



Special Session 1: Earth Intelligence to Implement EW4ALL  
The 16th AOGEO Symposium  
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# Earth Intelligence to Implement EW4ALL: **ONLINE SYNTHESIS SYSTEM IN DAVAO, PHILIPPINES**

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# Introduction of Panelist Organization

**Davao Central College** (DCC) – a private Higher Education Institution conducting research and development projects related to flood management and grassroots innovations

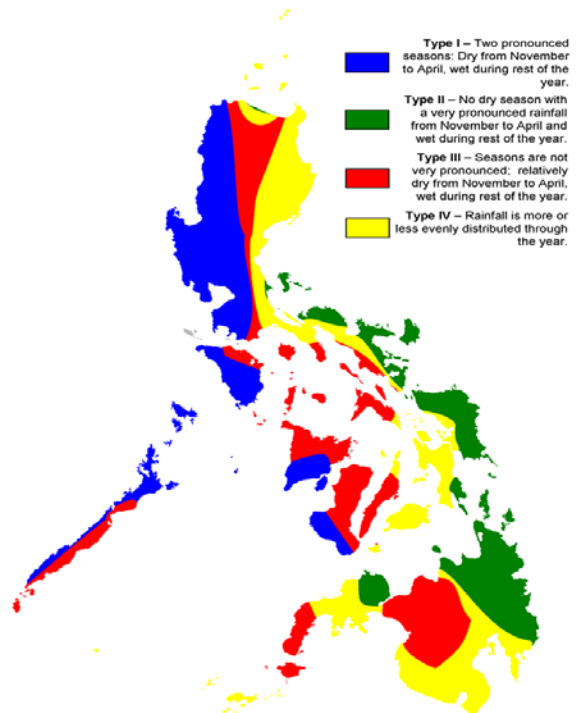
DCC partners with the following agencies:

Department of Science and Technology (**DOST** XI)

**HELP** (Hydrology for Environment , Life and Policy) Davao Network

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

Data Integration and Analysis System (**DIAS**) - Japan



The **Philippines** has a **tropical and maritime climate**, characterized by **high temperature and humidity with abundant rainfall**

**Tropical cyclones and intense rainfall of seasonal monsoons make vulnerability to hydro-hazard a national priority concern**

## Major Water Risks and Damages



**Flood**



**Drought**



**Water quality**

Infrastructure and Communication	Industries, Businesses, and Private Properties	Agriculture	Environmental Integrity

# PLATFORM on Water Resilience and Disasters

*National*

Data  
Integration

Early  
Warning

Climate Change  
Assessment

*Region*

Davao (Davao  
River Basin)

