

# Global Disaster Risk Reduction Project for EW4All Initiative

Chihun Lee

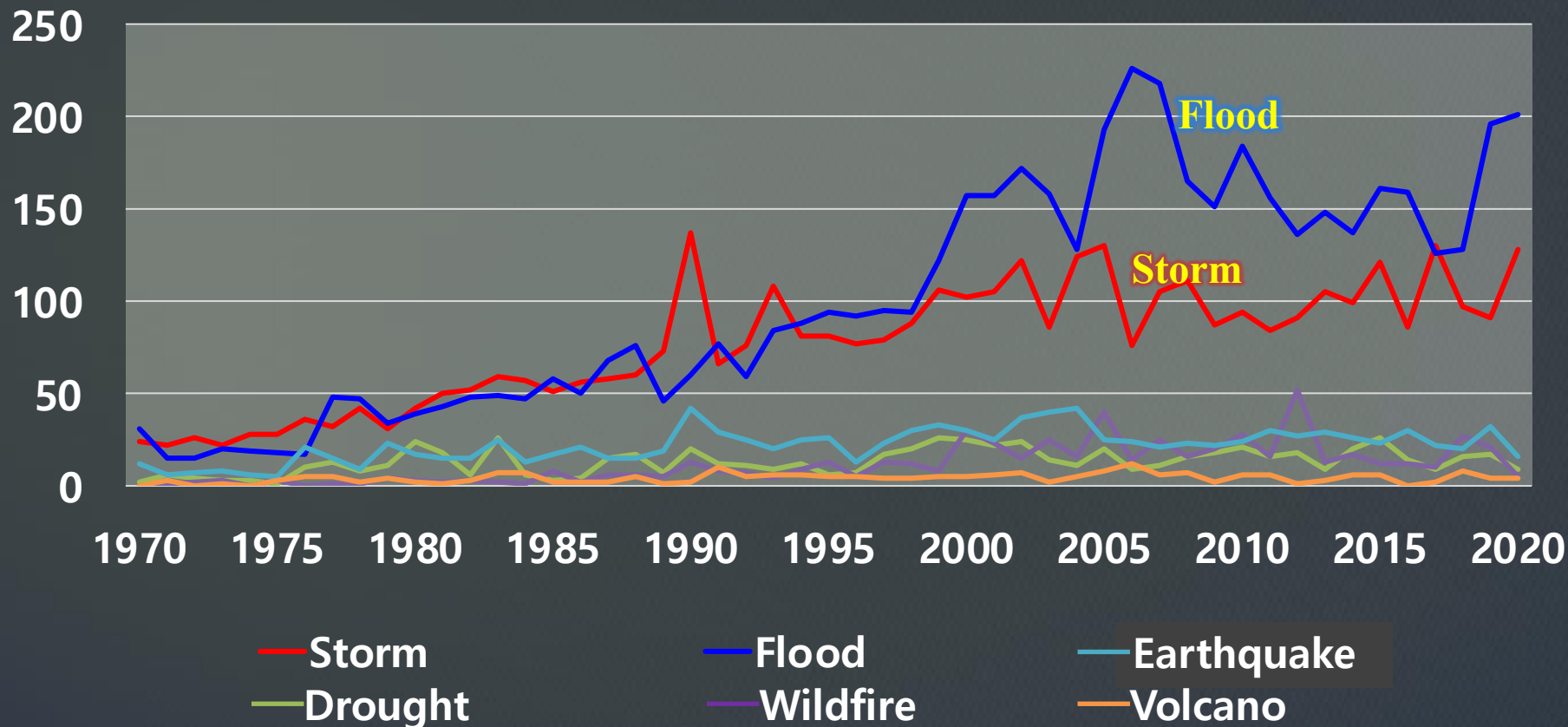


Ministry of the Interior and Safety  
National Disaster Management  
Research Institute

# Disasters in the World (1970-2020)

Number of events

Disaster occurrence by type 1970-2020



Source: EM-DAT(Accessed on 31 May, 2021)

# International Cooperation on **DRR**

# Why ?

**Geographical aspect**

**Economic aspect**



# Disasters without Borders

## Geographical aspect



China

Myanmar

Laos

Thailand

Cambodia

Vietnam

Trans-boundary Flood Risk in Asia and the Pacific

# Disasters without Borders

## Geographical aspect

### Laos dam collapse sends floods into Cambodia, forcing thousands to flee

Water levels rise 11.5 metres in some areas of neighbouring country, leaving entire homes underwater



