

Session 1: Enhancing Climate Crisis Preparedness through Climate Service

# Climate-related Challenges in Hydrology

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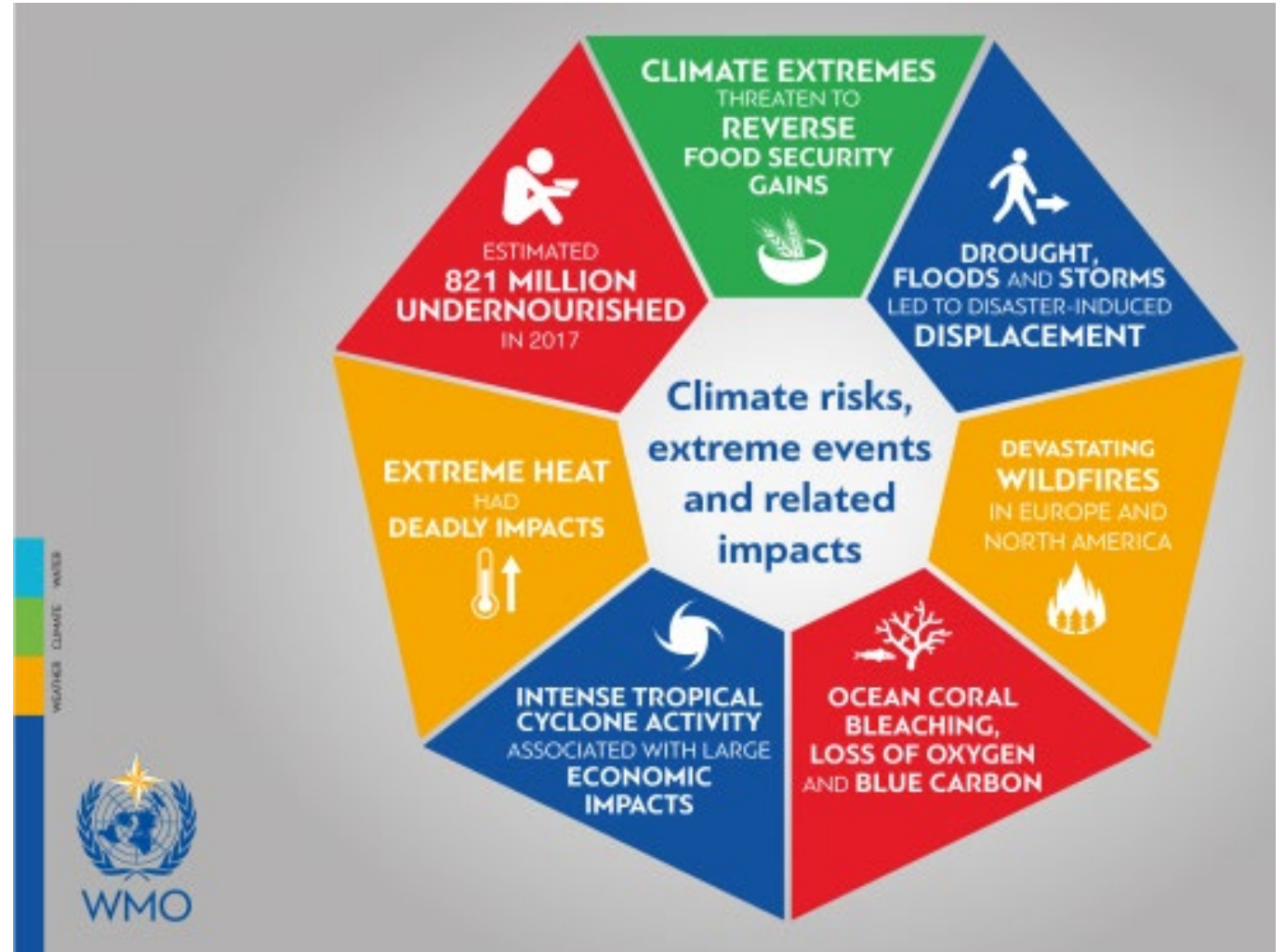
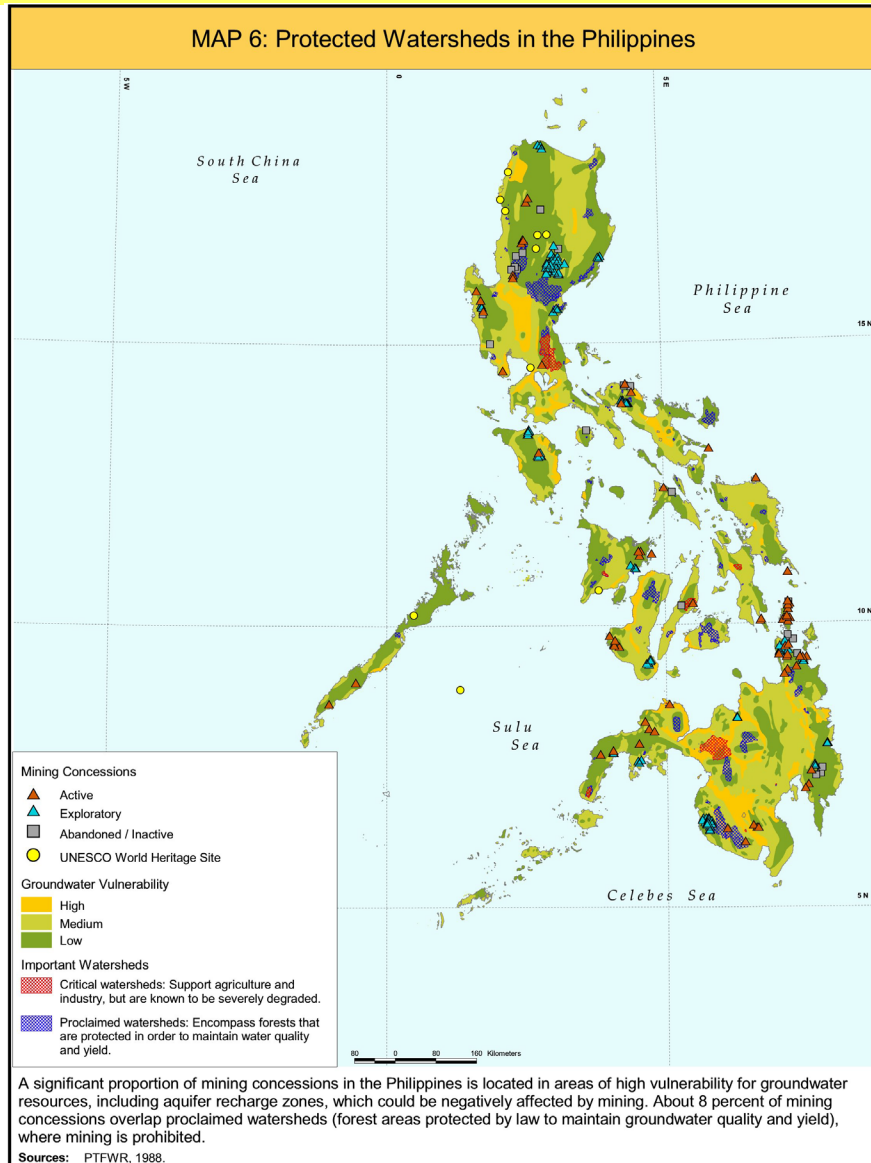
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# Water-related challenges



