

21 December 2021





TROPICAL CYCLONE RAI-21

PRELIMINARY SATELLITE-DERIVED BUILDING DAMAGE ANALYSIS



Dinagat Islands & Socorro municipality of Region XIII (Caraga), Cebu province of Region VII (Central Visayas), and Palawan province of Region IV-B (Mimaropa) ;Philippines

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

 Further action(s): Continue monitoring



PHILIPPINES



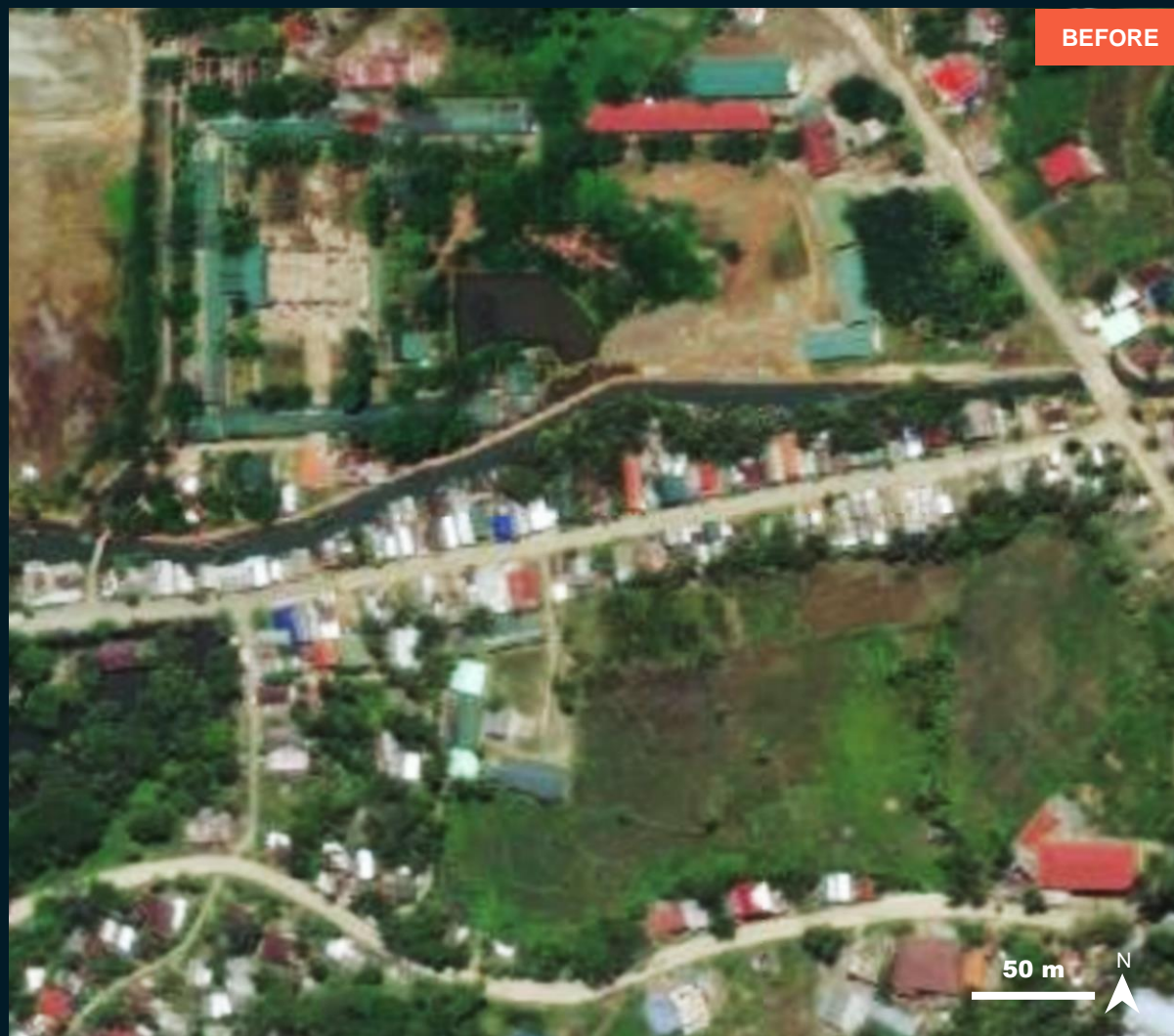
AOI 1-1: SAN JOSE TOWN, DINAGAT ISLAND, REGION REGION XIII (CARAGA)

Widespread damaged structures and damaged school

Image center:
125°34'32.811"E
10°0'52.605"N



Dinagat
Island



BEFORE



AFTER



Don Ruben E. Eclep Sr. Memorial
National High School damage

Widespread
damaged structures

ESRI Basemap / Worldview 3 / 16 June 2018

Worldview-3 / 17 December 2021

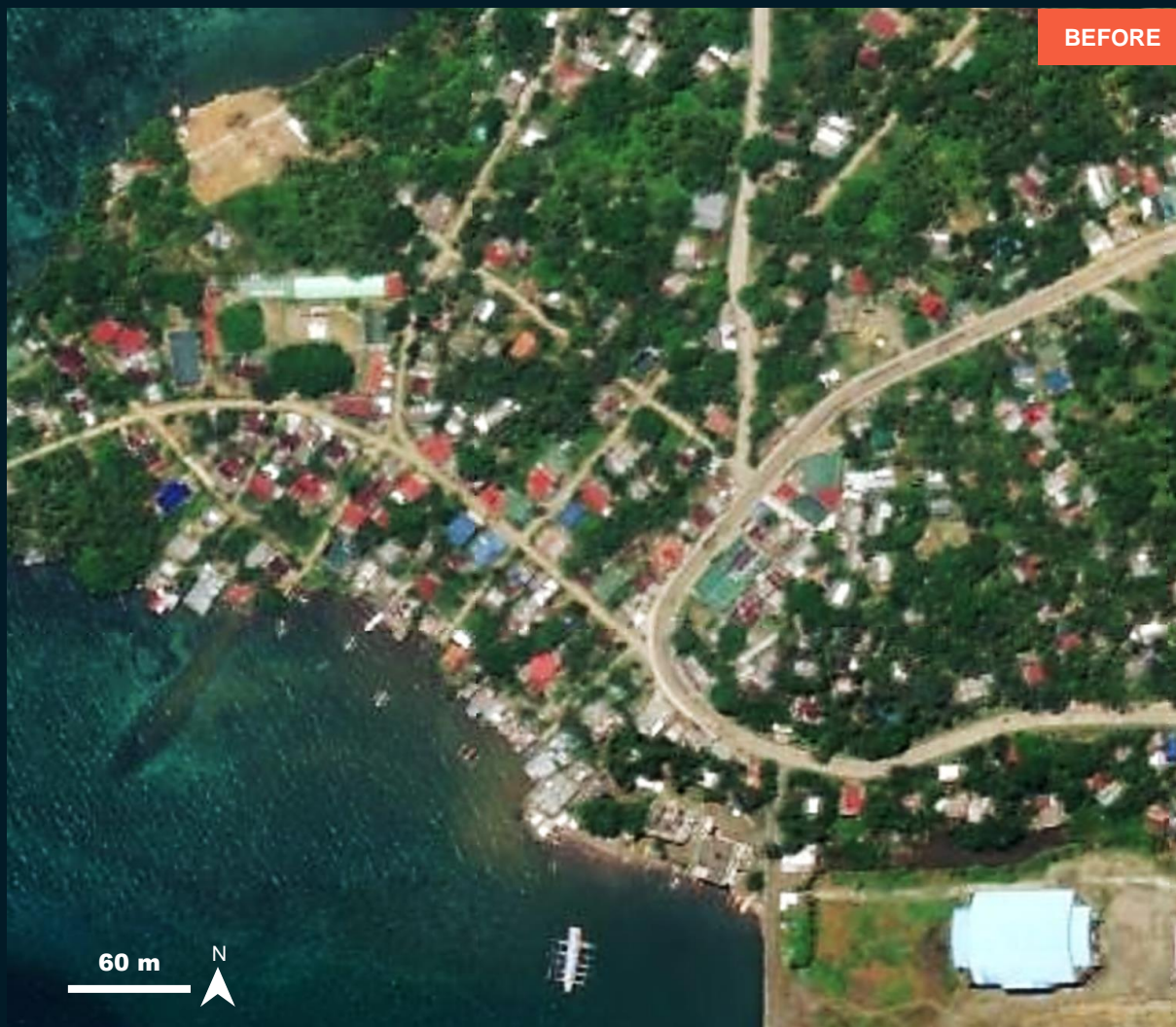
AOI 1-2: SAN JOSE TOWN, DINAGAT ISLAND, REGION REGION XIII (CARAGA)

