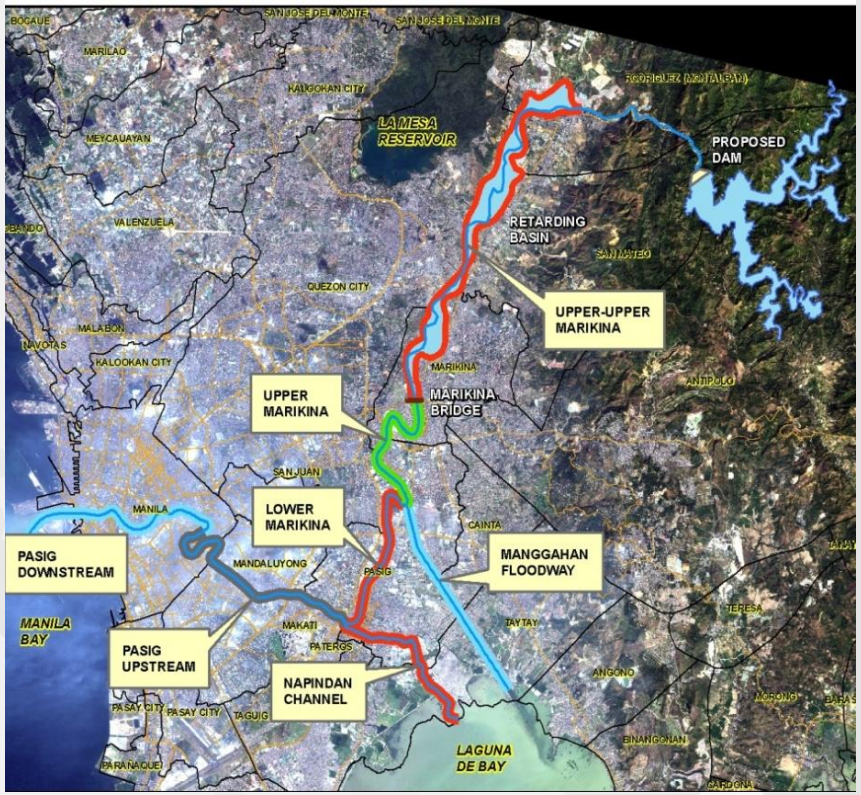
11th GEOSS Asia-Pacific Symposium

Institutional Initiatives of the Philippines



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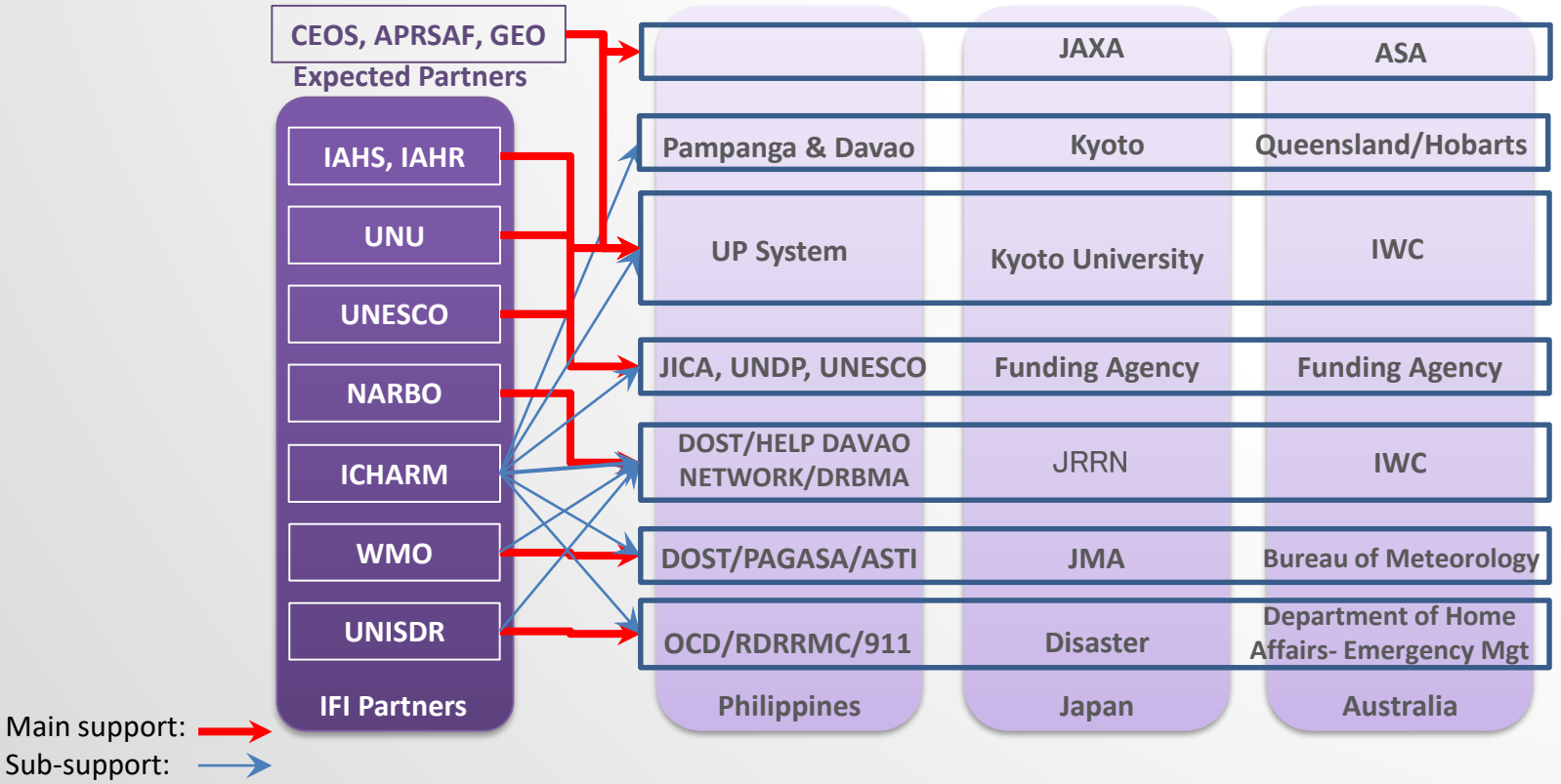
PHILIPPINES

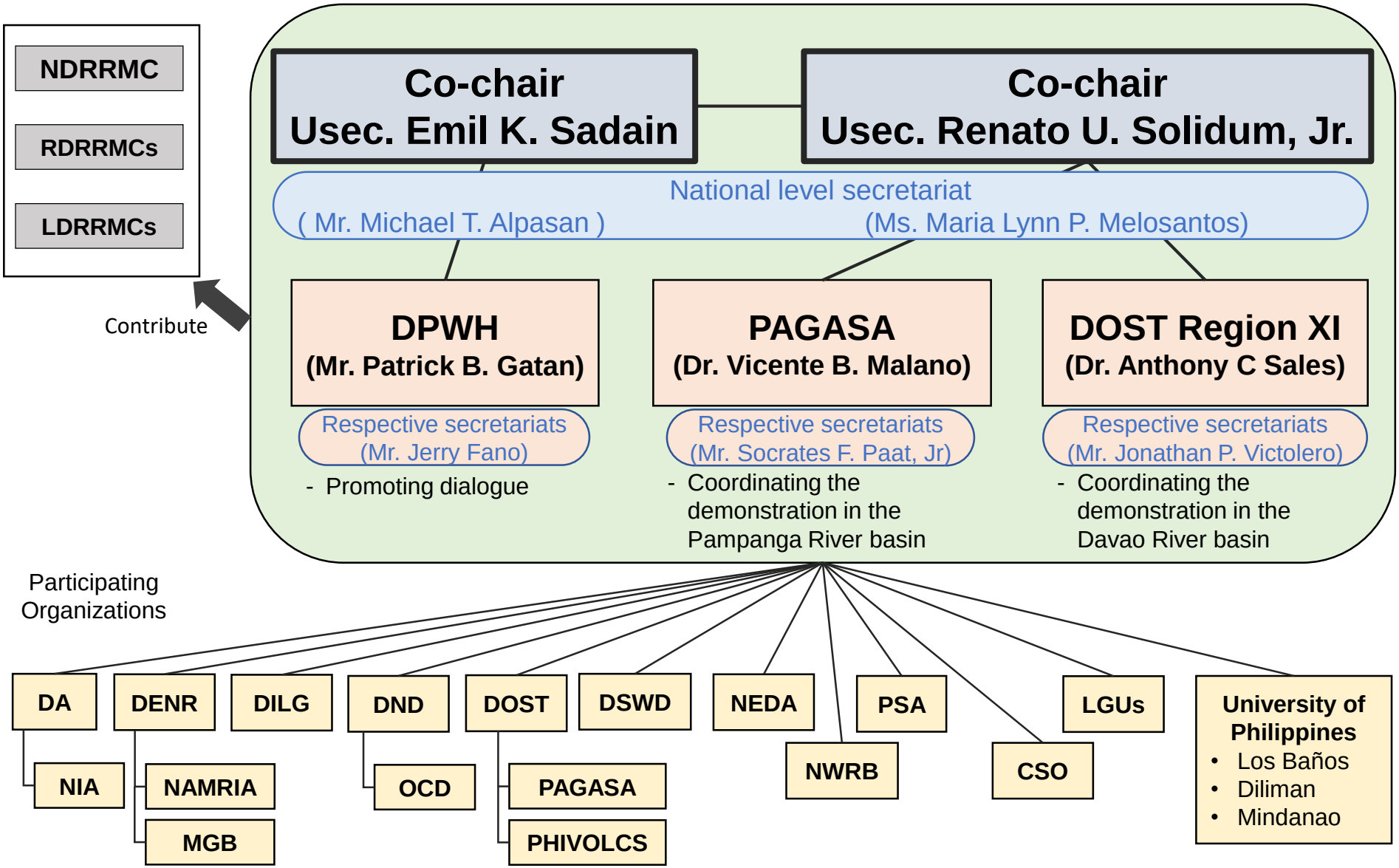
REGIONAL COORDINATION

Areas of key interest for collaboration:

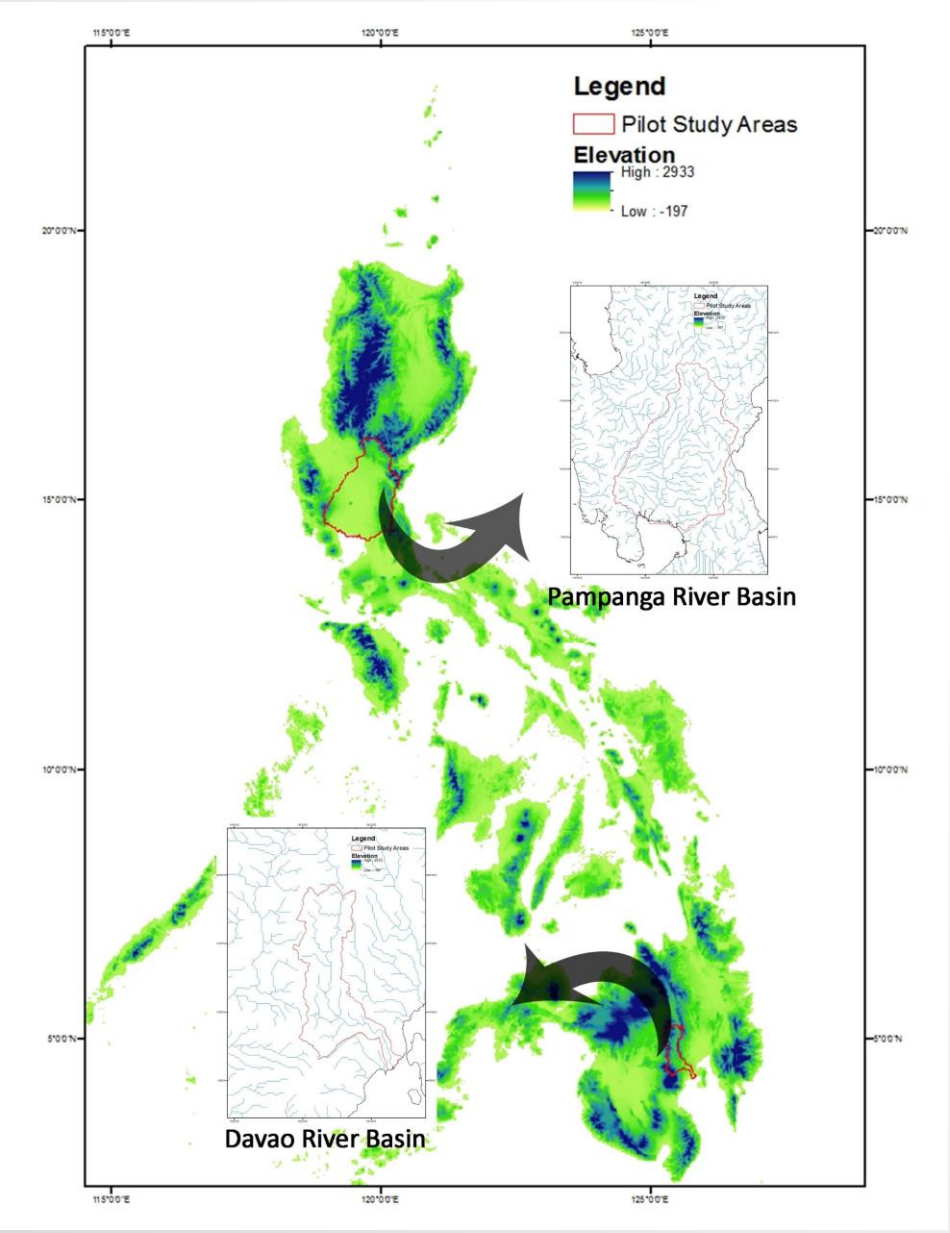
- Urban risk planning
- Structural Safety/ Critical Infrastructures
- Decision Support System for Disaster Response
- Urban Wastewater Planning
- Smart Technologies for Climate Change – water, agriculture and energy



Institutional Structure of "**Platform on Water Resilience and Disasters**"



SATREPS PROJECT PROPOSAL



Goals and Objectives:

- **collect local data** and **sharing of data** through data integration and analysis system (**DIAS**);
- conduct highly accurate **risk assessment on water-related disaster risks** to **urban** and **sub-urban areas** of **Pampanga** and **Davao** through the use of a hybrid assessment technology using models and big-data platform that are capable of handling data and information on hydrology and hydraulics, agriculture, and economy;
- mainstream water-related risk assessment output for **early warning system** and **policy recommendations**;
- **knowledge** and **technology transfer** through trainings and exchange programs of human resources from the Philippines; and
- create **policy recommendations** on approaches for promoting sustainable local economic development amidst the threats and impacts of climate change.
- Establish **communities of practice**

Expected Outputs:

- Establish **big-data platform** for water-related disasters using DIAS
- Establish **hybrid risk assessment model** for water-related disasters
- Develop **communities' resilience assessment indices** and mainstream water- related disaster risk assessment for policy decision making
- Draft **policy recommendations** for promotion of sustainable local economic development.

1. DATA INTEGRATION

Current Missions/Tasks/Activities

A. Integrate the real-time data from ARGs, WLMS, and Tandem units with the in-house systems of Central 911 and RRDRMC of Davao City

Davao Central 911 uses Emergency Computer Aided Dispatch (ECAD) that enables the authorities to locate the distress calls and gives assistance to the citizens that needs emergency resources of the government.

