

COUNTRY REPORT ON THE PLATFORMS ON WATER RESILIENCE AND DISASTERS

Davao River Basin Management

Dr. Anthony C. Sales, CESO III

Regional Director, Department of Science and Technology XI

Secretary, HELP Davao Network



125°18'0.00"E

125°24'0.00"E

125°30'0.00"E

125°36'0.00"E

7°18'0.00"N

7°12'0.00"N

7°6'0.00"N

7°18'0.00"N

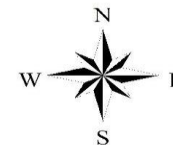
7°12'0.00"N

7°6'0.00"N

Davao River Basin

Length of Main River: 86 km
 Area: 175,960 ha
 Coverage: Traverses 3 Provinces
 Bukidnon Province - 25.3%
 Davao del Norte - 8.2%
 Davao City - 66.4%
 One of 10 major river systems
 that drain to the Davao Gulf

Davao River Basin Drainage System in Flood Prone Barangays



Map Scale:
1:160,000 meters

4 0 4 km

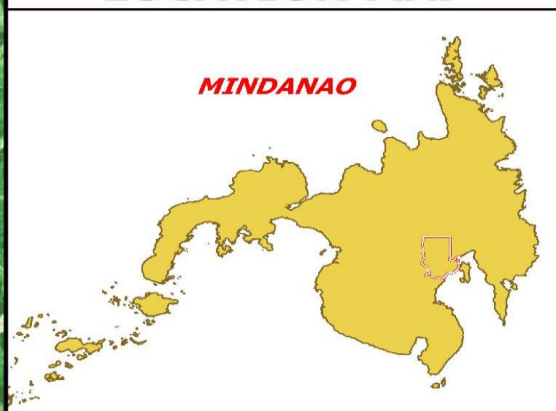
C.Y. 2016

Map Datum: WGS 84

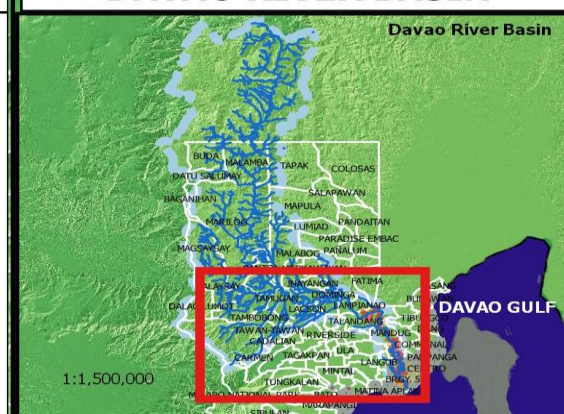
Legend

- Drainage System
 - Davao River
 - Davao City Barangays
 - Mindanao Boundary
 - Flood Prone Barangays
 - Davao River Basin
- Flood Hazard (100 year return)
- High
 - Medium
 - Low

LOCATION MAP



DAVAO RIVER BASIN



125°18'0.00"E

125°24'0.00"E

125°30'0.00"E

125°36'0.00"E

References :
 Drainage System (DPWH/CPDO)
 Flood Hazard Map/
 100yr return (MGB/DREAM Phil-LIDAR 1)
 Davao City Barangay Boundary (CPDO),
 Mindanao, Rivers, River Basin (DENR RXI)

Note:
 -Boundaries are non
 authoritative.
 -Data presented are for
 reference use only.