Widespread damaged structures and damaged school

Image center:
125°34'15.82"E
10°1'4.199"N



Dinagat
Island



BEFORE

ESRI Basemap / Worldview 3 / 7 Aug 2018



AFTER

Sta. Cruz Elementary
School damage

Widespread
damaged structures

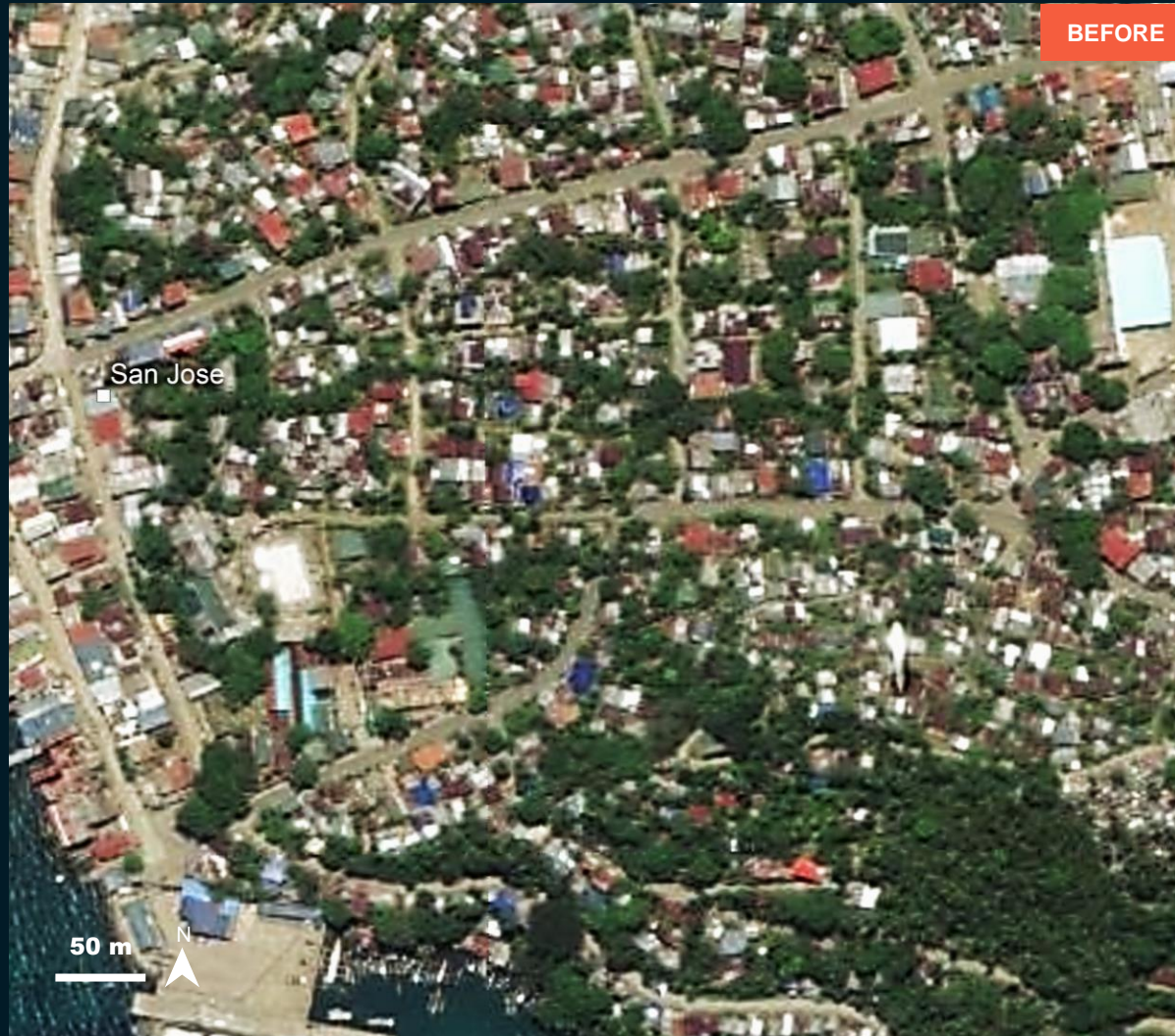
Damaged structure

Worldview-3 / 17 December 2021

AOI 1-3: SAN JOSE TOWN, DINAGAT ISLAND, REGION XIII (CARAGA)