1. DATA INTEGRATION

Further Expected Information

- Predict downstream level rise in a certain lead time based on upstream hydromet data
- Identification of possible areas where distress calls may come from

Further Expected Value

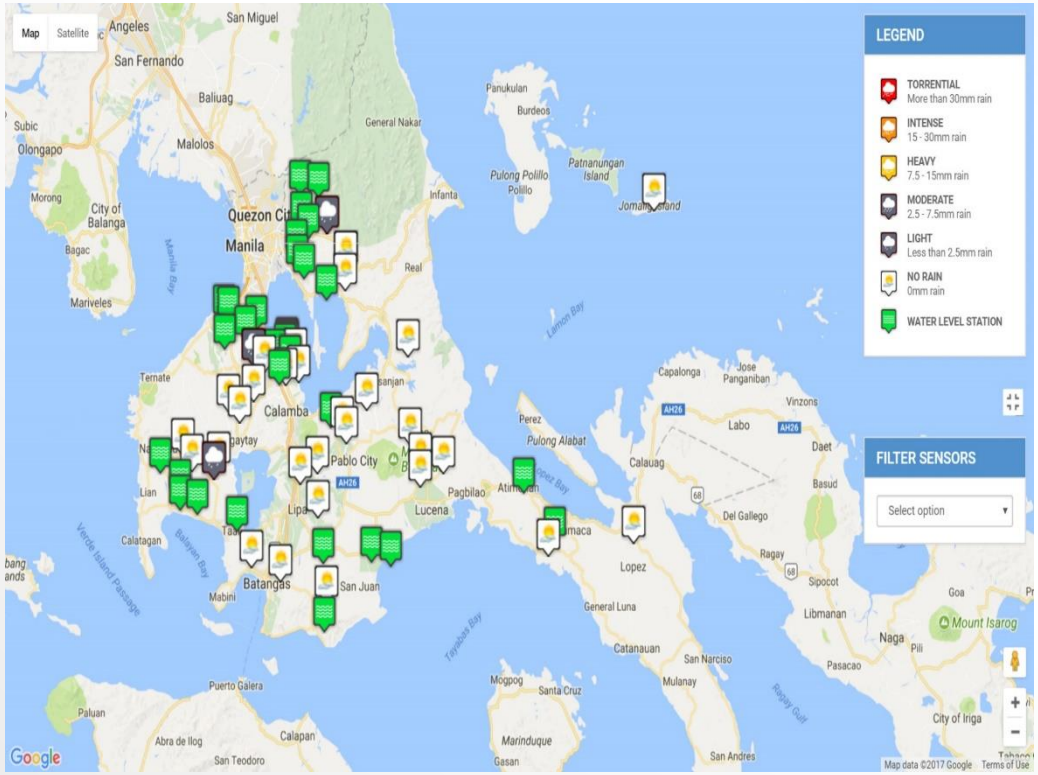
- Faster location of areas that may experience flooding
- Advance positioning of emergency resources
- Pro-active emergency response
- Resilient communities

1. DATA INTEGRATION

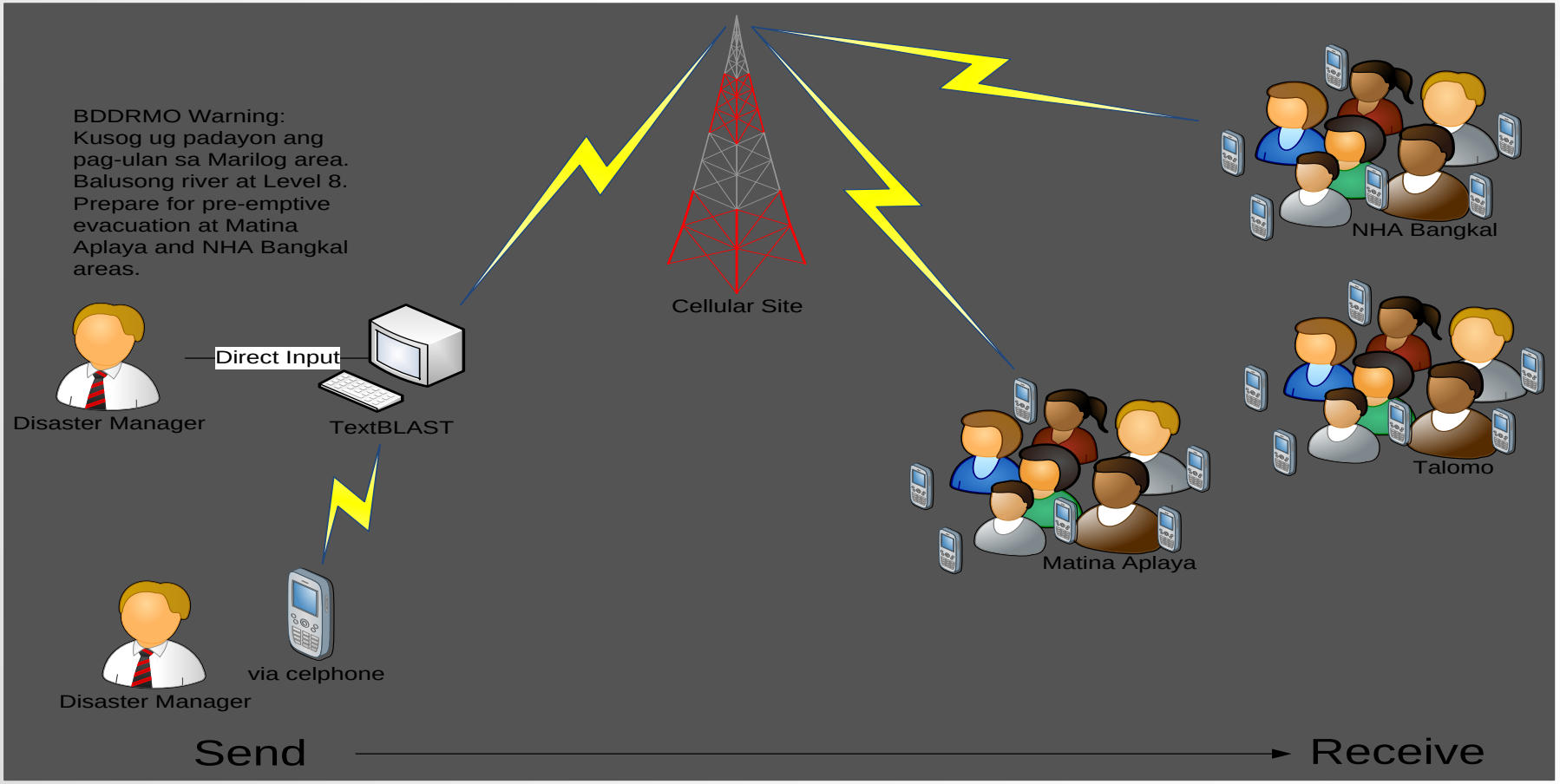
Current Missions/Tasks/Activities

B. Project HANDA: information system for disaster notification

is an ICT-enabled Disaster Risk Reduction and Management (DRRM) system used in the dissemination disaster-related updates



TEXTBLAST (TEXT BROADCAST LEVEL AUTOMATED SENDING TOOL)



Development of a system that integrates Project HANDA to existing SMS based information system of OCD XI.

1. DATA INTEGRATION

Further Expected Information

- Provide hazard notification to DRRM focal persons
- Disseminate weather and earthquake bulletins
- Alert communities on possible disasters
- Provide access to geo-hazard maps

Further Expected Value

- Improve disaster response
- Improve community response and readiness against disasters
- Enhance evacuation planning and disaster response planning of local governments
- Resilient communities

2. EARLY WARNING

Current Missions/Tasks/Activities

A. Deployment of early warnings systems (DEWS)

Entire Davao Region:

26 Tandem Units

46 ARGs

6 WLMSs

Davao City only:

6 Tandem Units

8 ARGs

2 WLMSs

2. EARLY WARNING

Current Missions/Tasks/Activities

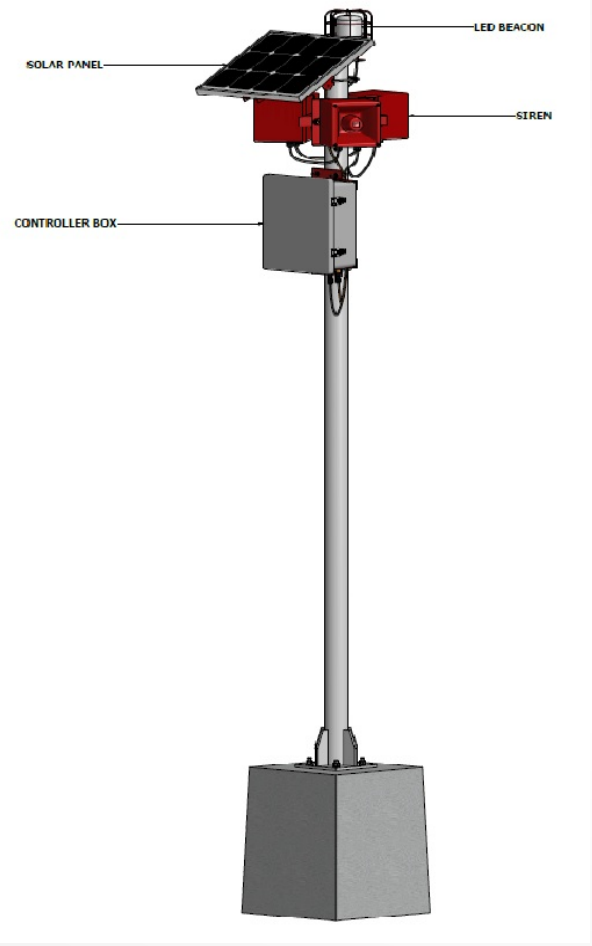
B. Installation of community-based alerting stations

Entire Davao Region:

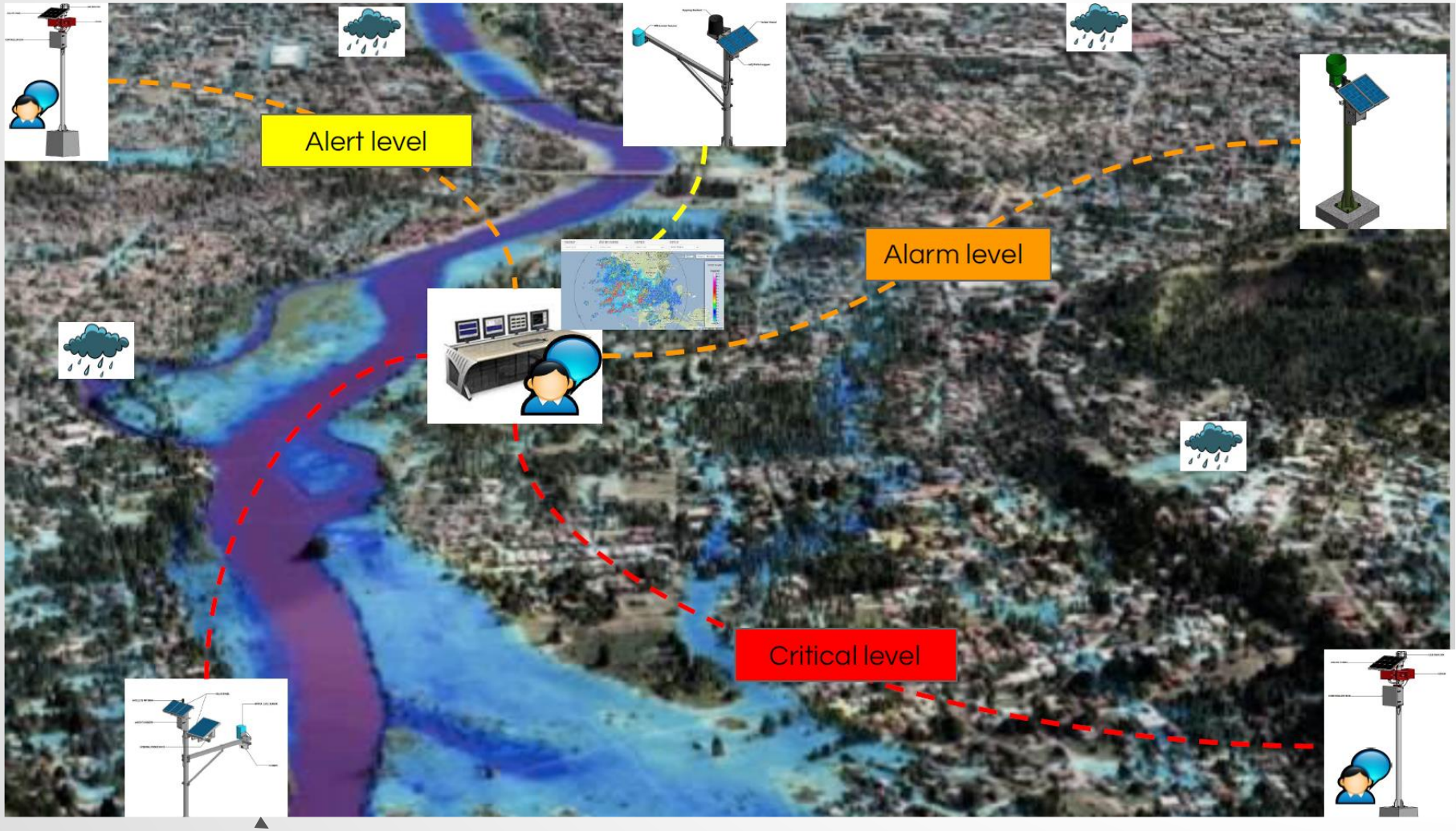
16 CBFEWs

Davao City only:

4 CBFEWs

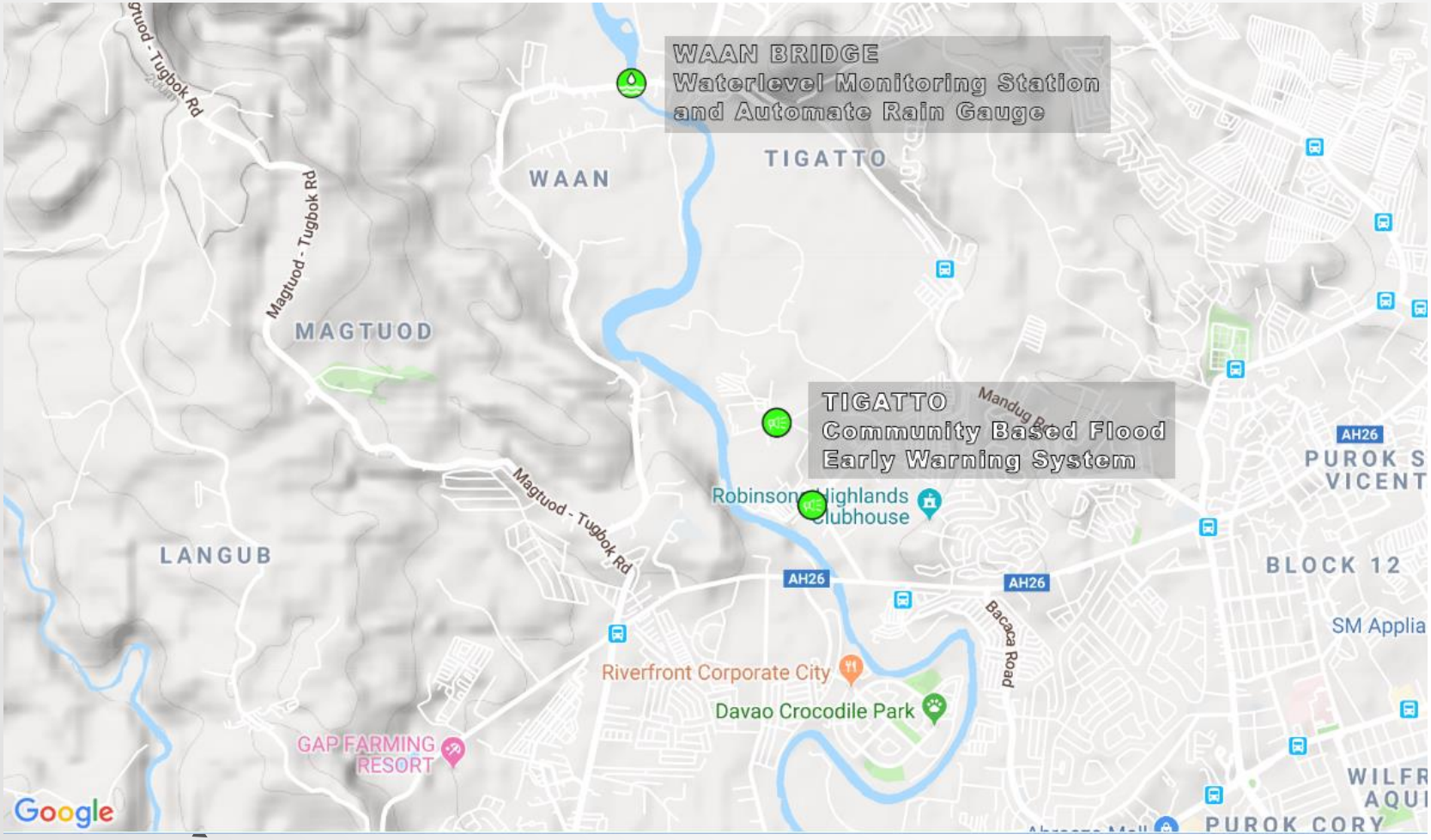


DOST REGION XI



Use of data from ARGs/WLMS to trigger the Warning Stations according to alert, alarm, and critical levels

DOST REGION XI



Locations of installed Warning Systems along Davao River

2. EARLY WARNING

Further Expected Information

- Predict areas where flooding may occur
- Develop evacuation plans

Further Expected Value

- Improve disaster response
- Provide time for save properties, valuables, and lives
- Improve community response and readiness against disasters
- Enhance evacuation planning and disaster response planning of local governments
- Resilient communities

3. CLIMATE CHANGE

Current Missions/Tasks/Activities

A. Collaborative proposal for Davao City: *"Be Climate Smart NOW: Enhancing Resilience to Disasters and Climate Change through Sustainable Technologies and Practices"*

Track analyses conducted for historical climate stimulus, climate scenarios, human resources and demographics, and climate change impact

3. CLIMATE CHANGE

Current Missions/Tasks/Activities

B. S&T Action Frontline for Emergencies and Hazards Program (SAFE)

Development and submission of S&T strategies/proposals that will mitigate and manage the effect of disasters in the Agriculture, Aquaculture and Natural Resources (AANR) sectors.