# Water-related challenges

## WATER STRESS BY COUNTRY

ratio of withdrawals to supply

- Low stress (< 10%)
- Low to medium stress (10-20%)
- Medium to high stress (20-40%)
- High stress (40-80%)
- Extremely high stress (> 80%)

This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

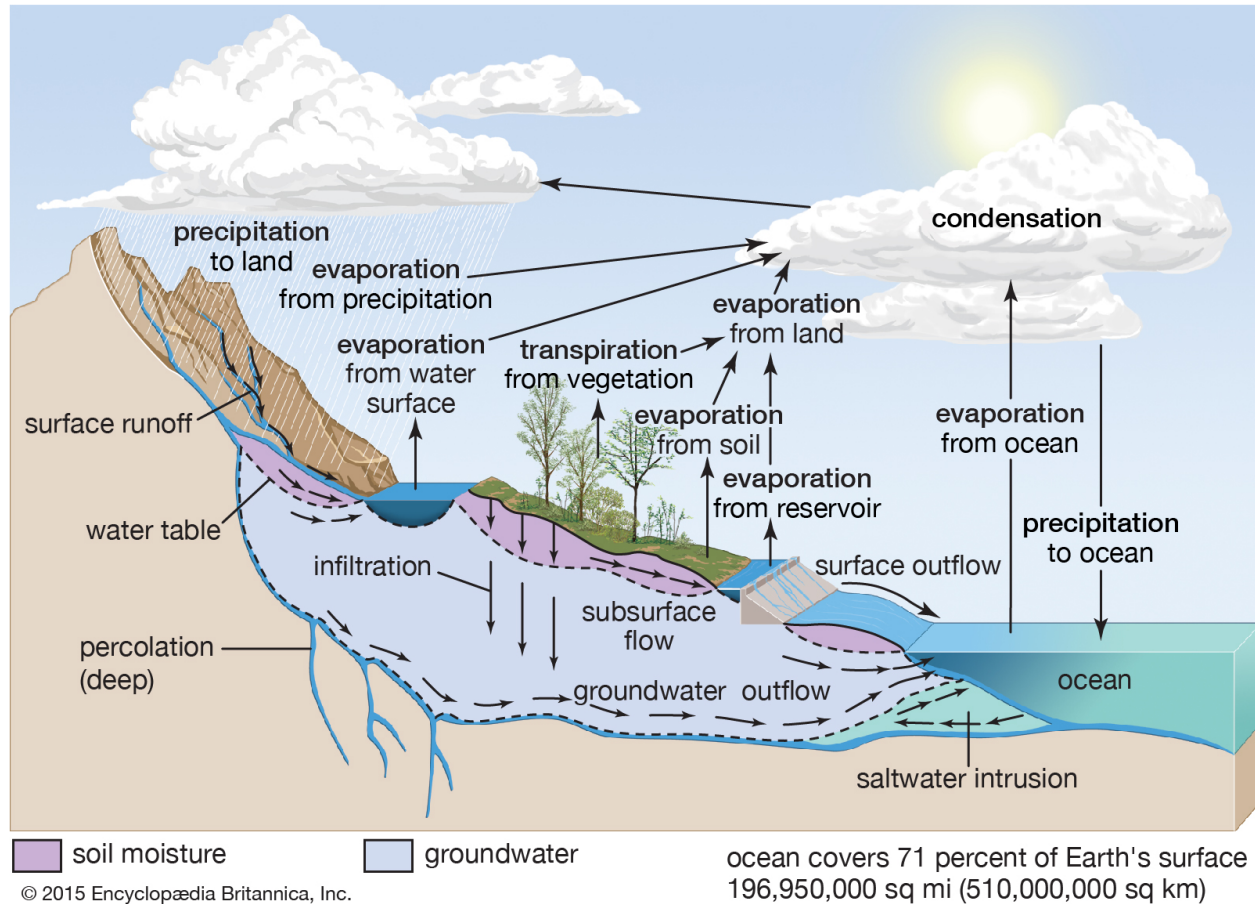