Central Luzon-NCR-  
CALABARZON

SATREPS

Davao HELP  
Network

Early Warning

CCA

Water-related Disaster

Environment

Agriculture

Economics

AOGEO  
AWCI

OSS-SR

E-Learning for Facilitators

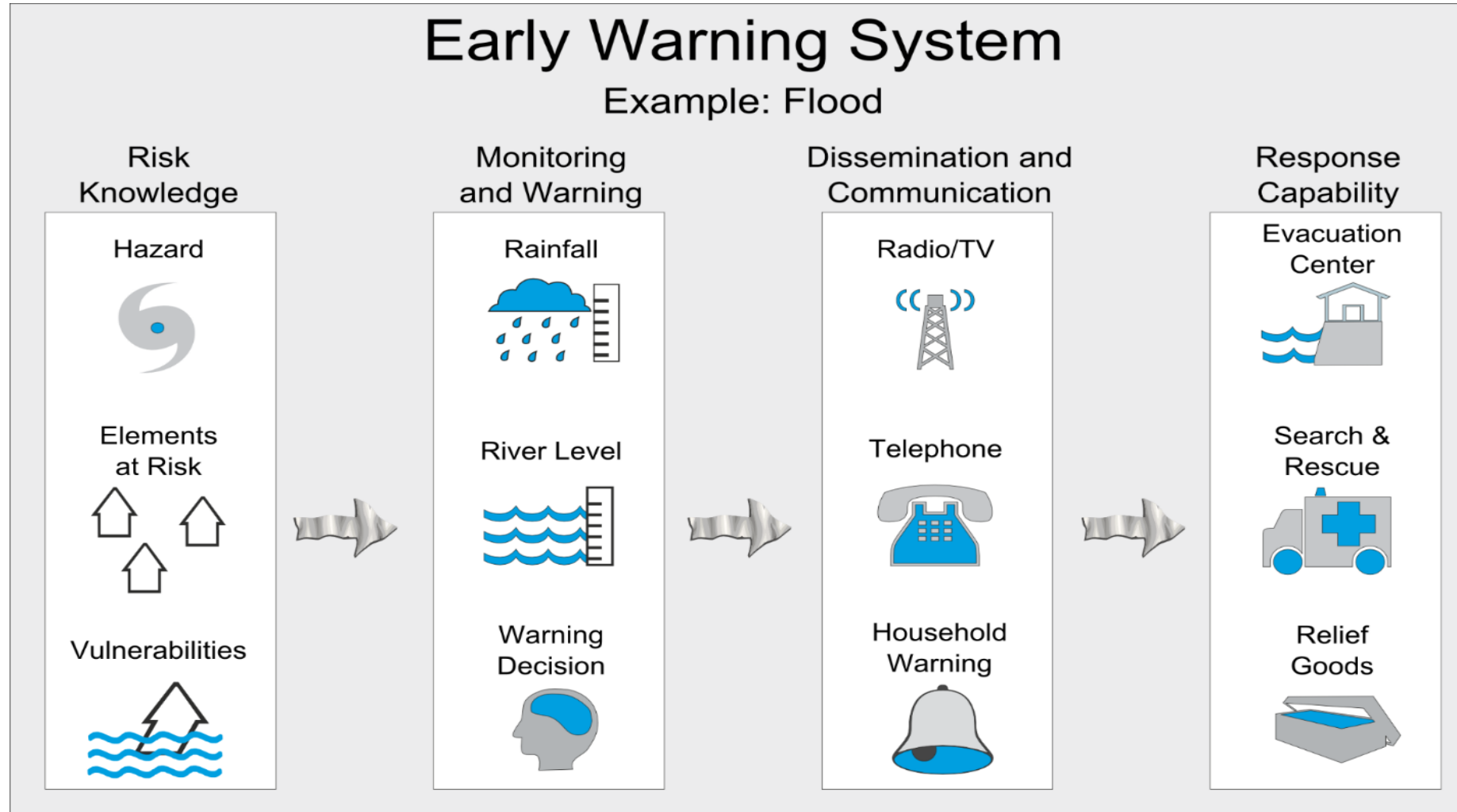
OSS-SR

E-Learning

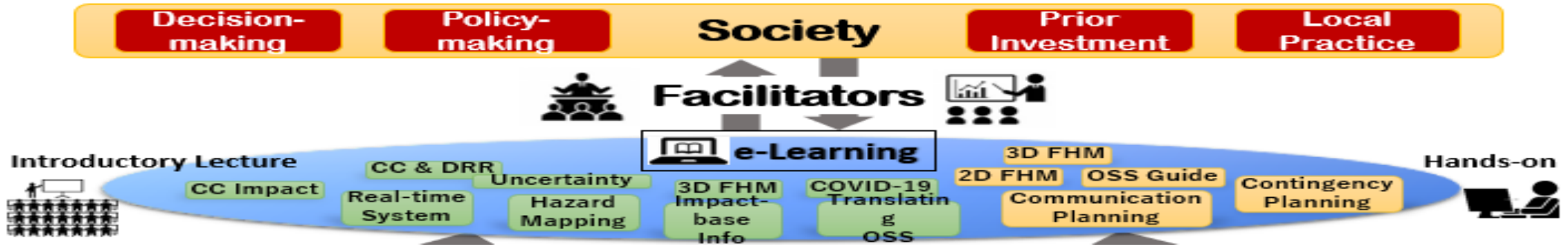
modeling

# Early Warning System

Example: Flood



# Online Synthesis System (OSS)



## Participants in WS

Candidates for the facilitator were invited from different disciplines and sectors of society.