2018 Lao PDR Dam Collapse



# Disasters without Borders

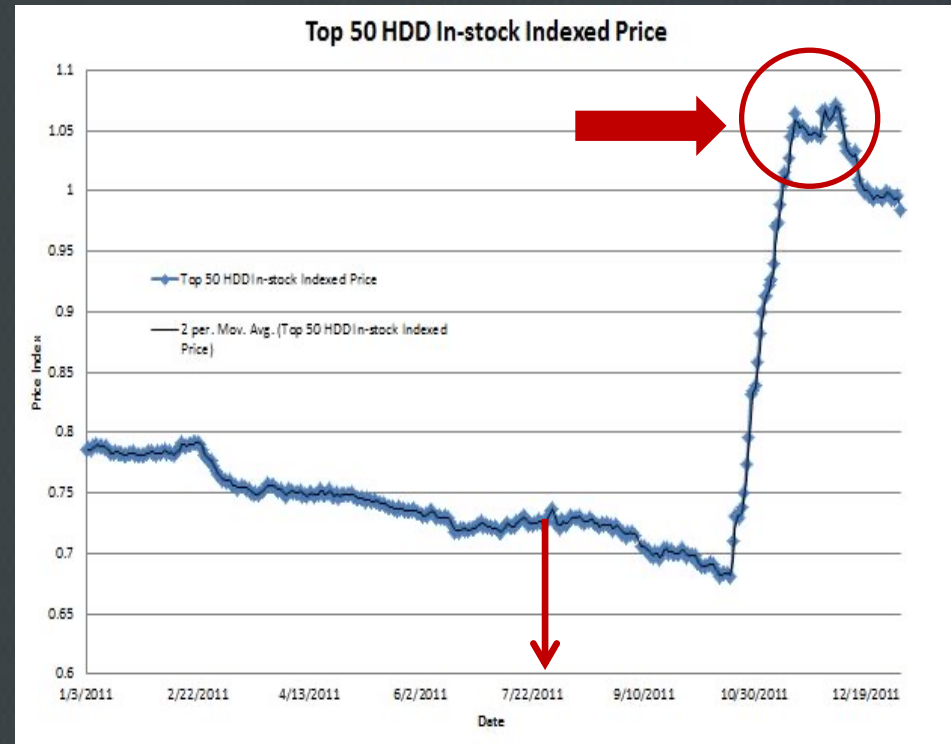
## Economic aspect



2011 Thailand Big Flood

# Disasters without Borders

## Economic aspect



Source: Analytics data supplied by real-time ecommerce tracking company Dynamic Data  
<https://www.cio.com/article/2400114>



Disaster in one country not only threaten **one country,**  
but also effected **all around World**



# Global **DRR** Project In **NDMI**



# Global DRR Project in NDMI

Since 2013

## Danao, Argo(2023)

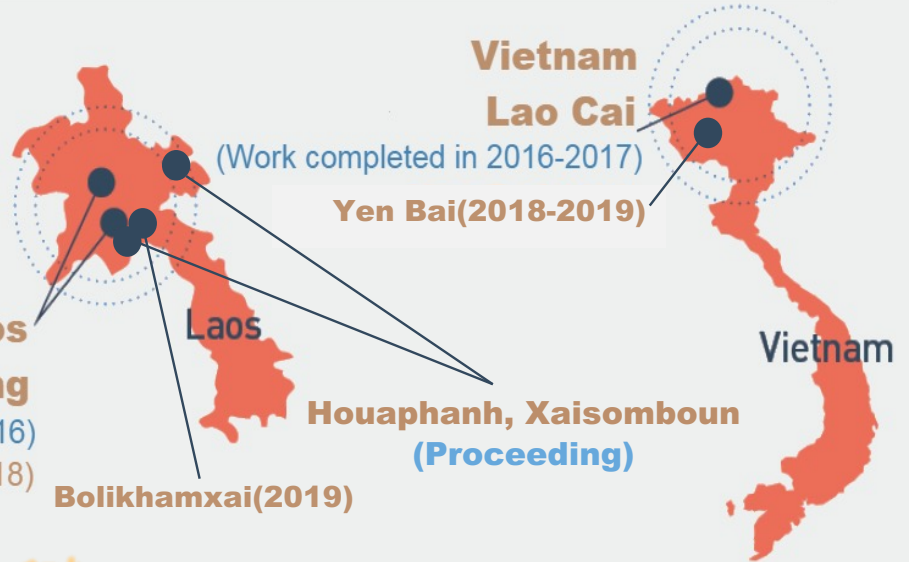


## Toledo, Dumanjug(2022)

Mindanao Island, Philippines

Work completed (2013-2015)