# Water-related challenges

**Monitor water resources using conventional practices and space technology**

**Impact assessment of climate change and anthropogenic activities**

**Establish a sustainable water management system**

# Implementing climate information in water management

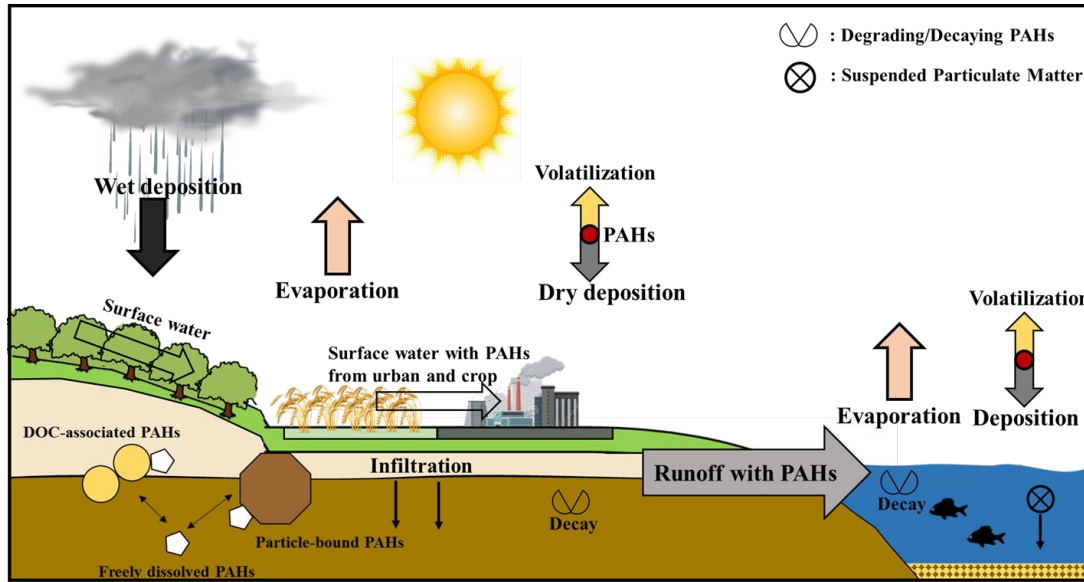