- CRITERIA 1 (Direct disciplines):** Those who have a background in DRRM, CCA, Sustainability, IWRM, RBO management, Flood management, and Climate/meteorology
- CRITERIA 2 (Good mix of sciences):** Natural science, Engineering, Social science including communication, ICT, and Communicator in the mother tongue.
- CRITERIA 3 (Representation from different levels of governance):** Barangay, City/Municipality, National government, Private sector/Industry, Civil society, Academe, Media, and Special representation from DRBMA which is an interregional body.
- CRITERIA 4:** Members of HELP Davao Network



Candidate of Facilitator

National Government	11
Local Government	2
Academe	11
Civil Society Organization	1
Private Sector	2
Media	2
<b>TOTAL</b>	<b>29</b>

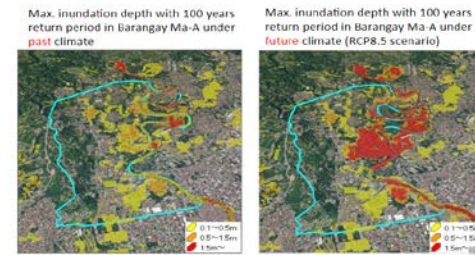


Participants in the Q & A Session

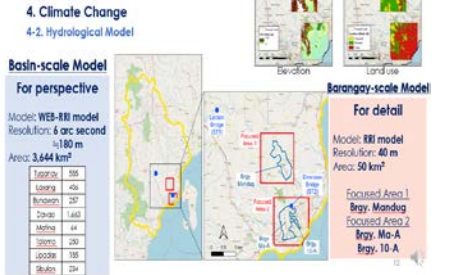
	Title	Lecturer	Outline
2-1	How to Use the OSS	M. Miyamoto K. Tamakawa	Understand the overview of OSS. Instruct how to download and use the data of climate change impact assessment, real-time basin-scale inundation, and local barangay-scale inundation.
2-2	Training on 2D & 3D Flood Hazard Mapping	K. Naito N. Nagumo	Learn how to make 2D flood hazard maps and identify flood risk at each Barangay level by using flood simulation results and QGIS software (free GIS software). Learn how to visualize flood risk in 3-dimension(3-D) by google earth and street view function.
2-3	Training on Contingency Planning	M. Ohara	Learn how to develop contingency scenario and plan among related stakeholders by using flood simulation results.
2-4	Communication planning	Della Grace Bacaltos (DSSC)	Create the specific action plan of Science Communication

