

NASA DEVELOP National Program



NOAA National Centers for Environmental Information
Spring 2017

Short Title: Philippines Disasters

Subtitle: Utilizing NASA and NOAA Earth Observations to Enhance the United Nation's Office for the Coordination of Humanitarian Affairs in Storm Preparation and Disaster Relief Planning Methods in the Philippines

VPS Title: Eyes on the Storm: A Gender Vulnerability Analysis of Tropical Cyclone Impacts in the Philippines

Project Team & Partners

Project Team:

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Advisors & Mentors:

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Partner Organizations:

Organization	POC (Name, Position/Title)	Partner Type	Boundary Org?
United Nations Office for the Coordination of Humanitarian Affairs (OCHA)	Rowena Dacsig, Gender Advisor	End-User	No
United Nations Institute for Training and Research, Operational Satellite Applications Program (UNOSAT)	Rohini Swaminathan, UNITAR GIS Technical Expert	Collaborator	Yes

Project Details

Applied Sciences National Applications Addressed: Disasters, Weather

Study Area: Philippines

Study Period: September 1982 – December 2016

Earth Observations & Parameters:

Shuttle Radar Topography Mission (SRTM)—DEM for use in risk analysis

NOAA Precipitation Estimation from Remotely Sensed Information Using Artificial Neural Networks,

Climate Data Record (PERSIANN-CDR) – precipitation estimates

Ancillary Datasets Utilized:

- NCEI International Best Track Archive for Climate Stewardship (IBTrACS) – tropical cyclone climatology
- NCEI Global Historical Climatology Network – validation of satellite precipitation estimates
- Public/partner *in situ* data: OCHA-Philippines Population Demographic Data (single headed households, population density) – Cyclone hazards risk map

Software Utilized:

- ESRI ArcGIS – raster manipulation/analysis, map creation
- R – statistical comparisons
- Python – index calculation, statistical comparisons

Project Overview

Objectives Overview:

The Philippines and its surrounding area are threatened by tropical cyclones each year which often have the potential to cause mass destruction and population displacement. To further understand the threats introduced by these cyclones, this project aims to combine tropical cyclone tracking and intensity climatologies with population vulnerability statistics related to gender. Combining these statistics with other demographic data such as socioeconomic status, building and government response capabilities, and population distribution, will enable our partners to predict the areas of greatest vulnerability in future cyclone events.

Abstract:

A comprehensive understanding of where sensitive populations and demographics are threatened by natural hazards is necessary for the assessment and prevention of disasters. The island nation of the Philippines is often threatened by tropical cyclones, which have had disastrous consequences in the past (e.g., Tropical Cyclone Haiyan in 2013 claimed over 6,000 lives). This project aimed to assess areas of greatest disaster risk in the Philippines with a special focus on gender. Combining archived tropical cyclone data from the International Best Track Archive for Climate Stewardship (IBTrACS) and the Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks – Climate Data Record (PERSIANN-CDR) dataset with population demographic data from the Philippines, this project aimed to determine where intense tropical cyclones are most prone to make landfall, and what areas and populations are most sensitive to cyclone events of a given strength based on gender and socioeconomic status. These results will be used by the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) to target areas of greatest need for further development in disaster response and mitigation techniques.

Keywords:

Tropical cyclones, gender vulnerability, population analysis, United Nations, OCHA, IBTrACS, PERSIANN

Community Concerns

- About 19 tropical cyclones enter the Philippine Sea each year, and an average of six – nine make

landfall in the Philippines.

- Cyclones are common natural hazards in the Philippines, causing extensive societal consequences, such as population displacement, which can lead to serious health, social, and economic consequences.
- Due to the high risk of traumatic impacts, people of the Philippines seek to improve their ability to prepare for and recover from land-falling tropical cyclones.
- The category five tropical cyclone Typhoon Haiyan/Yolanda (November 2013) proved to be the deadliest storm to ever hit the Philippines, killing over 6,000 people.

Current Management Practices & Policies:

Currently, our partners utilize hazard information (e.g., threat maps) generated by the Nationwide Operational Assessment of Hazards (NOAH), an organization launched in 2012 by the Filipino Department of Science and Technology in response to President Aquino's goal to implement a disaster prevention and mitigation program. Since its launch, the NOAH project has installed over 500 pieces of weather equipment, such as automated weather stations (AWS) and automated rain gauges (ARG). Despite these efforts, hazard management is not reaching all vulnerable populations. To address this issue, we are working with UN-OCHA to use additional datasets including tropical cyclone tracks, satellite derived precipitation estimates and various population statistics to focus on gender vulnerability.

Decision Support Tools & Benefits:

End-Product	Earth Observations Used	Benefit & Impact	Software Release
Philippines Cyclone Climatology Maps & Figures	IBTrACS archived tropical cyclone data/tracks, precipitation from PERSIANN-CDR, GPM	Climatology maps & figures will be used by UN-OCHA to better understand typical cyclone tracks, intensity, and impacts	N/A
Cyclone Hazards and Vulnerabilities Map	Satellite Radar Topography Mission SRTM	Vulnerability map used in decision making regarding the allocation of emergency management resources	N/A