Widespread damaged structures and damaged school

Image center:
125°34'15.938"E
10°0'27.038"N



BEFORE

ESRI Basemap / Worldview 3 / 16 June 2018



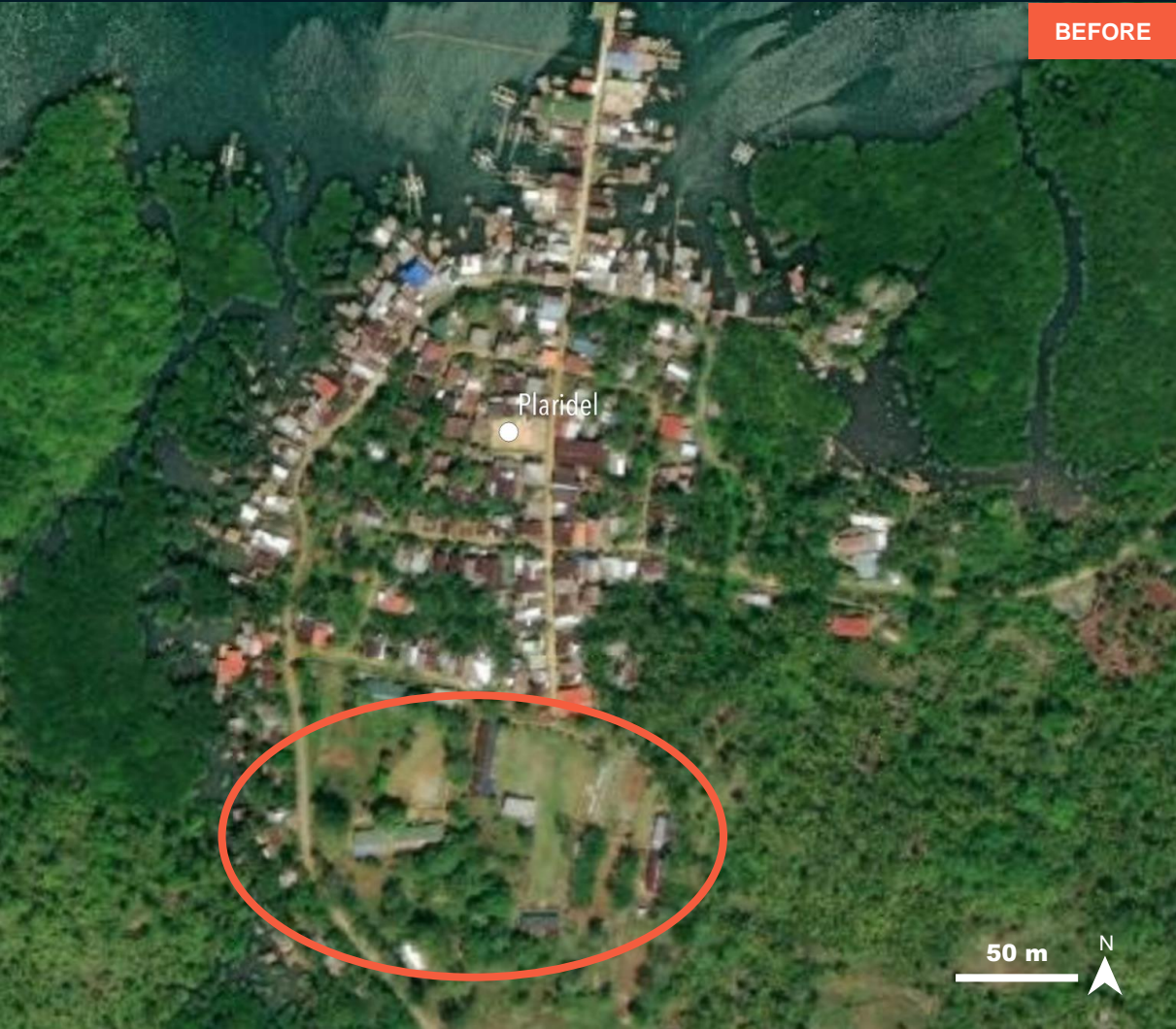
AFTER

Worldview-3 / 17 December 2021

**AOI 1-4: PLARIDEL VILLAGE, DINAGAT ISLAND,
REGION REGION XIII (CARAGA)**

Damaged structures

Image center:
125°29'54.031"E
10°7'53.777"N



BEFORE



AFTER

Damaged structures

**AOI 1-5: SANJOES VILLAGE, DINAGAT ISLAND,
REGION REGION XIII (CARAGA)**

Damaged structures and damaged school

Image center:
125°33'58.122"E
10°10'29.448"N



Google Earth / June 2020



Worldview-3 / 17 December 2021

AOI 1-6: SANJOES VILLAGE, DINAGAT ISLAND, REGION REGION XIII (CARAGA)

Damaged structures

Image center:
125°33'45.391"E
10°10'36.311"N



Dinagat
Island



Google Earth / June 2020



Worldview-3 / 17 December 2021

AOI 2-1: SOCORRO TOWN, SOCORRO MUNICIPALITY, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Damaged hospital and damaged structures

Image center:
125°57'47.857"E
9°37'6.206"N



Socorro



ESRI Basemap / Worldview 2 / 22 July 2019



Worldview-3 / 17 December 2021

AOI 2-2:, SANTA CRUZ VILLAGE, SOCORRO MUNICIPALITY, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Standing water and widespread damaged structures

Image center:
125°54'29.502"E
9°38'47.687"N



Socorro



ESRI Basemap / Worldview 2 / 22 July 2019



Worldview-3 / 17 December 2021

AOI 2-3:, SOCORRO MUNICIPALITY, SURIGAO DEL NORTE PROVINCE, REGION XIII (CARAGA)

Widespread damaged structures

Image center:
125°56'39.312"E
9°39'51.238"N



Socorro



Google Earth / June 2021



Worldview-3 / 17 December 2021

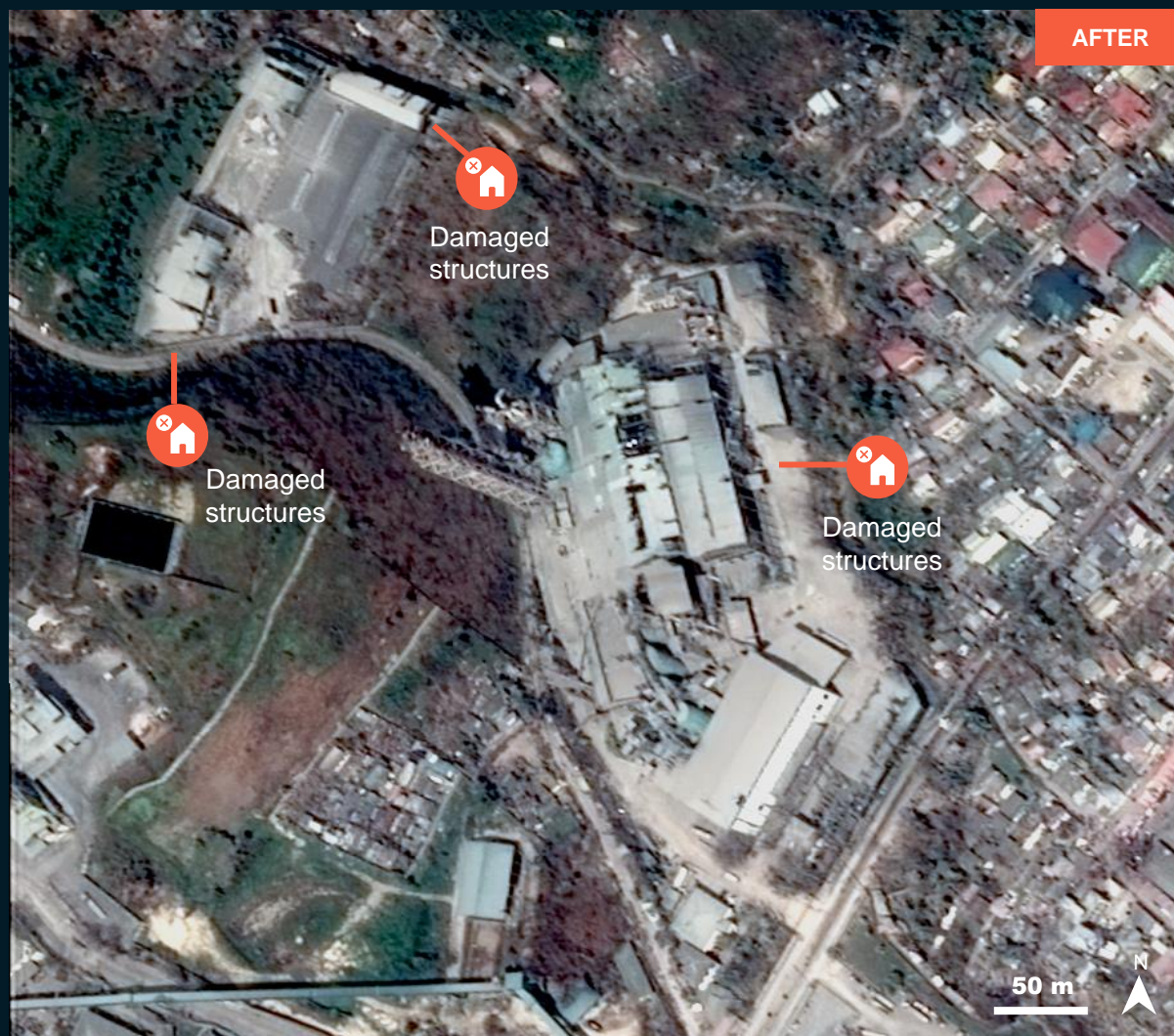
AOI 3-1: SAN FERNANDO MUNICIPALITY CEBU PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structures