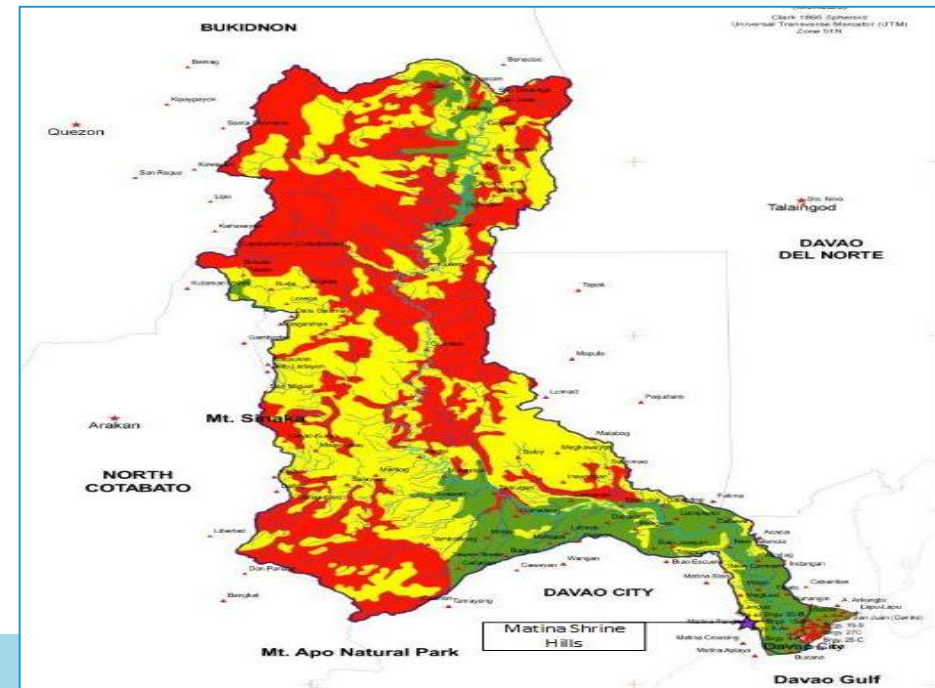
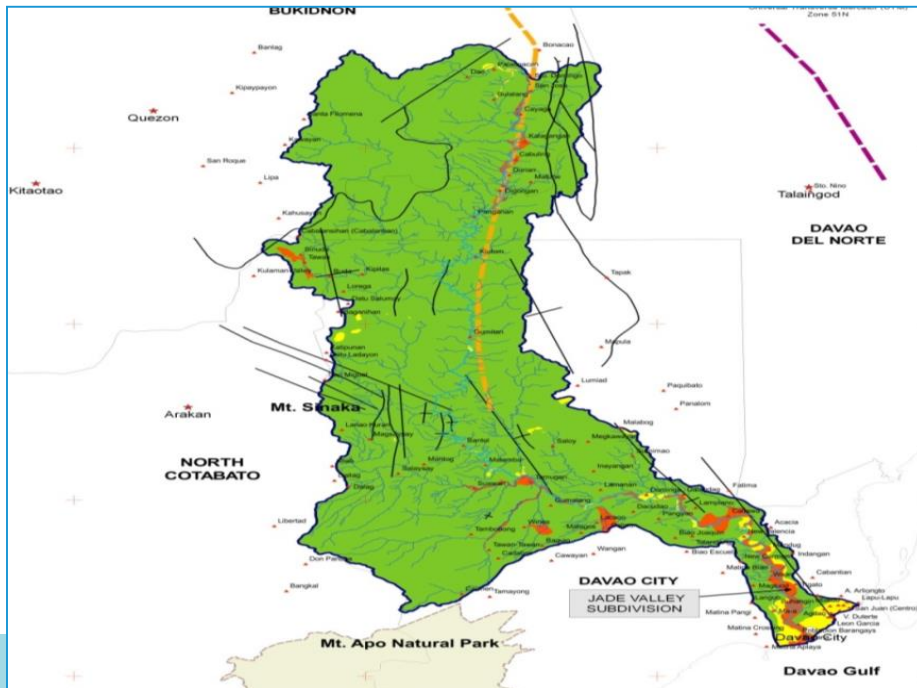
Hazards along Davao River Basin

