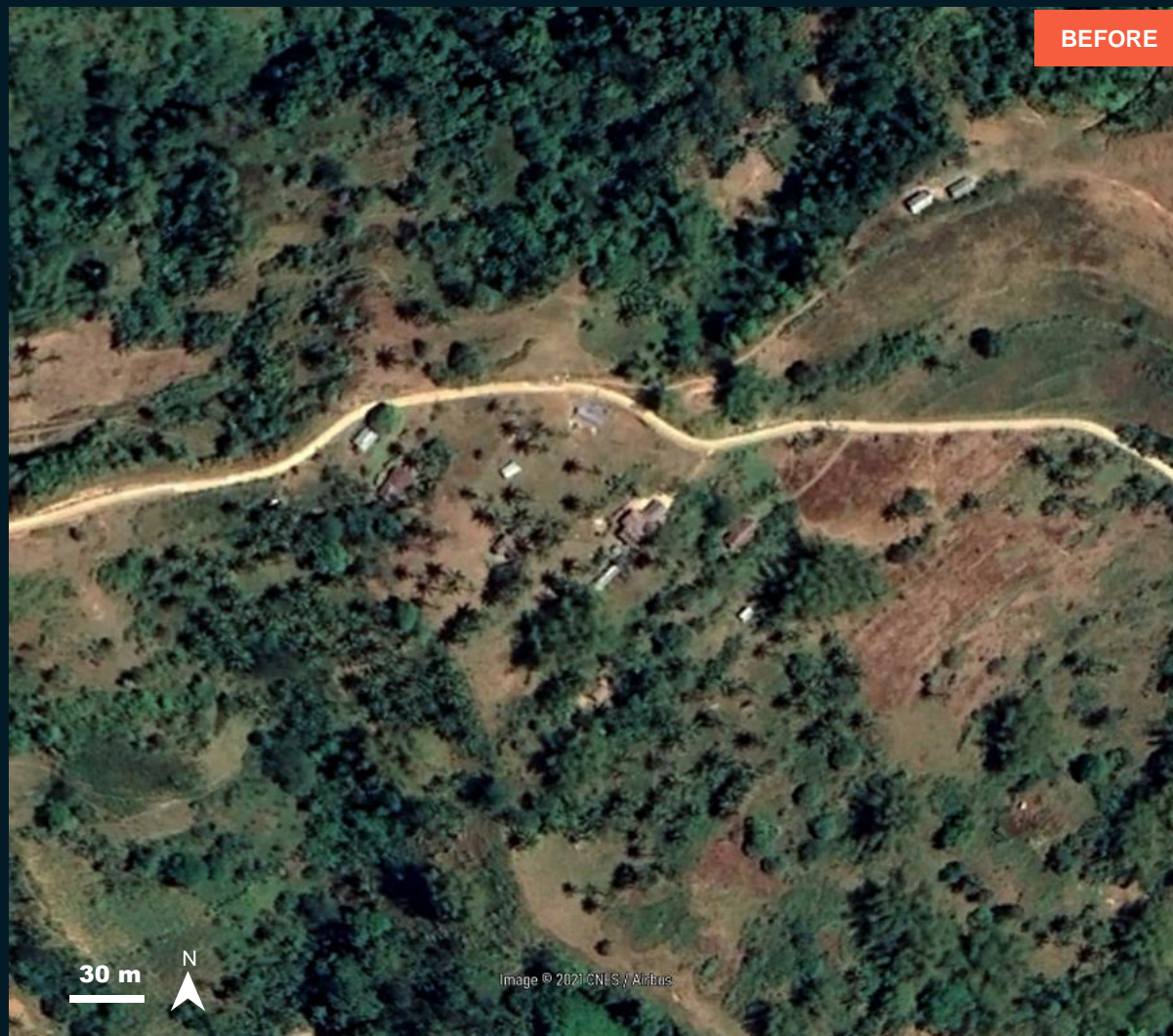
Pléiades / 22 December 2021