Laos  
Vang Vieng  
(Work completed in 2016)  
Udomxai (2017-2018)



## Ba province(Lautoka, Ba town) (2023)

Republic of  
Fiji

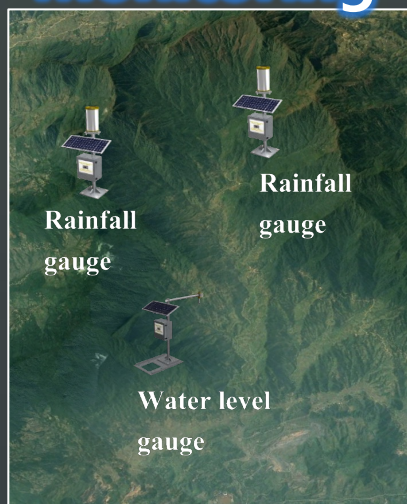


# Global DRR Project in NDMI

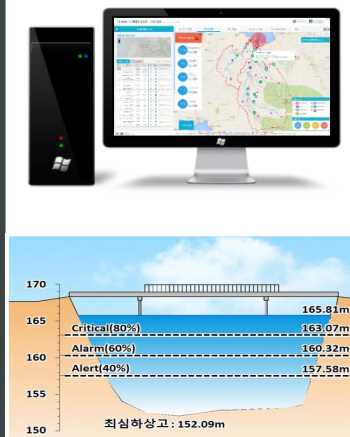
## FEWS (Flood Early Warning System)

It composed of Flood Early Warning System (FEWS) and Automatic Rainfall Warning System