Earthquakes and Flooding

Local Government Units	Barangays along faultline	Barangays highly susceptible to flooding
Bukidnon	12	5
Davao del Norte	3	3
Davao City	9	20
Total	24	28
Area Affected (ha)		6,168

Landslides

LGU	Barangays Highly Susceptible to Landslides	Area Affected (ha)
Bukidnon	22	33,921
Davao del Norte	3	278
Davao City	31	35,853
Total	56	70,052

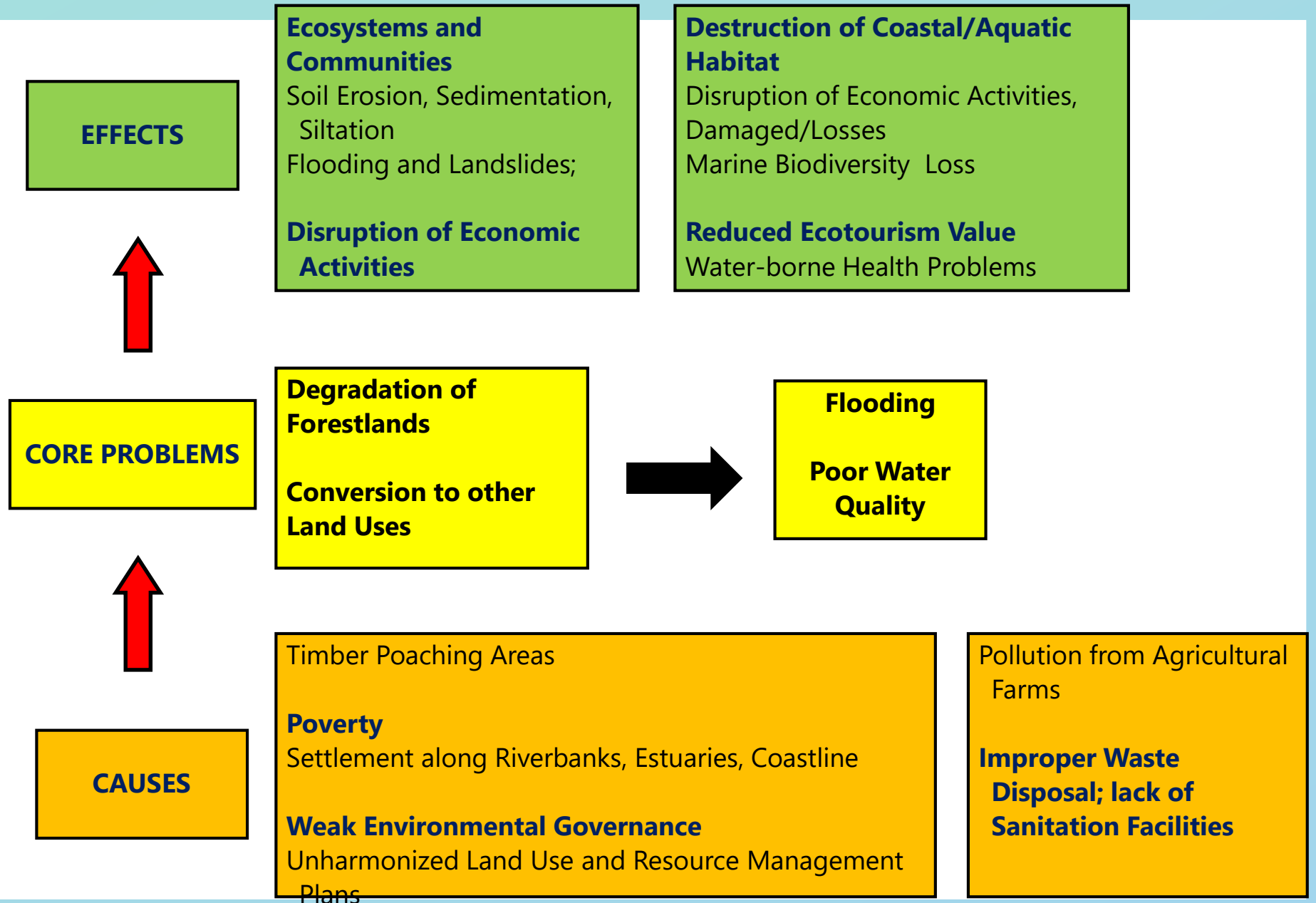


Climate Change Impacts in Davao River Basin



Climate Change-Related Stressors	Vulnerable Areas
1. Increase in mean sea level	Coastal settlements/built-up and tourism areas; Coastal habitats