Image center:
123°42'17.08"E
010°9'44.151"N



ESRI Based map / WorldView-3 / 1 April 2020

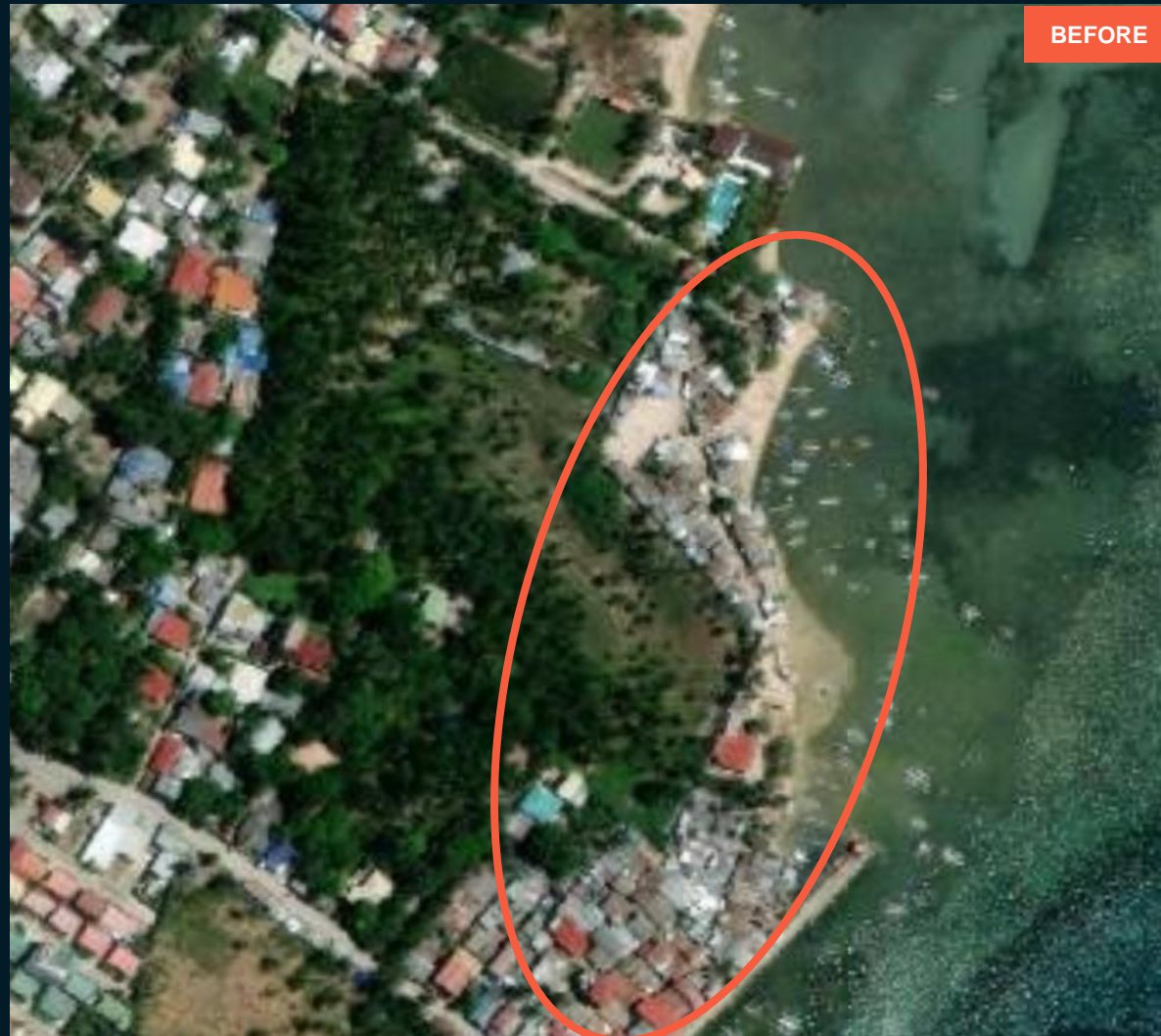


Pléiades / 21 December 2021

AOI 3-2: SAN FERNANDO MUNICIPALITY CEBU PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged structure along the shoreline

Image center:
123°42'38.92"E
10°9'39.447"N



ESRI Based map / WorldView-3 / 1 April 2020

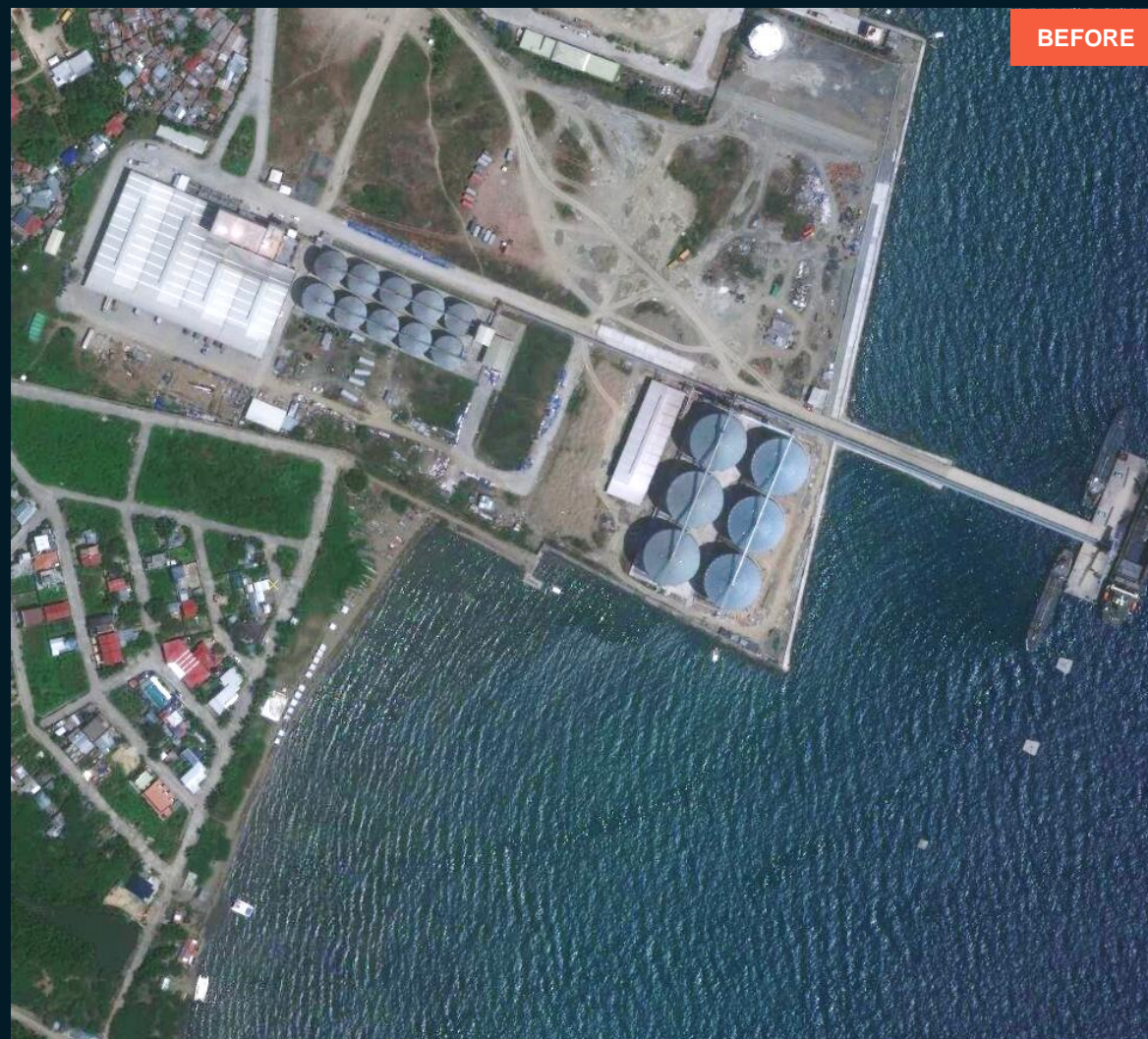


Pléiades / 21 December 2021

AOI 3-3: CITY OF NAGA, CEBU PROVINCE, REGION VII (CENTRAL VISAYAS)