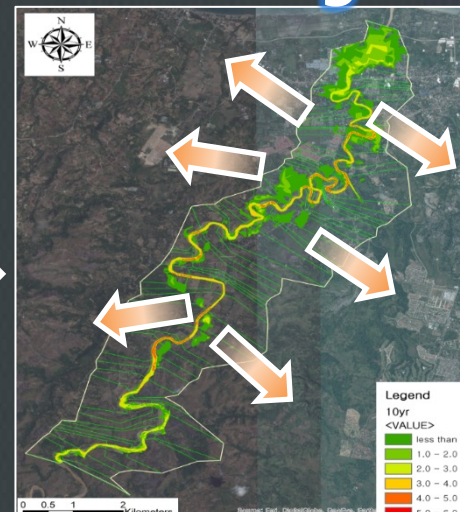
### Monitoring



### Flood Forecasting and Warning System



### Warning

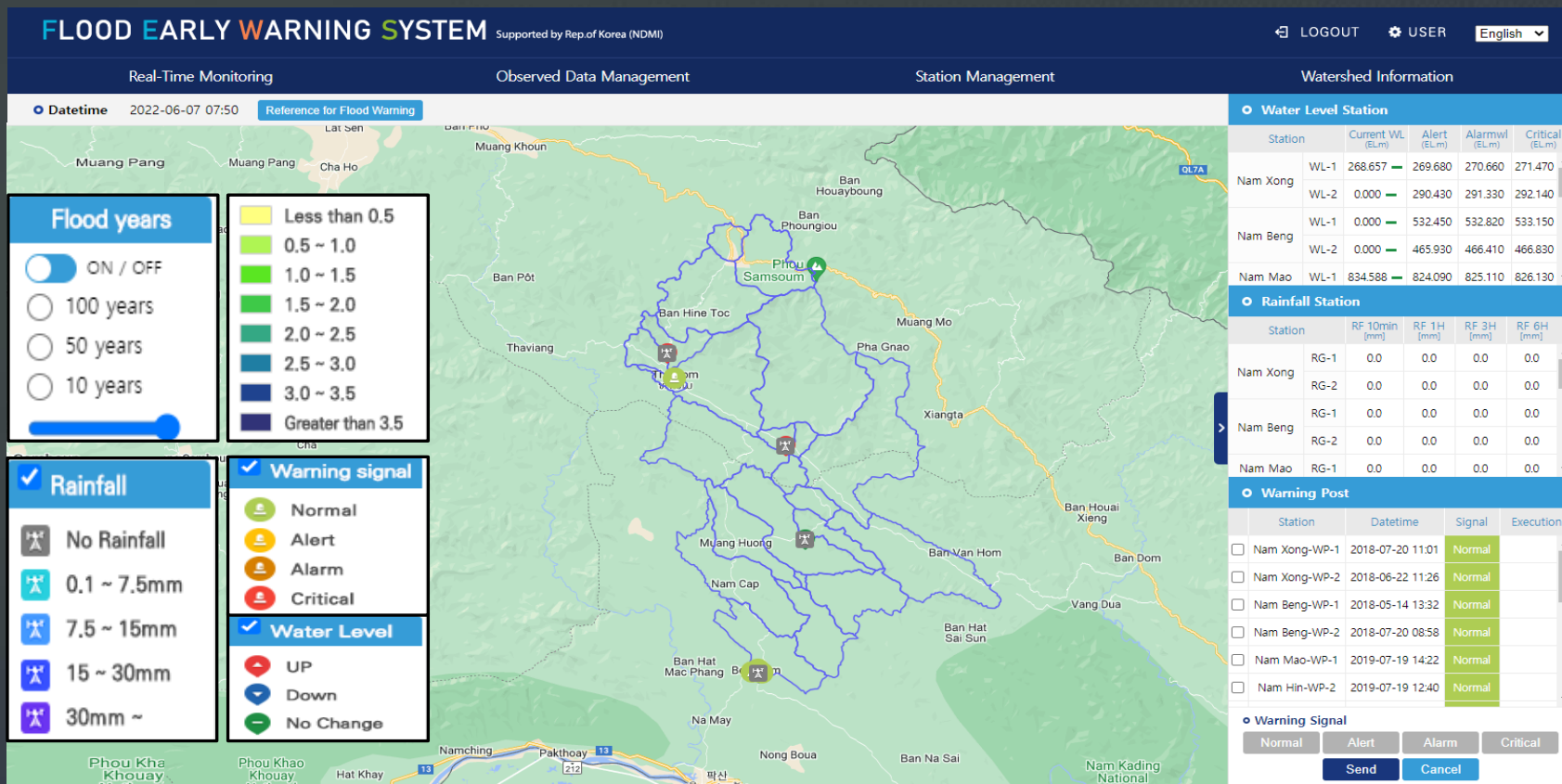


Automatic Rainfall Warning System



# Global DRR Project in NDMI

## Flood Early Warning System based on Web-GIS



# Global DRR Project in **NDMI**

## FEWS (Flood Early Warning System)

### Automatic Rainfall Warning System (ARWS)



**Rainfall Gauge**



**Water level Gauge**



**Warning Post**



# Field Survey

Hydrological Station Site Survey in Argao



Hydrological Station Site Survey in Danao



Waning Post Site Survey in Argao



Waning Post Site Survey in Danao





# Meeting with Local Government

Visayas PAGASA Meeting



Argao Meeting with Mayor



Danao Meeting with Mayor



Wrap-up Meeting





# Survey for Hydrologic-Hydraulic Analysis



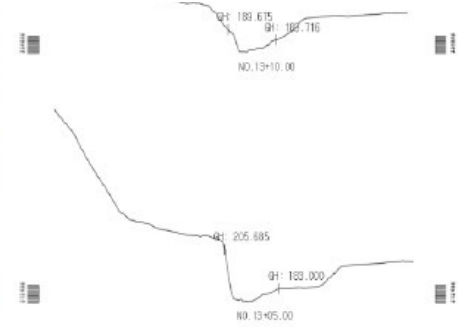
# Survey for Hydrologic-Hydraulic Analysis



