

Collaborative approach of DRR in the Philippines -HyDEPP-SATREPS Project-

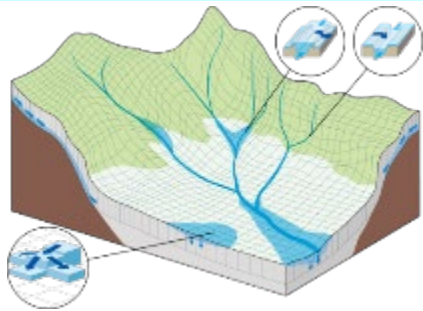
Miho OHARA,
International Centre for Water Hazard and Risk Management
under the auspices of UNESCO

International Centre for Water Hazard and Risk Management (ICHARM)

ICHARM was established as a UNESCO Category II center and part of the Public Works Research Institute (PWRI) of Japan in March 2006.

- Flood and Drought Analysis and Risk Assessment
- Field Investigation

- Master's and Ph.D. courses of disaster management program of National Graduate Institute for Policy Studies (GRIPS)
- JICA Short-term training programs



Innovative Research



Information Networking

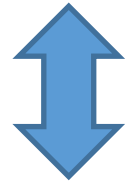
Capacity Building



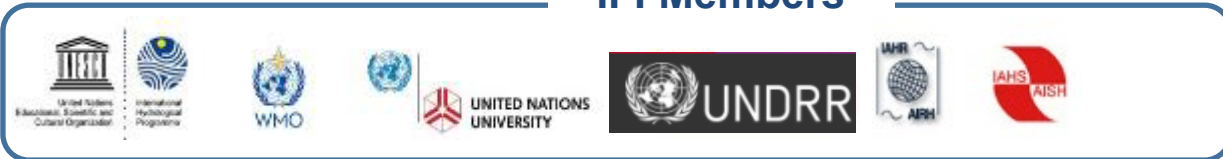
More than 1,000 people joined these programs



- Secretariat of International Flood Initiative (IFI)

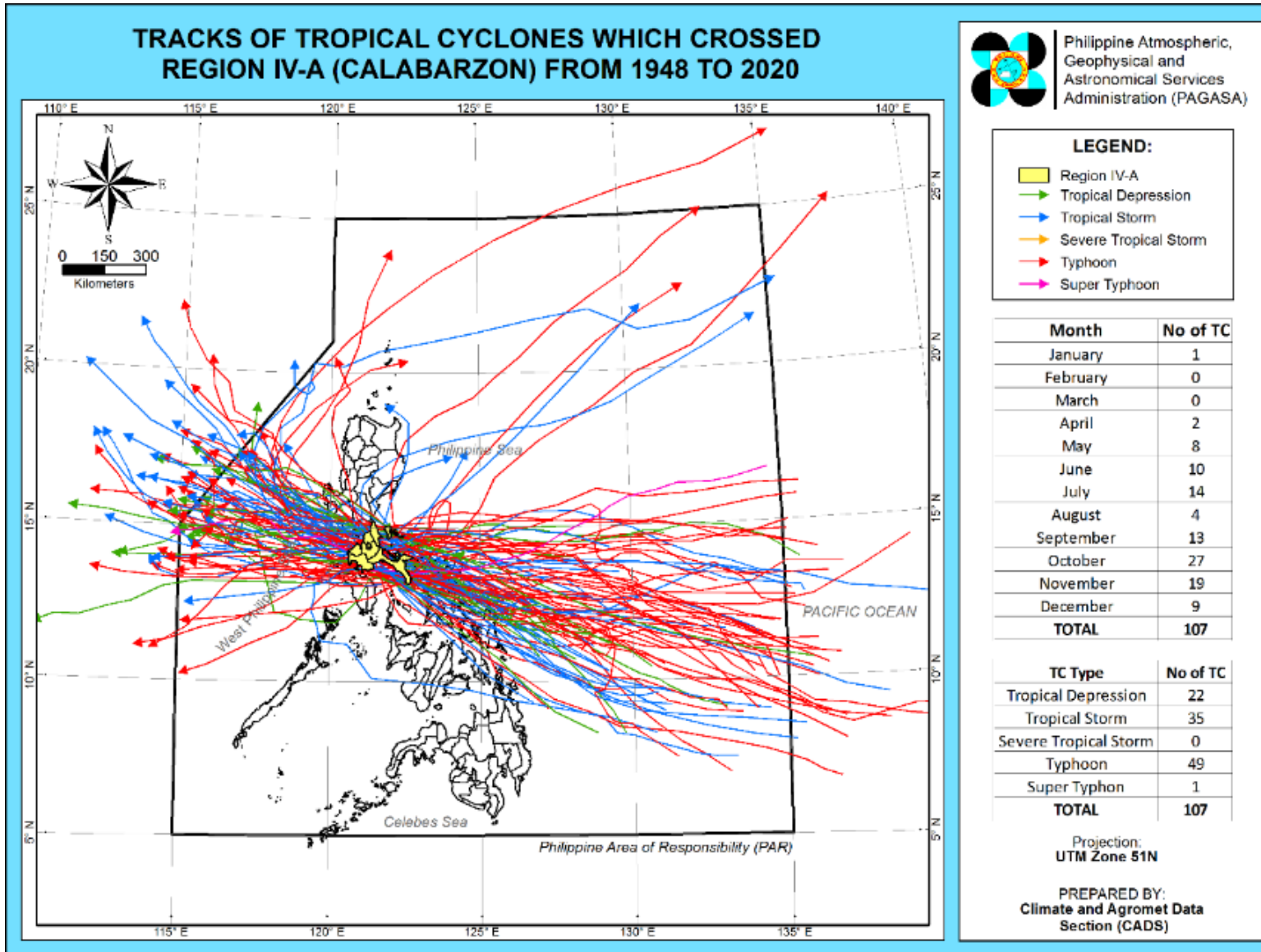


IFI Members



Water-related Disaster Risk

7 out of 22 Tropical Cyclones enter the Philippine Area of Responsibility from October 13 to November 13, 2020



