

# PLATFORMS FOR BUILDING RESILIENCE TO WATER- RELATED DISASTERS

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Department of Science and Technology  
*Regional Office No. XI*

*and*

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ISO 9001



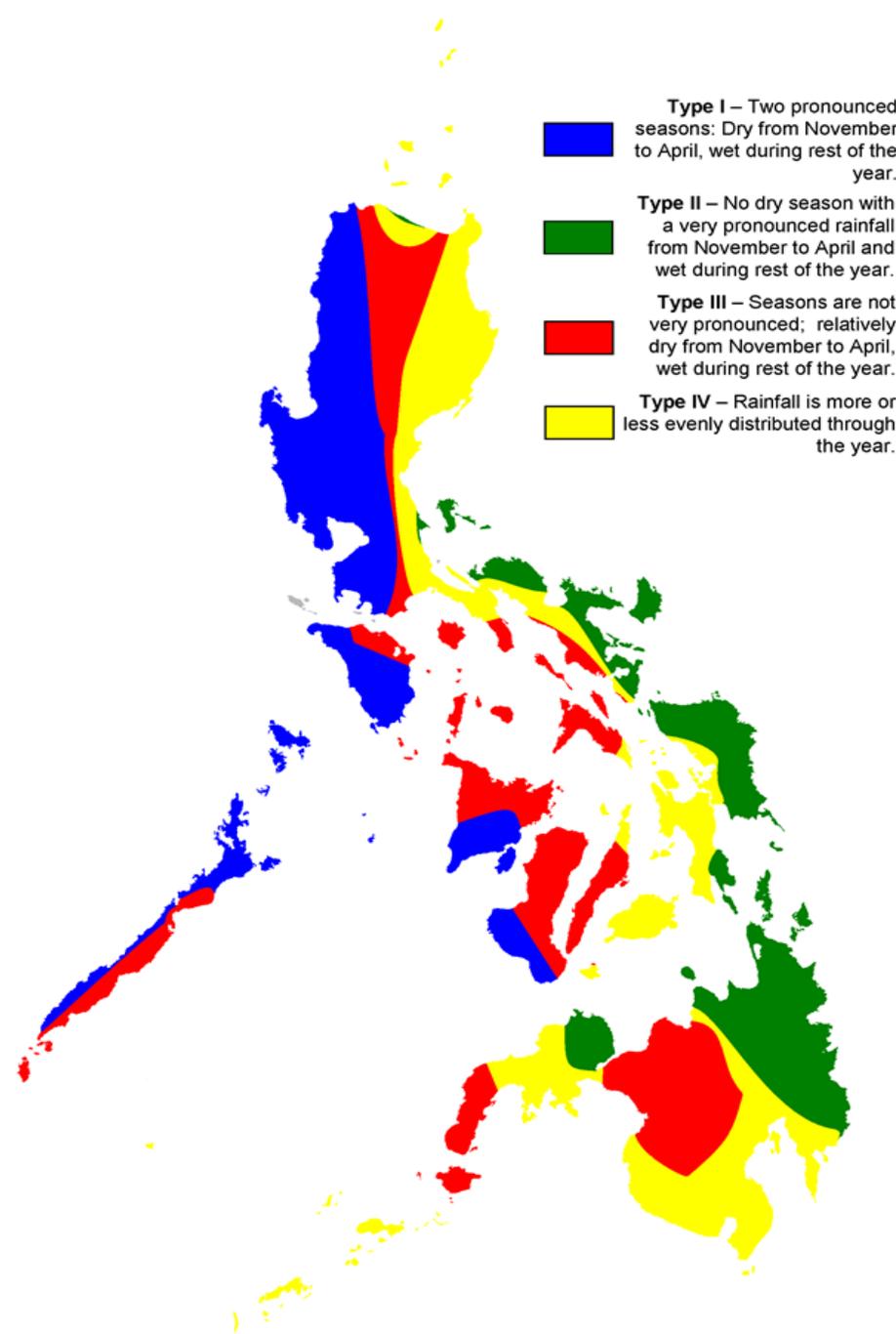
# OUTLINE

- Context
- Platforms for Building Resilience to Water Related Disasters
  - DRRM at National and Subnational Levels
  - Role of DOST and HELP Davao Network
  - Major Initiatives
- Lessons Learned and Steps Forward

# CONTEXT

- Water Resources of the Philippines
- Climate in the Philippines
- Water related hazards and disasters





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

# The Philippines

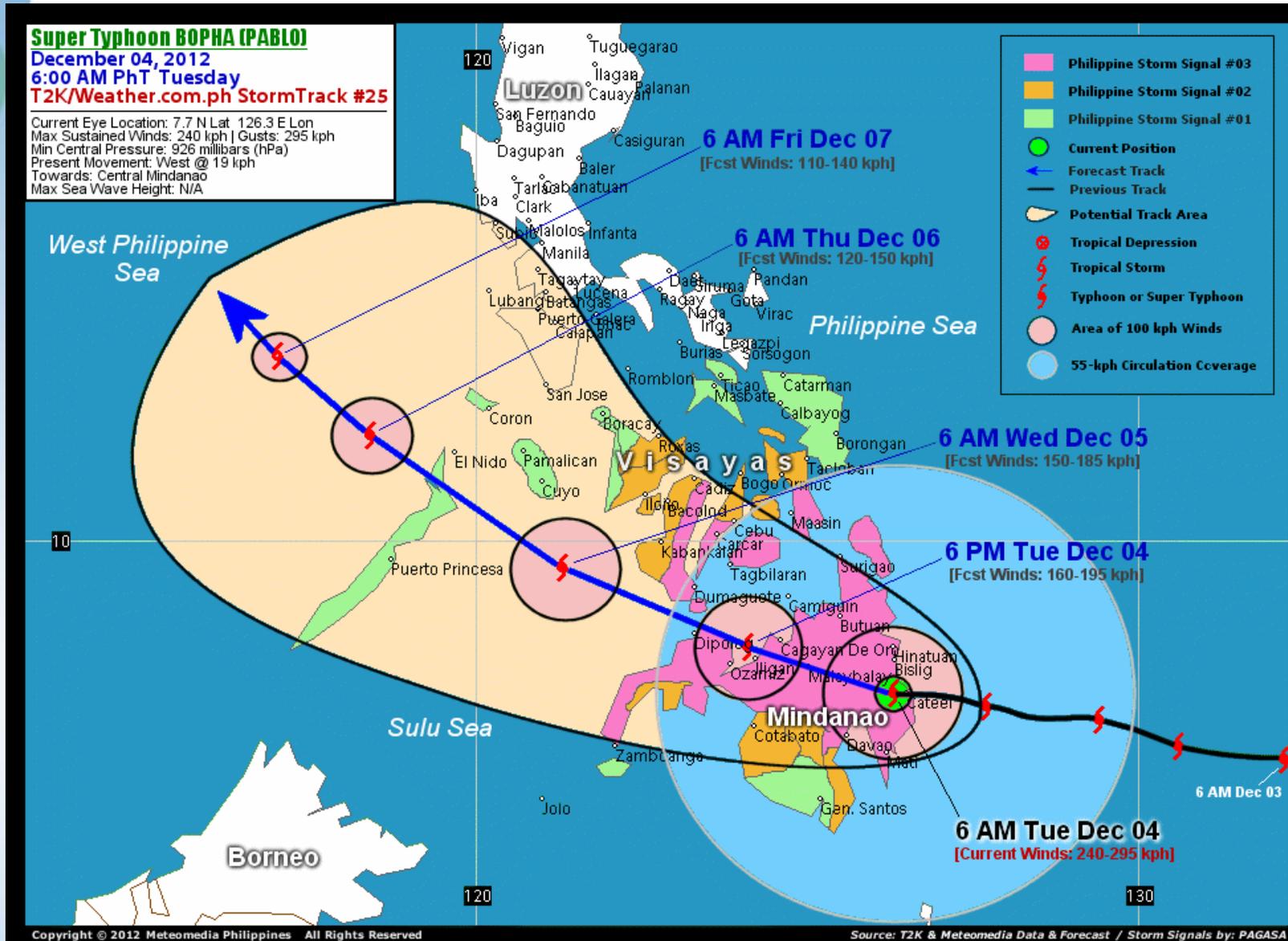
We expect around 20 tropical cyclones to enter or develop within the Philippine Area of Responsibility every year, and 8 to 9 would progress to landfall.