2. Increase in rainfall	Steep slopes unstable soil conditions; Settlements and crop lands in flood prone and landslide prone areas; Terrestrial wildlife habitats
3. Drought	Grasslands, shrublands and forests; crop lands Groundwater recharge areas, rivers Terrestrial wildlife habitats
4. Increase in ambient temperature	Terrestrial and aquatic habitats Urban settlements
5. Increased occurrence/ Intensity of tropical weather disturbances	Settlements and crop lands in flood prone and landslide prone areas ; Terrestrial wildlife and aquatic habitats; tourism areas

ISSUES AND PROBLEMS IN DAVAO RIVER BASIN



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

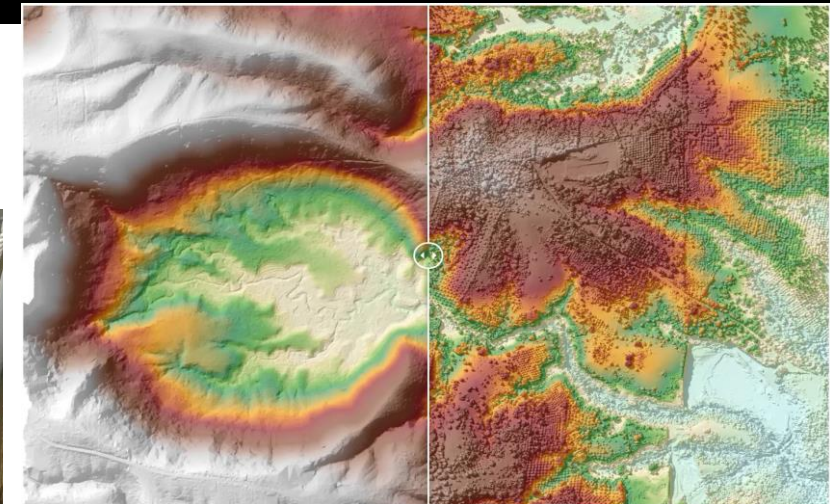
Advocacy and Capacity Building on IWRM/DRR/CC