3 programs:
-Ridge-to-Reef approach,
-Marine Protected Areas
-Smarter Technologies for Farmers

3. CLIMATE CHANGE

Further Expected Information

- Predict climate change impacts and scenarios
- Predict damages to natural resources
- Predict priority areas for sustainable development planning (ex: resilient agriculture)

Further Expected Value

- Sustainable development planning
- Sustainable production of AANF to support needs of communities
- Resilient communities

4. ECONOMIC ASSESSMENT

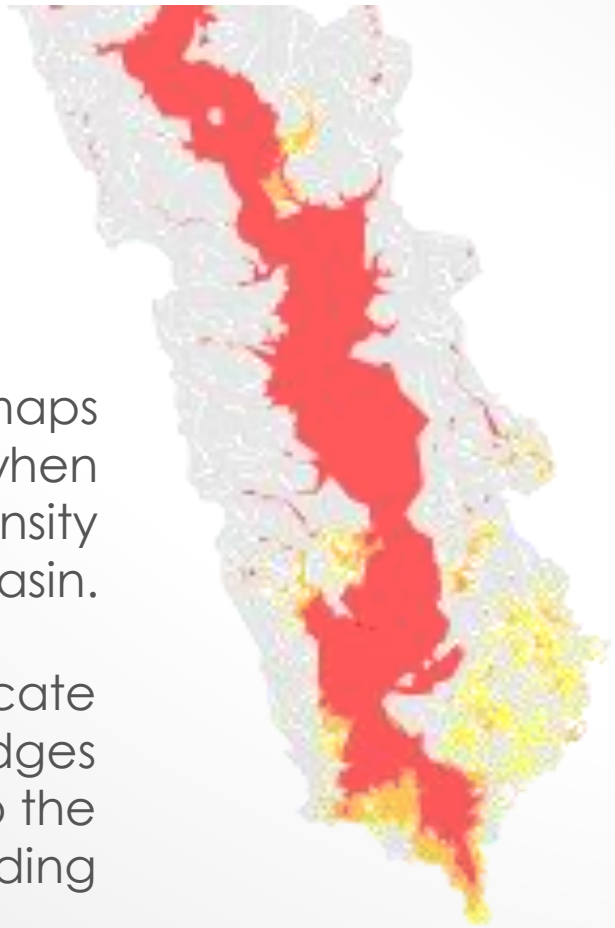
Current Missions/Tasks/Activities

A. Geo-informatics for the systematic assessment of flood effects and risks for resilient Mindanao (GEO-SAFER Mindanao)

Produces scenario-based flood hazard maps showing areas which can get flooded when rainfall or varying duration and intensity occurs over the basin.

Maps can be analyzed further to locate infrastructures like buildings, roads, bridges and other infrastructures that are at risk to the effects f flooding

Davao 100 Year Flood Hazard Map



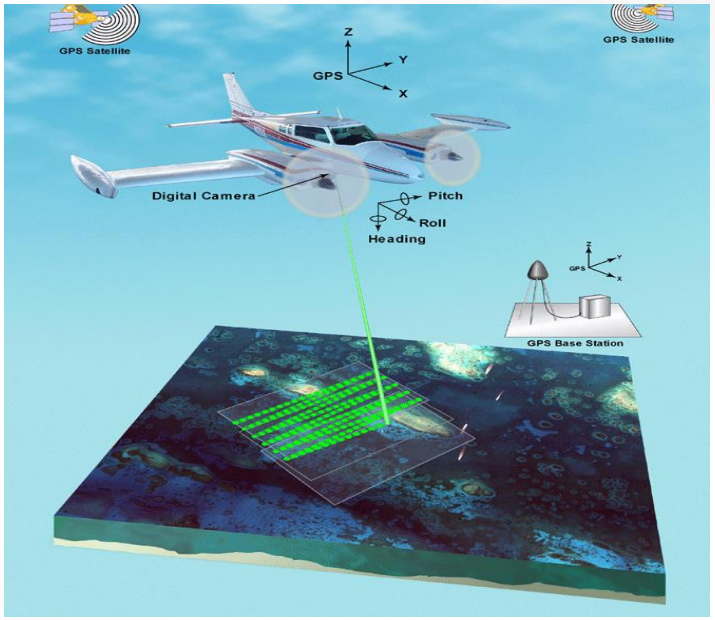
4. ECONOMIC ASSESSMENT

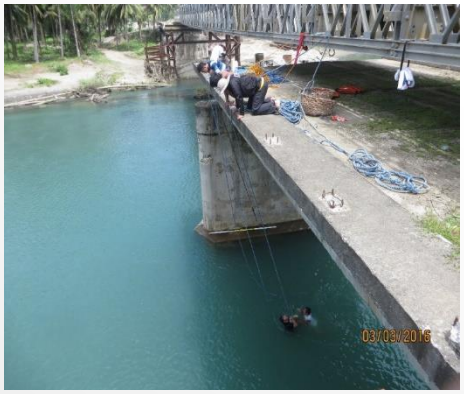
Current Missions/Tasks/Activities

B. Use of LiDAR data for Resource Mapping

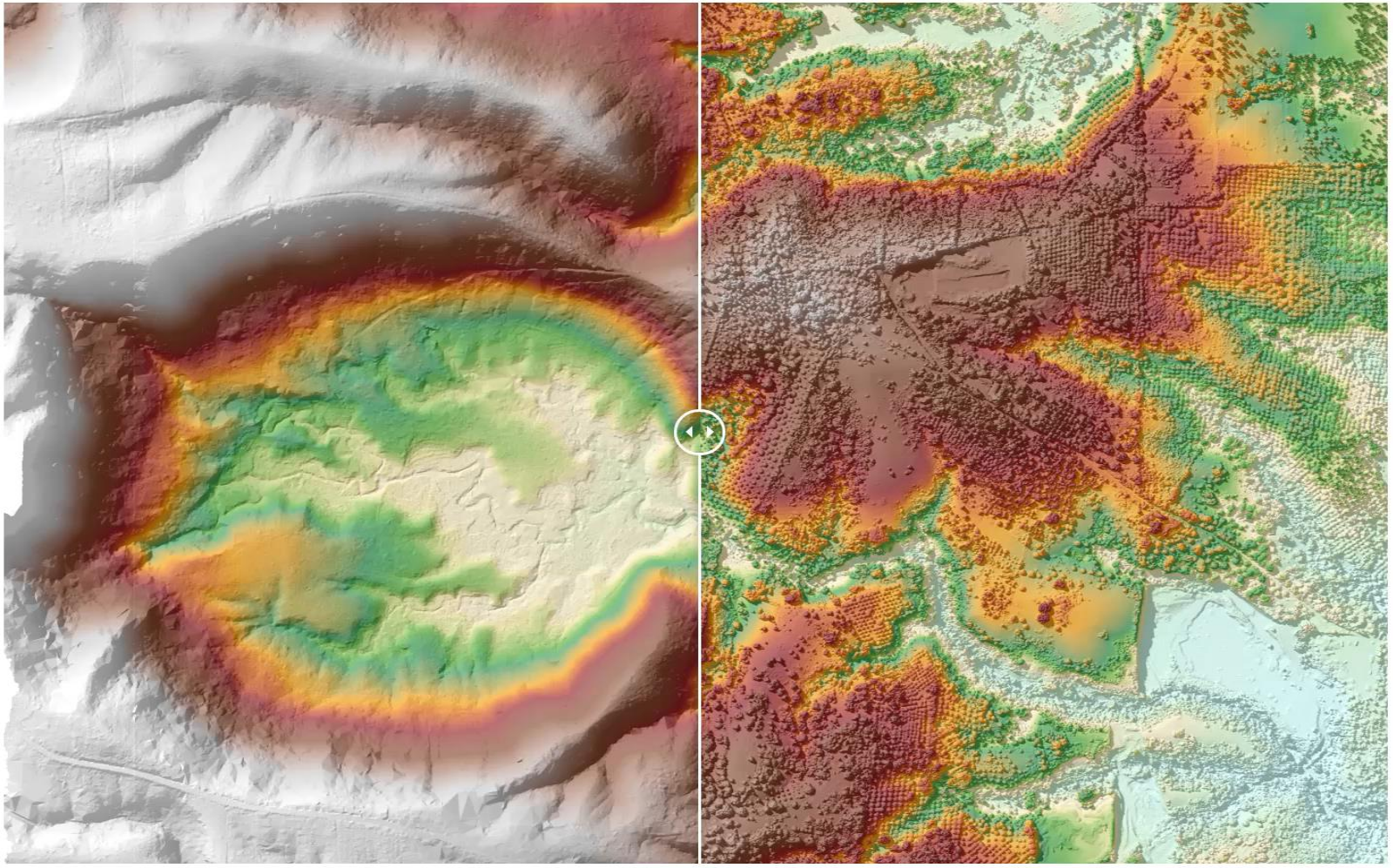
produce detailed resource maps using LiDAR for various applications:

- production of high value crops
- irrigation assessment
- aquaculture production
- forest protection
- discovery of renewable energy sources





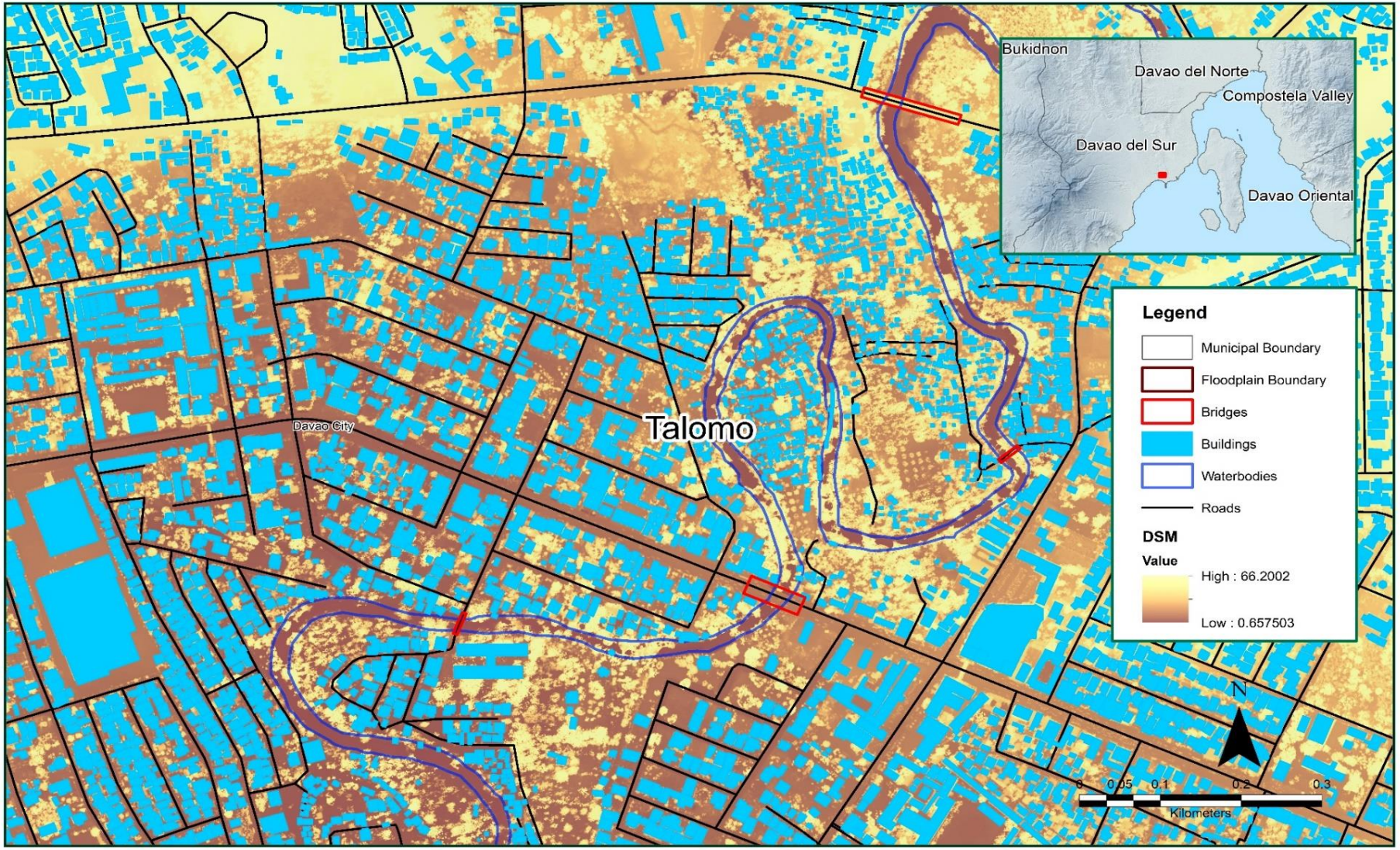
RESULTS: LIDAR DATA (DEM) PROCESSING



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.

DOST REGION XI

Extracted FEATURES FROM PROCESSED LIDAR DATA
(road networks, buildings, waterbodies, bridges)

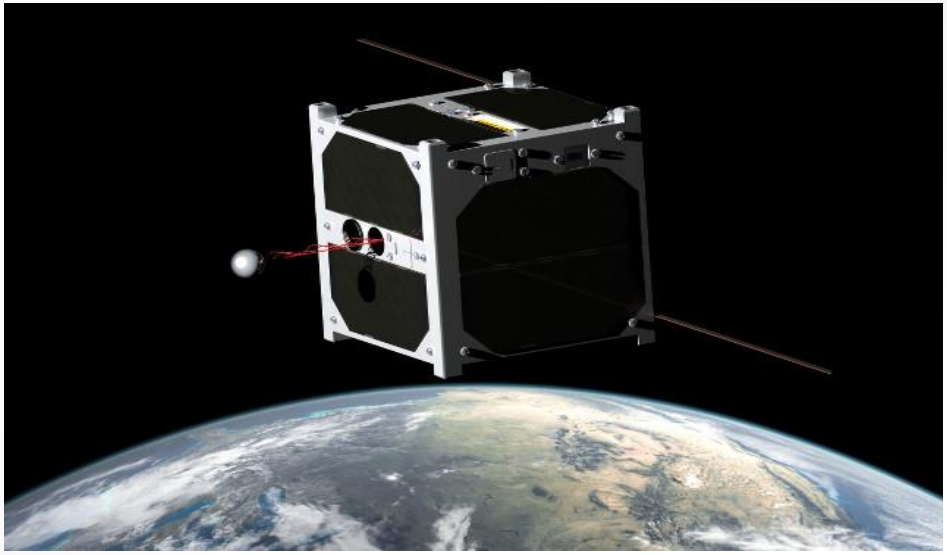


4. ECONOMIC ASSESSMENT

Current Missions/Tasks/Activities

C. PHL-MICROSAT

provides remote sensing information useful in assessing of damages associated with disasters, as well as studying agriculture, fishery, forestry and changes in the environment



4. ECONOMIC ASSESSMENT

Further Expected Information

- Predict damages in infrastructures, agriculture, industries, and basic services (energy, water, communication)
- Enhanced evacuation and contingency plans