# TYPHOON BOPHA (Pablo) 2012



# Typhoon Bopha (Pablo) - 2012



# The impact of **Typhoon Bopha (Pablo)**



Infrastructure and Communication



Industries, Businesses and Private Properties



Agriculture



Education



Health and Safety



Livelihood

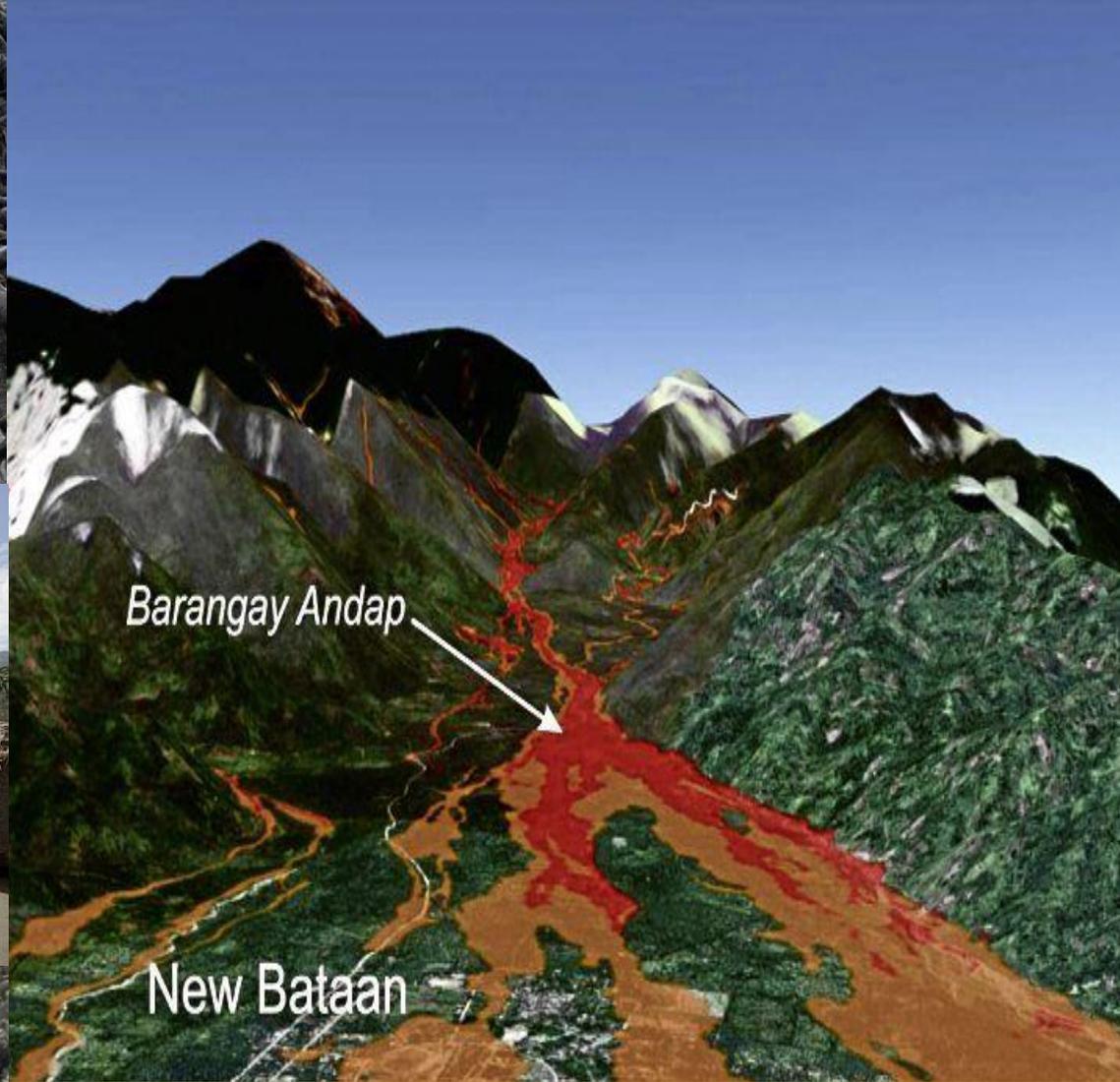


Environmental Integrity



Lives

Total Estimated Cost of Damage:  
**>PHP36 M; ca 620 M euros** (*agriculture, infrastructure, properties*)  
Total families Affected: **711,682**  
Total Casualties: **1,607**  
Reported Missing: **834**



**Barangay Andap, New Bataan,  
Compostela Valley Province**  
**16 affected barangays**  
**46,309 affected individuals**  
**126 casualties**

# Davao City Flooding in 2011



Thousands of families in 4 Barangays (Ma-a, Matina Pangi, Matina Crossing and Talomo Proper) were submerged in 10 feet high flash flood for several hours due to heavy rains that poured on June 28, 2011, forcing families to seek for higher and safer grounds.