Damaged industrial structures

Image center:
123°45'32.419"E
010°12'6.779"N



ESRI Based map / WorldView-4 / 17 March 2018



Pléiades / 21 December 2021

**AOI 3-4: CEBU CITY, CEBU PROVINCE,
REGION VII (CENTRAL VISAYAS)**

Damaged structures

Image center:
123°50'56.373"E
10°14'57.966"N

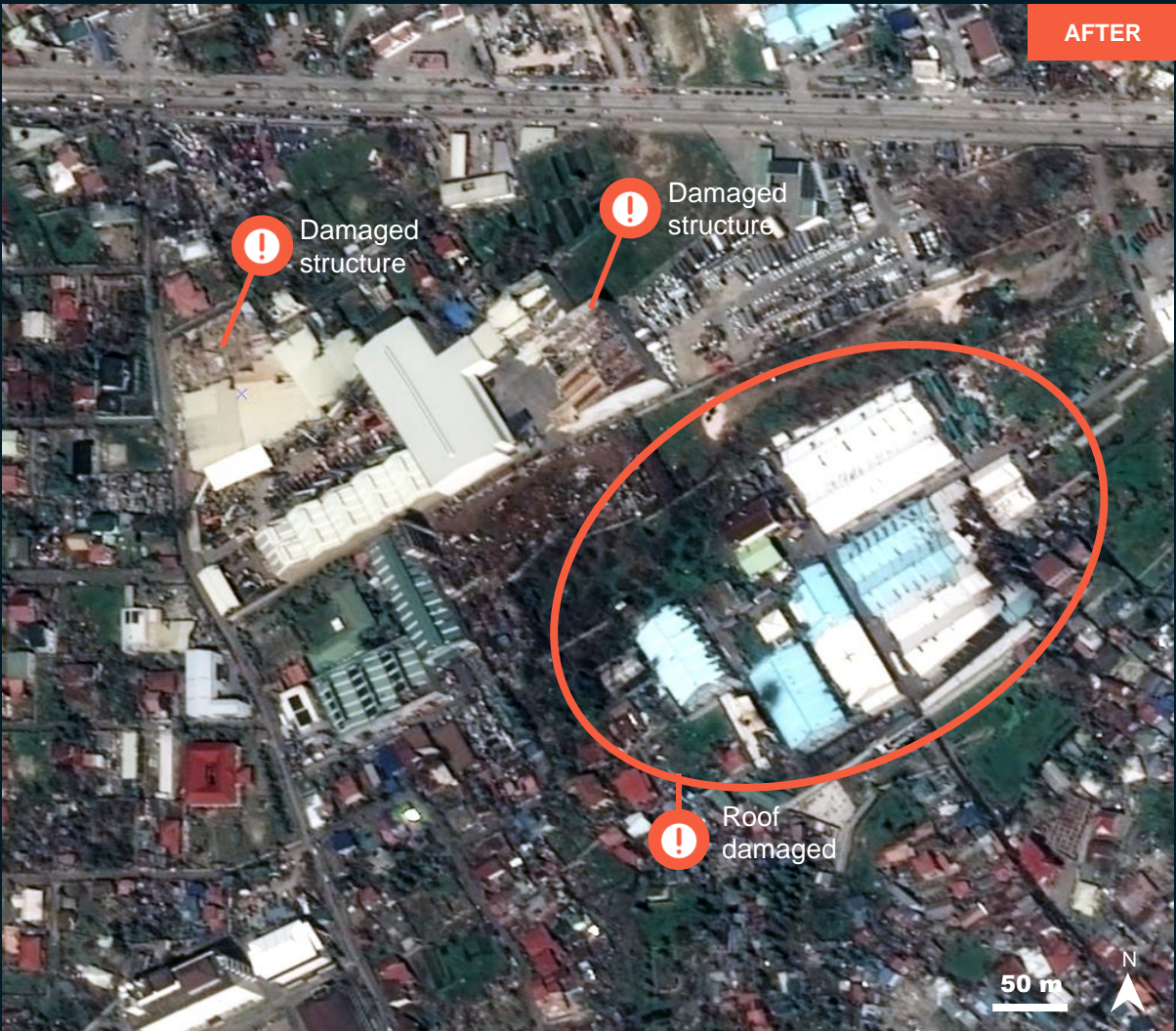


Cebu
Island



BEFORE

ESRI Based map / WorldView-4 / 17 March 2018