Tropical Cyclone	Category	Duration Inside PAR
OFEL	Tropical Depression	October 13 – 16
PEPITO	Typhoon	October 19 – 22
QUINTA	Typhoon	October 23 – 27
ROLLY	Super Typhoon	Oct. 29 – Nov. 3
SIONY	Severe Tropical Storm	November 1 – 6
TONYO	Tropical Storm	November 7 – 9
ULYSSES	Typhoon	November 10 – 13

Source: PAGASA

Regions Most Frequently Visited by Tropical Cyclone in 2020

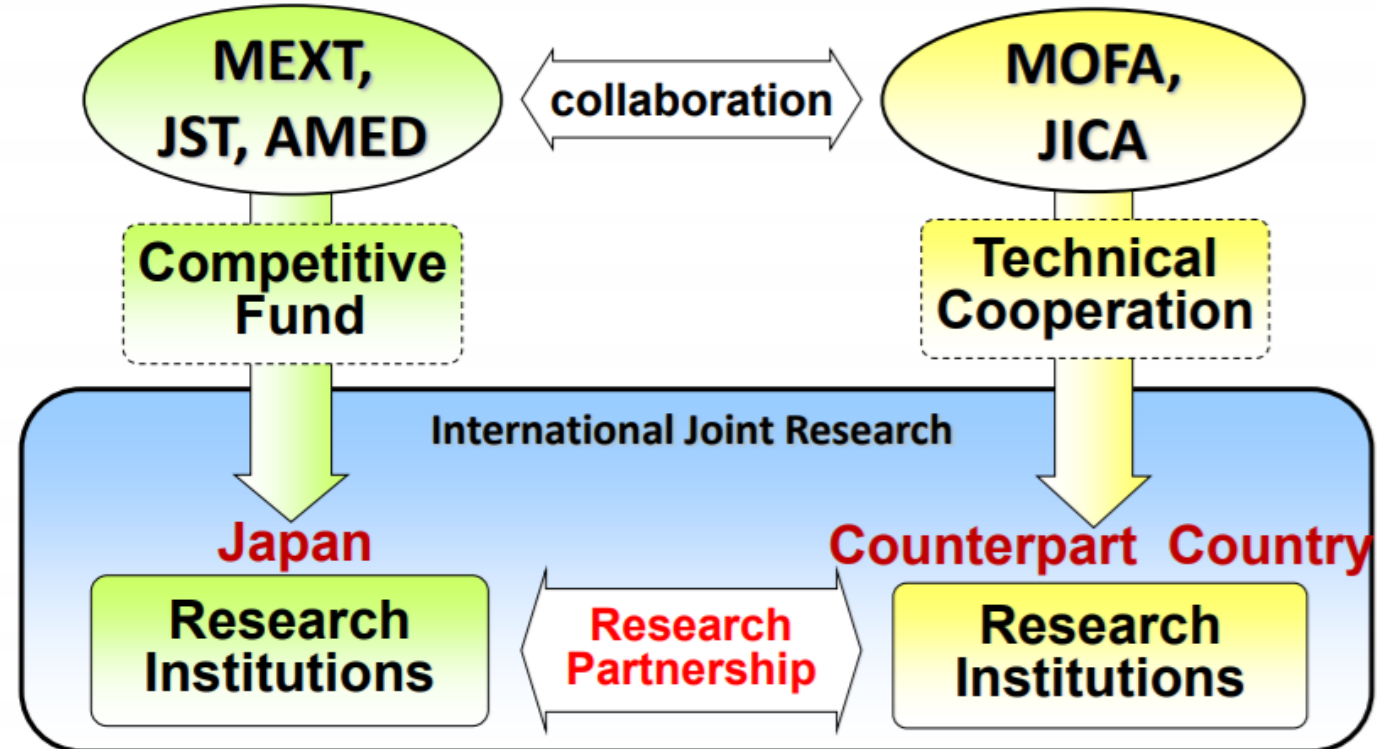
- **CALABARZON (Region IV-A)** – 5 Tropical Cyclones
- **Central Luzon (Region III)** – 5 Tropical Cyclones

Source: PAGASA, (Santos et al., 2021)

Outline of SATREPS

: Science and Technology Research partnership for Sustainable Development

SATREPS program structure



MEXT: Ministry of Education, Culture, Sports, S&T

JST: Japan Science and Technology Agency

AMED: Japan Agency for Medical research and Development

MOFA: Ministry of Foreign Affairs

JICA: Japan International Cooperation Agency

◆ Project Title

The Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Philippines

◆ Project Purpose

Policy recommendations for sustainable economic development in urban and rural areas under climate change are formulated based on **hybrid water-related disaster risk assessment technology** covering climate change, hydrology, agriculture, and socio-economic activity in target basin.

◆ Principle Organizations

Philippines: University of the Philippines Los Baños (UPLB)

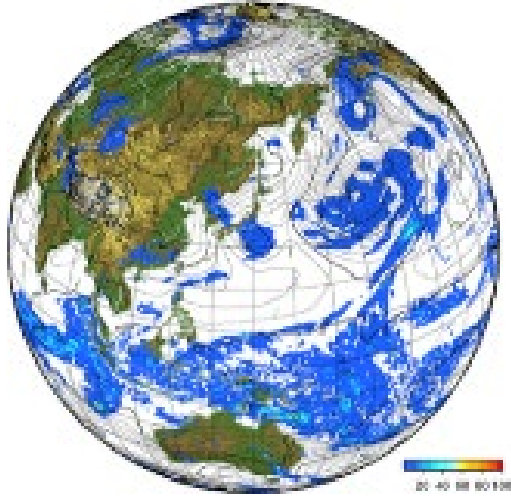
Japan: International Centre for Water Hazard and Risk Management (ICHARM)