**Total Estimate Cost of Damage: Php 11 M; ca 183 M euros**  
**(infrastructure, private properties)**  
**Total families Affected: ca 15,000**  
**Total Casualties: 30 Individuals**  
**Other immediate problems: WASH, Food Security, Health and Safety, Shelter**

# **Damages of the Flash Flood Incident In Davao City (Matina Pangi River) - 2011**



**Infrastructures, Private Properties, and Businesses**



**Health and Sanitation, Safety, Households, Livelihood**

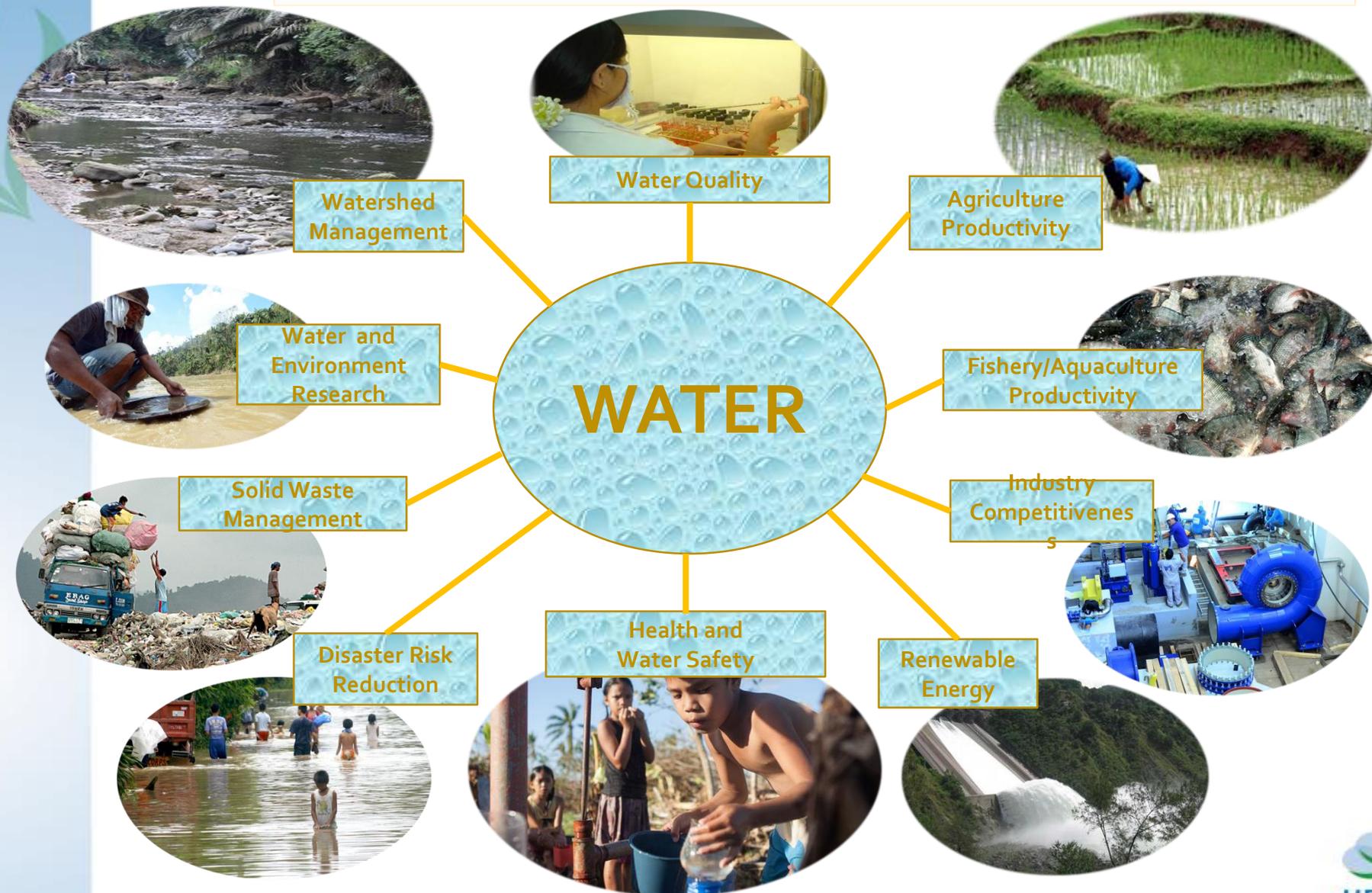
# PLATFORMS FOR BUILDING RESILIENCE TO WATER RELATED DISASTERS

- DRRM at National and Subnational Levels
- Role of DOST and HELP Davao Network
- Major Initiatives