Vertical Helophyte Filter System in Communities

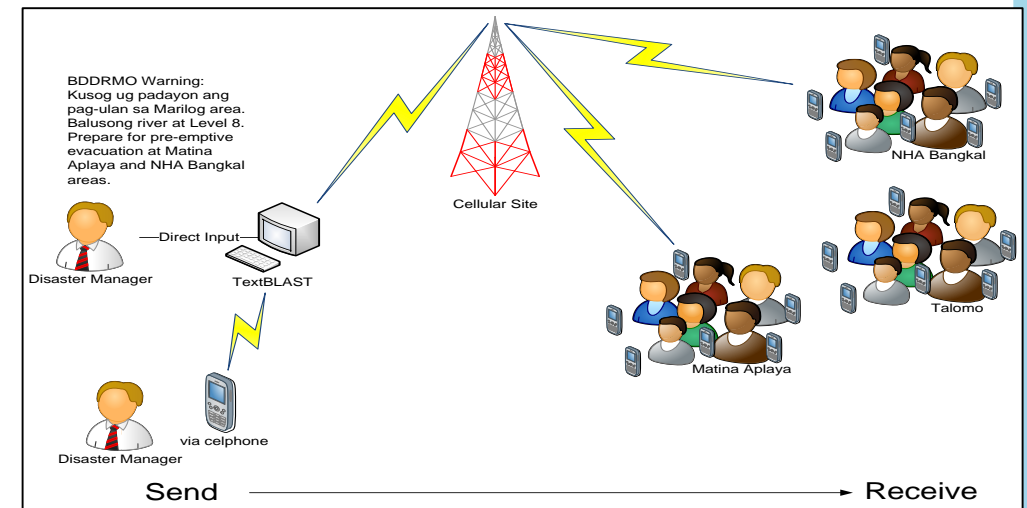
Sustainable Basin Livelihood

Community Learning Centers

Knowledge and Tools for Decision Making



LIDAR-derived elevation products: Digital Terrain Model (DTM) contains the bare Earth surface and contours and Digital Surface Model (DSM) contains important topographic features such as roads, buildings, river banks and dykes that have great effect on flow dynamics and flood propagation.



Management Plans and Policy Making



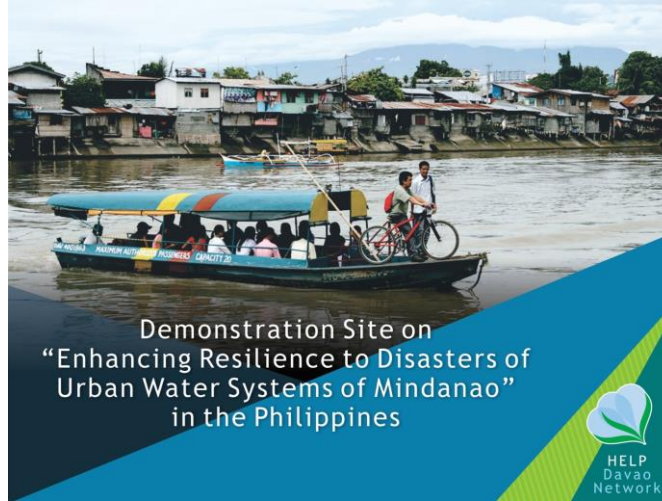
Customized IWRM Guidelines
for Davao City and Region XI



METRO DAVAO EARTHQUAKE MODEL



A Probabilistic Seismic Ground Motion
Hazard Assessment of Metro Davao



Demonstration Site on
“Enhancing Resilience to Disasters of
Urban Water Systems of Mindanao”
in the Philippines



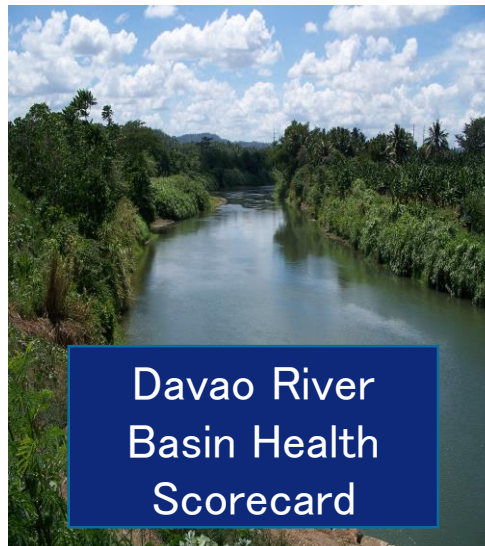
DAVAO RIVER MANAGEMENT ALLIANCE

Bukidnon Watershed Protection and Management Council (BWPMC)

Davao City Watershed Management Council (DCWMC)

Davao Gulf Management Council (DGMC)

- Policy Formulation
- investment promotion
- Advocacy
- Program coordination
- conflict resolution
- PAPs Monitoring



Davao River
Basin Health
Scorecard



Management Plans and Policy Making

Policy and Enforcement Support Priorities

- Land use regulation especially in PCHHAs
- Water use regulation and allocation
- Small scale mining and quarrying
- Water pollution
- Incentive systems for various activities
- Harmonization of DRB Master Plan and CLUPs and zoning plans; local ordinances