**The Hydrologic Cycle**

## Hydro-hazards

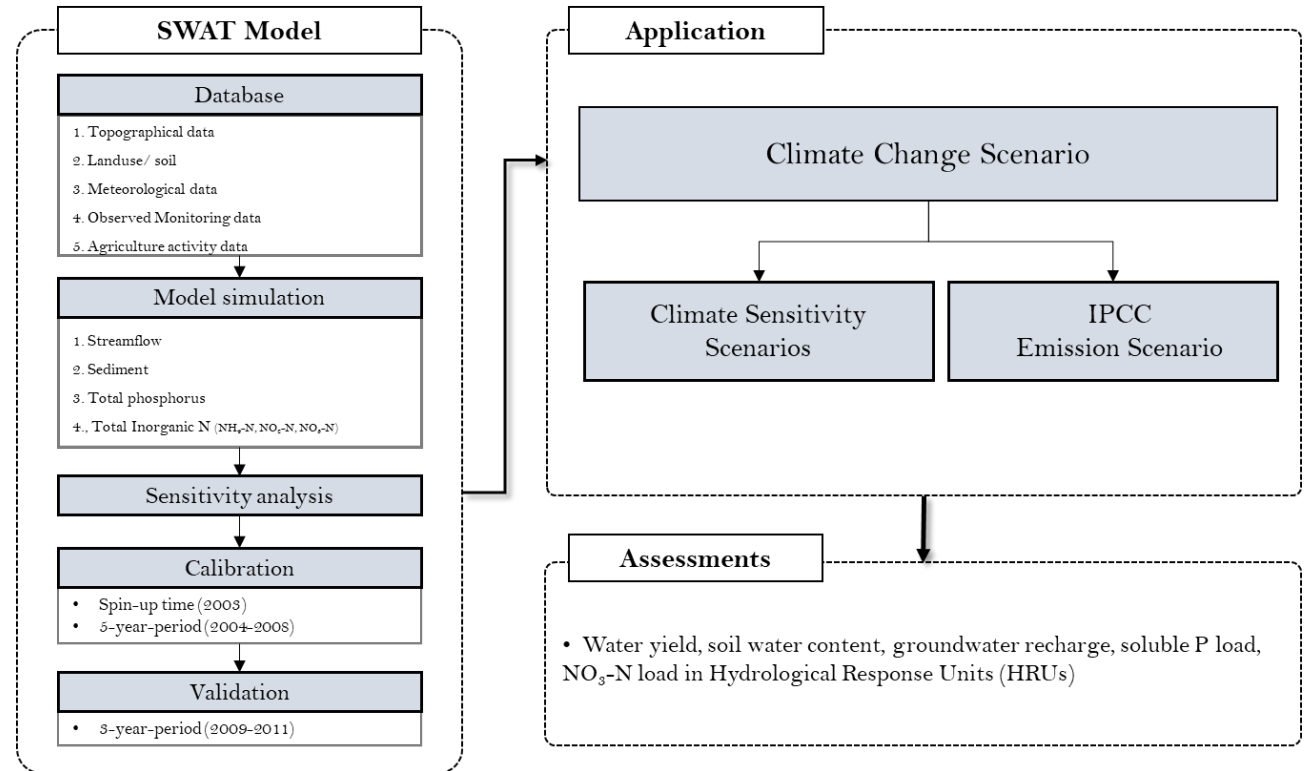
- Floods
- Landslides
- Tsunamis
- Storms
- Heat waves/ Cold spells
- Ocean Acidification
- Drought
- Waterborne disease

# Implementing climate information in water management



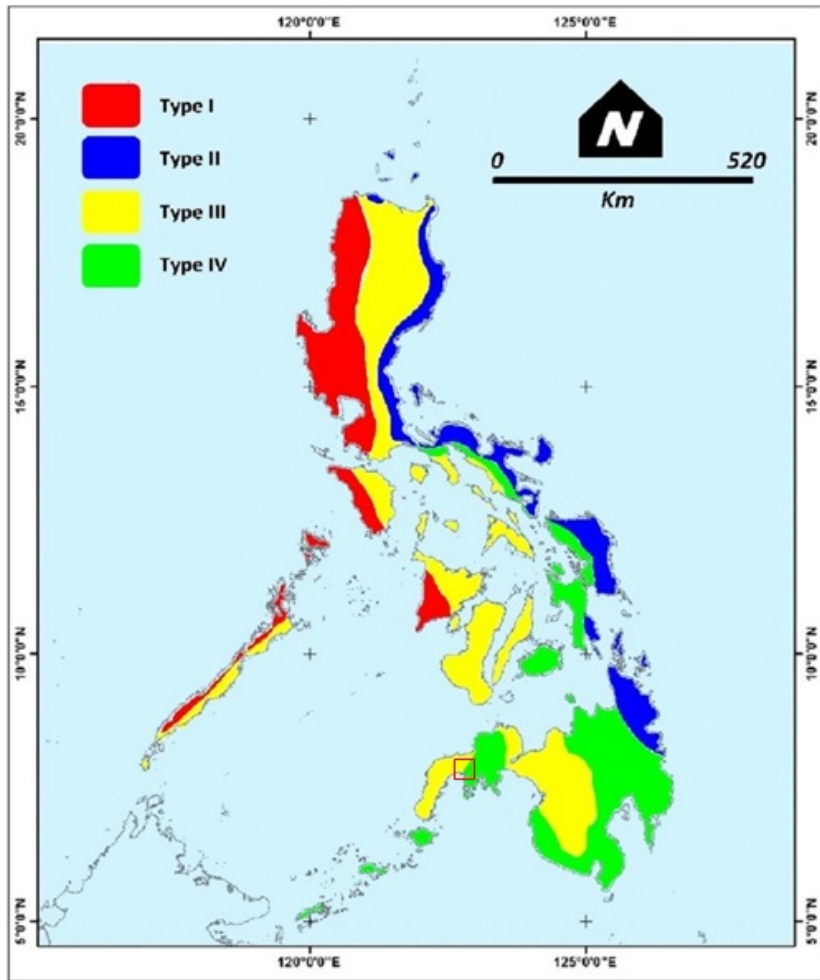
## Climate-related works:

- Mayzonee Ligaray, Sang-Soo Baek, Hye-Ok Kwon, Sung-Deuk Choi\*, Kyung Hwa Cho\*. Watershed-scale modeling on the fate and transport of polycyclic aromatic hydrocarbons (PAHs). *Journal of Hazardous Materials*, 320 (2016): 442-457.
- Mayzonee Ligaray, Minjeong Kim, Sang Soo Baek, Jin-Sung Ra, Jong Ahn Chun, Yongeun Park, Kyung Hwa Cho\*. Modeling the fate and transport of malathion in the Pagsanjan-Lumban Basin, Philippines. *Water*, 9 no. 7 (2017), 451.
- Dong Jin Jeon, Mayzonee Ligaray, Minjeong Kim, Gayoung Kim, Gil Lee, Yakov A. Pachepsky, Dong-Hyun Cha\*, and Kyung Hwa Cho\*. Evaluating the influence of climate change on the fate and transport of fecal coliform bacteria using the modified SWAT model. *Science of The Total Environment* 658 (2019): 753-762.



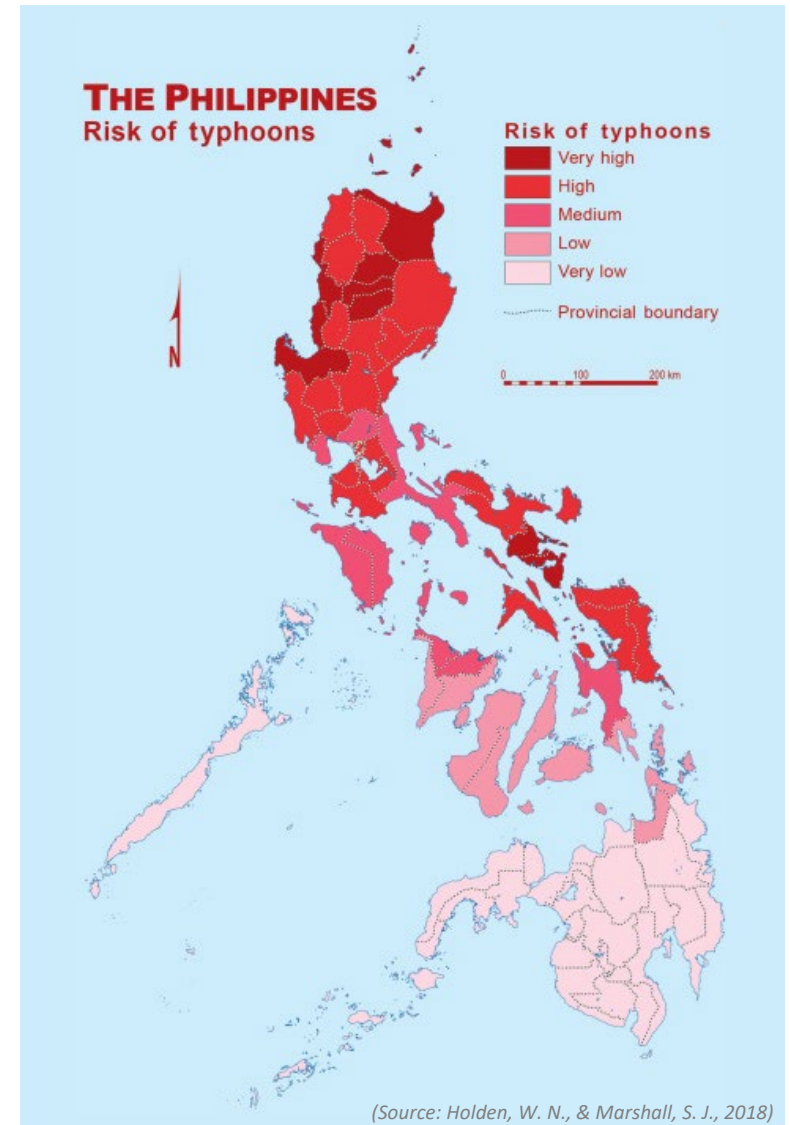
Mayzonee Ligaray, Hanna Kim, Suthipong Sthiannopkao, Seung Won Lee, Kyung Hwa Cho\*, Joon Ha Kim\*. Assessment on hydrologic response by climate change in the Chao Phraya River Basin, Thailand. *Water*. 7 no.1212 (2015): 6892-6909.

# Roles of climate science to enhance climate crisis preparedness



Modified Coronas Climate classification map of the Philippines (PAGASA, 1992).