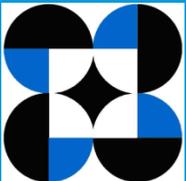
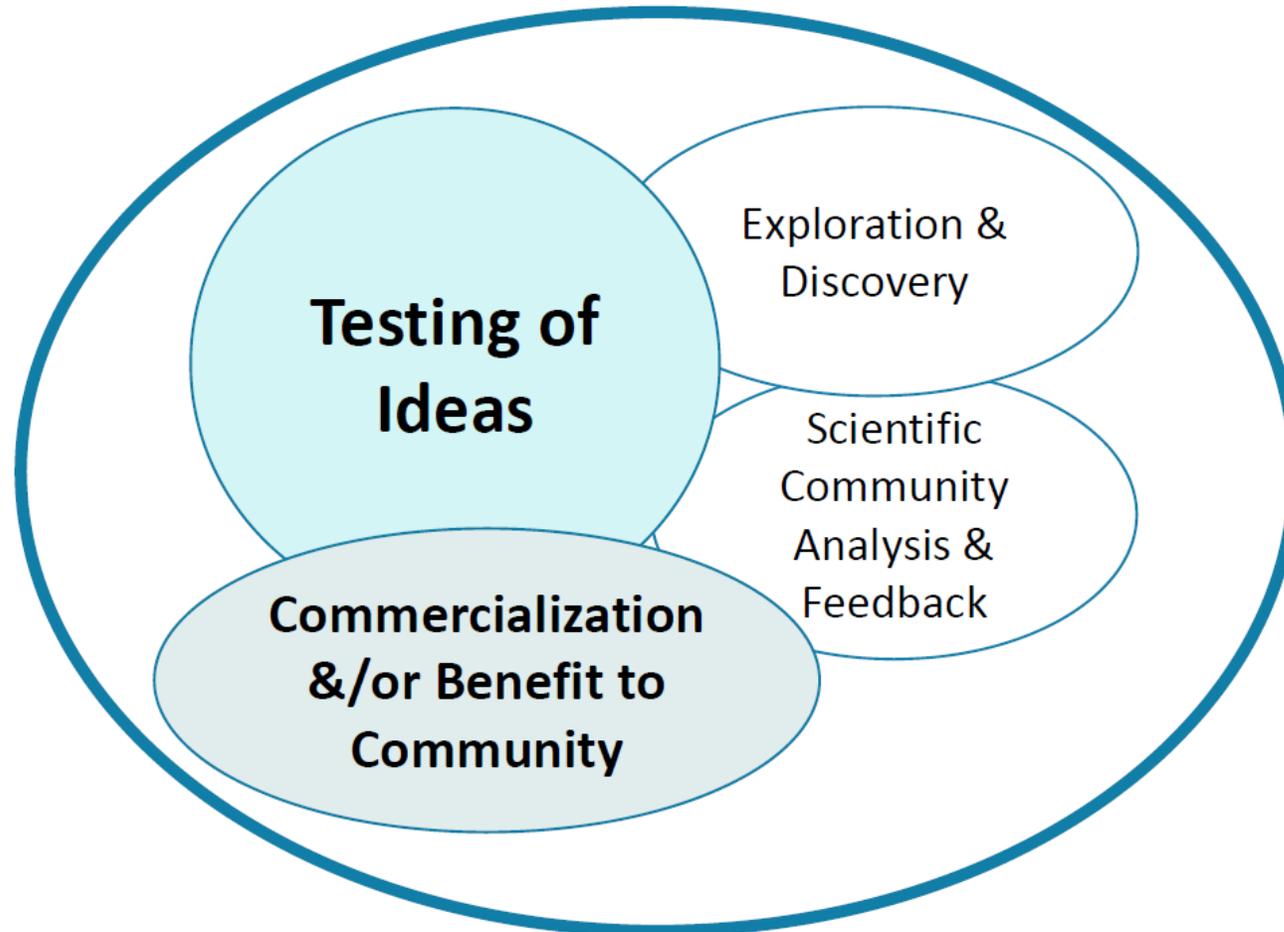
# DRRM

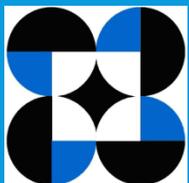
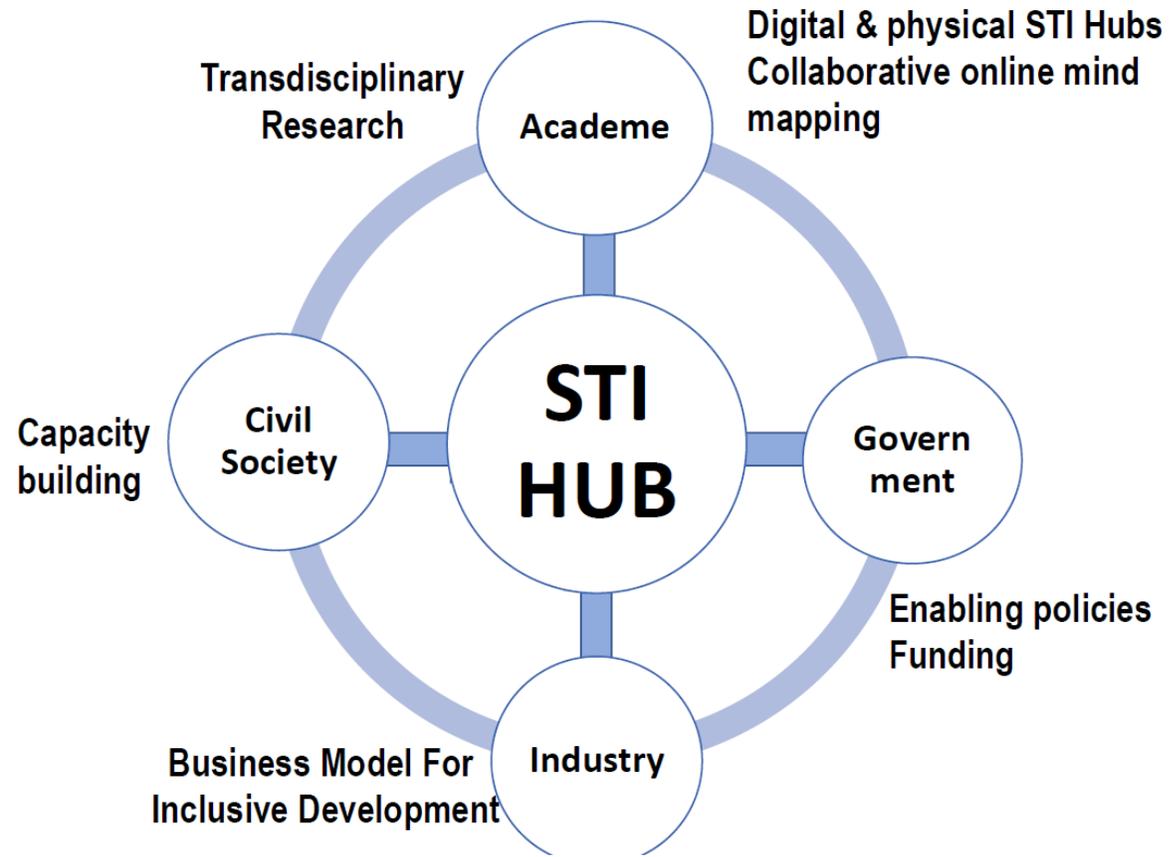
- National Disaster Risk Reduction and Management Council (RA 101211)
  - Disaster Prevention and Mitigation (DOST)
  - Disaster Preparedness (DILG)
  - Disaster Response (DSWD)
  - Disaster Rehabilitation and Recovery (NEDA)

# S&T and R&D in Water



## RESEARCH FOR DEVELOPMENT (R4D)





# HELP Davao Network

[www.helpdavaonetwork.com](http://www.helpdavaonetwork.com)



HELP Davao Network  
Hydrology for Environment, Life and Policy

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HELP Davao Network  
Hydrology for Environment, Life, and Policy



# HELP Davao Network

## WHO ARE WE?

**Multi-Sector network of volunteers and professionals** with various backgrounds in technical, political economic, planning and development, social, and environmental advocacies, commonly working together in **ensuring that stakeholders have access to sound science that can be used to better inform complex decisions and hard choices in water management**