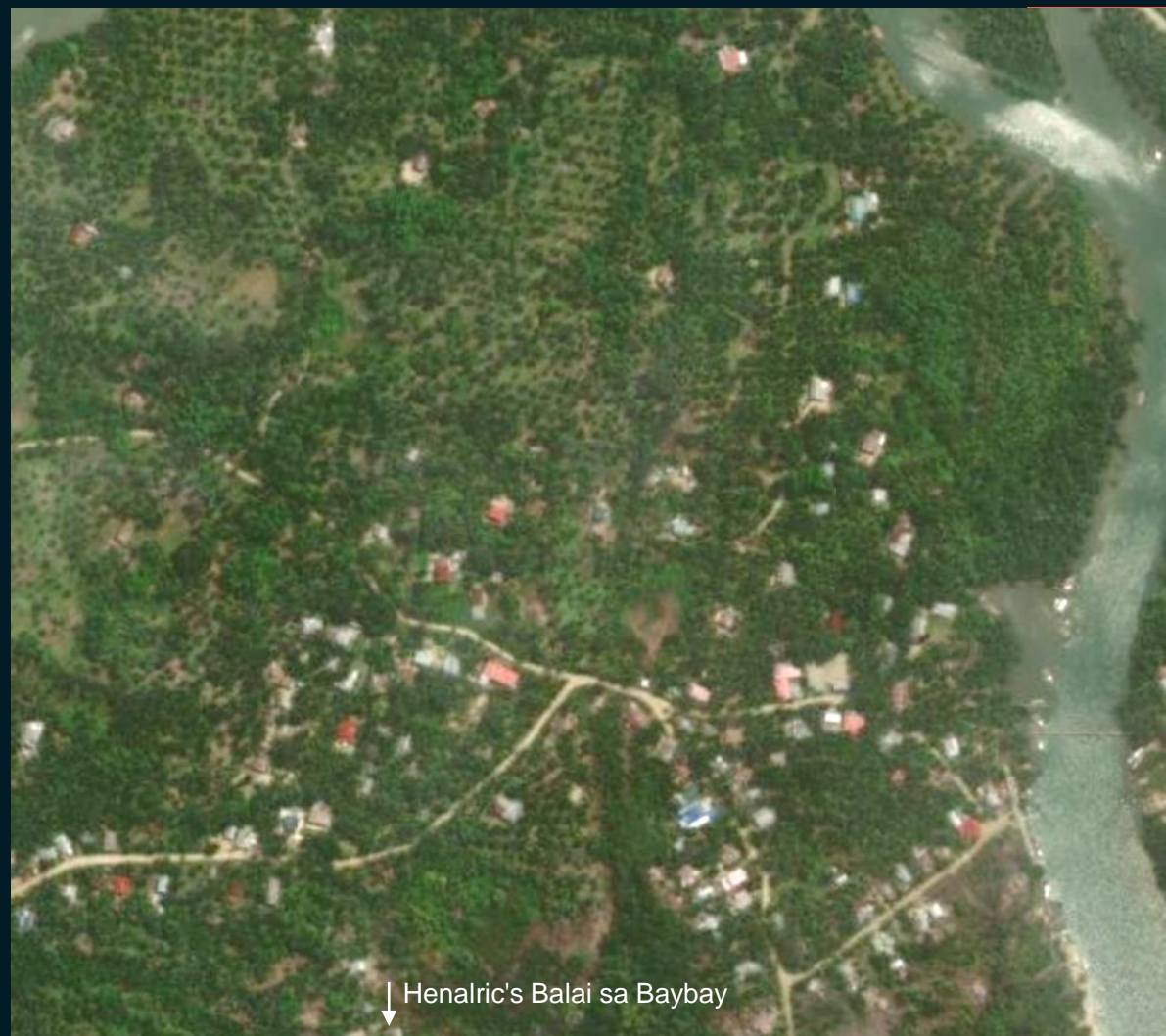
AFTER

Pléiades / 21 December 2021

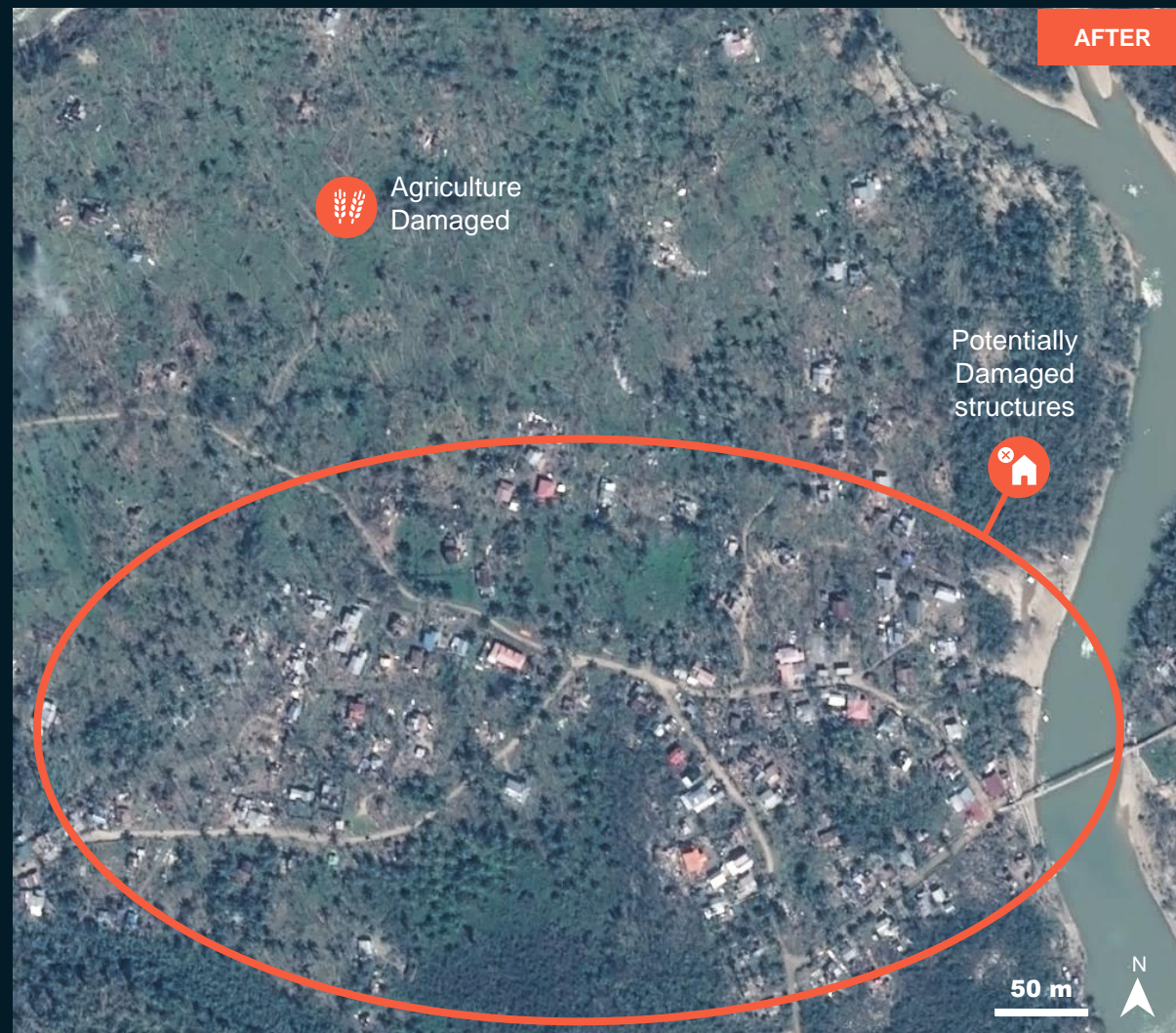
AOI 4-1: ROXAS MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Agricultural area damaged

Image center:
119°13'47.648"E
10°10'54.973"N



ESRI Based map / GeoEye-1 / 18 May 2019



Pléiades / 21 December 2021

AOI 4-2: ROXAS MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Damaged structures along the shoreline