◆ Project Period: 2021.6.3-2026.6.2



Hybrid water-related disaster risk assessment technology

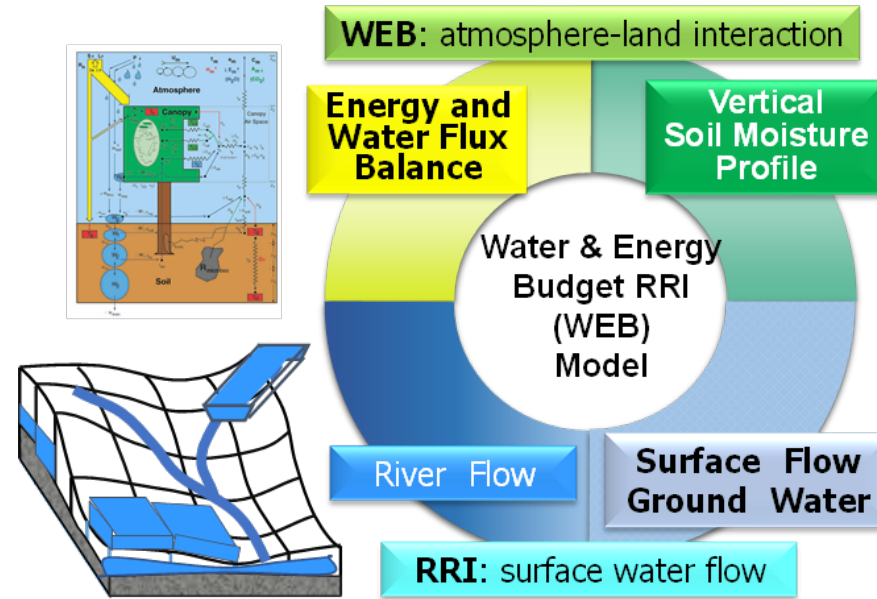
Climate Model



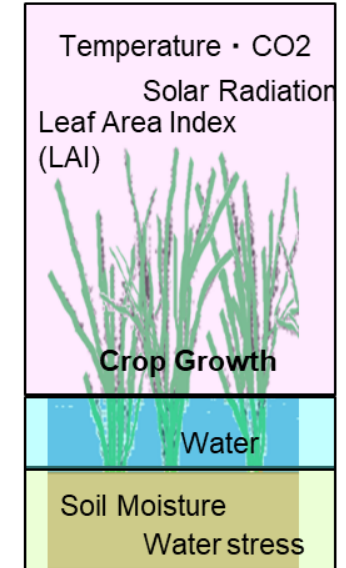
Overall Goal

The policy recommendations are reflected to policies/plans of national and/or local governments, in order to achieve the sustainable economic development by improving water-related disaster resilience and to promote balanced national land development.

Hydrological model

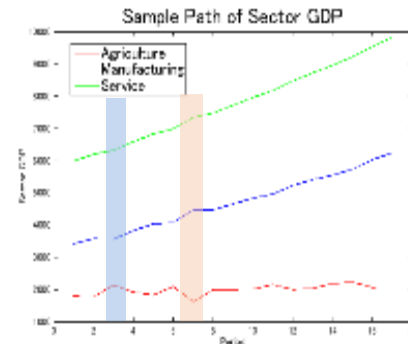


Agricultural model (SIMRIW)

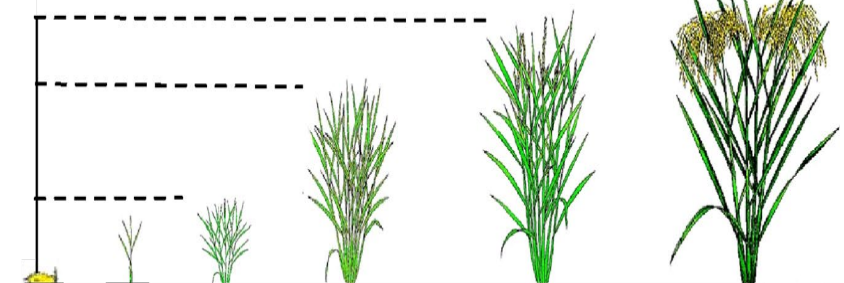


Socio-economic model

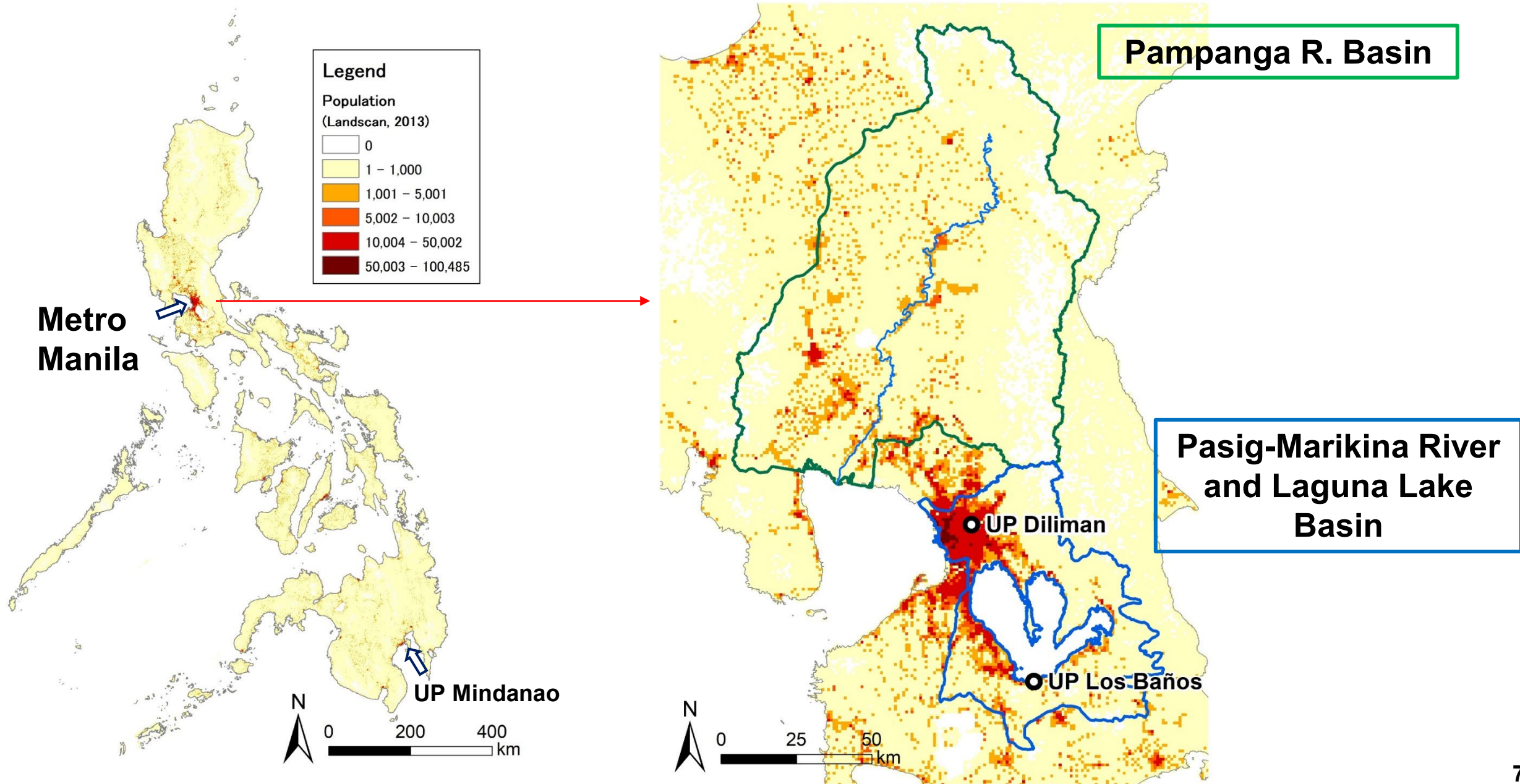
Prediction of future local development scenario with/without adaptation measures