# HELP Davao Network

## WHO ARE OUR MEMBER-STAKEHOLDERS?

- City Mayor of Davao
- Government Line Agencies (**DOST, DENR, DA, DOT, DOH, NCIP, DCWD**)
- Non-government organizations (**PCEEM, HELP-Davao, KFI, CRS, SALIGAN, IDIS, Davao Medical Society, RECORD Foundation**)
- Private Sectors (**Federation of Davao Chamber of Commerce, Aboitiz, HEDCOR, PBGEA**)
- People Organizations (**Protect Davao River Movement, Protect Bunawan River Movement, Federation of Federations of Urban of Poor, Mindanao**)
- Media (**Environmental Media in Action, PIA, SunStar**)
- Management Councils (**Watershed Management Coordinating Committee, Watershed Youth Management Council, Davao Gulf Management Council**)
- Academe (**University of the Philippines, Ateneo de Davao University, University of Southeastern Philippines, University of Immaculate Concepcion, Southern Philippines Agri-business and Marine and Aquatic School of Technology**)



# HELP Davao Network

## WHAT DO WE DO?

To be involved in the process of policy and/or critical decision making and planning in water management



- Acted as technical mediator when DCWD and Aboitiz competed for the use of the same surface water for drinking and hydropower
- Consulted when the City declared a ban on the practice of aerial spraying by banana and pineapple plantations



# HELP Davao Network

## WHAT DO WE DO?

To promote pro-active participation in planning for water and watershed management programs



- Acted as technical mediator when DCWD and Aboitiz competed for the use of the same surface water for drinking and hydropower
- Consulted when the City declared a ban on the practice of aerial spraying by banana and pineapple plantations



# HELP Davao Network

## WHAT DO WE DO?

**Enhance capability in water and watershed management  
By facilitate participation of water leaders and water advocacy  
groups in trainings, consultations and cross visits**





# HELP Davao Network

## WHAT DO WE DO?

To develop a model on water and watershed management, conservation, and protection for replication by other watershed management bodies



Customized IWRM Guidelines for Davao City and Region XI





# HELP Davao Network

## WHAT DO WE DO?

To establish community-based water and watershed watch groups





# HELP Davao Network

## WHAT DO WE DO?

To promote water accessibility to marginalized sectors





# HELP Davao Network

## WHAT DO WE DO?

To conduct constant community-based consultation and information dissemination





# HELP Davao Network

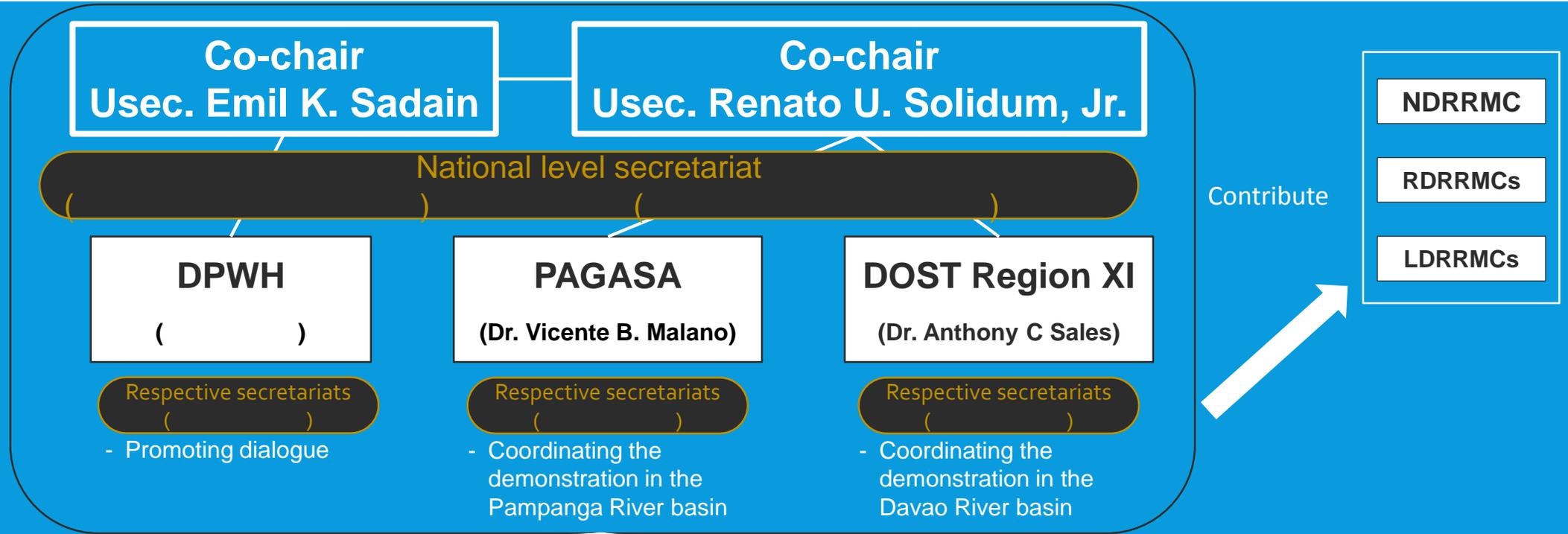
## WHAT DO WE DO?

**Conduct baselines studies, surveys, and researches in water resource management**

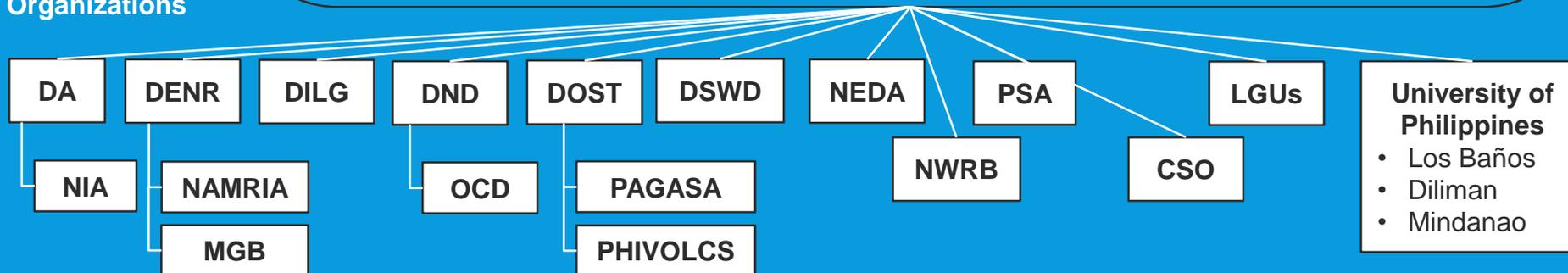


- A nationwide assessment of water safety systems and procedures of water services providers including those in Davao Region is now being conducted by HELP Davao Network.