Further Expected Value

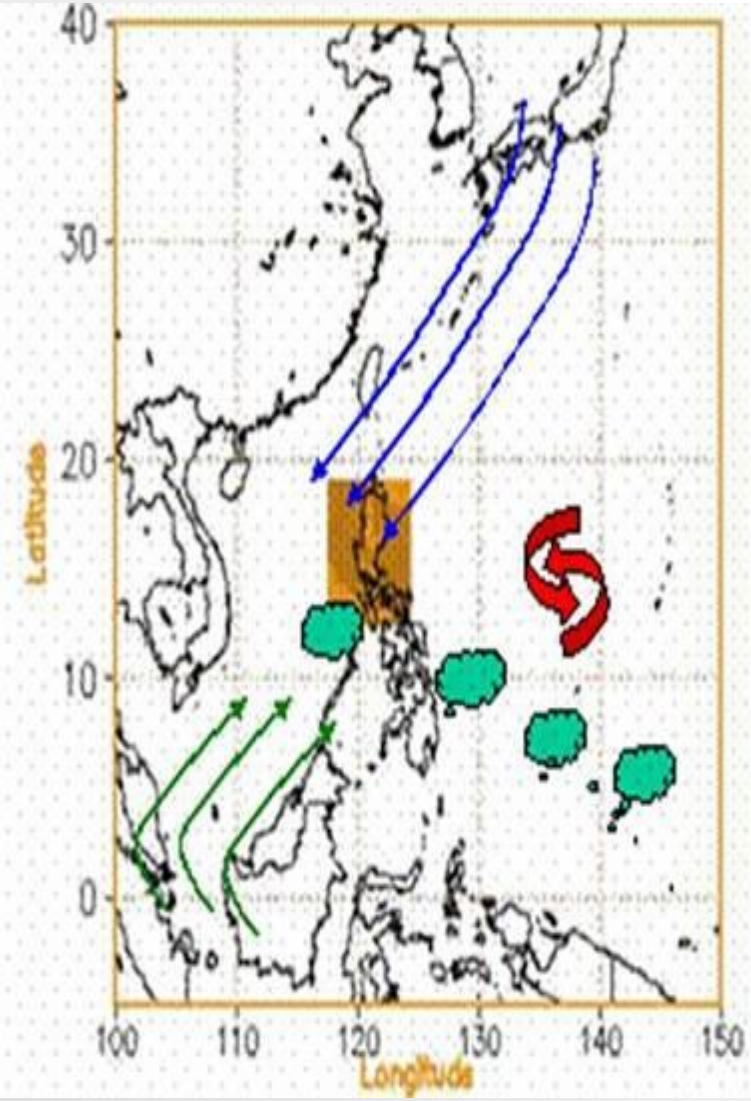
- Faster recovery after disaster
- Lesser losses due to disaster
- Resilient communities

2. EARLY WARNING

Current Missions/Tasks/Activities

- Typhoon Monitoring
- Flood Forecasting and Warning
- Establishment/Acquisition of state-of-the-art Hydro-meteorological Monitoring Facilities

"Most Weather Causing Phenomena are present."



1. Low Pressure Areas (LPAs)/ Tropical Cyclones

20 TCs ANNUALLY (Average)

2. ITCZ
3. Southwest Monsoon
4. Northeast Monsoon
5. Thunderstorms
6. Easterly waves
7. Tail end of cold front

TYPHOON MONITORING

EARLY DETECTION OF TROPICAL CYCLONES

Some recent Strong Typhoons that struck the Philippines (> 200km/hr):

TYPHOON MANGKHUT (2018 SEP)
(LOCAL NAME: OMPONG)

TYPHOON HAIMA (2016 OCT)
(LOCAL NAME: LAWIN)

TYPHOON HAIYAN (2013 NOV)
(LOCAL NAME: YOLANDA)

FLOOD FORECASTING & WARNING

EARLY WARNING FOR FLOODS AND LANDSLIDES

Some Floods that affected the Philippines:

TS THELMA FLOOD (1991 NOV)
(LOCAL NAME: URING) ····· **CASUALTIES: 5,081***

TYPHOON KETSANA FLOOD (2009 SEP)
(LOCAL NAME: ONDOY) ····· **CASUALTIES: 464***

TYPHOON PARMA FLOOD (2009 OCT)
(LOCAL NAME: PEPENG) ····· **CASUALTIES: 465***

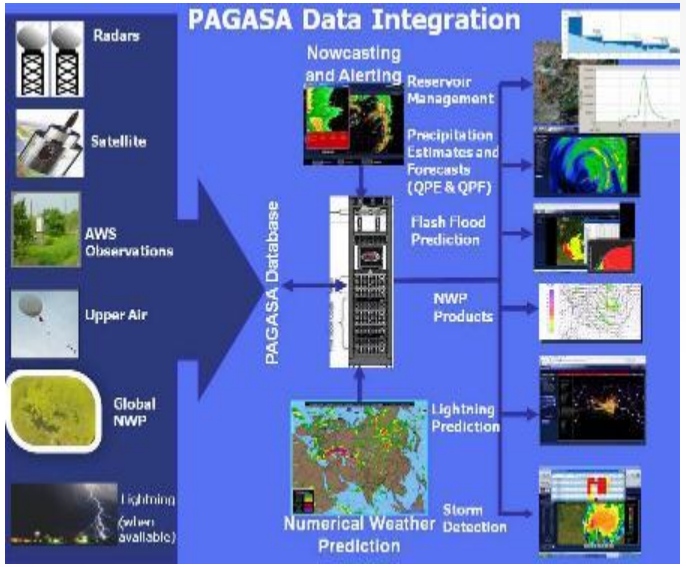
TYPHOON WASHI FLOOD (2011 DEC)
(LOCAL NAME: SENDONG) ····· **CASUALTIES: 1,268***

*Source: NDRRMC

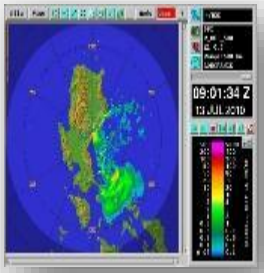
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)

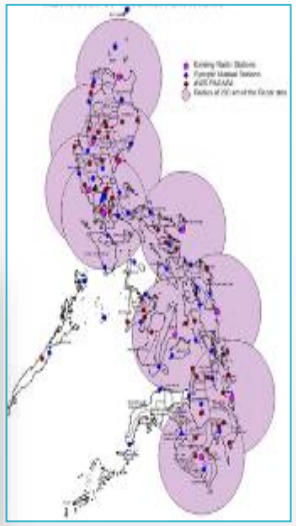
Infrastructure on EWS (hydromet hazards)

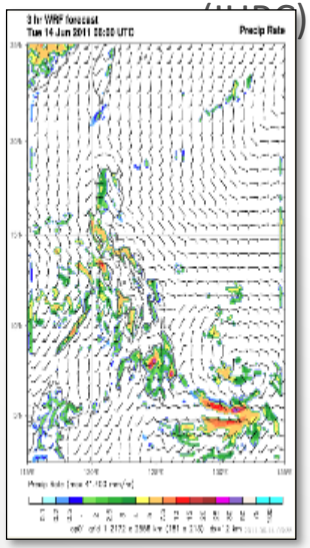
- 58 Synoptic stations
- 23 Agromet stations
- 120 Automatic Weather Stations
- 6 Upper air stations
- 2 Marine buoys
- 8 telemetered major river basins
- 5 telemetered major multi-purpose dams
- 3 Satellite receivers

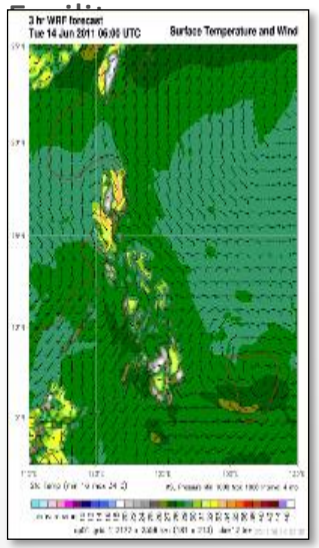


Integrated High Power Computing









1. DATA INTEGRATION

Data List

Damage

Data	Source of information
Casualties & missing person	OCD
Num. of affected people	OCD
Agricultural damage	DA
Housing damage	OCD
Damage to critical infrastructure	DPWH, LGU
Direct economic loss other than agricultural loss	LGU NEDA

Hazard

Data	Source of information
DEM (LiDAR)	UP Mindanao
DEM (ifSAR)	NAMRIA
Hydromet data	PAGASA, ASTI, DREAM
Inundation depth (LiDAR)	UP Diliman, UP Mindanao
Inundation depth (interview)	PAGASA
Rainfall	PAGASA
River flow	DPWH, UP Mindanao
River cross section	DPWH, UP Mindanao
Tidal level	NAMRIA

Socio-economic

Data	Source of information
Land use	LGU, DOST
Agriculture	PSA, DA
Population	PSA
Infrastructure	DPWH/LGU
Industry	DTI
Commerce	DTI
Drainage facility	DPWH/LGU
Information	PSA, NEDA
Regional GDP	PSA
Tax revenue	BIR
Land price	City Assessors Office

1. DATA INTEGRATION

Data Sharing Policy

Category 1: Data, metadata and products are shared as Open Data by default.

Category 2: Data, metadata and products are shared only among the PLATFORM Participants

Category 3: Data, metadata and products are shared with those who get a permission from the data provider.

Procedures for Data Upload

Data Manager	DIAS, ICHARM
1. Data list creation 2. Data collection & Metadata preparation 3. Provision of a station list 5. Data upload 7. Quality control 8. Metadata registration	1. Data list creation 4. Preparation of data upload site 6. Format conversion

1. DATA INTEGRATION

Metadata Preparation

Category	Data	Source of information	Data Type	Specification
Hazard	DEM (LiDAR)	UP Mindanao	Map	Year: Area: Spatial Resolution: Elements:
	DEM (ifSAR)	NAMRIA	Map	Year: Area: Spatial Resolution: Elements:
	Hydromet data	PAGASA	Point ☐ Digital ☐ Paper	Name(s) or Total number: Period: Temporal Resolution: Elements:
	Inundation depth (LiDAR)	UP Diliman	Map	Year: Area: Spatial Resolution: Elements:
	Inundation depth (interview)	PAGASA	Map ☐ Digital ☐ Paper	Year: Area: Spatial Resolution: Elements:
	Rainfall	PAGASA	Point ☐ Digital ☐ Paper	Name(s) or Total number: Period: Temporal Resolution: Elements:
	River flow	DPWH UP Mindanao	Point ☐ Digital ☐ Paper	Name(s) or Total number: Period: Temporal Resolution: Elements:
	River cross section	DPWH UP Mindanao	Point ☐ Digital ☐ Paper	Name(s) or Total number: Period: Temporal Resolution: Elements:
	Tidal level	NAMRIA	Point ☐ Digital ☐ Paper	Name(s) or Total number: Period: Temporal Resolution: Elements:

REALTIME DATA SHARING FOR 2. EARLY WARNING

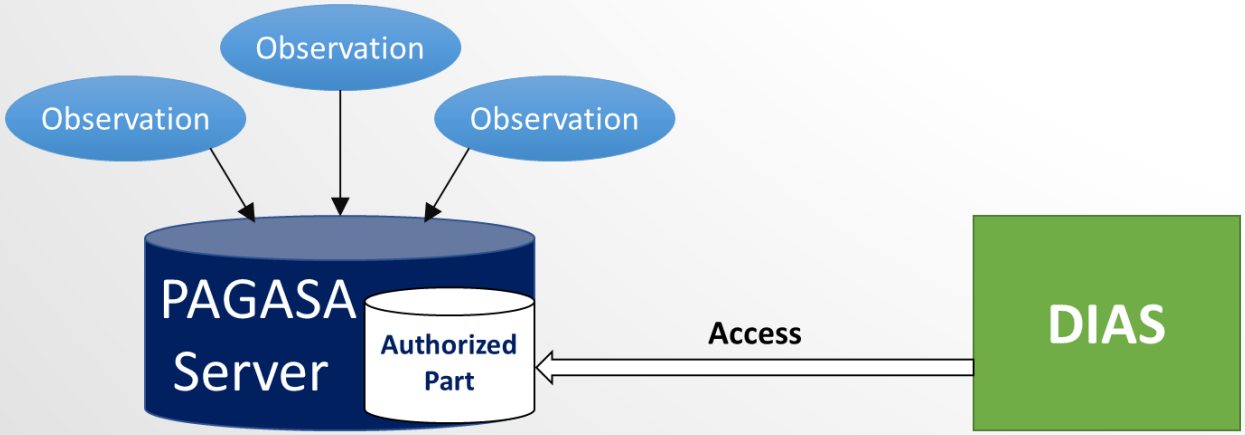
Objectives

- Development of a prototyping flood early warning system on real-time through DIAS to realize the support of sound and timely decisions and actions for reducing water-related disaster risk.

Realtime System

- Real-time rainfall prediction, flood forecasting, and early warning system will be developed

Realtime Data Sharing Scheme



REALTIME DATA SHARING FOR 2. EARLY WARNING

Rainfall data to be obtained

Data	Source	Acquisition	Processing
Ground gauge rainfall	PAGASA	Realtime	
Predicted rainfall (72h prediction)	NCEP	Realtime download	Dynamic Downscaling by WRF
GSMaP_NOW	JAXA	Realtime download	Corrected with ground gauge rainfall data

Necessary Actions

1. Examine a way for real-time data sharing of ground gauge rainfall data (PAGASA)
2. Prepare a server/space with access authorization to DIAS (PAGASA)
3. Real-time data copy (ground gauge rainfall) to the prepared server/space (PAGASA)
4. Ground gauge data transmission to DIAS (DIAS)
5. Rainfall data processing for the flood forecasting models (ICHARM)
6. Develop the flood forecasting models and EWS (ICHARM)
7. Display the results of flood inundation simulation (DIAS)

Done

Further Expected Information

- Establish and improve "End-to-end monitoring and response, forecasting and early warning systems"
- Assist in developing contingency plans for timely evacuation.

Further Expected Value

- Strengthen disaster preparedness
- Mainstream and integrate disaster risk reduction and management and climate change adaptation (DRRM and CCA) in national, sectoral, regional and local development policies, plans and budget

CONTINGENCY PLANNING

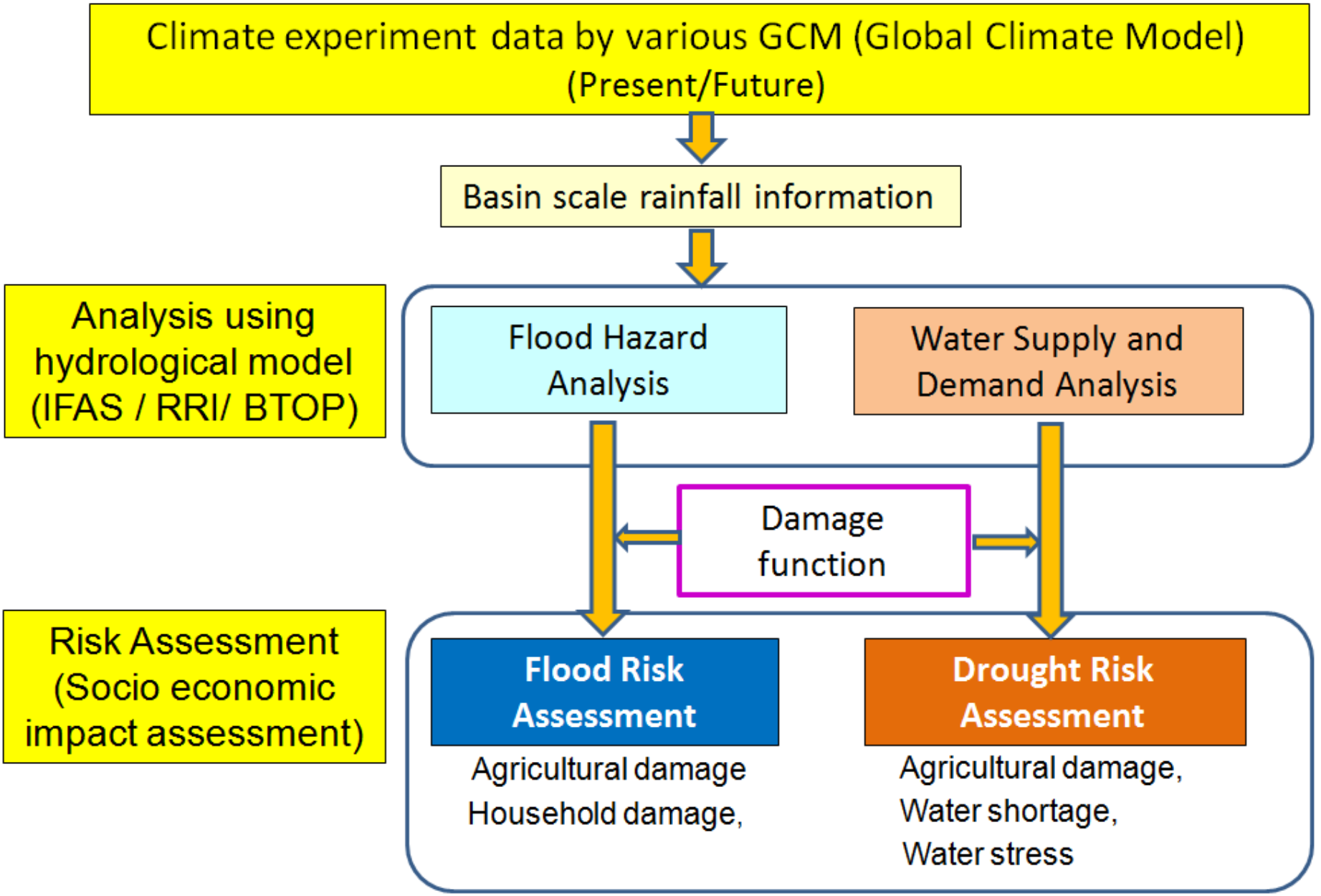
Current Missions/Tasks/Activities

- Engineering / construction arm of the government that undertakes major infrastructure projects.
- Planning and Design of water resources projects, flood control, national roads and bridges.
- Construction and Maintenance of water resources projects, flood control, national roads and bridges.