Description	
<b>Type I-</b>	Two pronounced season, dry from November to April and wet during the rest of the year. Maximum rain period is from June to September.
<b>Type II-</b>	No dry season with a very pronounced maximum rain period from December to February. There is not a single dry month. Minimum monthly rainfall occurs during the period from March to May.
<b>Type III-</b>	No very pronounced maximum rain period with a dry season lasting only from one to three months, either during the period from March to May. This type resembles type I since it has a short dry season.
<b>Type IV-</b>	Rainfall is more or less evenly distributed throughout the year. This type resembles type 2 since it has no dry season.



(Source: Holden, W. N., & Marshall, S. J., 2018)

# Roles of climate science to enhance climate crisis preparedness

## Official: Over 10,000 feared dead in Typhoon Haiyan

Sunshine de Leon, Thomas Maresca, Yamiche Alcindor, Doyle Rice and Katharine Lackey

USA TODAY

Published 5:07 a.m. ET Nov. 9, 2013 | Updated 5:13 a.m. ET Nov. 10, 2013



A view of the typhoon-ravaged city of Tacloban, Philippines, on Nov. 9. Dennis M. Sabangan, European Pressphoto Agency

INSIDE DEVELOPMENT | NEWS: SUPER TYPHOON HAIYAN

## Storm surge: Lost in translation and interpretation

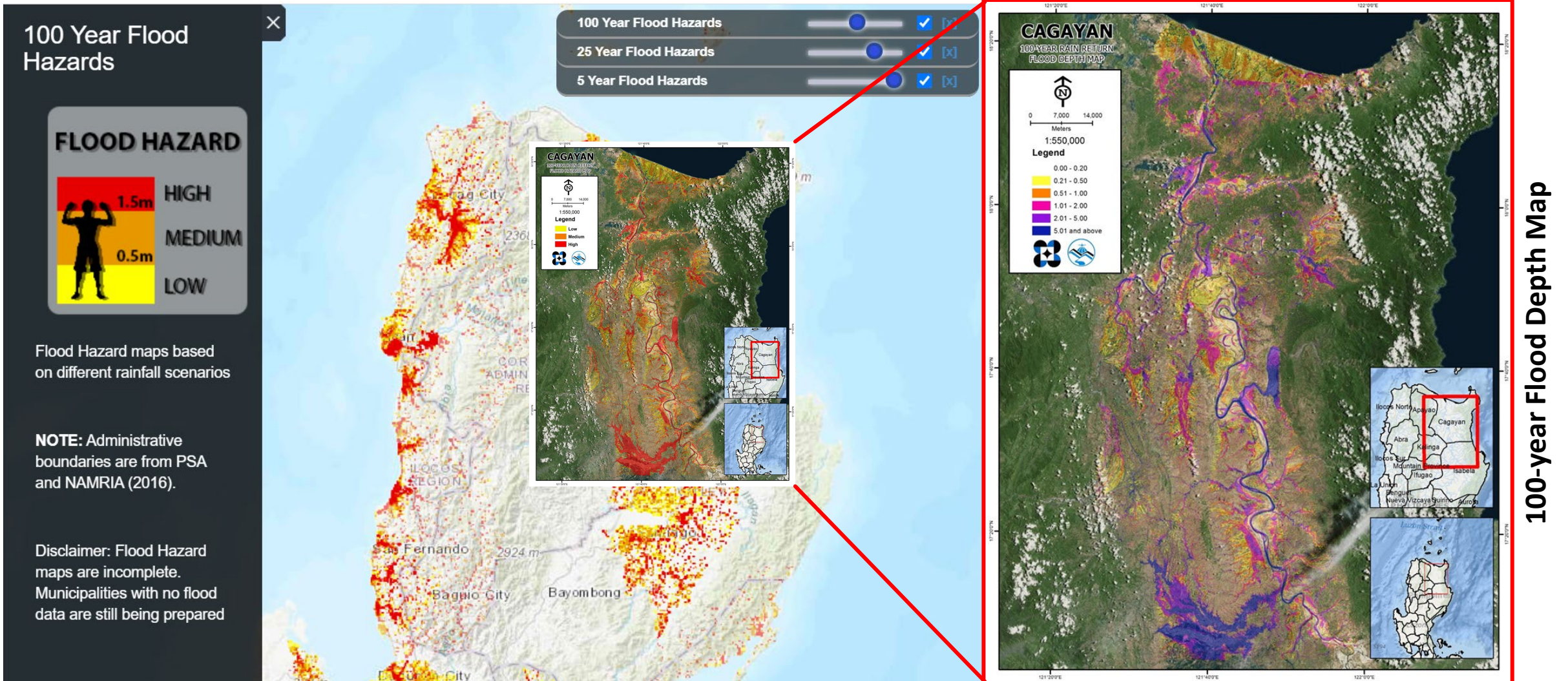
By *Lean Alfred Santos* // 15 November 2013

Humanitarian Aid



The coast of Eastern Samar after Super Typhoon Haiyan hit the province, bringing with it strong winds, heavy rain and storm surge. Photo by: Conrad Navidad / IOM / CC BY-NC-ND

# Roles of climate science to enhance climate crisis preparedness



(Source: <http://www.nababaha.com/>; UP DREAM Program)

# Roles of climate science to enhance climate crisis preparedness



## PHILIPPINES

### Typhoon Vamco (Ulysses) and Super Typhoon Goni (Rolly) Snapshot

As of 19 November 2020

President Rodrigo Duterte declared a state of calamity for the entire Luzon, after a series of typhoons, including Typhoon Vamco (locally named Ulysses), ravaged the country's largest and most populous island.