Image center:
119°19'9.46"E
10°18'23.288"N

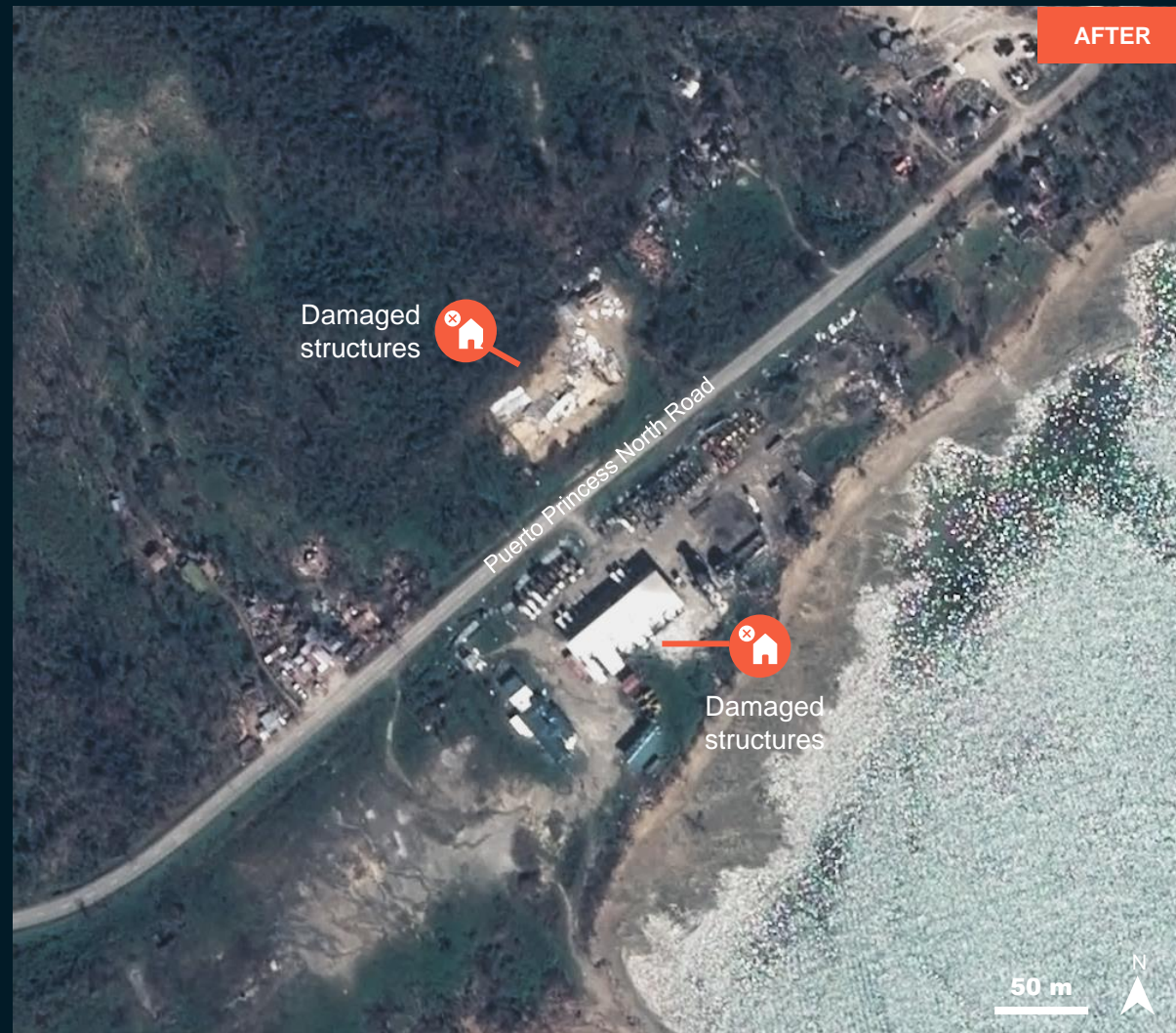


Palawan
Island



BEFORE

ESRI Based map / GeoEye-1 / 18 May 2019



AFTER

Pléiades / 21 December 2021

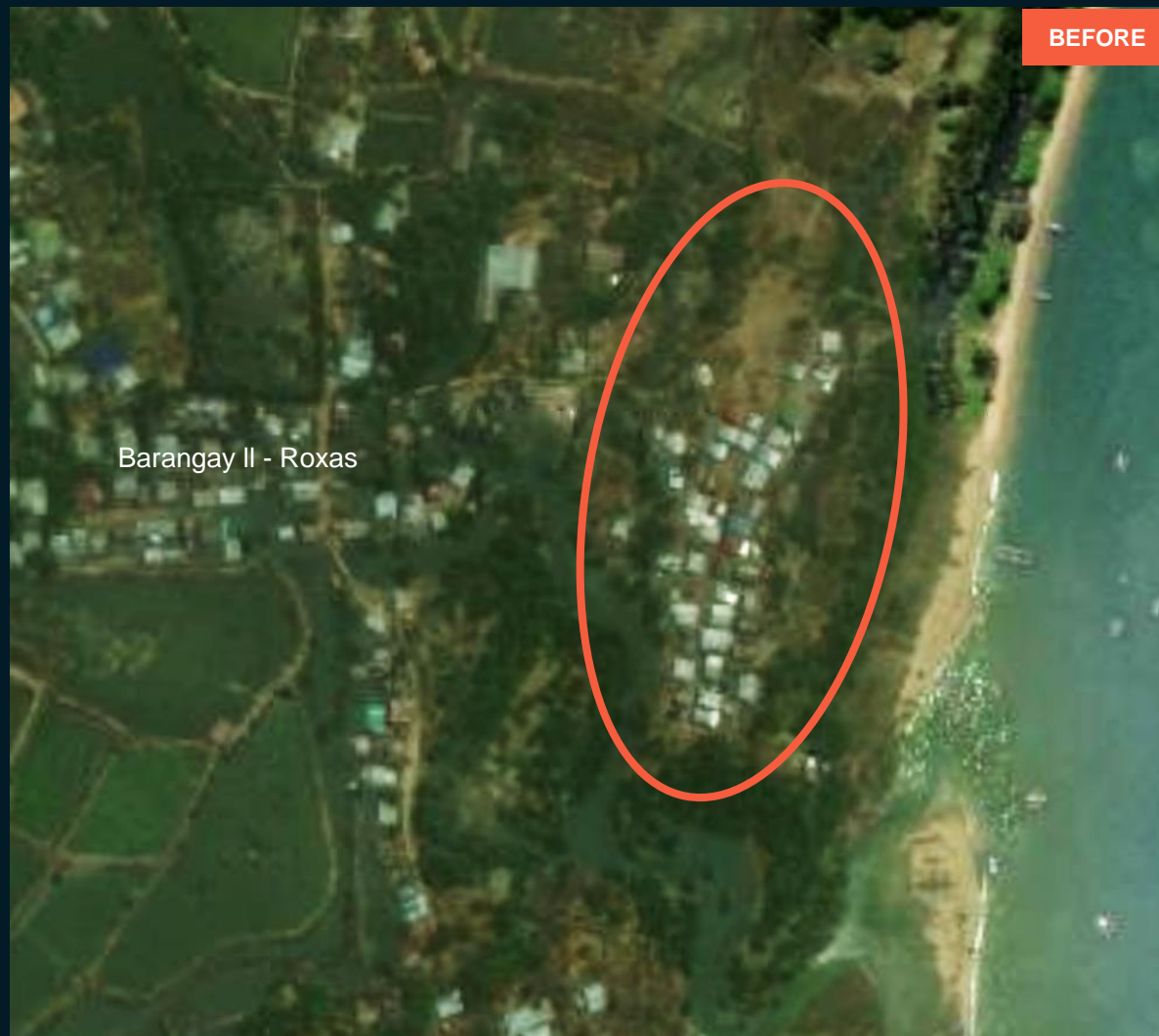
50 m



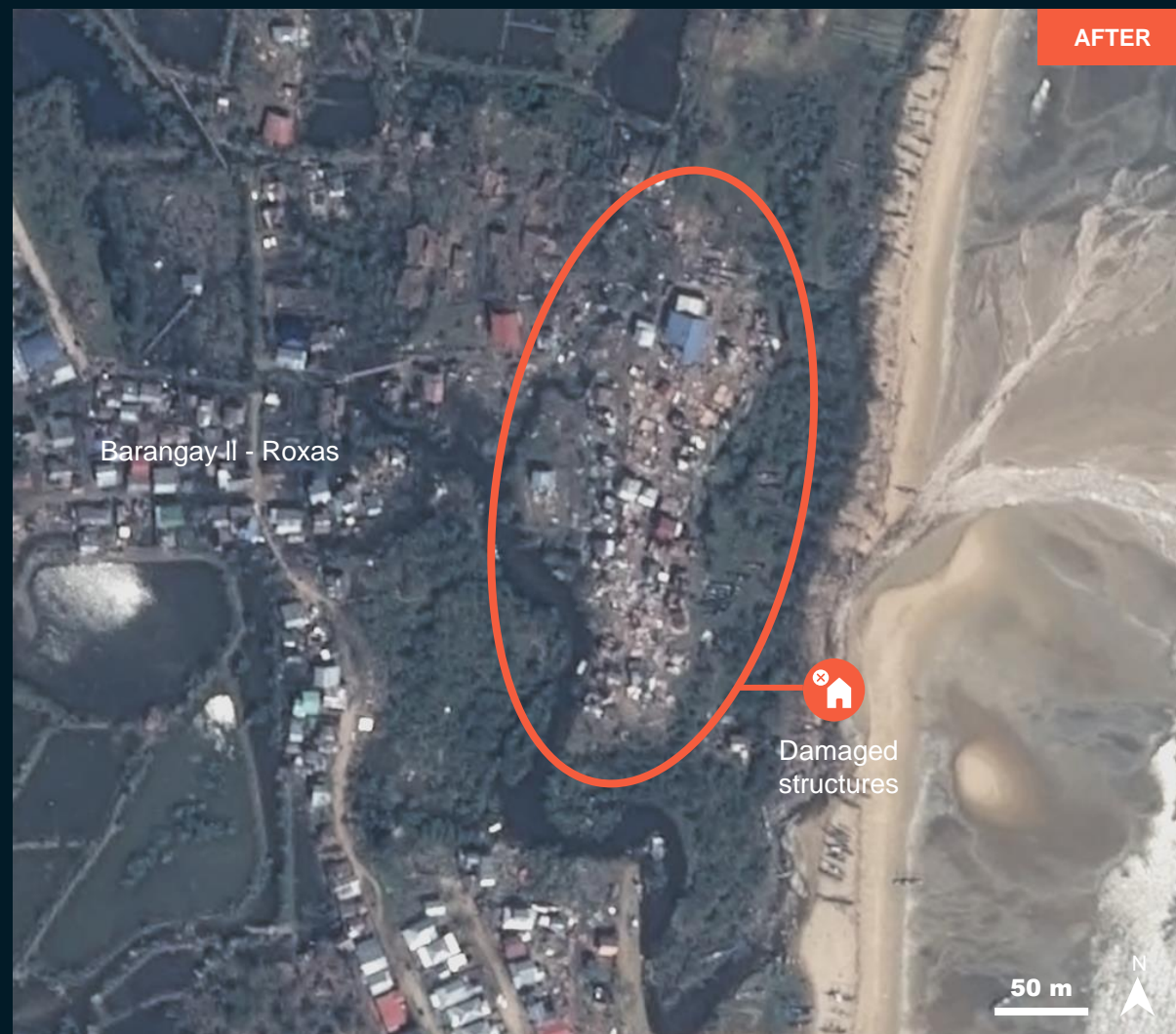
AOI 4-3: ROXAS MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Damaged structures

Image center:
119°21'2.964"E
10°19'11.687"N



ESRI Based map / GeoEye-1 / 18 May 2019



Pléiades / 21 December 2021

AOI 4-4: ROXAS MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Inundated agriculture area