# INSTITUTIONAL STRUCTURE OF “PLATFORM ON WATER-RELATED DISASTERS”



## Participating Organizations





# DAVAO VISIT

11 MARCH 2017





# TELECONFERENCE MEETING

*5 MARCH 2018*



# STAKEHOLDERS MEETINGS

*18 MAY 2018*



CATEGORY	SOURCE OF INFORMATION	DATA	STATUS	TYPE OF DATA
Hazard	UP DILIMAN	DEM (LiDAR)	Available but needs confirmation for Data Sharing	Digital
		Inundation Depth (LiDAR)	Available but needs confirmation for Data Sharing	Digital
		River flow	Available but needs confirmation for Data Sharing	Digital
		River cross Section	Available but needs confirmation for Data Sharing	Digital
	NAMRIA	DEM (ifSAR)	Available	Digital
		Tidal level	Available	Digital
	PAG-ASA	Hydomet	Available but needs confirmation for Data Sharing	Digital
		Rainfall	Available but needs confirmation for Data Sharing	Digital
	DPWH	River flow	Available	
		River cross Section	Available	

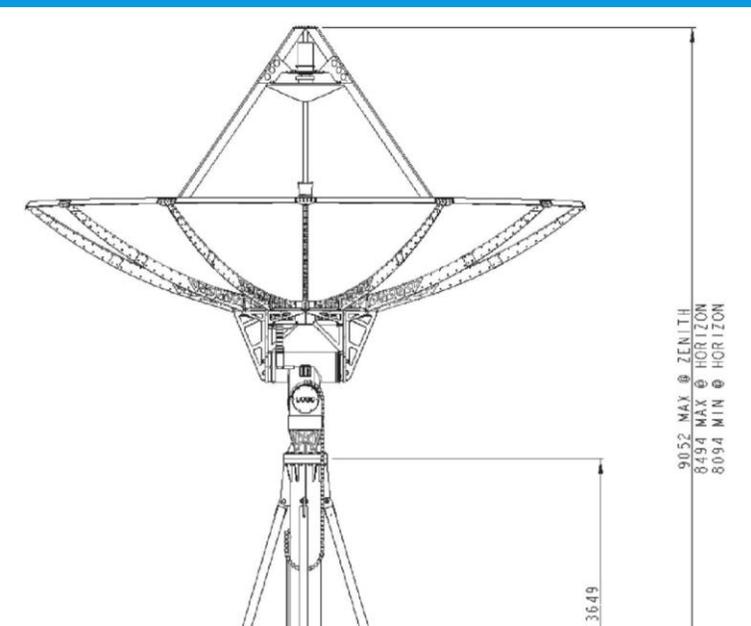
CATEGORY	SOURCE OF INFORMATION	DATA	STATUS
Damage	OCD	Casualties and Missing persons during disaster	
		Number of affected people during disaster	
		Housing damage	
	DA	Agricultural Damage	
	LGU – CPDO	Damage to critical infrastructure during disaster	
		Direct economic loss (other than agricultural loss)	
	DPWH	Damage to critical infrastructure during disaster	Refer to Central 911 for the data
	NEDA	Direct economic loss (other than agricultural loss)	

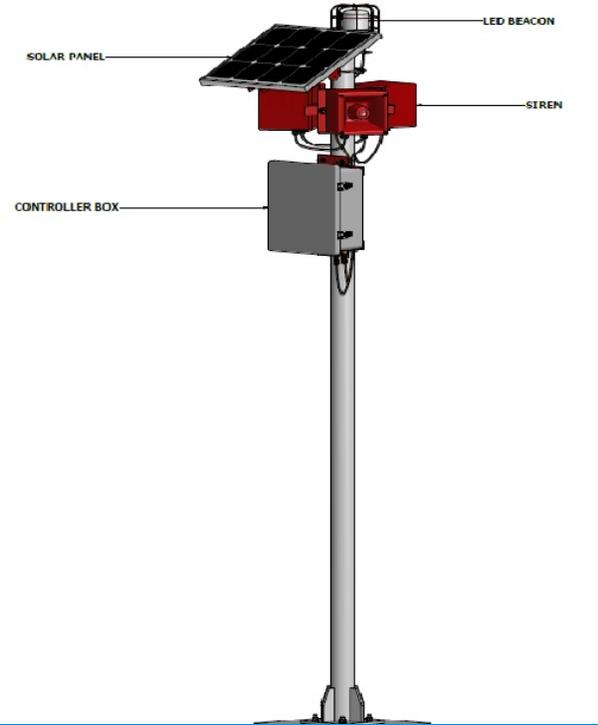
CATEGORY	SOURCE OF INFORMATION	DATA	STATUS	Data Type	
Socio – economic	LGU – CPDO	Land use			
		Infrastructure			
		Drainage facility			
	DOST – ASTI	Land use	Available	Digital	
		Agriculture	Available	Digital	
	NEDA	Agricultural Production	Available		Paper
		Economic Zones	Available		Paper
		Tourism	Available		Paper
	DENR	Land Use	Available but needs confirmation for Data Sharing		

CATEGORY	SOURCE OF INFORMATION	DATA	STATUS	DATA TYPE
Socio – economic	DA	Agriculture		
	DPWH	Infrastructure	Refer to CPDO for the data	
		Drainage Facility	Refer to City Engineer's Office for the additional data	
	NEDA	Land Use		
		Information		
	PSA	Agriculture	Available	Paper
		Population	Available	Paper