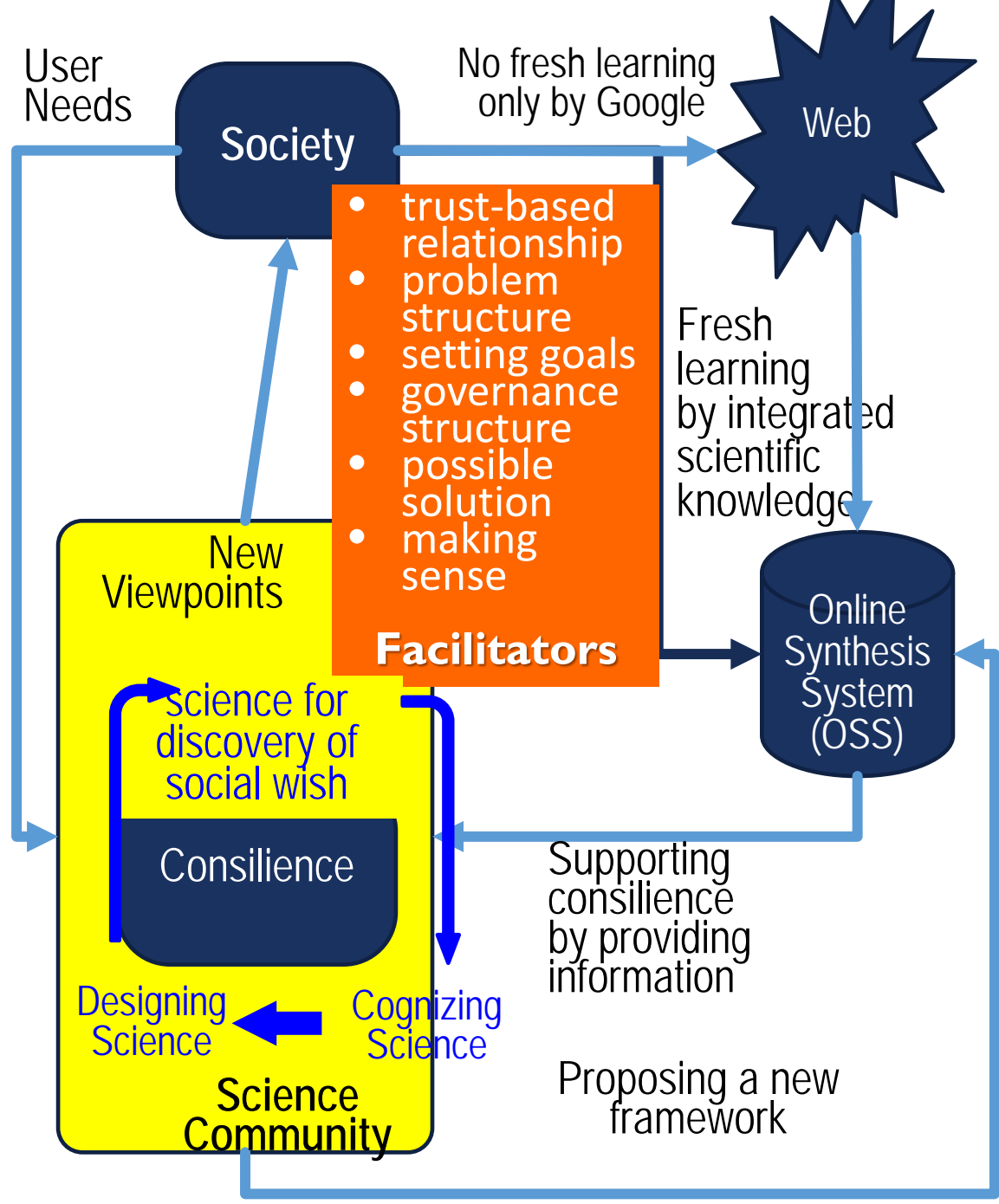
### Increased Hazard under Climate Change

From Training HT-2



### Contents of Davao OSS





(Slide courtesy of ICHARM)

### OSS Functions

- explore, collect, archive and search of scientific information in mother tongues
- predict and simulate, and visualize
- data integration, information fusion
- coordination of various disciplines
- conduit or communication arm between society and science community

# Platform for Water Resilience and Disaster in Davao River Basin

## Knowledge and Tools for Decision Making

**Data Integration**

- Real-time data from ARGs, WLMS, and Tandem units
- Predict downstream level rise in a certain lead time based on upstream hydromet data
- Identification of possible areas where distress calls

**Early Warning**

- Information system for disaster notification disaster-related updates
- Deployment of early warnings systems (DEWS)
- Installation of community-based alerting stations

**Climate Change**

- Geo-informatics for the systematic assessment of flood effects and risks for resilient Mindanao (GEO-SAFER Mindanao)
- Use of LiDAR data for Resource Mapping
- PHL-MICROSAT
- Utilization of satellite images through the Davao Ground Receiving Station for flood monitoring

## Management Plans and Policy Making

- Davao River Basin Management Plan
- Davao River Basin Health Scorecard
- Customized IWRM Guidelines for Davao City and Davao Region
- Resilience Demonstration Project: Assessment of Urban Water Systems
- City and Barangay Flood Hazard Maps
- Metro Davao Earthquake Model

## Communities of Practice

- Enhanced Barangay Disaster and Risk Management Plan
- Advocacy and Capacity Building on IWRM/DRR/CC
- Vertical Helophyte Filter System in Communities
- Sustainable Basin Livelihood
- Community Learning Centers