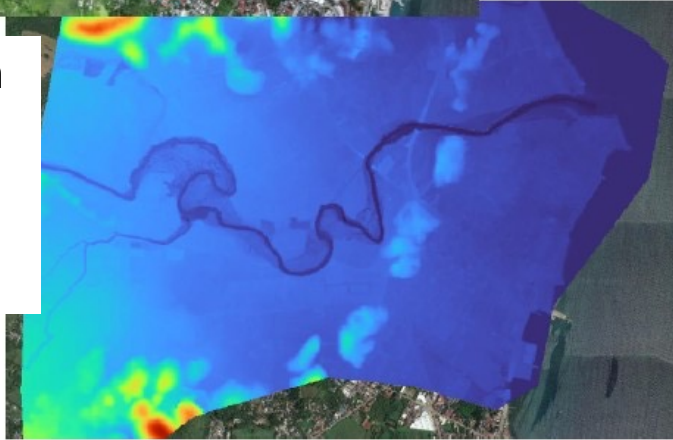
Digital Surface Model(DSM)  
and  
Ortho imagery



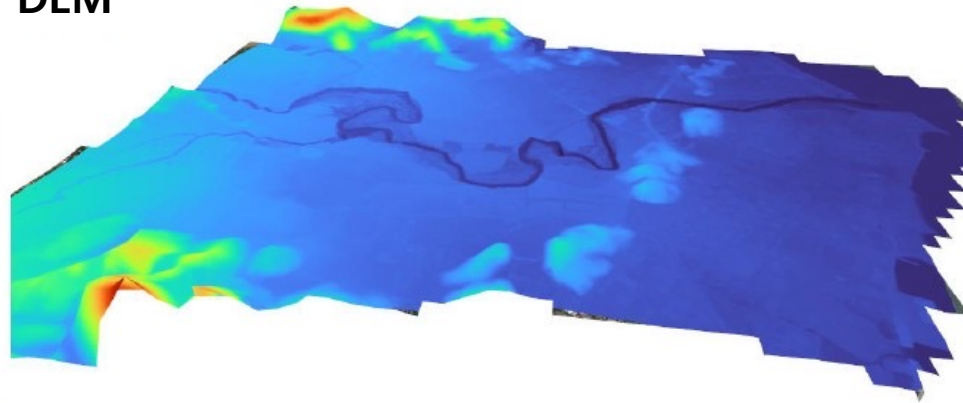
River Cross Section



Generation  
of  
Digital  
Elevation  
Map(DEM)