Estimation of yield loss due to flood and drought



River Basins Surrounding the Metro Manila Area



Implementation Structure

As of June 30, 2021

Joint Coordinating Committee

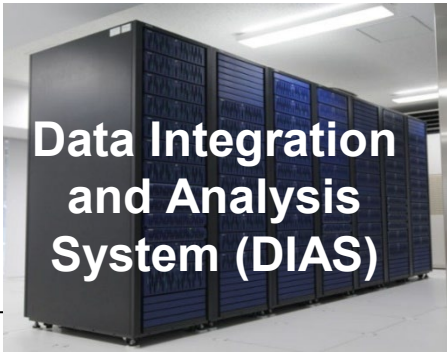
Philippine side

Cooperative Organization <ul style="list-style-type: none">- Department of Science and Technology (DOST)- Department of Public Works and Highways (DPWH)- Laguna Lake Development Authority (LLDA)- Metropolitan Manila Development Authority (MMDA)	Project Director Fernando C. Sanchez Jr., University of the Philippines Los Baños (UPLB)
	Project Manager Patricia J. Sanchez, School of Environmental Science and Management (SESAM), UPLB
	Members Representative Research Institution <ul style="list-style-type: none">- UPLB Cooperative Research Institution <ul style="list-style-type: none">- University of the Philippines Diliman (UPD)- University of the Philippines Mindanao (UPMin)

Japanese side

Research Team Member (ICHARM/ Cooperative Organizations) Project Leader: Dr. Miho Ohara Long-term expert <ul style="list-style-type: none">- Coordinator Short-term experts <ul style="list-style-type: none">- Application for data uploading- Flood and drought risk assessment- Resilience assessment- Simulation of future scenarios of local economic development	JICA <ul style="list-style-type: none">- Member of Mission Dispatched by JICA- JICA Philippine Office- Other person(s) concerned appointed by JICA
Cooperating Organization <ul style="list-style-type: none">- University of Tokyo- Tohoku University- University of Shiga Prefecture- University of Nagoya- Kyoto University	Observer/Support <ul style="list-style-type: none">- Embassy of Japan- Japan Science and Technology Agency (JST)

Online Synthesis System for Sustainability and Resilience (OSS-SR) for sharing Realtime/Past Simulation Results and Knowledges



Satellite observation (Himawari and GSMaP satellite rainfall map)

Flood simulation results

Online Synthesis System for HyDEPP-SATREPS



HOME	Insitu Data	Satellite Data	Flood Monitoring	Past Flood	e-Learning
------	-------------	----------------	------------------	------------	------------

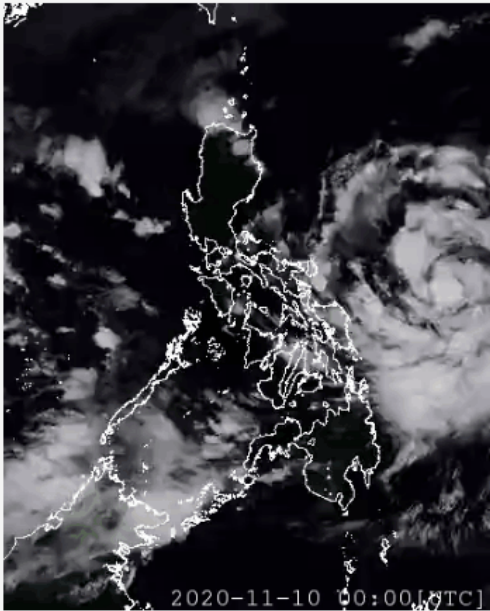
Home -> Rain Map -> Himawari-8 and GSMaP (2020/11/10-13)

Satellite Viewer (2020/11/10-13)