Image center:
119°22'29.072"E
10°21'30.344"N



ESRI Based map / GeoEye-1 / 23 August 2018

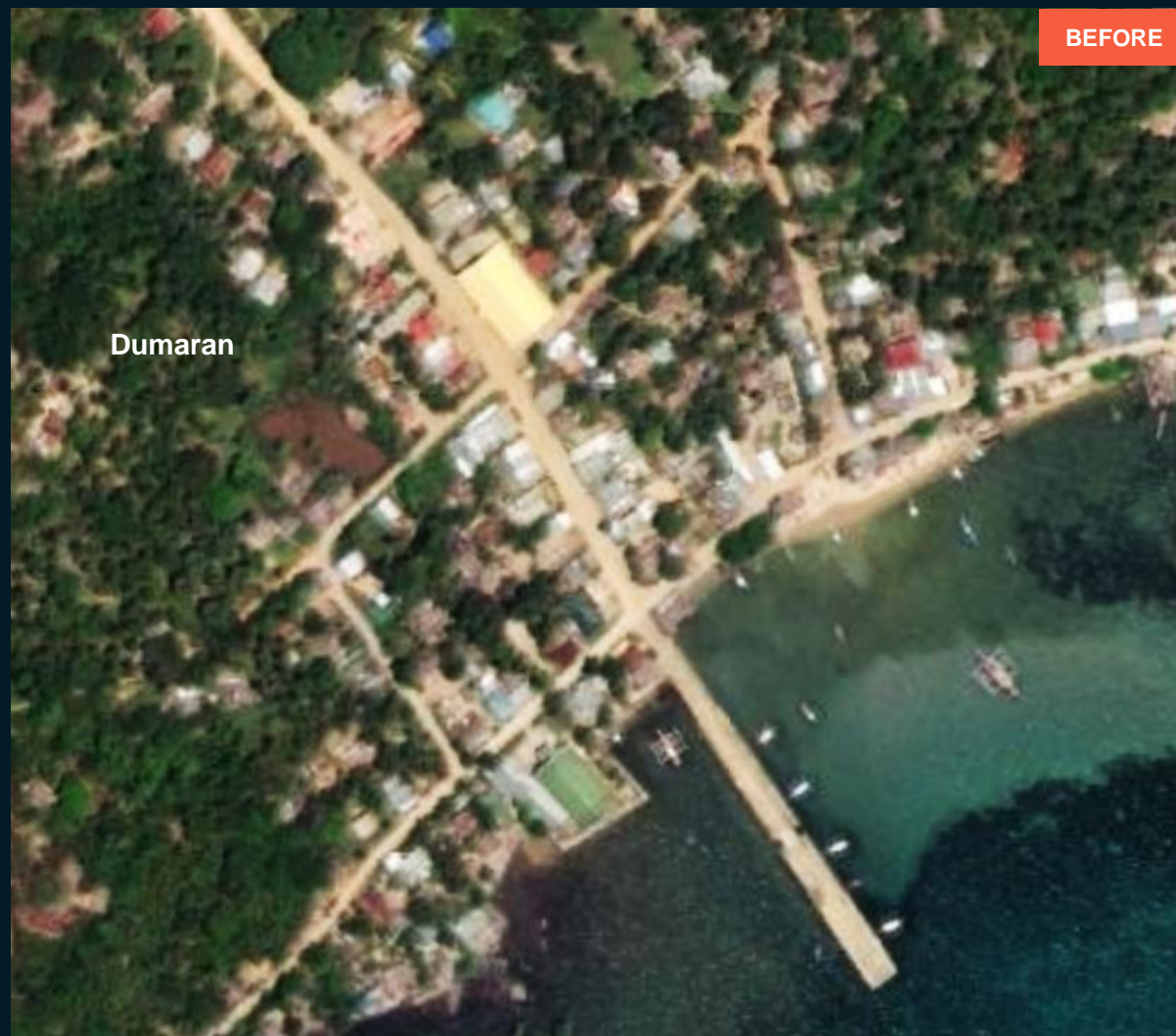


Pléiades / 21 December 2021

AOI 4-5: DUMARAN MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Potentially damaged structures in Dumarán

Image center:
119°40'35.341"E
10°29'33.543"N



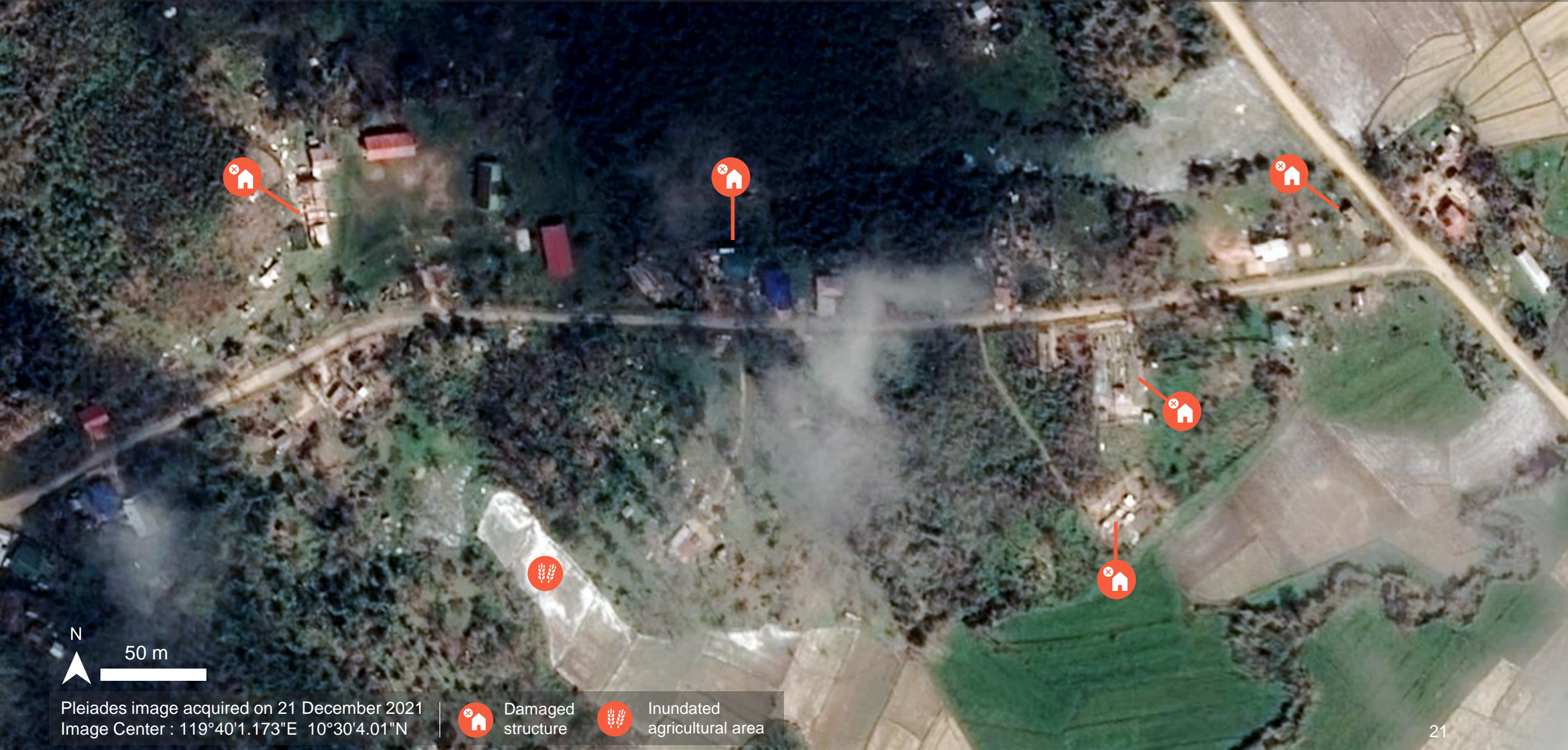
ESRI Based map / WorldView-2 / 23 May 2013



Pléiades / 21 December 2021

AOI 4-6: DUMARAN MUNICIPALITY, PALAWAN PROVINCE, REGION IV-B (MIMAROPA)

Damaged structures



N
50 m

Pleiades image acquired on 21 December 2021
Image Center : 119°40'1.173"E 10°30'4.01"N



Damaged structure



Inundated agricultural area

SUMMARY OF FINDINGS

- Widespread damage observed in Dinagat Islands, Region XIII (Caraga) as of 17 Dec 2021.
- Widespread damage observed in San Jose town, Dinagat Islands , Region XIII (Caraga) as of 17 Dec 2021.
- Widespread damage observed in Plaridel village, Dinagat Islands , Region XIII (Caraga) as of 17 Dec 2021.
- Damaged education facilities of Don Ruben E. Ecleo Sr. Memorial National High School, Sta. Cruz Elementary School, San Jose Central Elementary School, and San Jose National High School in Dinagat Islands, Region XIII (Caraga) observed as of 17 Dec 2021.
- Widespread damage observed in Socorro municipality, Region XIII (Caraga) of 17 Dec 2021.
- Damaged Socorro District Hospital in Socorro municipality, Region XIII (Caraga) observed as of 17 Dec 2021.
- Damaged industrial structures observed in Cebu province, Region VII (Central Visayas) as of 21 Dec 2021.
- Widespread damage observed in Cebu province, Region VII (Central Visayas) as of 21 Dec 2021.
- Damaged agricultural areas observed in Palawan province, Region IV-B (Mimaropa) as of 21 Dec 2021.
- Widespread damage observed in Palawan Province, Region IV-B (Mimaropa) as of 21 Dec 2021.

COPYRIGHTS AND SOURCES

Data sources:

(1) Satellite Image (Post-event)

Worldview-3: 17 Dec 2021

Resolution: 50 cm

Copyright: Digital Globe, Inc. (2021)

Source: HDDS/USGS

Pléiades: 21 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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