Further Expected Information

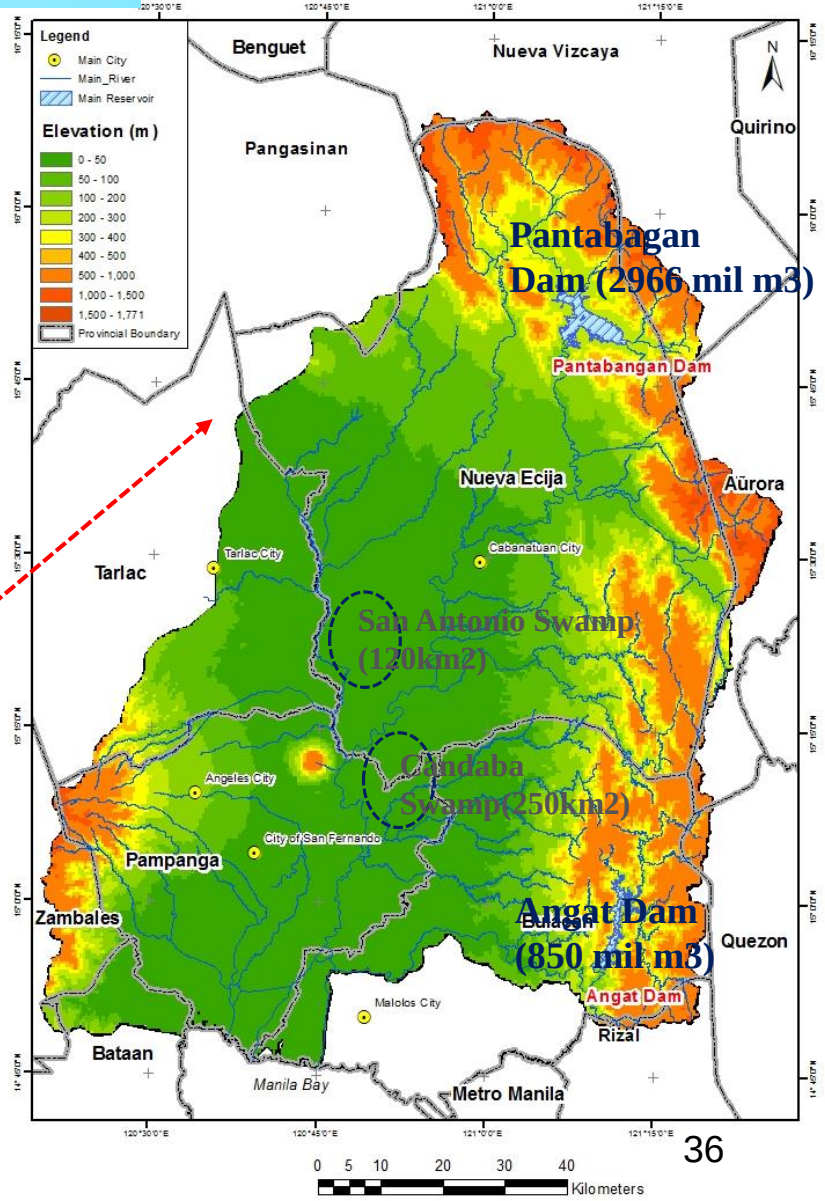
- Establish a nationwide inventory of structures.
- Improve the Rehabilitation/Repair of damaged structures.
- Develop a contingency plan for evacuation

Basic Methodology for Risk Assessment



Pampanga River Basin: General Features

Location of study area



Forth largest river basin in the Philippines

Catchment Area: 10,434 km^2

River Length: 260 km

Average annual rainfall: 2155mm/year

Population: 6.58 million (based on national statistic 2010)

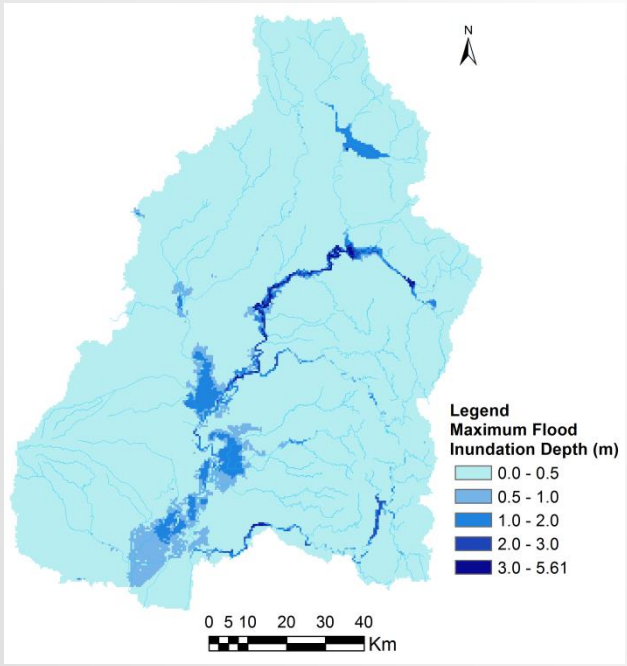
Population Density: 630 persons / km^2

Flood Hazard Assessment

Flood Hazard Analysis by RRI Simulation

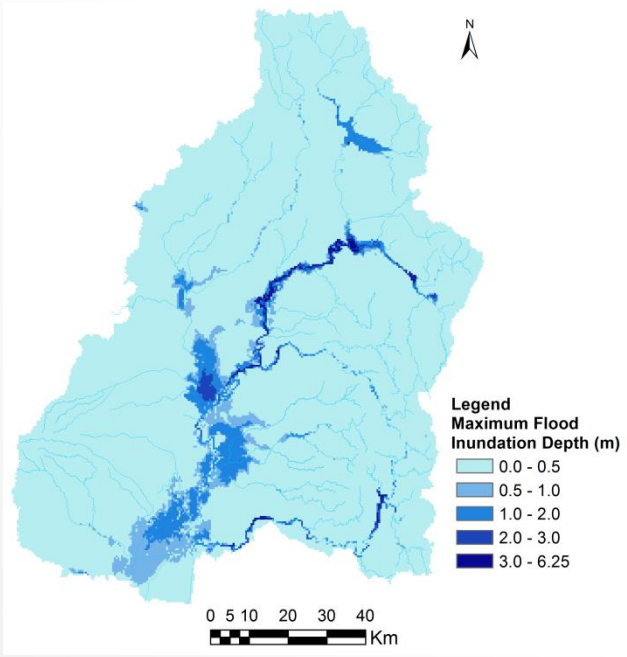
Different Flood Scale

Maximum Inundation Depth



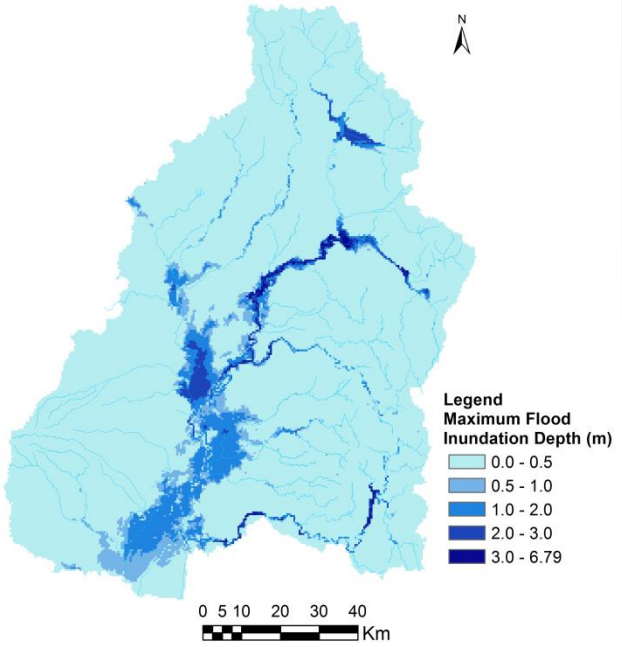
25-Year Flood

Inundated area (>0.5m depth)= 77,396 ha



50-Year Flood

Inundated area (>0.5m depth)= 103,376 ha



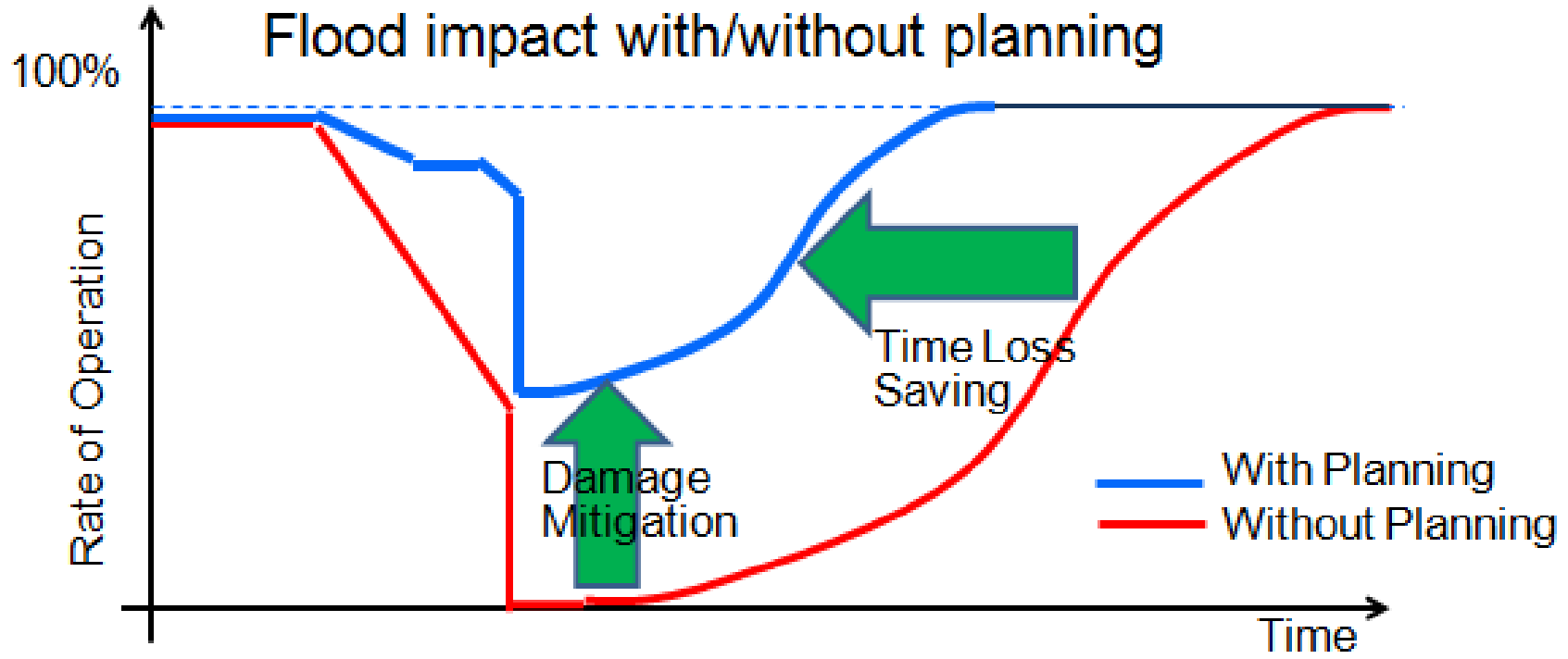
100-Year Flood

Inundated area (>0.5m depth)= 127,008 ha

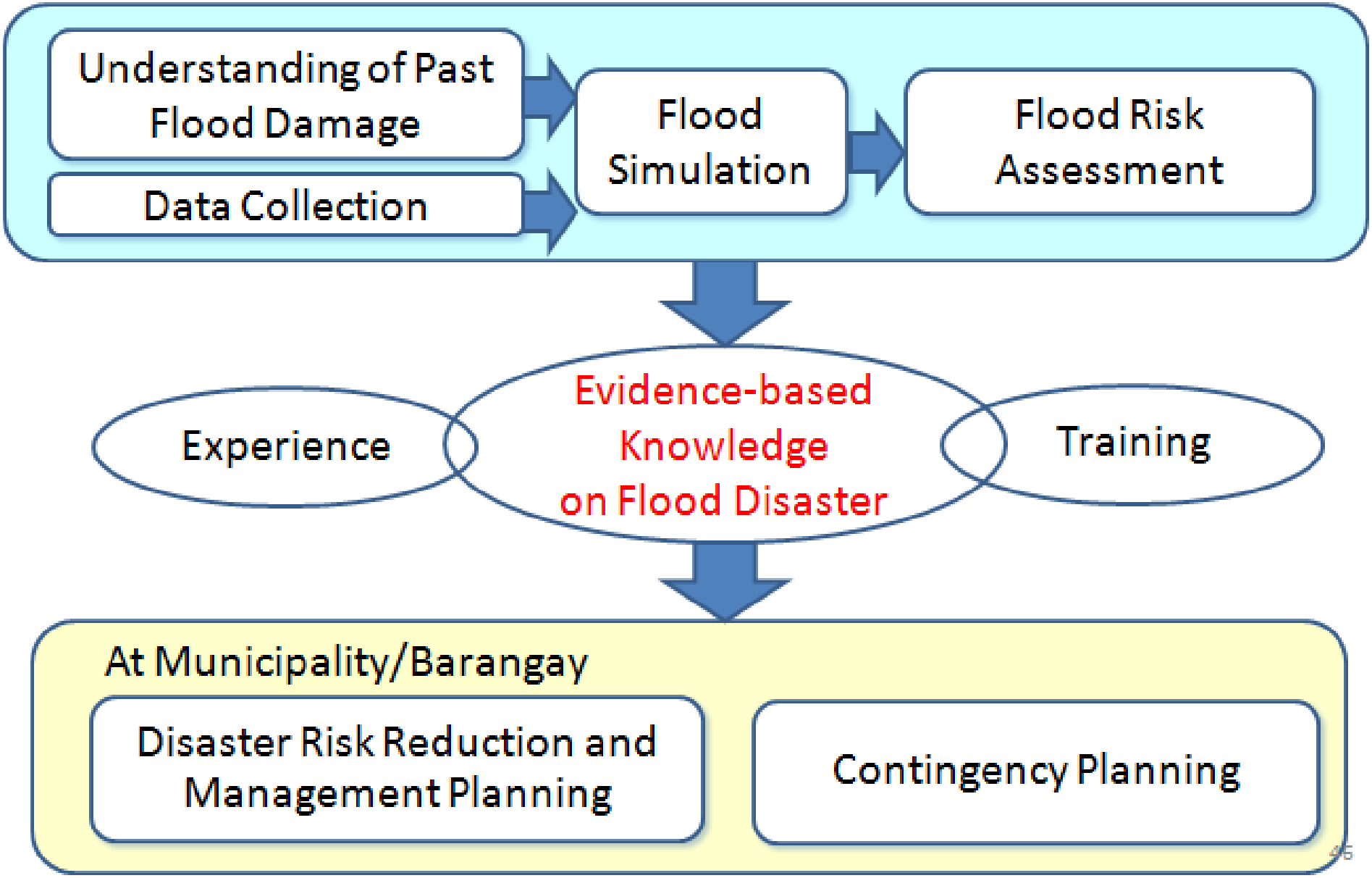
Using IfSAR DEM

Aim of Flood Contingency Planning

1. Protect people/property/activity from damage
2. Quickly recover from damage
3. Reduce impacts due to disaster



What is "Evidence-based Planning"