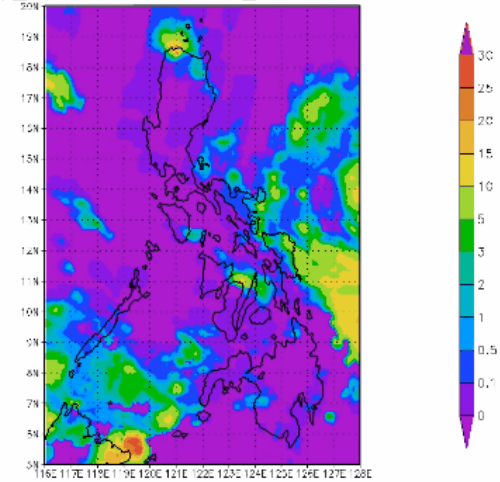
4 Days Animation (2020/11/10-13) (Click image to start)

Himawari-8 B13 Channel

GSMaP-NOW



gsmap_now.20201110.0000_0059.120x150 UTC



Online Synthesis System for HyDEPP-SATREPS

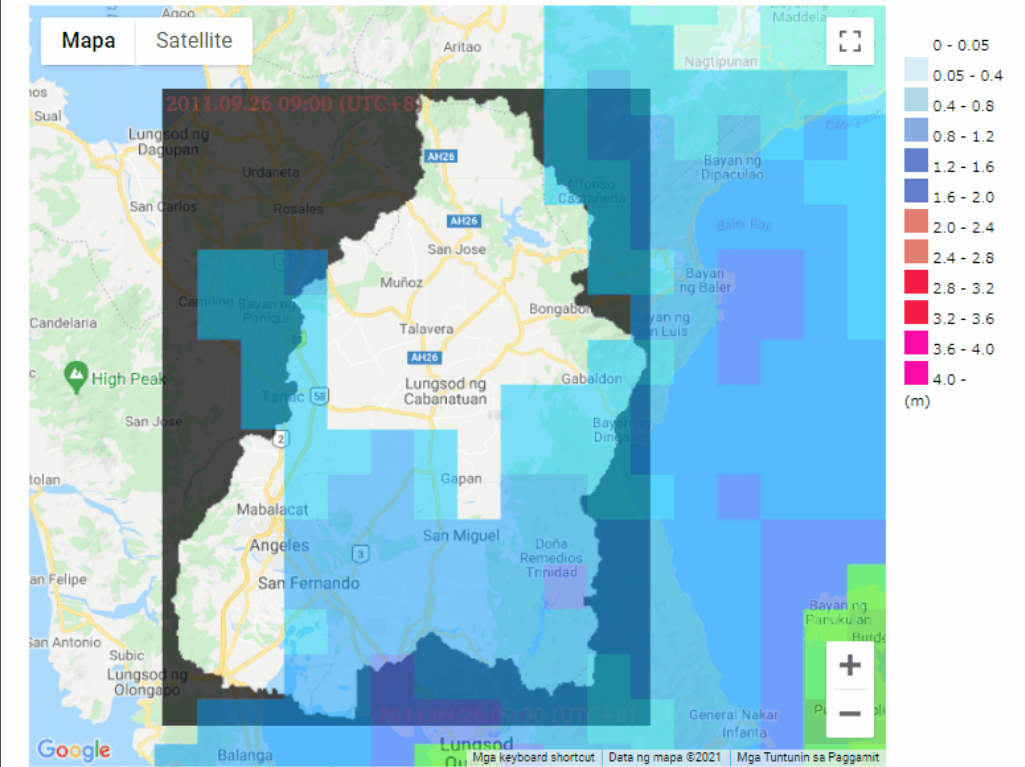


HOME	Insitu Data	Satellite Data	Flood Monitoring	Past Flood	e-Learning
------	-------------	----------------	------------------	------------	------------

Home -> Past Flood -> Past Flood (RRI Monitoring, 2011/09/26-10/5, Pampanga River Basin)

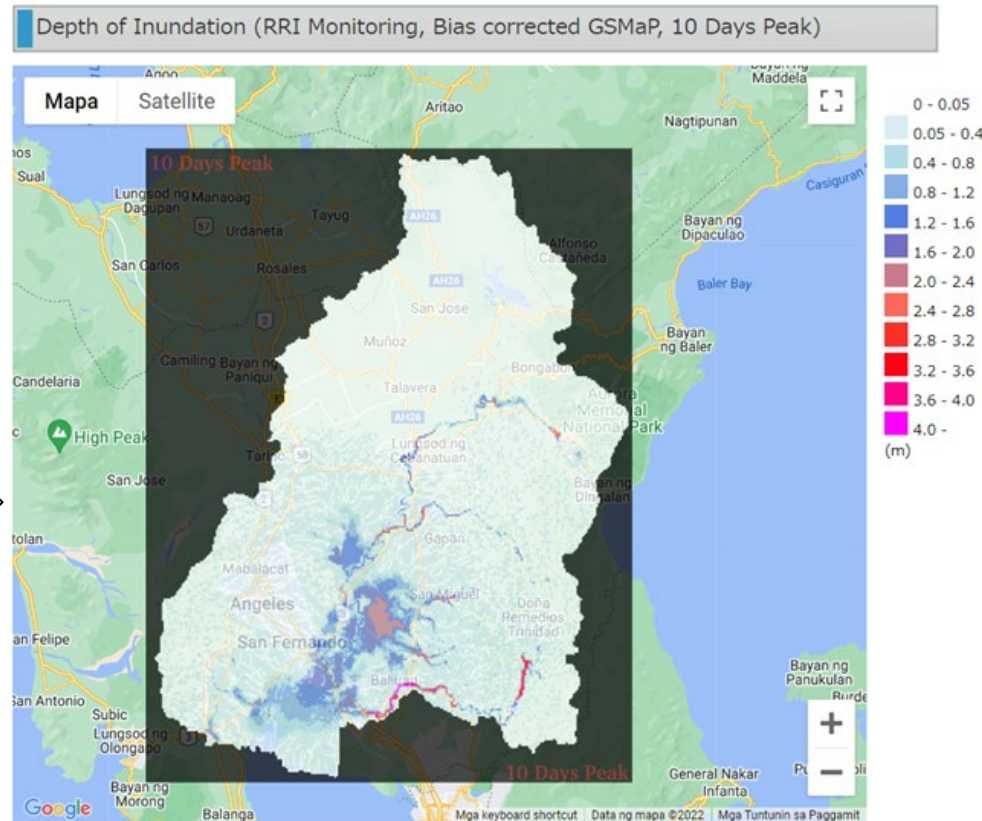
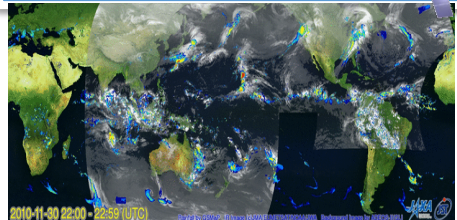
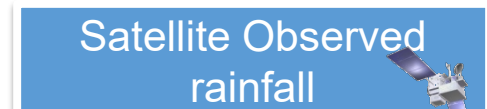
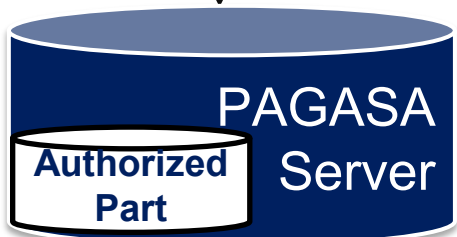
Inundation Depth (RRI Monitoring, 2011/09/26-10/5, Pampanga River Basin)