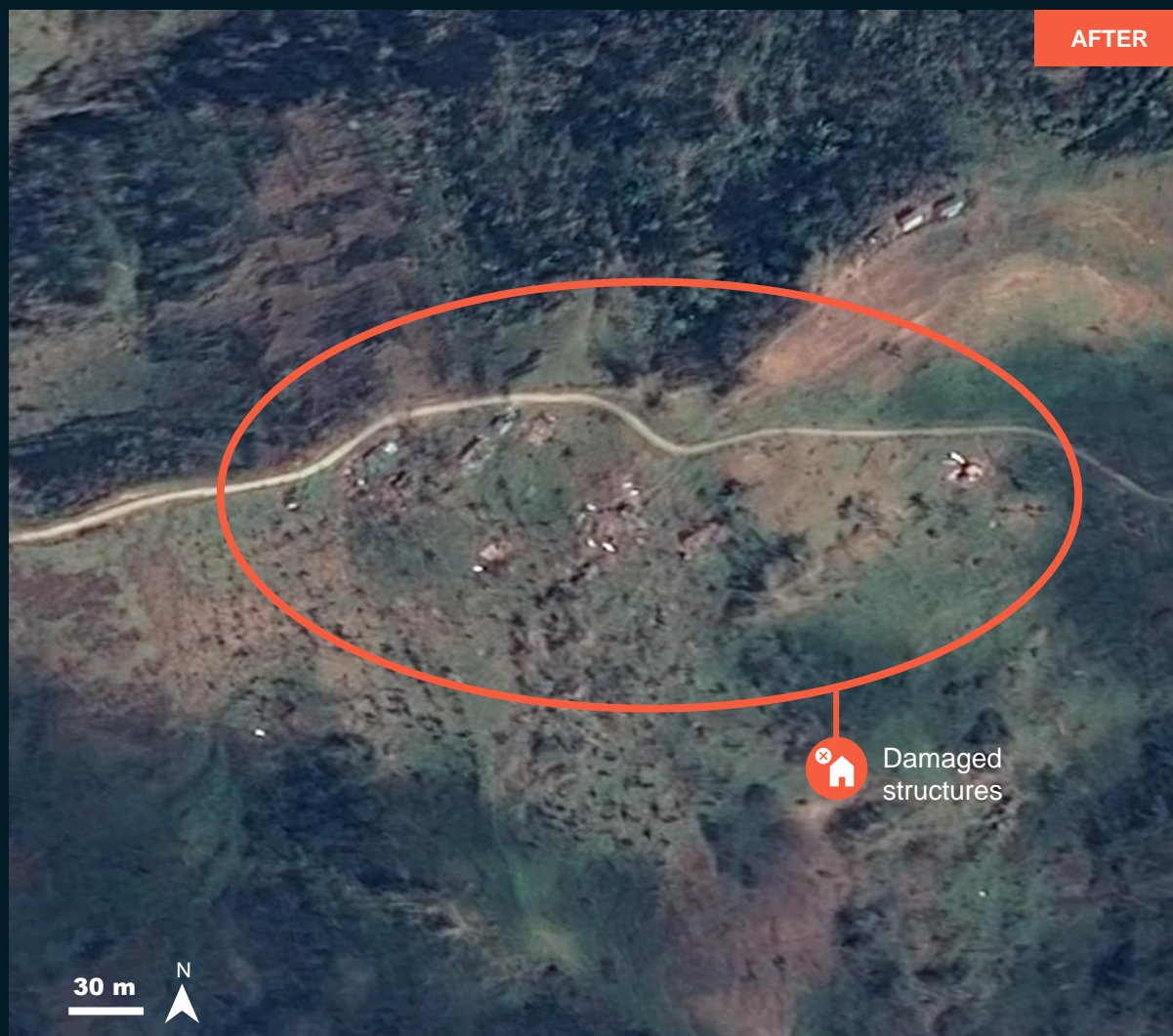
# AOI 2-9: NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures

Image center:  
123°9'31.87"E  
10°0'59.651"N



Google Earth / October 2021



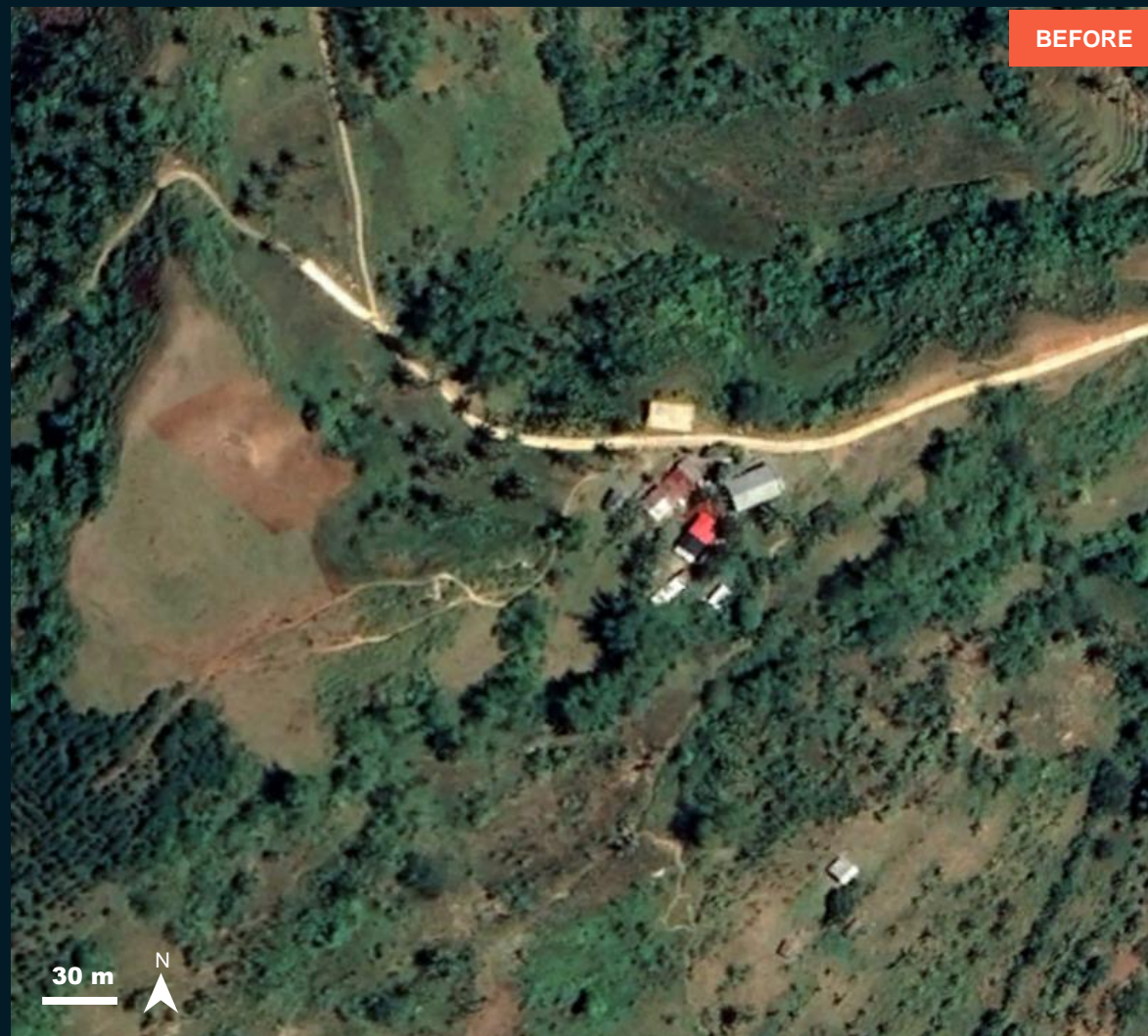
Pléiades / 22 December 2021



# AOI 2-10: NEGROS ORIENTAL PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures

Image center:  
123°9'6.83"E  
10°0'57.514"N





# SUMMARY OF FINDINGS

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- Widespread damage observed in Siargao Islands, Region XIII (Caraga) as of 19 Dec 2021.
- Affected areas along the shoreline observed in Siargao Islands, Region XIII (Caraga) as of 19 Dec 2021.
- Severally damaged education facilities of Del Carmen National High School, Surigao State College of Technology, Sayak Elementary School, Bagacay Primary School, Numancia Central Elementary School, Oguing Navarro Mem. National High School, Mariano Matugas Memorial National High School, Tuboran Elementary School, Mabuhay elementary School, Santa Cruz Elementary School, Salvacion Elementary School, Pilar National High school, Caridad National High School, Tigasao, Elementary School in Siargao Islands, Region XIII (Caraga) observed as of 19 Dec 2021.
- Damaged health facilities of Del Carmen District and Pilar Municipal Hospitals in Siargao Islands, Region XIII (Caraga) observed as of 19 Dec 2021.
- Widespread damage observed in La Libertad town, Negros Oriental Province, Region VII (Central Visayas) as of 22 Dec 2021.
- Affected area along the shoreline observed in Negros Oriental Province, Region VII (Central Visayas) as of 22 Dec 2021.
- Standing waters in agricultural areas observed in Negros Oriental Province, Region VII (Central Visayas) as of 22 Dec 2021.



# COPYRIGHTS AND SOURCES

## Data sources:

### (1) Satellite Image (Post-event)

GeoEye-1: 19 Dec 2021

Resolution: 50 cm

Copyright : © DigitalGlobe, Inc. (2021)

Source: HDDS/USGS

Pléiades: 22 December 2021

Resolution: 50 cm

Copyright : © CNES (2021), distribution Airbus D&S

Source : Airbus Defense and Space

### (2) Satellite Image (Pre-event)

ESRI Basemap

Google Earth

### (3) Ancillary data

Administrative boundaries: National Mapping and Resource Information Authority (NAMRIA), Philippines Statistics Authority (PSA)

Populate place: OpenStreetMap

Analysis: United Nations Satellite Centre (UNOSAT)

Production: United Nations Satellite Centre (UNOSAT)





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**UNOSAT**, United Nations Institute for Training  
and Research (UNITAR)  
7 bis, Avenue de la Paix, CH-1202 Geneva 2,  
Switzerland

T +41 22 917 4720  
E [unosat@unitar.org](mailto:unosat@unitar.org)  
[www.unosat.org](http://www.unosat.org)