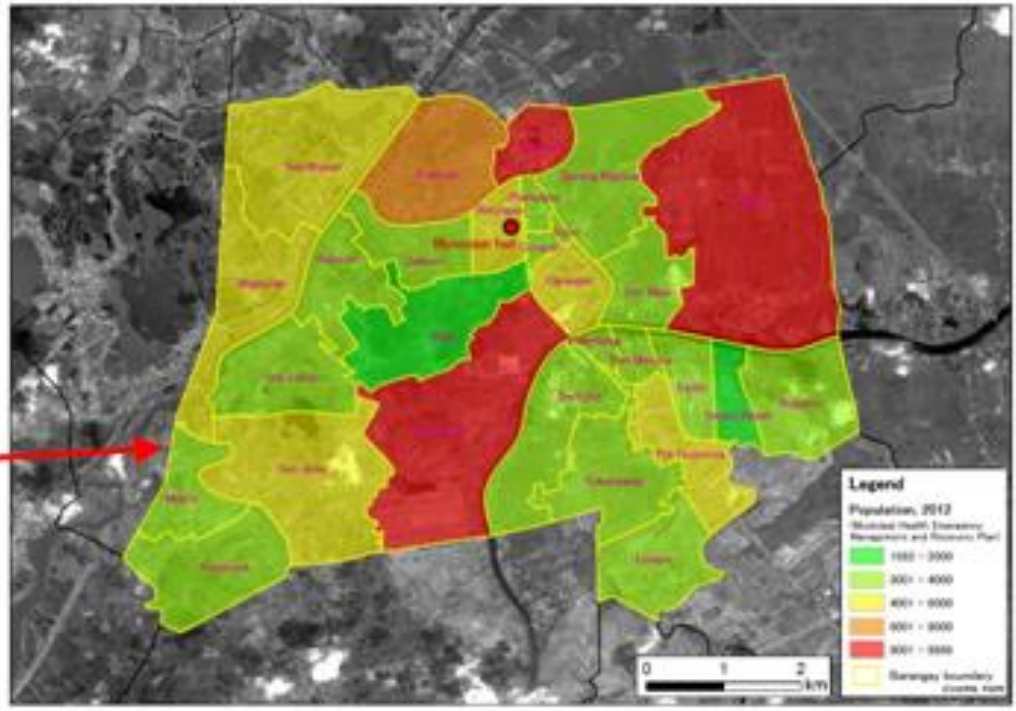
Location of CALUMPIT Municipality

Number of Barangays: 29

Population: 112,007 (based on Municipality data)

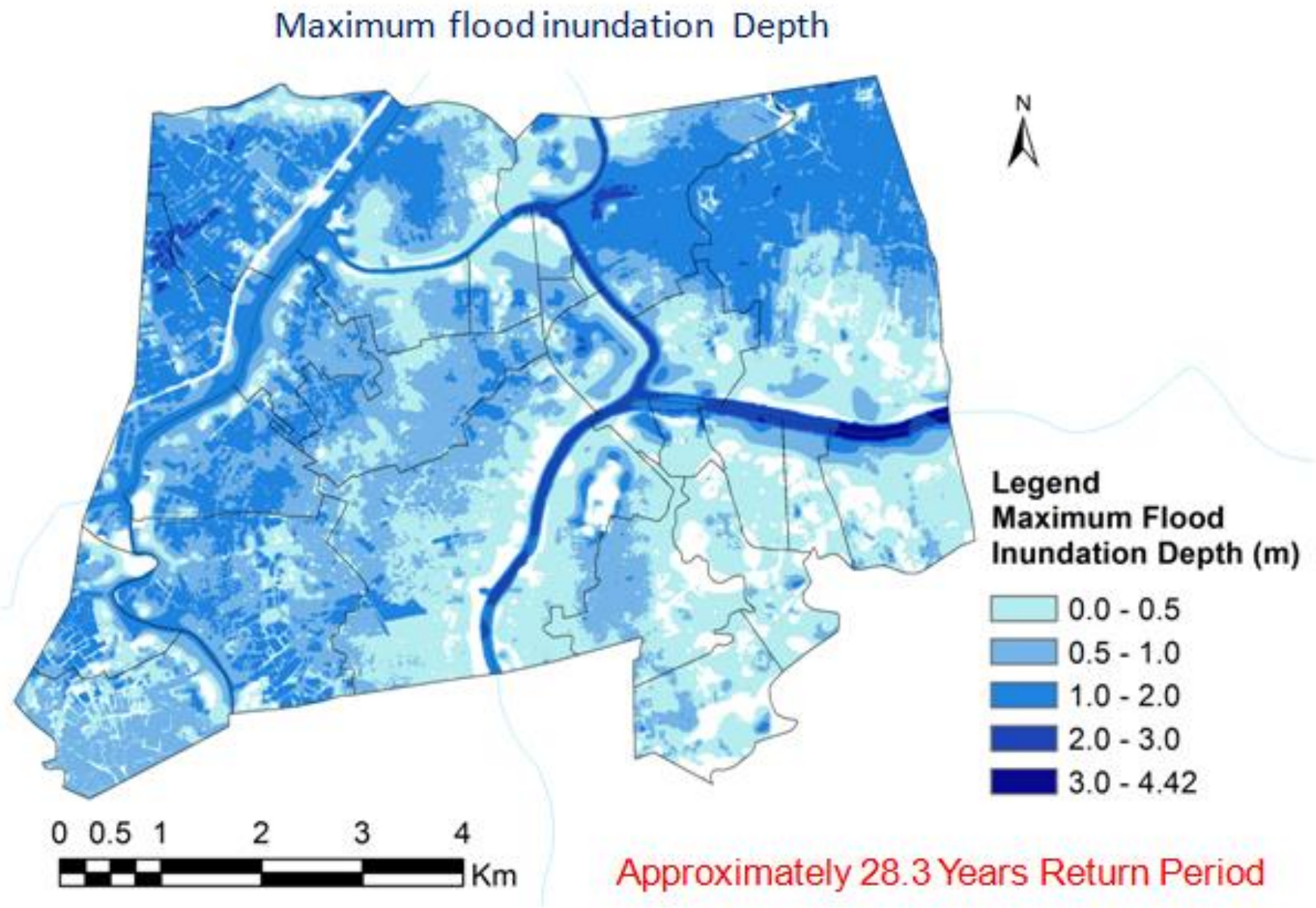
Households: 22,402

Area: 5,625 ha



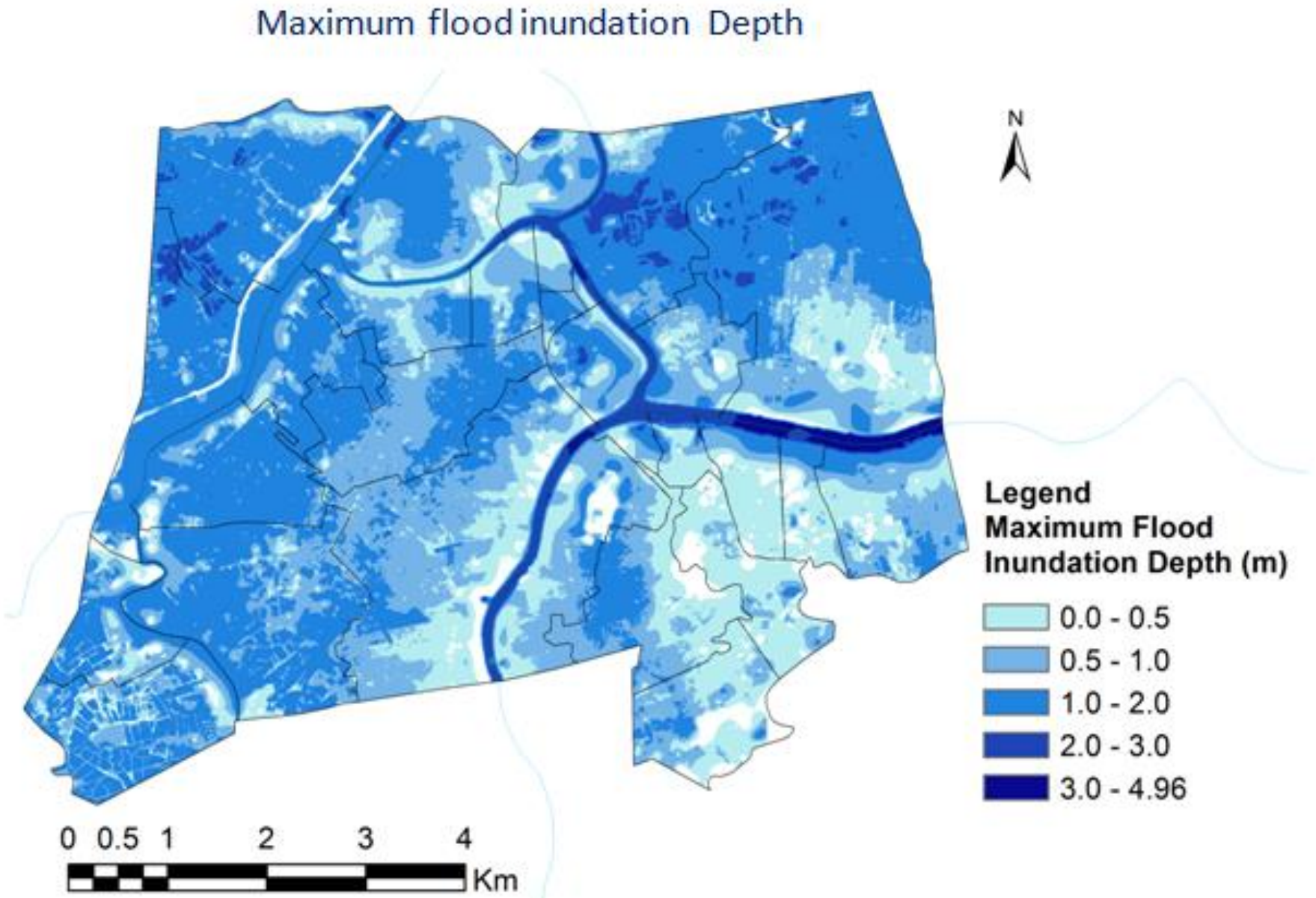
Flood Hazard Assessment: CALUMPIT Municipality

RRI Simulation for 26 September to 4 October, 2011 Flood (Pedring and Quiel)



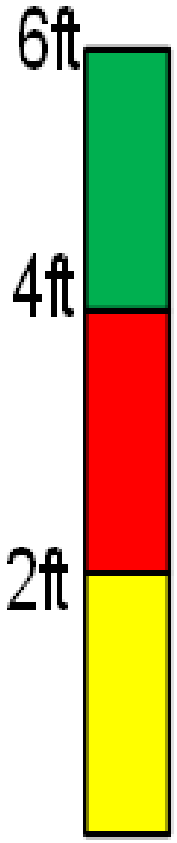
Flood Hazard Assessment: CALUMPIT Municipality

Extreme Flood (100 Years Flood)



Current Preparedness: Color of Safety Markers (Calumpit Municipality)

- Electric poles are colored with " Yellow, Red, Green" to provide guidance for evacuation.
- About 193 markers are installed in the Municipality.
- Each marker has a designated contact person for reporting water level to MDRRMO.

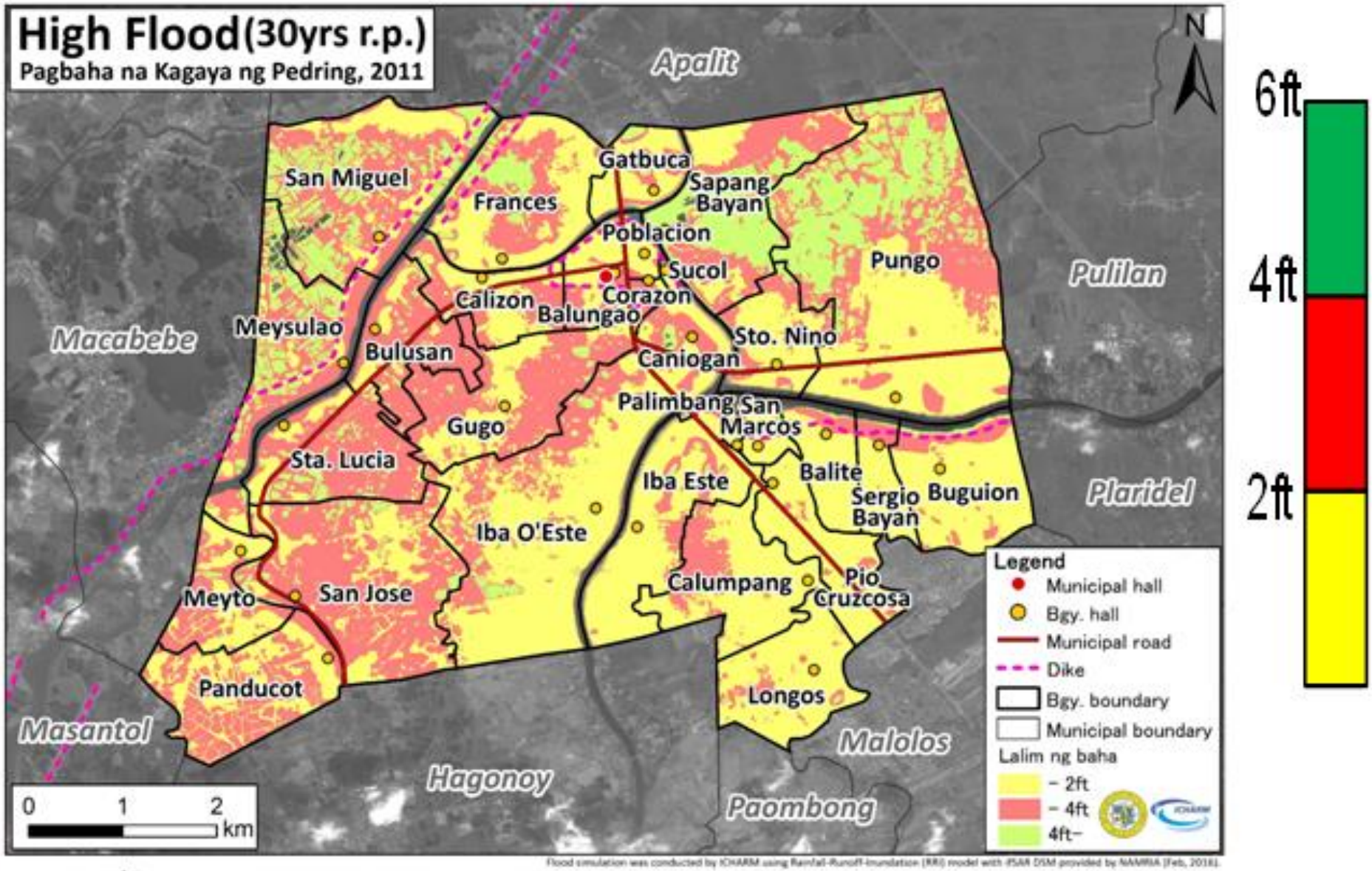


Indicate that anyone who has earlier refused to evacuate during the red color cannot be anymore rescued by truck.

Indicate safe time for evacuation to safer grounds or to a predetermined evacuation centers. Trucks from the municipal response teams may safely fetch them.

Provide information on flood progression.