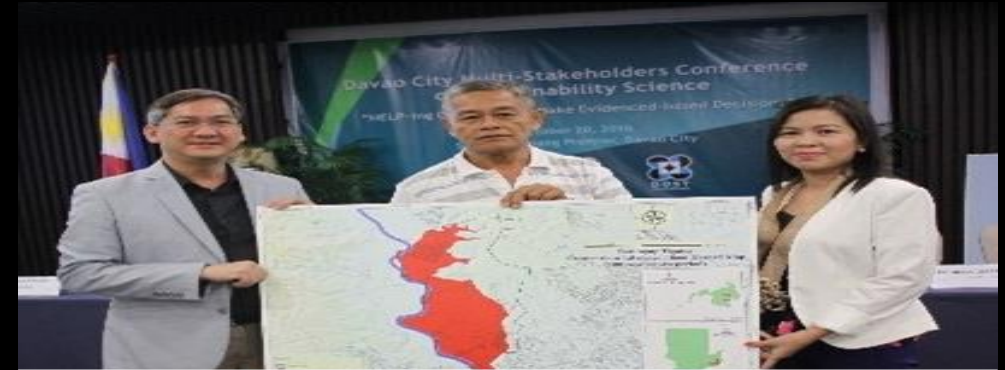
Capability Building Priorities

- Forest protection, conservation and rehabilitation, to include forest fire protection
- ADSDPP, resource management plan preparation
- Agroforestry and farm planning; soil and water conservation
- HVC and farm production technologies
- Vulnerability and risk assessments; community-based disaster preparedness
- Financing mechanisms (user fees, PES)
- M and E

Communities of Practice IWRM/DRRM/CC



Installation of Vertical Helophyte Filter System and Community Learning Center for DRRM in Davao River Basin



Distribution and Use of Barangay-Level Flood Hazard Maps (Outputs of Sustainability Science Project)