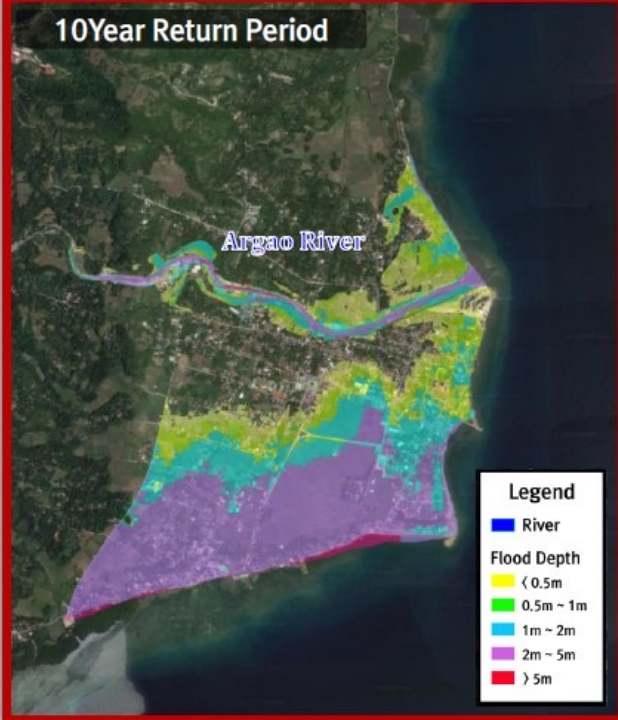
DEM





# Analysis of Flood Inundation with Return Period

10Year Return Period



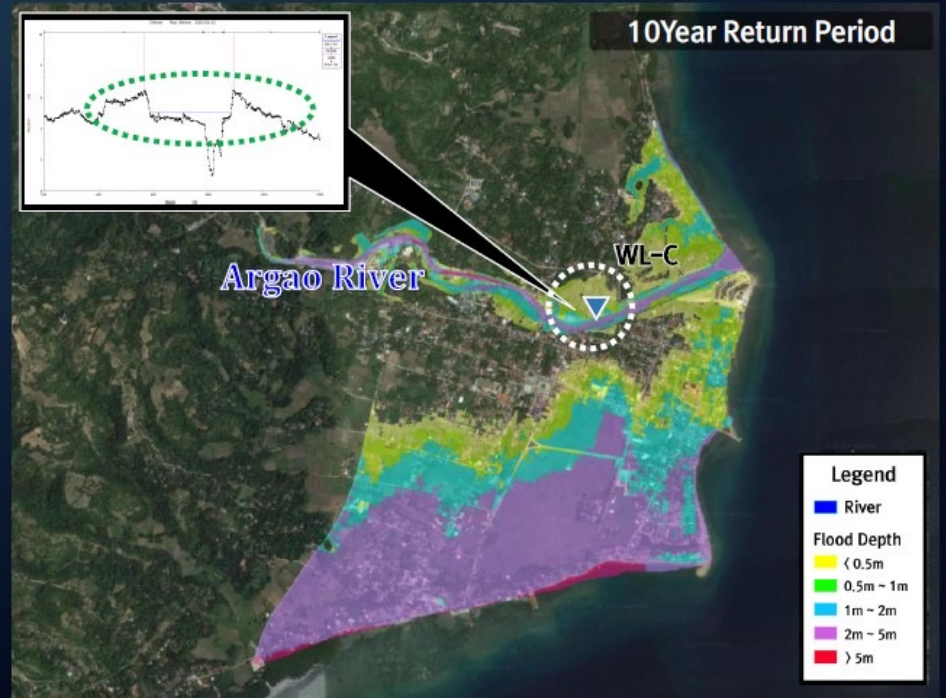
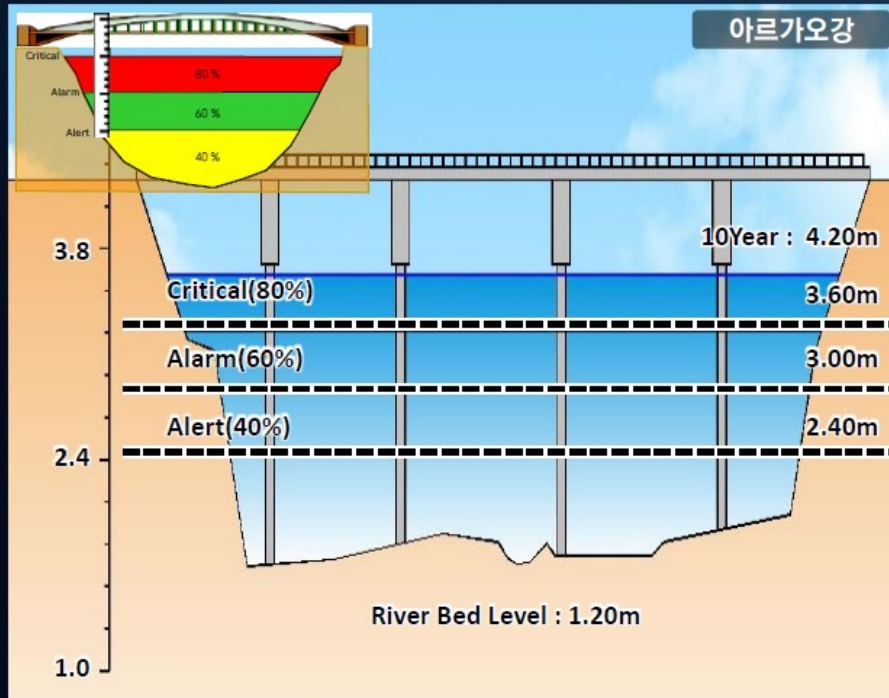
50Year Return Period