Animation



Flood Monitoring System on Online Synthesis System for Sustainability and Resilience

Inundation by Typhoon Karding in Sep, 2022 was successfully monitored by real-time flood simulation.



At Pampanga Provincial Office

Course-1: Basic lectures		
BL-1	Lecture on the HyDEPP-SATREPS Project	<i>Prof. Patricia Ann J. Sanchez (UPLB)</i>
BL-2	Lecture on the integrated approach for climate change and flood disaster risk reduction in the Philippines	<i>Prof. Toshio Koike (ICHARM)</i>
BL-3	Lecture on the basics of hydrological models and the Rainfall-Runoff-Inundation model (RRI Model)	<i>Assoc. Prof. Mamoru Miyamoto (ICHARM)</i>
BL-4	Lecture on the use of hazard/risk information for flood disaster risk reduction in Japan	<i>Prof. Miho Ohara (ICHARM)</i>
BL-5	Lecture on 3D flood hazard mapping for disaster risk reduction	<i>Dr. Takuya Inoue (Former, CERI, PWRI)</i>

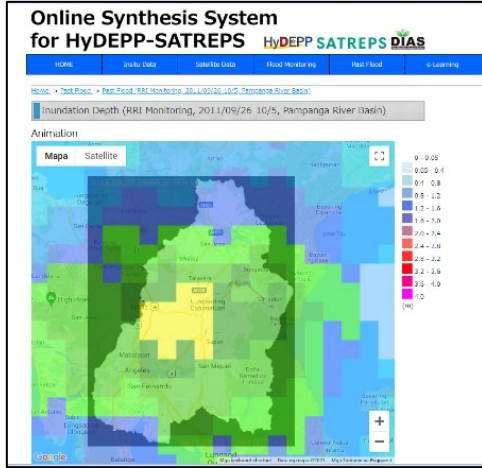
Course-2: Flood hazard mapping and risk assessment (Tutorial)		
F-1	Tutorial of flood simulation using Rainfall-Runoff-Inundation (RRI) model	<i>Dr. Shrestha Badri Bhakta (ICHARM)</i>
F-2	Tutorial of data management on DIAS (Data Integration and Analysis System)	<i>Dr. Masaki Yasukawa (Univ. of Tokyo) and Dr. Katsunori Tamakawa (ICHARM)</i>
F-3	Tutorial of 2D flood hazard mapping	<i>Dr. Kensuke Naito (ICHARM)</i>
F-4	Tutorial of 3D flood hazard mapping	<i>Dr. Naoko Nagumo (ICHARM)</i>
F-5	Tutorial of hazard/risk assessment for Barangay	<i>Prof. Miho Ohara (ICHARM)</i>

Course-3: Hydro-Agriculture-Economic Models (Lectures and Tutorial)		
M-1	Lecture on the Water and Energy Budget RRI model (WEB-RRI model)	<i>Prof. Abdul Wahid Mohamed RASMY (ICHARM)</i>
M-2	Lecture on the Crop Growth Simulation Model (SIMRIW)	<i>Prof. Koki Homma (Tohoku University)</i>
M-3	Lecture on economic development scenario prediction	<i>Assoc. Prof. Muneta Yokomatsu (Kyoto University)</i>
M-4	Tutorial of satellite image analysis	<i>Dr. Kentaro AIDA (ICHARM)</i>



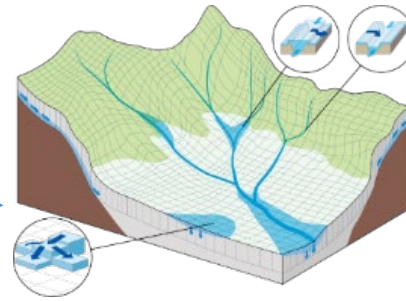
OSS-SR System

Page of archives of past flood



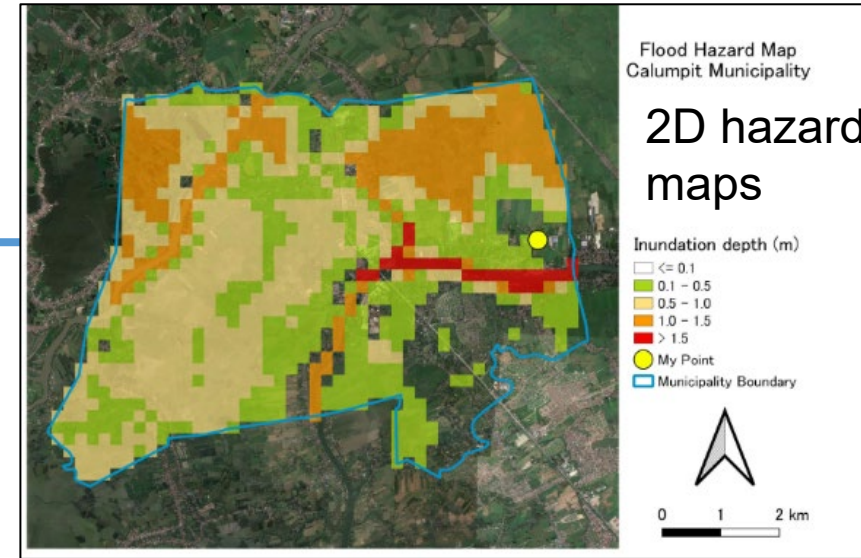
Download rainfall data as input of flood simulation