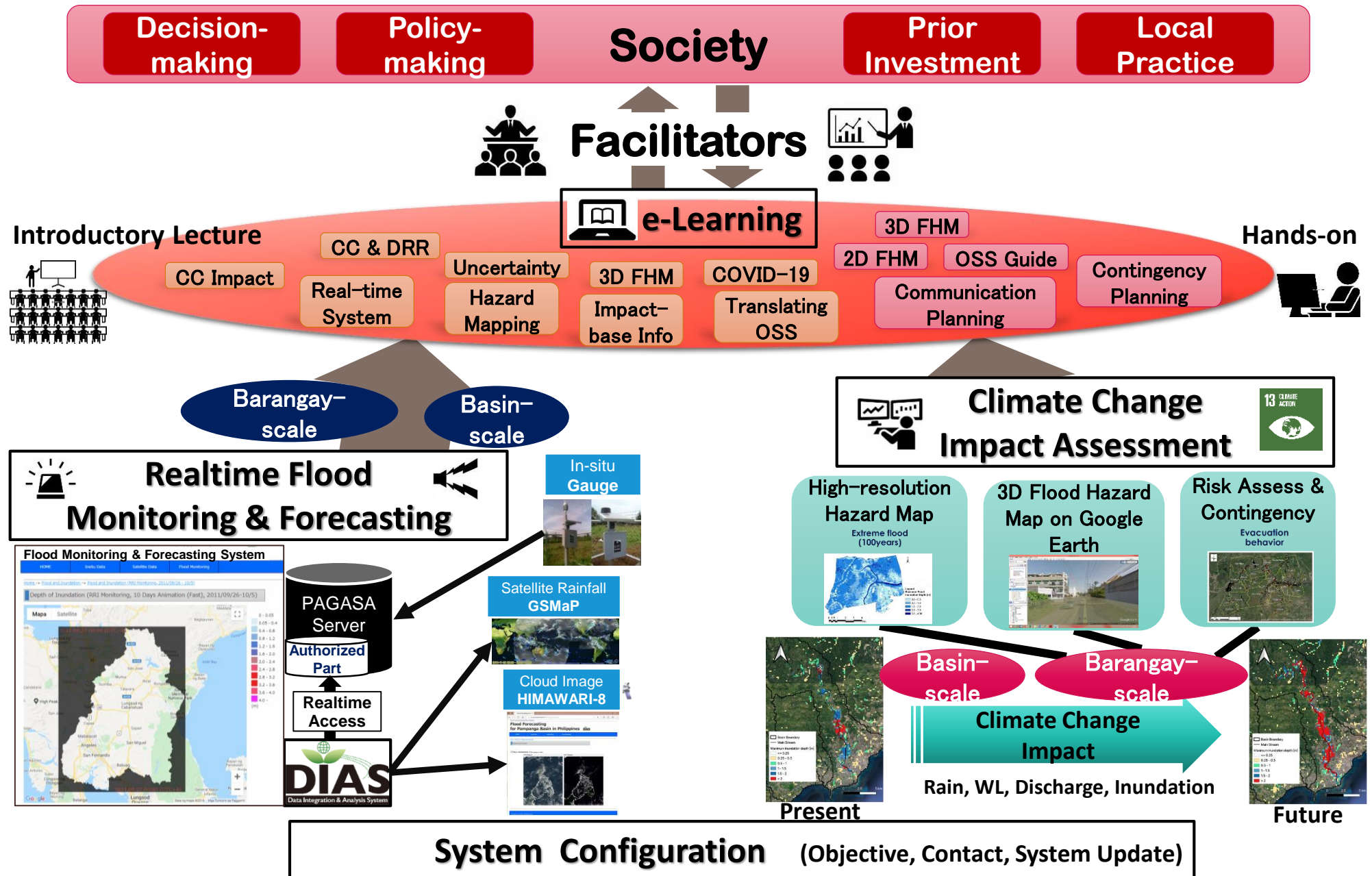


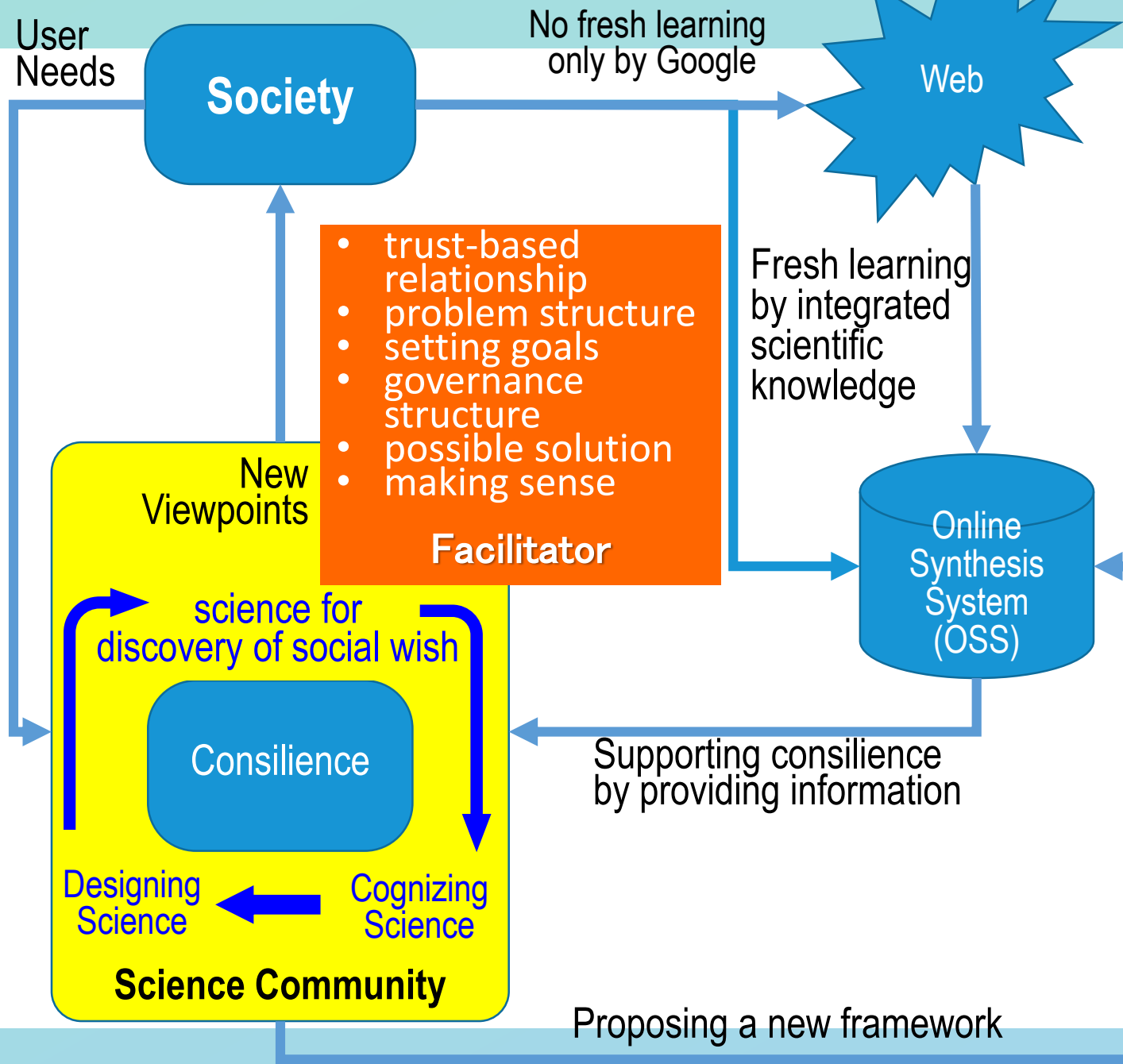
IWRM Trainings conducted at the Barangays along DRB



Enhanced Barangay Disaster Risk Management Plan

Online Synthesis System (OSS)





OSS Functions

exploration, collection, archive and search of scientific information in mother tongues

prediction and simulation, and visualization

data integration, information fusion

coordination of various disciplines

mutual risk communication between society and science community

Development of Online Synthesis System (OSS)

Background

- Disaster resilience and sustainable development are closely interlinked.
- Proper disaster management and capacity development must lead to the city/region's continuous prosperity.

Objectives

- **To develop an Online Synthesis System (OSS)**, achieving prevention and mitigation efforts of water-related disasters by synthesizing data, knowledge, information, experience, know-how, and technology for relevant stakeholders such as city office, regional/local governmental agencies, academia, and Barangay leaders.
- **To foster facilitators** capable of leading the accumulation of dialogues and communications to improve disaster resilience and sustainable development by the effective use of OSS.
- **To disseminate** the climate change initiatives in Davao City to the world as one of the best practices.

Candidates of facilitator

Candidates for the facilitator should be invited from different disciplines and sectors of society including civil society. Criteria for gathering candidates are as follows.

- **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

Further vision

- For the implementation of OSS and capacity development programs, online workshops gathering all relevant Davao City stakeholders are suggested to be organized. Also, collaborative works with ongoing programs/activities in Davao City, such as Local Climate Change Adaptation Plan by TWG, SETI projects, DRRM for Urban Water System, NICER, and Master Plan of the Davao River, should be examined.
- As the next stage, a policy proposal including land use planning, economic growth strategy, and water security under climate change impacts should be co-designed with stakeholders beyond the disaster response. Activities for disaster resilience and sustainable development under climate change have to contribute to the comprehensive and continuous prosperity of Davao City.
- To create a sub-committee under DRBMA for the sustainable operation of OSS