100Year Return Period



# Warning Criteria





# Installation of Equipment

Hydrological Monitoring Station

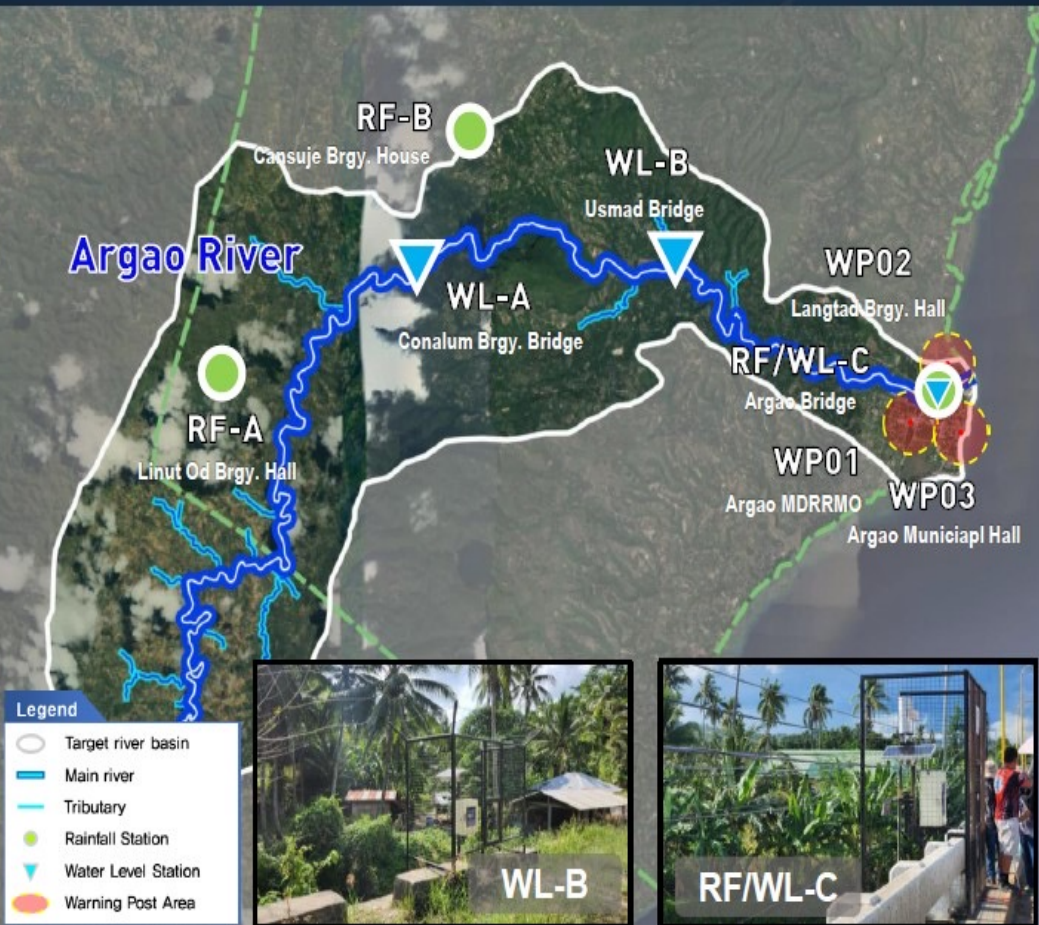


Warning Post





# Installation of Equipment





# Installation of Equipment

Turn Over Ceremony



Education of FEWS



Education on LGU



Education of equipment



Flood Drill with LGU



Flood Drill with LGU



# Effect Analysis of Global DRR Project

## Typhoon Washi(2011)

(2011.12.15. ~ 2011.12.19.)



65km/h / 1000 hPa



24.0 Million U.S dollars



1,268 Casualties(Total)  
694 (Cagayan de Oro city)



## Typhoon TEMBIN(2017)

(2017.12.20. ~ 2017.12.26.)