While the affected areas continue to reel from the consequences of Typhoon Goni and three preceding cyclones in October, Typhoon Vamco has further hampered response efforts and caused further destruction.



#### TYPHOON VAMCO (ULYSSES)

**3.67M** PEOPLE AFFECTED **73** DEATHS

**277.7k** PEOPLE DISPLACED **67k** HOUSES DAMAGED OR DESTROYED

#### SUPER TYPHOON GONI (ROLLY)

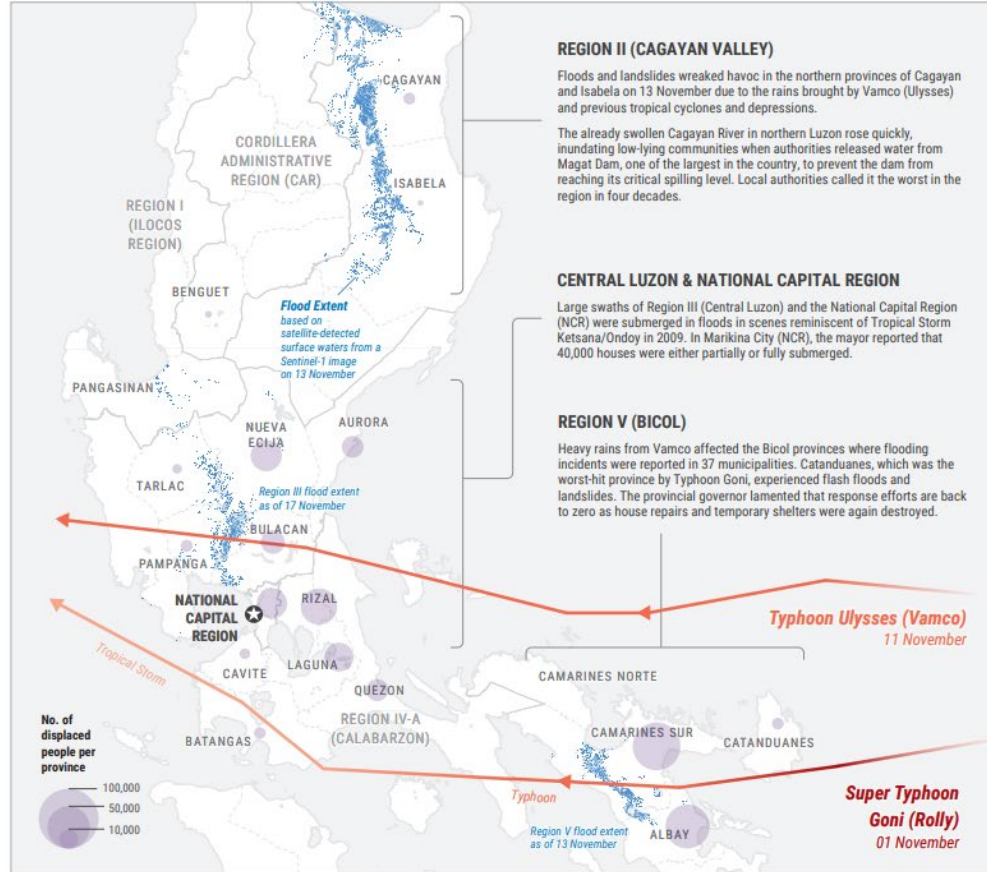
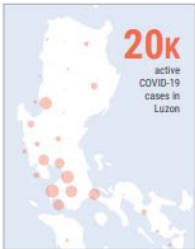
**2.14M** PEOPLE AFFECTED **25** DEATHS

**71.3k** PEOPLE DISPLACED **189k** HOUSES DAMAGED OR DESTROYED

#### COVID-19 AND WATERBORNE DISEASES

The Department of Health (DOH) issued a press release stating that they are on "heightened surveillance and warned the public against possible outbreak of waterborne and foodborne illnesses, influenza-like illnesses, leptospirosis and Dengue (W.I.L.D.) diseases following the aftermath of recent typhoons that struck the country." The DOH also "reiterated its call on the precautionary measures against spread of COVID-19 among the displaced population."

COVID-19 movement restrictions in Cagayan were hampering access of humanitarian actors at the onset of flooding. On 14 November, the national government requested the provincial authorities in Cagayan, and in other typhoon-affected areas, to lift strict COVID-19 health protocols to allow relief, search and rescue teams and media outlets immediate access to areas affected by Typhoon Vamco.