Rainfall-Runoff-Inundation Model (RRI Model)



Support understanding

Flood hazard mapping and risk assessment

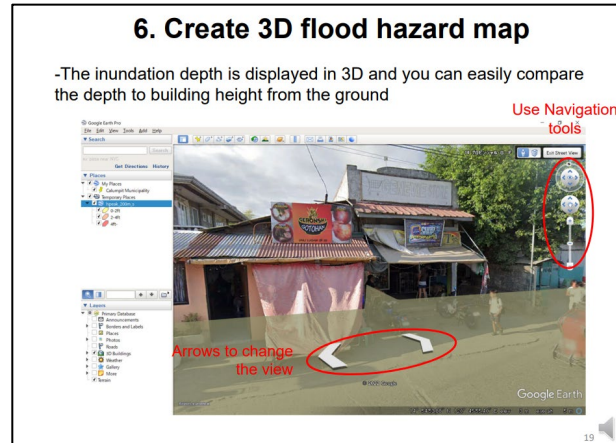


Page of downloading e-Learning contents

e-Learning (English)		
Course-1: Basic lectures		
BL-1	Lecture on the HyDEPP-SATREPS Project	Prof. Patricia Ann J. Sanchez (UPLB)
BL-2	Lecture on the integrated approach for climate change and flood disaster risk reduction in the Philippines	Prof. Toshio Koike (ICHARM)
BL-3	Lecture on the basics of hydrological models and the Rainfall-Runoff-Inundation model (RRI Model)	Assoc. Prof. Mamoru Miyamoto (ICHARM)
BL-4	Lecture on the use of hazard/risk information for flood disaster risk reduction in Japan	Prof. Miho Ohara (ICHARM)
BL-5	Lecture on 3D flood hazard mapping for disaster risk reduction	Dr. Takuya Inoue (Former, CERI, PWRI)
Exam (Course-1)		
Course-2: Flood hazard mapping and risk assessment (Tutorial)		
F-1	Tutorial of flood simulation using Rainfall-Runoff-Inundation (RRI) model	Dr. Shrestha Badri Bhakta (ICHARM)

Download Movie and slides

e-Learning Lectures



3D hazard maps by Google Earth Street View





Submitted Assignments Report from the participants in Course2 : Flood hazard mapping and risk assessment

Flood simulation in Pampanga River Basin by RRI model

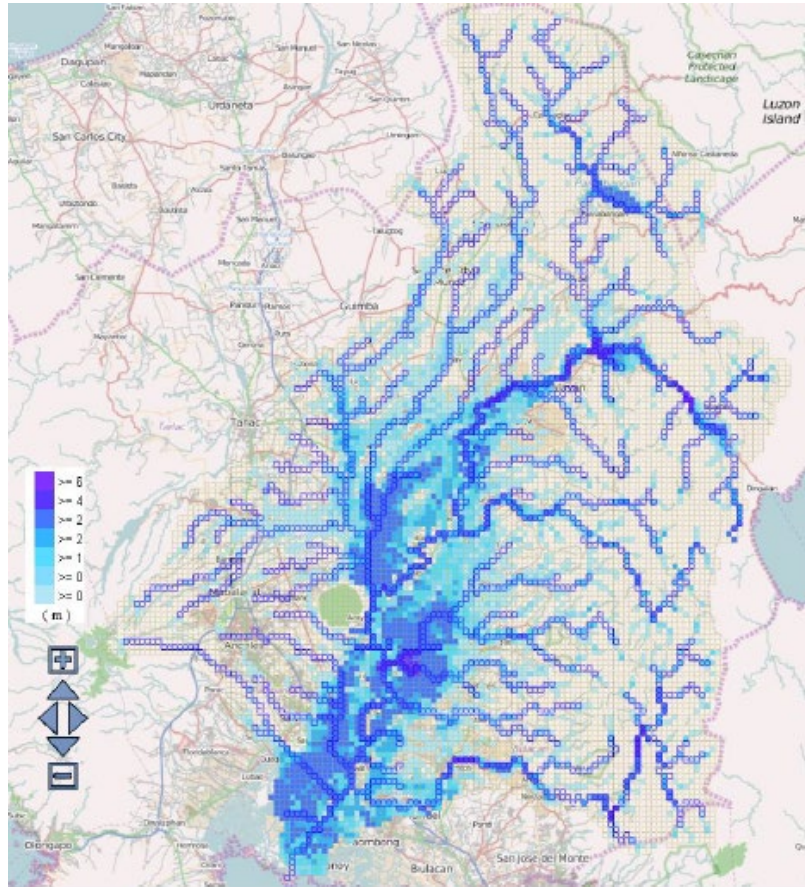
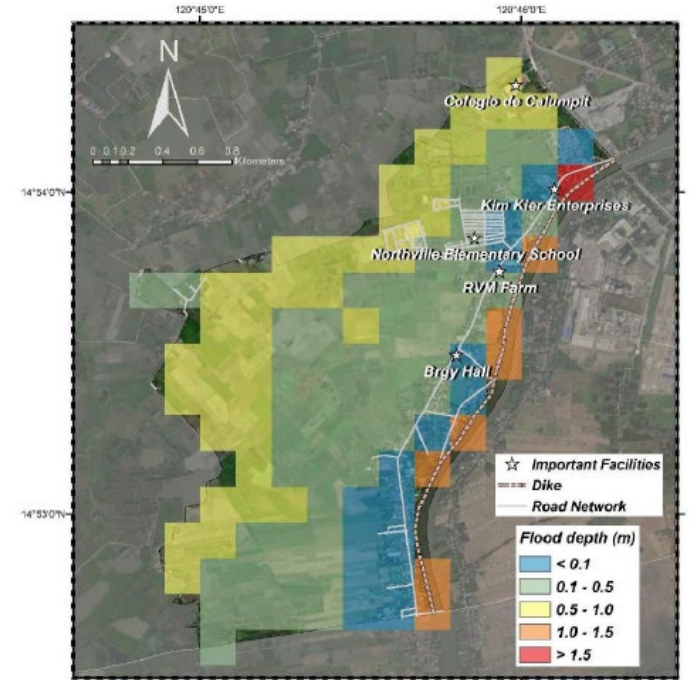