**Indigenous Peoples  
 Students/Youth**

**AOGEO  
 AWCI**

**OSS-SR**

**e-Learning for  
 Facilitators**



# Platform for Water Resilience and Disaster in Davao River Basin, Philippines

**DAVAO RIVER MANAGEMENT ALLIANCE**  
 Bukidnon Watershed Protection and Management Council (BWPWC)  
 Davao City Watershed Management Council (DCWMC)  
 Davao Gulf Management Council (DGMCC)

Policy Formulation - Investment estimation - Advocacy  
 Program coordination - conflict resolution - PAs Monitoring

**REPUBLIC OF THE PHILIPPINES  
 REGIONAL DEVELOPMENT COUNCIL  
 DAVAO REGION**  
 RDC XI RESOLUTION NO. 78, SERIES OF 2021

ENJOYING DENR XI AND LGUs IN DAVAO REGION TO SUPPORT THE IMPLEMENTATION AND SUSTAINABILITY OF THE ONLINE SYNTHESIS SYSTEM (OSS)

WHEREAS, the Davao River Basin, one of the eight major water systems in Davao City, that drains to the Davao Gulf, is susceptible to the impacts of climate change including hazards such as flooding, earthquake, and landslides.

WHEREAS, the identification of all potential hazards, their sources, possible hazardous events, and assessment of the risk exhibited by each is vital in implementing an effective water risk management system;

WHEREAS, to strengthen the prevention and mitigation efforts of water-related disasters, the Department of Science and Technology (DOST) XI, together with the HELP-Davao Network, collaborated with the International Center for Water Hazard and Risk Management (ICWHM - Japan) for the development of the Online Synthesis System (OSS);

**DOST XI COLLABORATES WITH ICHARM JAPAN AND HELPS DAVAO NETWORK TO ADOPT THE DAVAO ONLINE SYNTHESIS SYSTEM WATER RESILIENCE AND DISASTER PLATFORM FOR DAVAO RIVER**

The Department of Science and Technology Region XI (DOST XI) partnered with the International Center for Water Hazard and Risk Management (ICWHM - Japan) to help Davao Network to adopt the Davao Online Synthesis System (OSS) for the development of the Online Synthesis System (OSS) for the Davao River Basin.

**Contents of Davao OSS**

5. Real-time Monitoring (Whole Basin)

Leaf 28 Basin Annotation  
 10 days maximum inundation depth  
 AICS file can be downloaded

Profile of Barangay Marikina  
 Location and Land Use: Marikina is a barangay within Davao City with a total land area of 265.16 ha and a coastal exposure of 2,048,342.075 m. The elevation is situated at 214 meters or 0.71 feet above sea level. It is a coastal barangay. It is located in the coastal zone of the Davao Region. It is located in the coastal zone of the Davao Region. It is located in the coastal zone of the Davao Region.

**Contents of Davao OSS**

4. Climate Change 4-2. Hydrological Model

Boundary condition (Output of Basin or model)  
 River Discharge Future  
 Flood

Boundary condition (Input of Basin or model)  
 River Discharge Future  
 Flood

Risk Matrix for Land Use Management  
 Some local government in Japan conducts land use management using "Risk Matrix". Land use is determined according to the inundation probability and inundation level.  
 If an inundation of over 10 centimeters deep is expected to occur more than once in 10 years, the area is designated as "High Risk zone," with building regulation.  
 If an inundation of over 3 meters deep is expected to occur more than once in 200 years, the area is designated as "Flood Risk zone," with building regulation.

**OSS Deployment and Sustainability**  
 Policy Support/Institutional Commitment/Sustainability of "Facilitators" / Finance and Infrastructure

**OSS Facilitators**  
 e-learning sessions/Cascading Sessions

**Knowledge and Tools for Decision Making**  
 Data Integration/Early Warning/Economic Assessment/ Climate Change (DIAS)/Communication/Contingency Plans