ALJAZEERA

News | Weather

## Thousands trapped in Philippines as toll from Typhoon Vamco rises

As deaths mount, aid agency says it fears for safety of thousands of people trapped by floodwaters in Cagayan Valley.



People stand on a roof of a building after Typhoon Vamco resulted in severe flooding in the Cagayan Valley region in the Philippines [Philippine Coast Guard/Handout via Reuters]

15 Nov 2020



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Sources: PSA, DSWD DROMIC, NDRRMC/OC, PAGASA, DOH, UNOSAT Feedback: ochaphilippines@un.org www.unocha.org www.reliefweb.int

# Roles of climate science to enhance climate crisis preparedness

National, News

## DENR launches watershed protection campaign seven months after Cagayan flooding nightmare

Published June 30, 2021, 1:30 PM  
by Ellson Quismorio

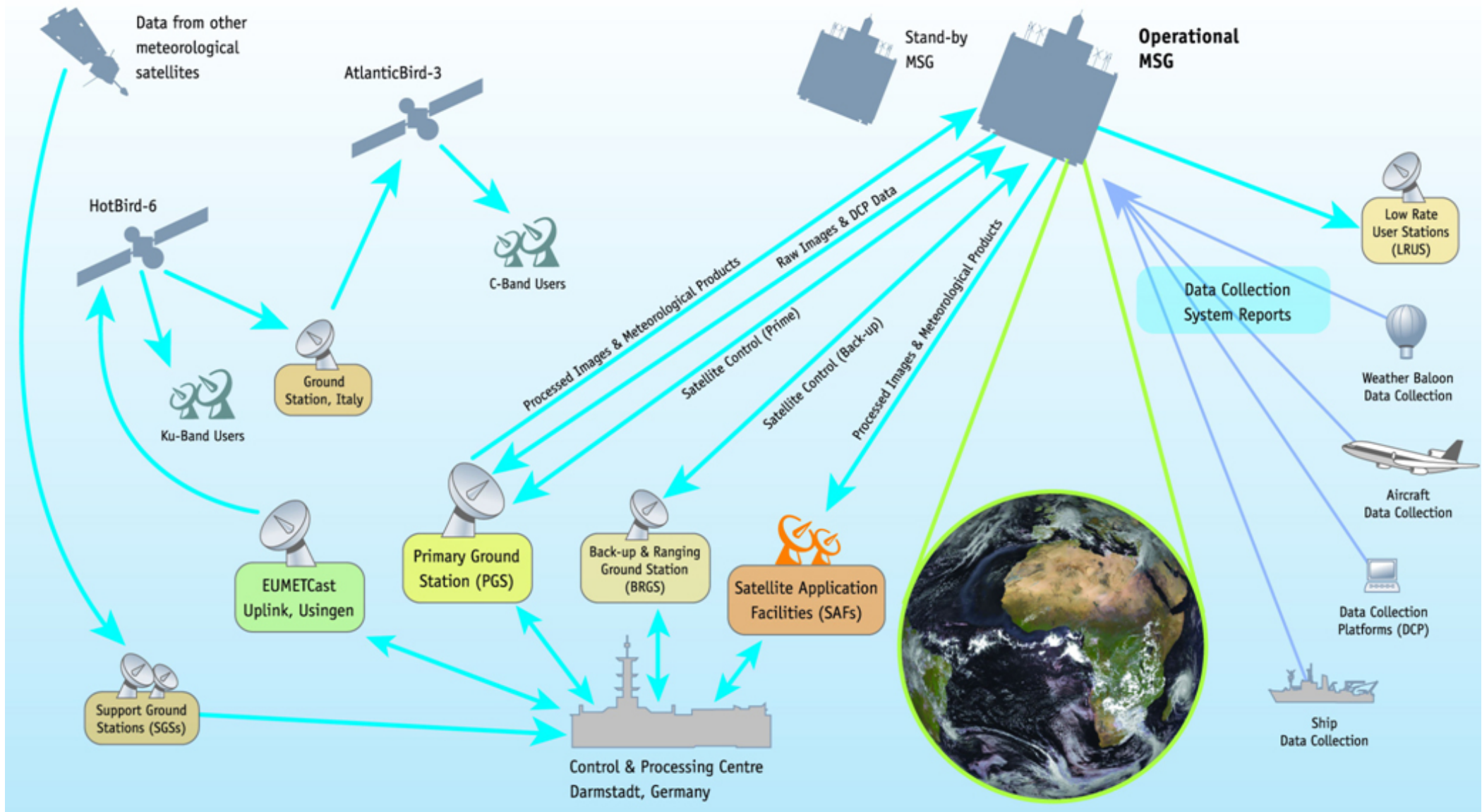
The Department of Environment and Natural Resources (DENR) launched on Wednesday, June 30 a watershed protection drive that was arguably triggered by the massive flooding experienced by Cagayan Valley last year at the hands of typhoon "Ulysses".



DENR Secretary Roy Cimatu (Screengrab from Zoom meeting)



# Making climate information more applicable in water sector



Take care and stay safe! 😊