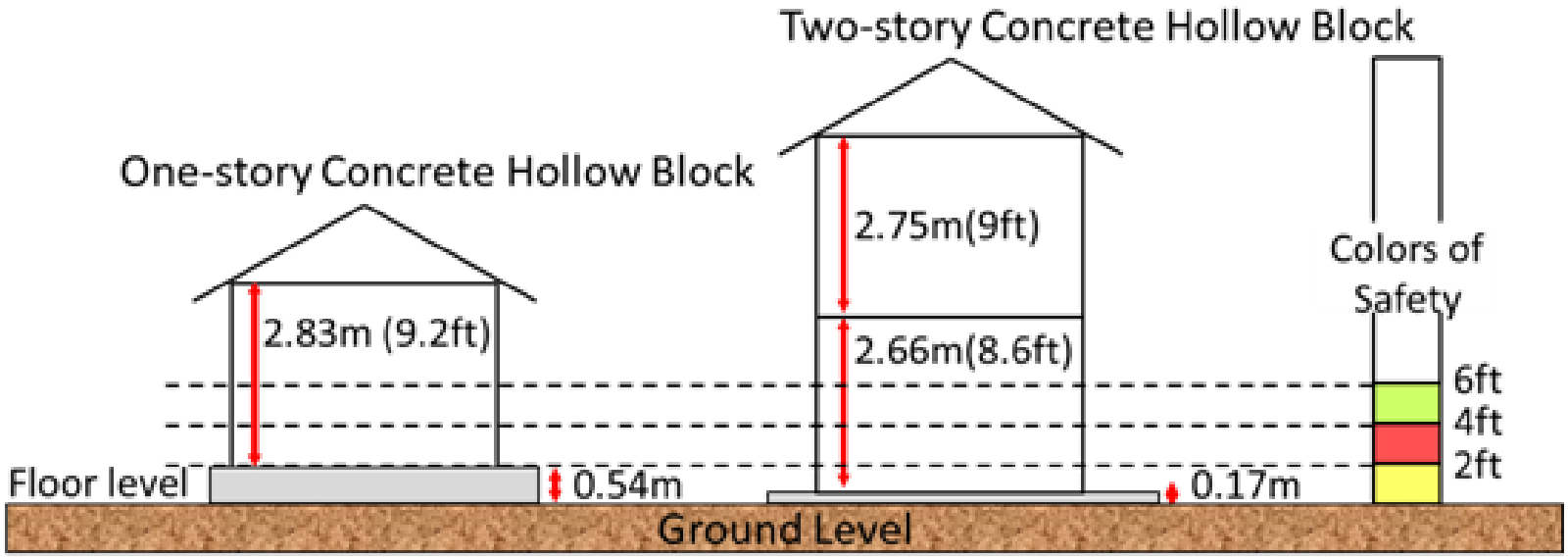
Flood Hazard Assessment: CALUMPIT Municipality



Flood simulation was conducted by ICHARM using Rainfall-Runoff-Inundation (RRI) model with IfSAR DSM provided by NAMRIA (Feb, 2016).

Flood Impact Analysis

Result of household survey for measuring average floor height



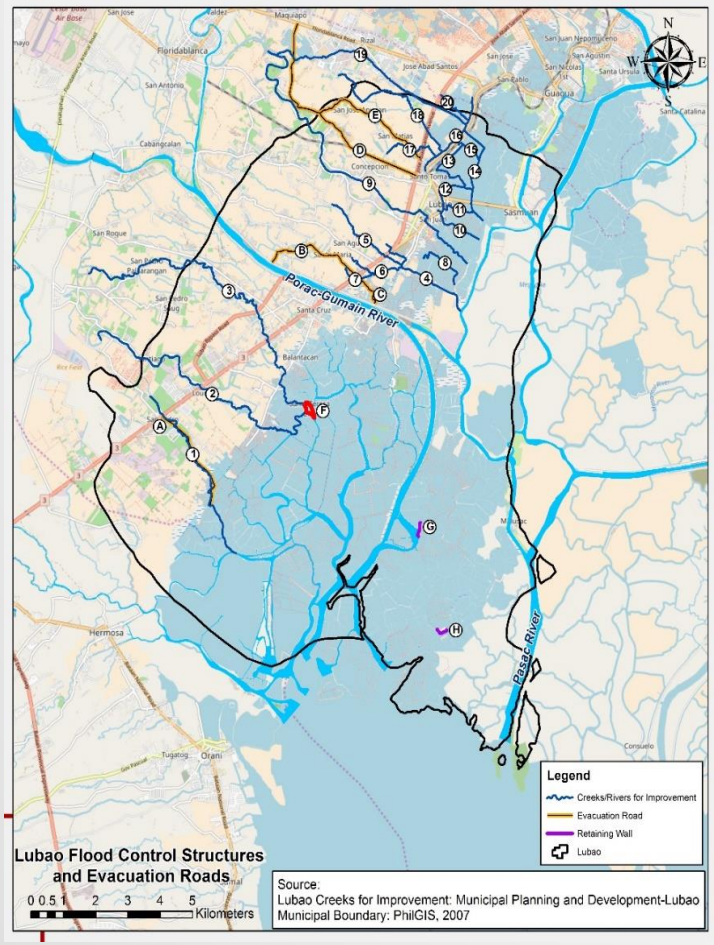
Height of Electric Plug
from floor level: 1.27m (4.1f
from ground level: 1.55m

	One Story	Two Story (5ft)
Yellow (less than 2ft)	Not inundated	Start inundated
Red (2-4ft)	Start inundated	Inundated
Green(more than 4ft)	Inundated	Inundated

Summary of Evidence-based Flood Contingency Planning

- This study proposed an effective method to implement evidence-based flood contingency planning.
- The proposed method was successfully applied to one of flood prone communities in Pampanga River basin in the Philippines.
- This method needs to be applied to different flood-prone communities for further verification of the method.
- For sustainable implementation of this method, technical and administrative cooperation between national and local governments should be ensured.

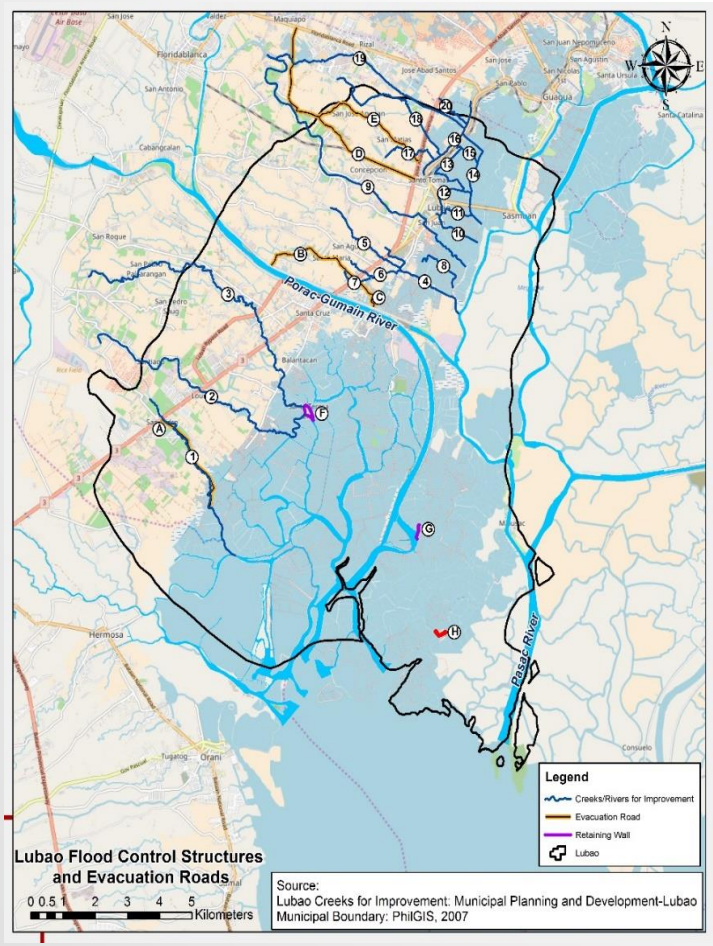
F. Sta. Teresa 2nd (Lambiki)
L = 1.11 km



Scope of Works: River Improvement

Cost: P 286 Million

H. Bancal Pugad
L = 0.42 km



Scope of Works: River Improvement

Cost: P 109 Million

REHABILITATION OF PAMPANGA RIVER BASIN AT BRGY. STA.CRUZ AND SAN NICOLAS, SAN SIMON, PAMPANGA

STA. CRUZ

SAN NICOLAS

Status of Projects:

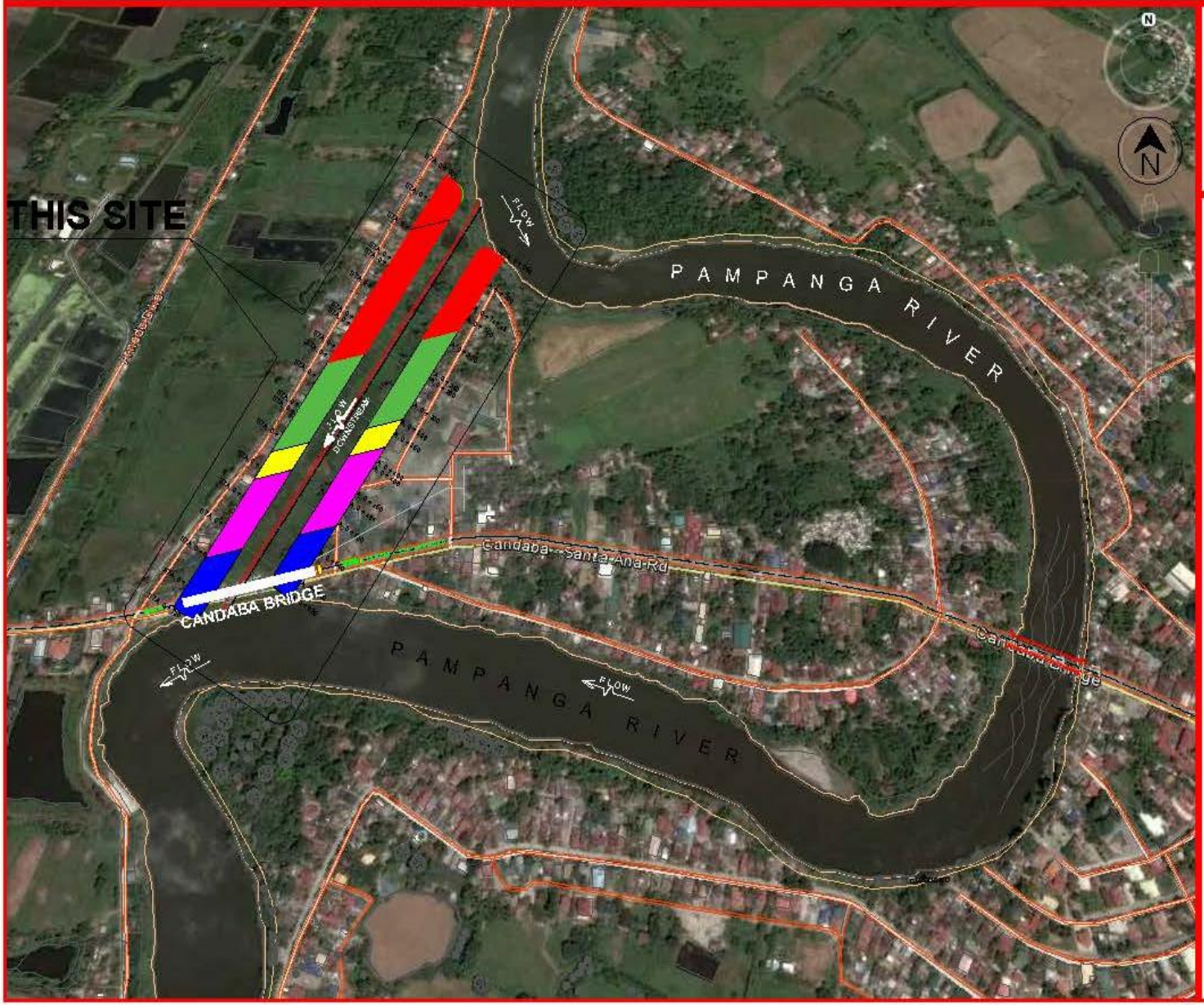
- Suspended due to adverse effect of recent typhoons = 23.409% actual accomplishment

Contract Cost:

- P108,485,759.85

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

UNIFIED PROJECT MANAGEMENT OFFICE
FLOOD CONTROL MANAGEMENT CLUSTER
(UPMO-FCMC/MPE)



MAP SHOWING PROPOSED CANDABA BRIDGE AND CUT - OFF CHANNEL

CONSTRUCTION OF FOUR (4) LANE BRIDGE
STA 0+483.443 ~ STA 0+616.557
LENGHT = 133.114m.

APPROACHES

WEST APPROACH
(GOING TO STA ANA)
STA 0+323.443 ~STA 0+483.443
LENGTH = 160.00m.

EAST APPROACH
(GOING TO CANDABA PROPER)
STA 0+616.557 ~STA 0+776.557
LENGTH = 160.00m.

CUT-OFF CHANNEL
SLOPE PROTECTION WORKS

RIGHT DIKE
STA 0+000 ~STA. 0+730
LENGTH = 730.00m.

LEFT DIKE
STA 0+050 ~STA. 0+625
LENGTH = 575.00m

LEGEND:

- FY-2015
- FY-2016
- FY-2017
- FY-2018
- FY-2019

REHABILITATION/RESTORATION OF DETERIORATED DIKES/ERODED RIVERBANKS ALONG PAMPANGA RIVER INCLUDING CANDABA CUT-OFF CHANNEL, CANDABA, PAMPANGA

Status of Projects:

- Suspended due to adverse effect of recent typhoons = 7.12% actual accomplishment

Contract Cost:

- P174,297,340.42

FLOOD CONTROL WORKS-ABACAN RIVER DIKING AND SLOPE PROTECTION WORKS, MEXICO, PAMPANGA

Status of Projects:

- **NTP-August 2, 2018 with an actual accomplishment of 0.559%**

Contract Cost:

- **P715,621,703.26**

REHABILITATION OF CABIAO-SAN ISIDRO RING LEVEE, CABIAO AND SAN ISIDRO, NUEVA ECIJA

Status of Projects:

- On-going with an actual accomplishment of 19.817%

Contract Cost:

- P134,795,154.92

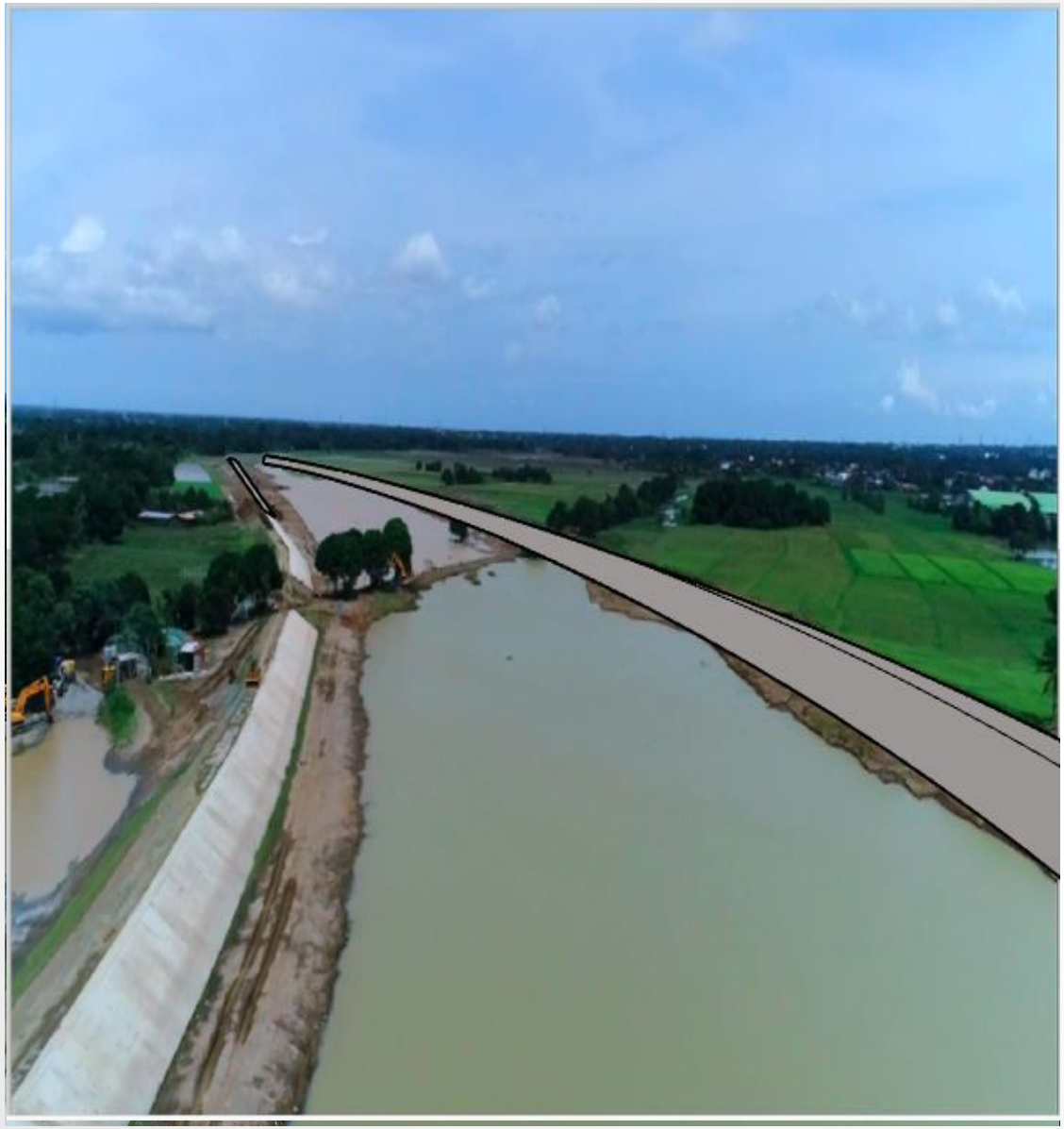
CONSTRUCTION OF LAYAC DIVERSION CHANNEL, INCLUDING ROW, DINALUPIHAN, BATAAN

Status of Projects:

- Contract agreement under process for approval

Contract Cost:

- P137,561,679.92



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1. DATA INTEGRATION

Current Missions/Tasks/Activities

- Databasing water-related researches & technology (repository)
- Gap & meta-analysis of water related researches and technology
- Instrumentation and Archiving of water-related data (offline and real-time)

Further Expected Information

- Formulation of Problem-based researches from thematic areas to provide science-based solutions

Further Expected Value

- Mainstreaming water-related researches, technologies and recommendations for possible implementation to local communities

2. EARLY WARNING

Current Missions/Tasks/Activities

- Implement projects on real-time flood monitoring and forecasting in Angat Watershed (Ongoing by UPLB-ISCW; funding: UP System) To complement SATREPS Proposal
- SARAI: Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines (2013-present; funding: DOST-PCARRD)
- Action-ready climate knowledge to Improve disaster risk management for smallholder-farmers in the Philippines (Ongoing by INREM; funding: ACIAR)

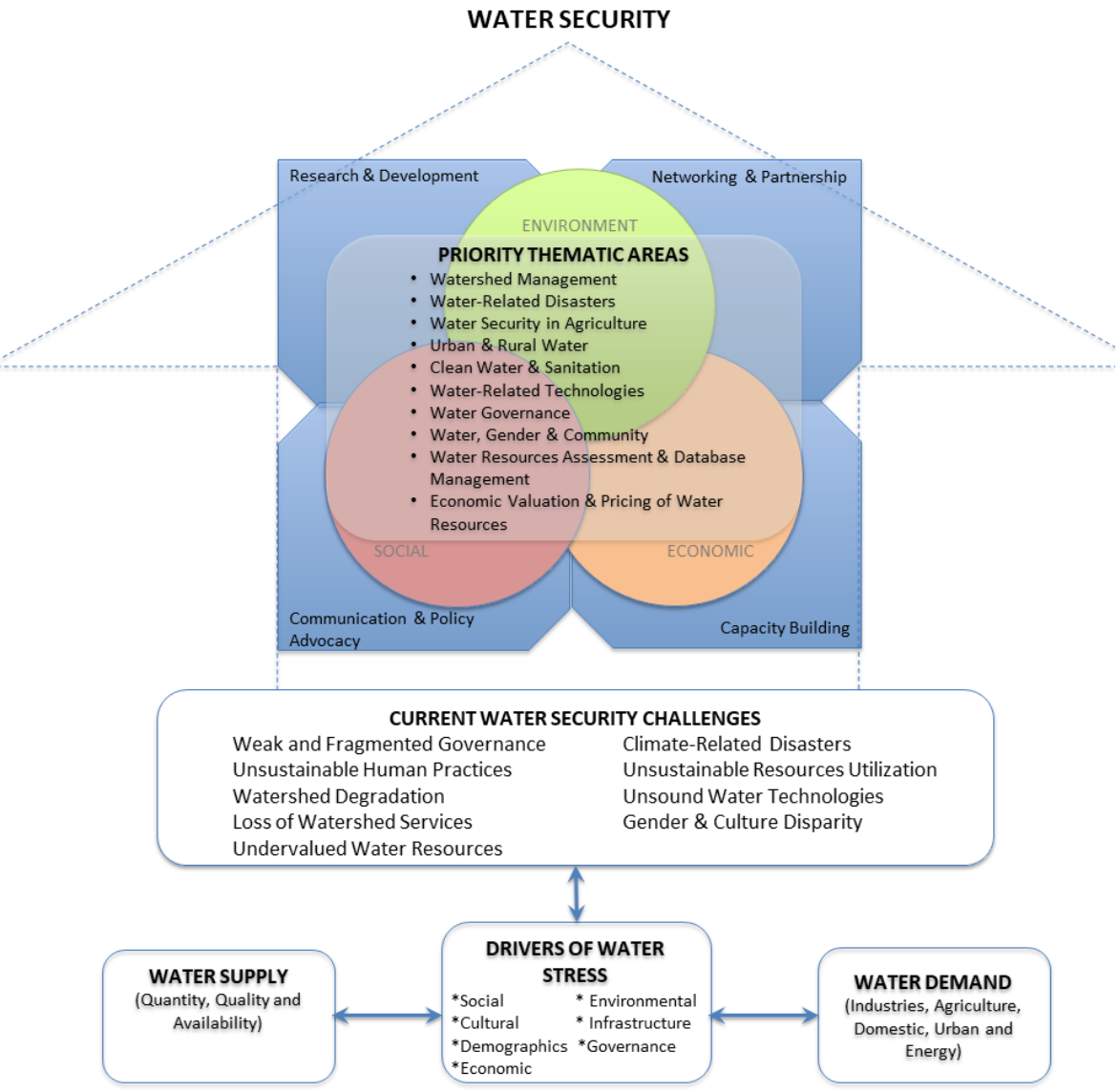
Further Expected Information

- Predict flood impact on damage and socio-economics
- Develop a proactive monitoring mechanism using available satellite images from NASA and European Union (EU)
- Improve the value of information flows between PAGASA and key decision makers involved in managing climate and weather risk of small-holder farmers

Further Expected Value

- Strengthen disaster preparedness in local communities of pilot areas
- Ensure capacities of stakeholders and communities
- Contribute to policy design and investment direction

UPLB IDSC-WATER FRAMEWORK



- WATER-RELATED DISASTERS
- WATERSHED MANAGEMENT
- WATER SECURITY IN AGRICULTURE
- URBAN AND RURAL WATER
- CLEAN WATER & SANITATION
- WATER-RELATED TECHNOLOGIES
- WATER GOVERNANCE
- WATER RESOURCES ASSESSMENT AND DATABASE MANAGEMENT
- ECONOMIC VALUATION AND PRICING OF WATER RESOURCES
- GENDER, CULTURE & COMMUNITY

University of the Philippines Los Baños
Interdisciplinary Studies Center for Water
(049) 572-2489
water.uplb@up.edu.ph

UPLB INTERDISCIPLINARY STUDY CENTER FOR WATER

NETWORKING & PARTNERSHIP

Strengthen networks, collaborations and partnerships with international and national groups towards water security

- ❑ AID IN WATER CENTER DEVELOPMENT IN SUCs
- ❑ RESEARCH COLLABORATIONS
  - ❑ PROVIDE AVENUE FOR KNOWLEDGE EXCHANGE
  - ❑ NOURISH DATABASE ON WATER

- ❑ FUNDING OPPORTUNITIES FOR RESEARCH, DEVELOPMENT & EXTENSION
- ❑ SUPPORT & STRENGTHEN INSTITUTIONAL PROGRAMS

- ❑ LOS BAÑOS
- ❑ BAGUIO
- ❑ VISAYAS
- ❑ MINDANAO

NATIONAL WATER RESOURCES BOARD

DILG

CALABARZON
Vibrant economies, empowered communities.

SEAMEO SEARCA

Forest Foundation Philippines
Let's grow together.

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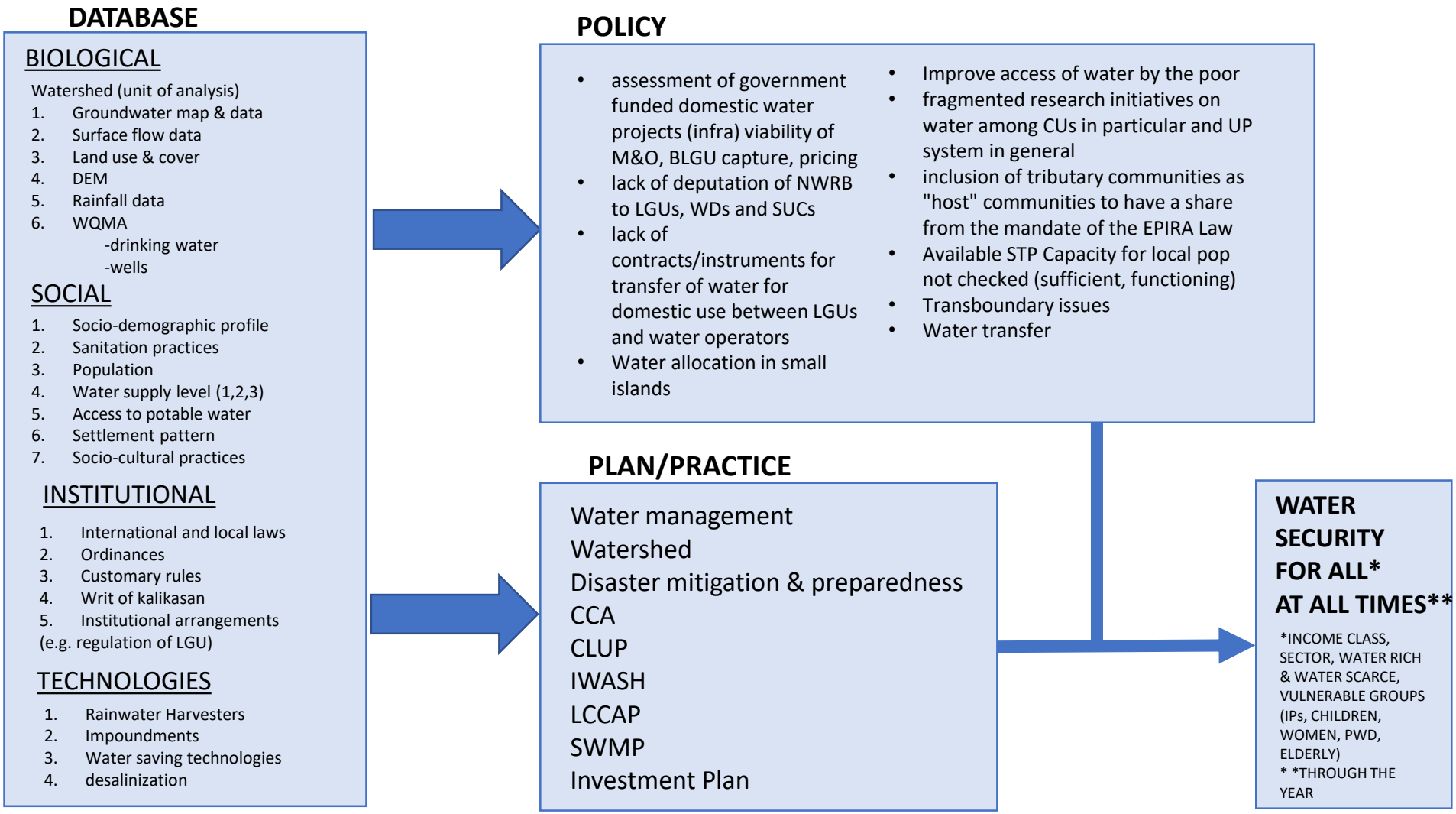
DATABASE
BIOLOGICAL
Watershed (unit of analysis)
1. Groundwater map & data
2. Surface flow data
3. Land use & cover
4. DEM
5. Rainfall data
6. WQMA
-drinking water
-wells
SOCIAL
1. Socio-demographic profile
2. Sanitation practices
3. Population
4. Water supply level (1,2,3)
5. Access to potable water
6. Settlement pattern
7. Socio-cultural practices
INSTITUTIONAL
1. International and local laws
2. Ordinances
3. Customary rules
4. Writ of kalikasan
5. Institutional arrangements
(e.g. regulation of LGU)
TECHNOLOGIES
1. Rainwater Harvesters
2. Impoundments
3. Water saving technologies
4. desalinization
POLICY
• assessment of government funded domestic water projects (infra) viability of M&O, BLGU capture, pricing
• lack of deputation of NWRB to LGUs, WDs and SUCs
• lack of contracts/instruments for transfer of water for domestic use between LGUs and water operators
• Water allocation in small islands
• Improve access of water by the poor
• fragmented research initiatives on water among CUs in particular and UP system in general
• inclusion of tributary communities as "host" communities to have a share from the mandate of the EPIRA Law
• Available STP Capacity for local pop not checked (sufficient, functioning)
• Transboundary issues
• Water transfer
PLAN/PRACTICE
Water management
Watershed
Disaster mitigation & preparedness
CCA
CLUP
IWASH
LCCAP
SWMP
Investment Plan
WATER SECURITY FOR ALL* AT ALL TIMES**
*INCOME CLASS, SECTOR, WATER RICH & WATER SCARCE, VULNERABLE GROUPS (IPs, CHILDREN, WOMEN, PWD, ELDERLY)
* *THROUGH THE YEAR

CONTRIBUTIONS TO SDG, PARIS AGREEMENT AND SENDAI FRAMEWORK

SDGs:

- **SDG** #1: NO POVERTY - poverty alleviation
- **SDG** #2: NO HUNGER - Food security
- **SDG**#11: Make cities and human settlements inclusive, safe, resilient and sustainable
  - Implementation of Sustainability Science Project focusing on resilience of urban water systems
  - Investment on disaster-prevention infrastructures, to make cities and human settlements to be inclusive, safe, resilient and sustainable"
- **SDG**#13: CLIMATE ACTION – Take urgent action to combat climate change and its impacts:
  - Through the implementation of various infrastructure and capacity-development projects, PAGASA can help: "Build the adaptive capacities of communities, increase the resilience of vulnerable sectors and natural ecosystems to climate change".
- For the DOST,
  - Development of SETI Scorecards to evaluate SETI projects
  - Aligning and prioritizing regional S&T projects and activities that contribute to attainment of SDGs (ex: community resilience, community empowerment, S&T education, water sustainability)

CONTRIBUTIONS TO SDG, PARIS AGREEMENT AND SENDAI FRAMEWORK

Paris Agreement

For **DOST**:

- Implementation of local "communities of practice" programs and projects

For **PAGASA**:

- Address crucial areas necessary to combat climate change

For **DPWH**:

- "Nationally determine contribution to construct communities that are climate-resilient"

CONTRIBUTIONS TO SDG, PARIS AGREEMENT AND SENDAI FRAMEWORK

Sendai Framework

DOST can contribute to the attainment of its targets by:

- Enhancing community preparedness thru installation of hydromet stations and alarm systems, implementing community drills, training local governments on IWRM, developing customized IWRM Guideline for Davao city, developing 15-year Sustainability Development Plan for Davao City

PAGASA can contribute to the attainment of its targets, specifically:

- Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020. The Philippines conducted the **1st TWG WORKSHOP TO UPDATE THE NATIONAL DISASTER RISK REDUCTION AND MANAGEMENT PLAN (NDRRMP) 2011-2028 (October 17-19, 2018)**
- Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

DPWH can contribute to the attainment of its targets by:

- " Promoting public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience."

ACTIVITIES

SCHEDULE	THEMATIC AREA/ TOPIC	VENUE
August 28, 2018	WATER FORUM SERIES #1: Revisiting Watershed Management and Governance in Sierra Madre	CFNR UPLB
Nov 12, 2018	WATER FORUM SERIES #2: Urban and Rural Water: Access, Sanitation and Governance	CAS AUDITORIUM UPLB
March 2019	WATER FORUM SERIES #3: • Water, Gender, Culture and Community • Economic Valuation and Pricing of Water Resource **INTERNATIONAL CONFERENCE:** Securing Water for Food and Nutrition in Southeast Asia (in collaboration with SEARCA)	UPLB SEARCA (UPLB)
June 2019	WATER FORUM SERIES #4: • Water Security in Agriculture • Water-related Technologies • Governance	UPLB
August 2019	WATER FORUM SERIES #5: • Water-related Disasters • Governance	UPLB
November 2019	**1ST National Conference on Water**	UPLB