86km/h / 990 hPa



34.0 Million dollars



44 Casualties(Total)  
**None** (Cagayan de Oro city)

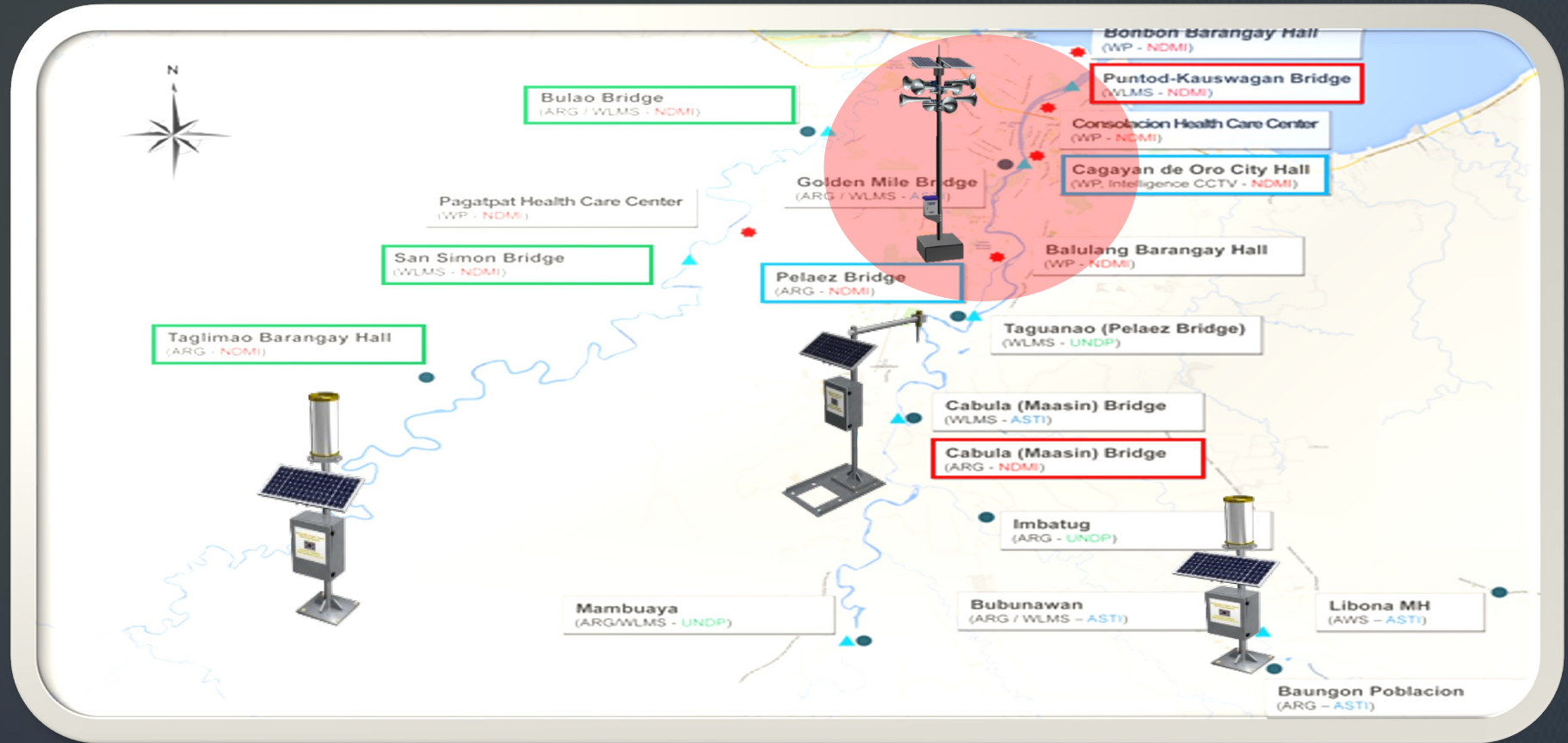




# Typhoon Washi(2011) in Philippines

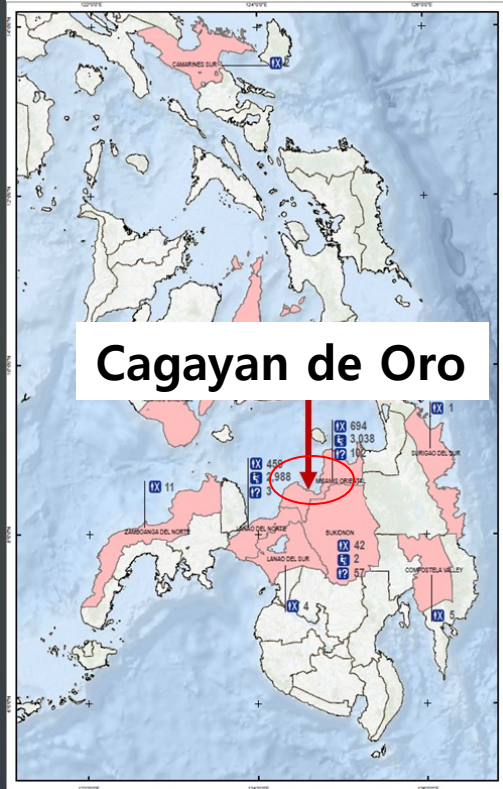


# Global Disaster Risk Reduction Project for Philippines('13~'15)



## Casualties Change by Early Warning('11 and '17)

# WASHI(2011)



# Cagayan de Oro



## TEMBIN(2017)



## Cagayan de Oro



\* (Ref) UNOSAT(UN Operational Satellite Applications Programme)



**No One Beyond Disaster**

Questions? More Information?

# Thanks!



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