Figure 3. Maximum inundation in the Pampanga River Basin.

Flood hazard mapping in Calumpit Municipality, Bulacan Province by QGIS

3D Flood hazard mapping in Calumpit Municipality, Bulacan Province by Google Street View



2021	UPL B	UP Diliman	UP Mindanao	Japa n	Total
Participants	65	10	5	3	83
Course 1	44	9	4	2	59
Course 2	35	8	4	2	49
Course 3	40	9	4	2	55

49 persons completed all three courses.

2021	UPLB	UP Diliman	UP Mindanao	Japan	Total
Participants	65	10	5	3	83
Course 1	44	9	4	2	59
Course 2	35	8	4	2	49
Course 3	40	9	4	2	55

49 persons completed all three courses.

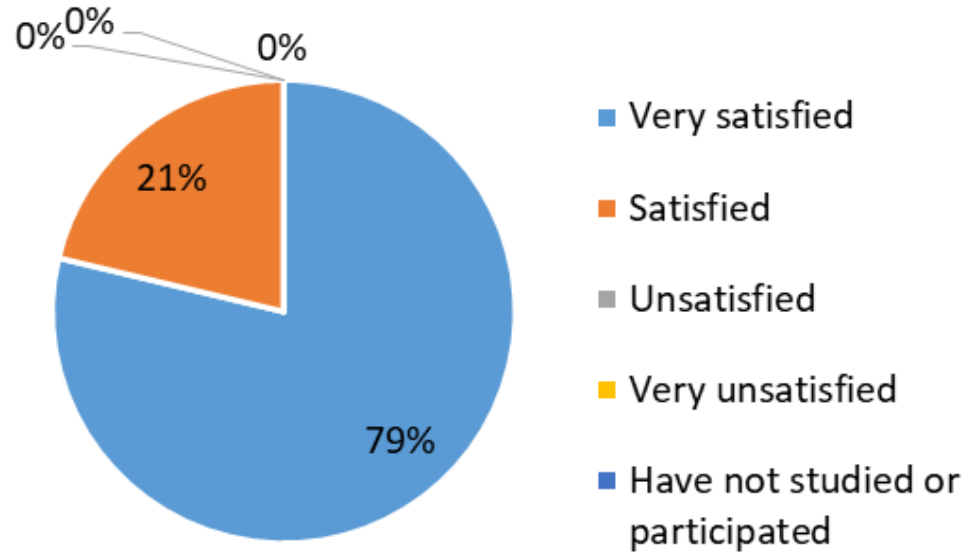


Expanded to governmental cooperative organizations (DOST, DPWH, LLDA, MMDA) in 2022

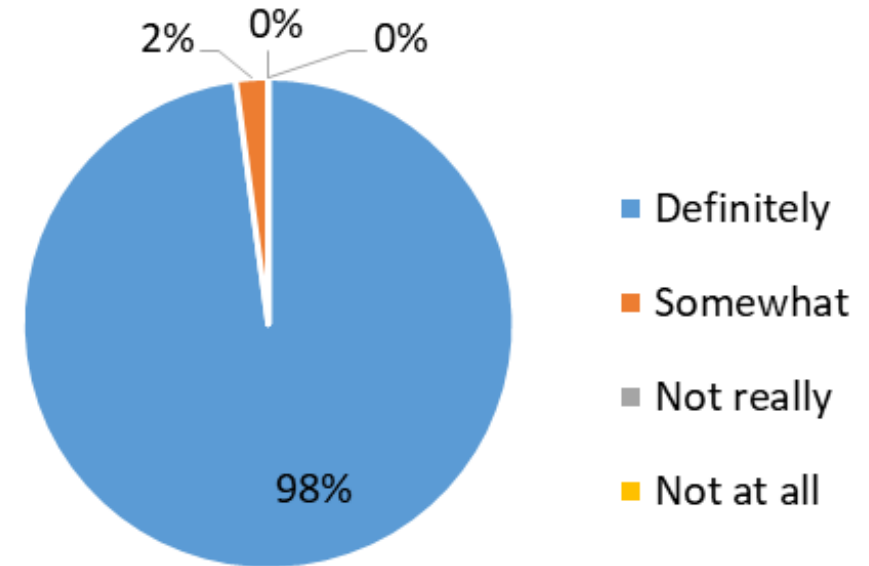
2022	UPLB	UP Diliman	DOST (+PHIVOLCS, PAGASA)	DPWH	LLDA	MMDA	Total
Participants	38	1	16	9	11	18	93
Course 1	19	0	11	8	11	14	63
Course 2	7	0	8	6	8	12	41
Course 3	15	0	10	7	9	12	53

40 persons completed all three courses.

Q. Were you satisfied with the contents of what you studied in Course2?



Q. Would you share the knowledge acquired through this training with your colleagues, friends, or other members in your organizations?



As an innovative solution to coping with a difficult situation during the worldwide pandemic, an e-learning training program was developed and provided in 2021 and 2022. It was verified that capacity building is somehow possible even in a remote environment or under a pandemic such as the one caused by COVID-19.