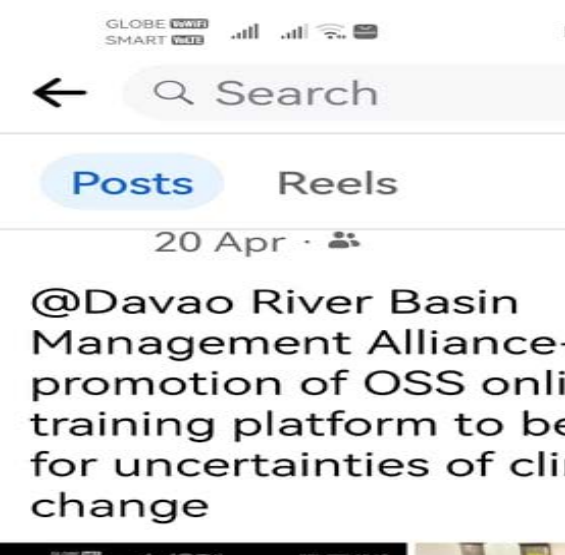
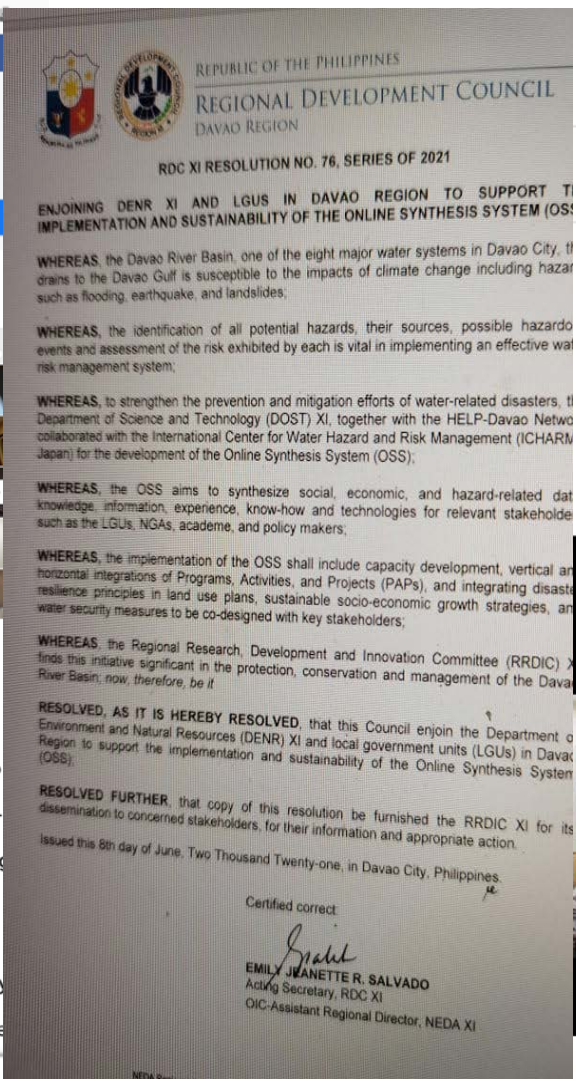
**Sustainable, Resilient, and Inclusive  
 Davao City**



**Kasama ni Mayan Inni si Cristy Garsuta Gallano at 7 pa.**  
 Abril 19 nang 5:38 AM · 🌐

April 19- The e-learning session for Online Synthesis System (OSS) as Platform for decision support system in managing water-related disasters in Davao River Basin has officially started this morning with twenty-three (23) participants from Davao Region on-board as candidate OSS facilitators. The said e-learning session which will run for four weeks is being facilitated by the team of experts from International Center for Water Hazards and Risk Management (ICHARM Japan).

During the 1st Quarter Meeting of the Regional Development Council (RDC XI), the OSS was favorably endorsed for adoption in Davao Region. Earning this policy support, the said platform is poised to enhance decisions and plans in terms of managing water-



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# Challenges and Collaborators

1. **Lacking local data** (e.g. rainfall) in some places because EWS (e.g. rain gauges) are not available.
2. Need for **convergence of flooding management plans** from various agencies to synchronize and pool resources.
3. Craft a **data sharing policy**
4. International **collaborators for capacity development of youth (students) and Indigenous people** on disaster literacy and EW4ALL.

THANK YOU !

MARAMING SALAMAT !

ARIGATO !