# REGIONAL INITIATIVES

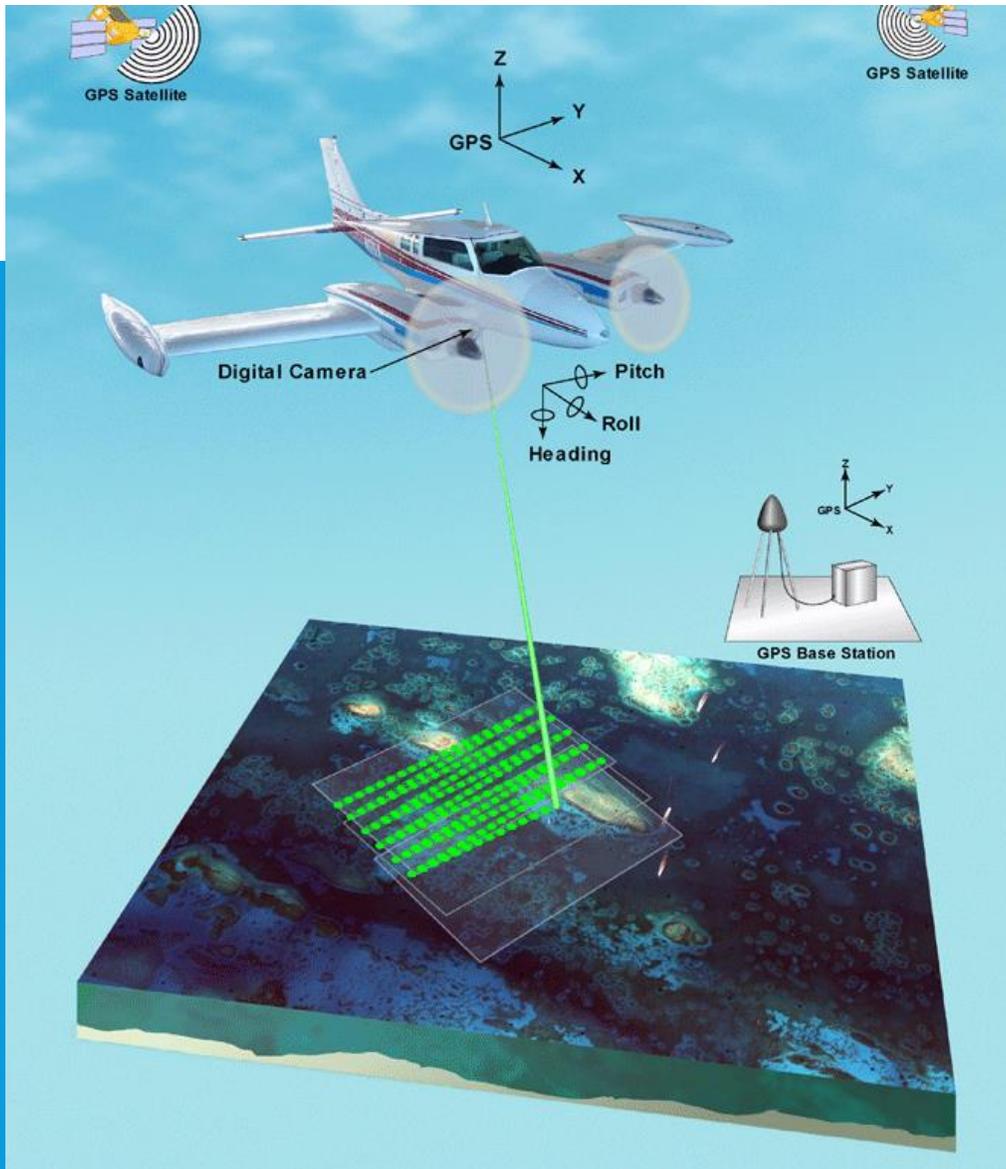






# DEPLOYMENT OF EARLY WARNING SYSTEM





# LIDAR

- *Components of airborne LIDAR survey:*
  - *GPS*
  - *IMU*
  - *Laser Rangefinder*



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



United Nations  
Educational, Scientific and  
Cultural Organization



**A multi-stakeholder  
collaboration**  
involving the key  
actors in water  
management/water  
governance in Davao  
Region: government  
and non-government  
agencies, academe  
and other research  
institutions, private  
institutions, and local  
communities



Davao  
River  
Initiatives



Proceedings of  
**STAKEHOLDERS' CONSULTATION  
AND TREE PLANTING ACTIVITY**

Demonstration Site on "Enhancing Resilience to Disasters  
of Urban Water Systems of Mindanao" in Philippines





## 3 Strategic Approaches:

**Assess the state of the Urban Water Systems in Davao City;**

**Strengthen integrated planning and coordination to enhance resilience in the management of the water systems;**

**Raise awareness on climate change adaptation among stakeholders by demonstrating resilience.**

# Strategic Approach of the Sustainability Science project:

**Component 1**

- Database and Assessment using the Geographical Information System (GIS)



**Component 2**

- Development of Plan and Demonstration of Technologies

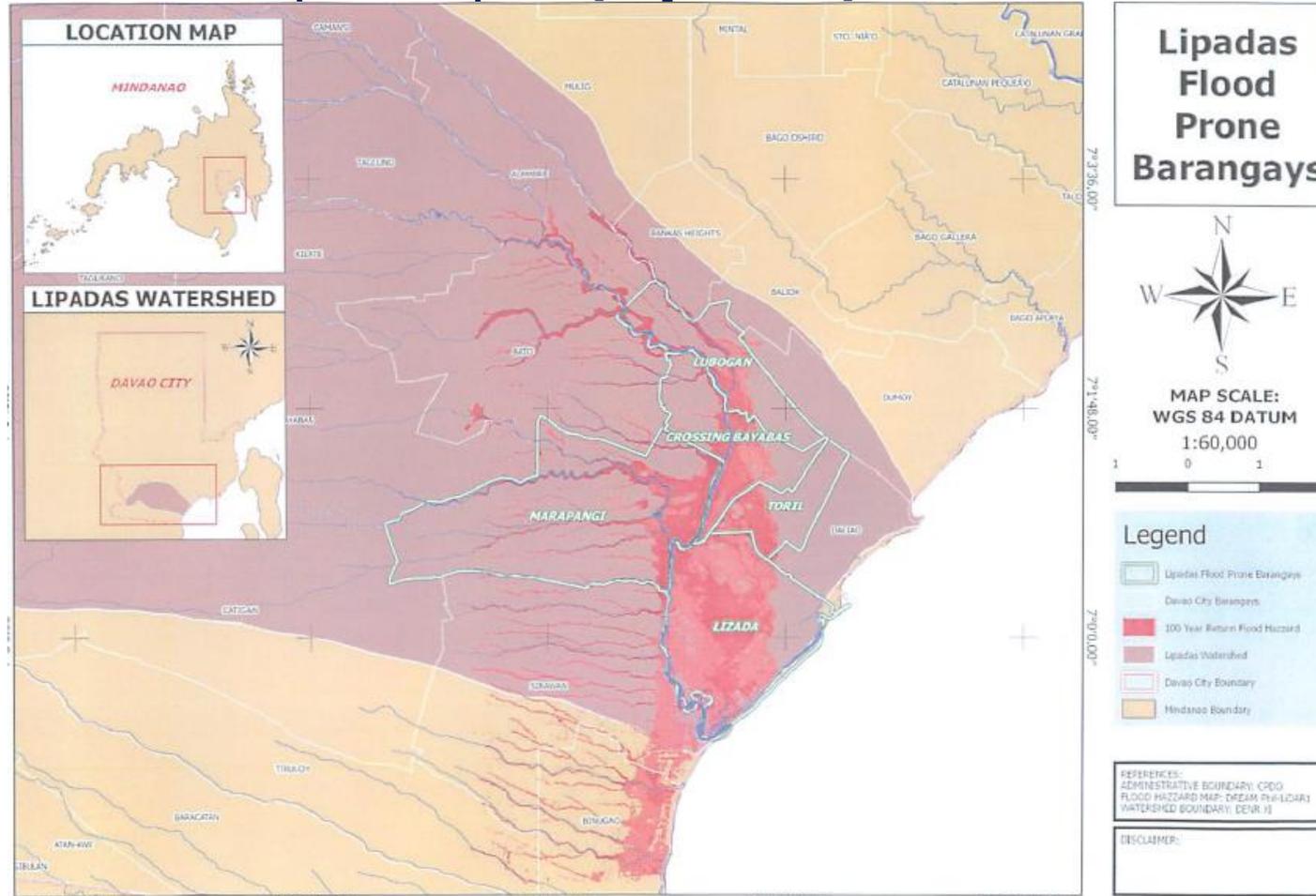


**Component 3**

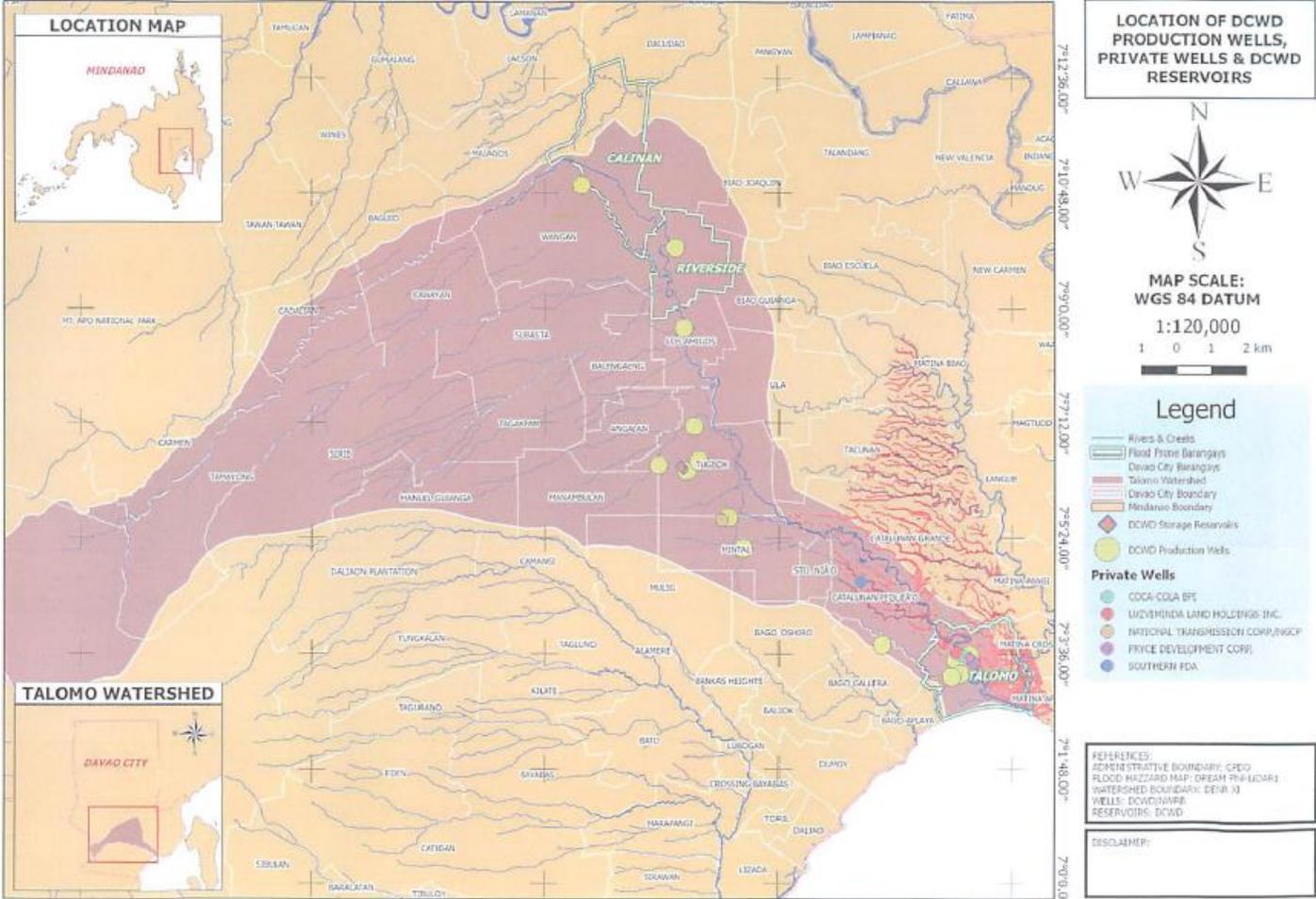
- Capacity Building and Raising Awareness on Climate Change Adaptation



# Flood map sample (Lipadas)



# Location of DCWD Production Wells, Private Wells & DCWD Reservoirs





## Major Outcome 1:

### Demonstration of technologies for rehabilitation and upgrading of water conveyance systems

(study on efficiency and effectiveness of existing water conveyance systems vis-a-vis affected populations; identification and pilot best water conveyance systems)



## Major Outcome 2:

### Improvement of monitoring systems responding to climate vulnerabilities

(Identification and evaluation of best monitoring/early warning systems and pilot/replicate these systems to other areas)



## Major Outcome 3:

### Developed/Improved integrated management of urban water systems towards climate change

(review of existing plans, gathering of best practices, recommendations for upgrading/improvement of old/damaged/outdated systems, workshop for development of resiliency plan – water-energy-food nexus)

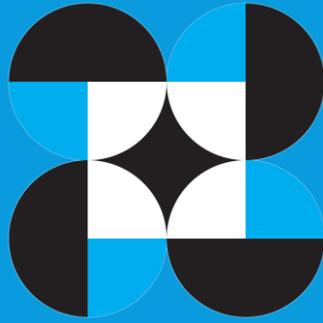


## Major Outcome 4:

**Improved capacities and awareness among educational institutions and local communities in the context of climate change adaptation** (develop sustainability science strategy in enhancing resilience to disasters of urban waters, develop and disseminate communication packages on how public can contribute to building disaster resilience in the region, build local capacities of water leaders in demonstrating technologies and systems, and public dissemination/dialogues/information drive on DRR and results of inventories/database, and developed plans for improve urban water systems

# LESSONS LEARNED AND STEPS FORWARD

- Quality/reliable data
- Translation of research results into usable forms
- Building resilience of communities and individuals
- Integration of efforts
- Sustainability Science – One Island, One Science



# JE VOUS REMERCIE!

**Department of Science and Technology**

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