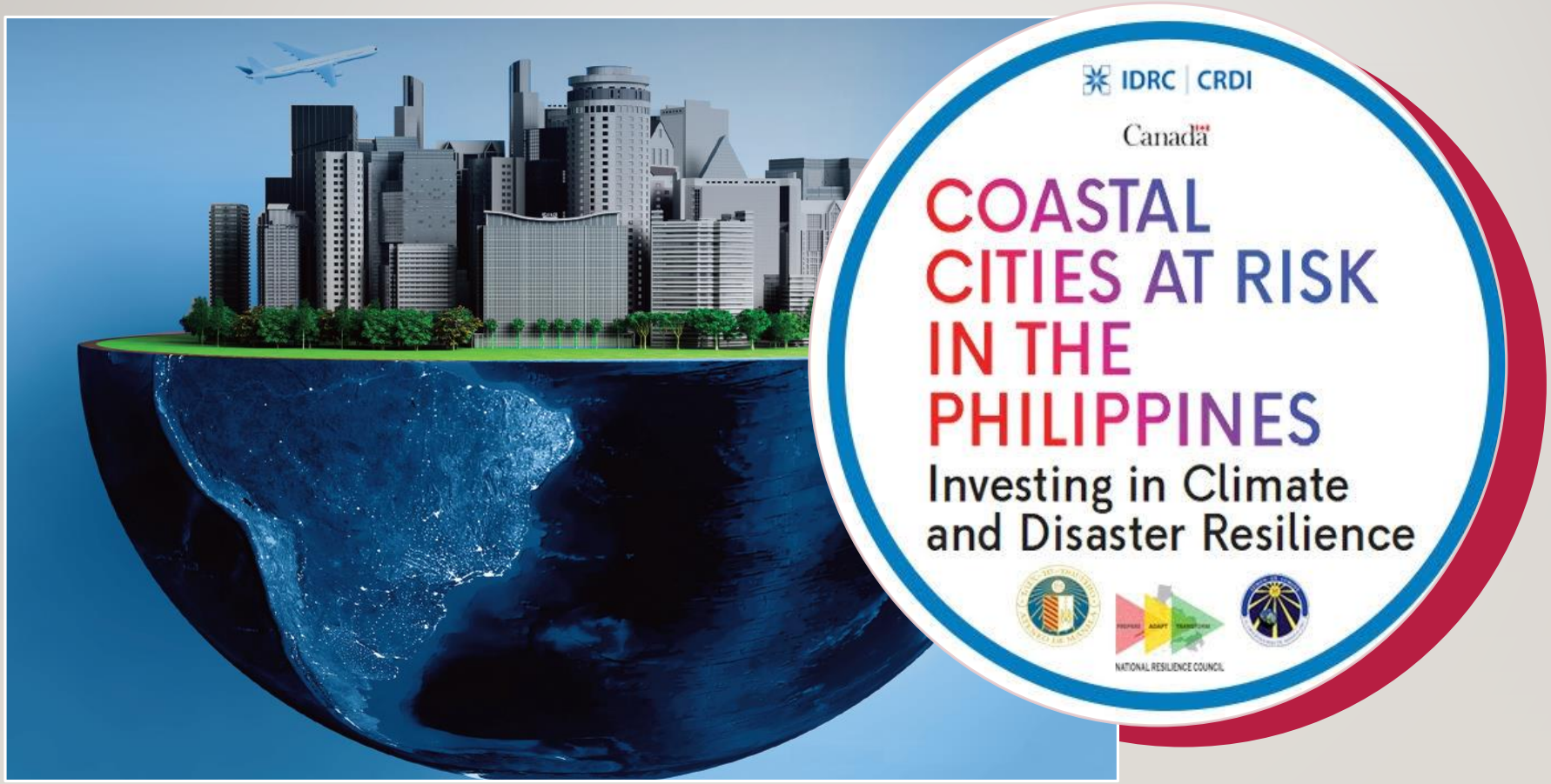
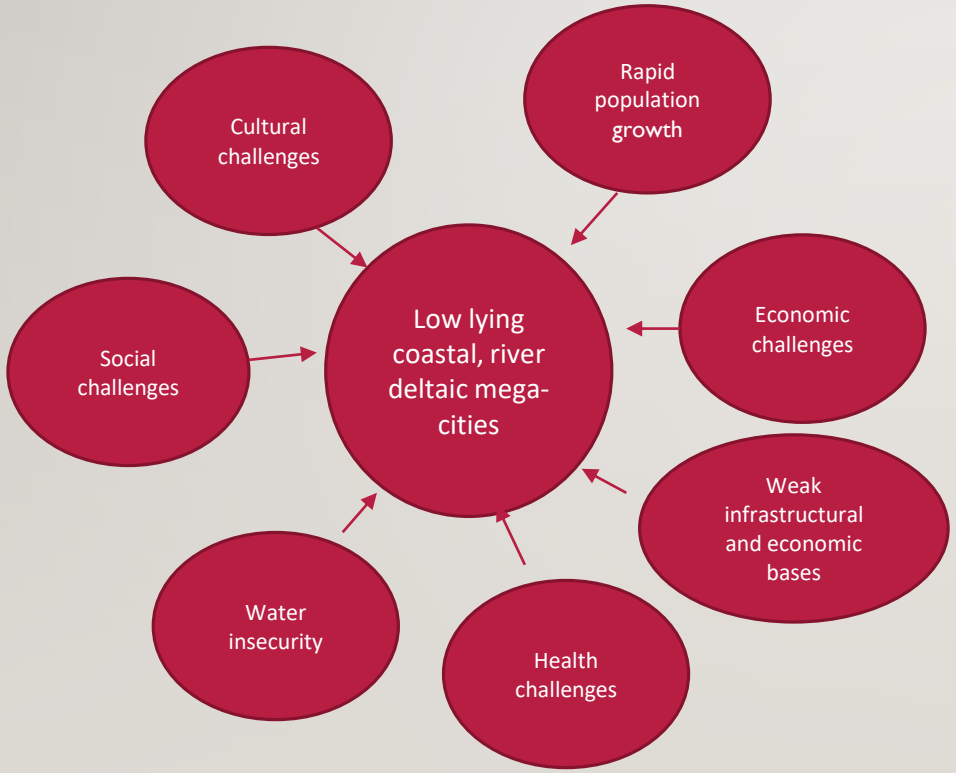
Asian Network on Climate Science and Technology (ANCST)

SEADPRI- Universiti Kebangsaan Malaysia

Workshop on Building Disaster and Climate Resilience in Cities, 15-16 Oct 2019, Intercontinental Hotel, Kuala Lumpur



Challenge: Climate, Pollution, etc…Driving Metro Manila's Low Quality of Life



CCARPH is focused in generating science/evidence-based solutions that are consumable/actionable by vulnerable populations and other stakeholders

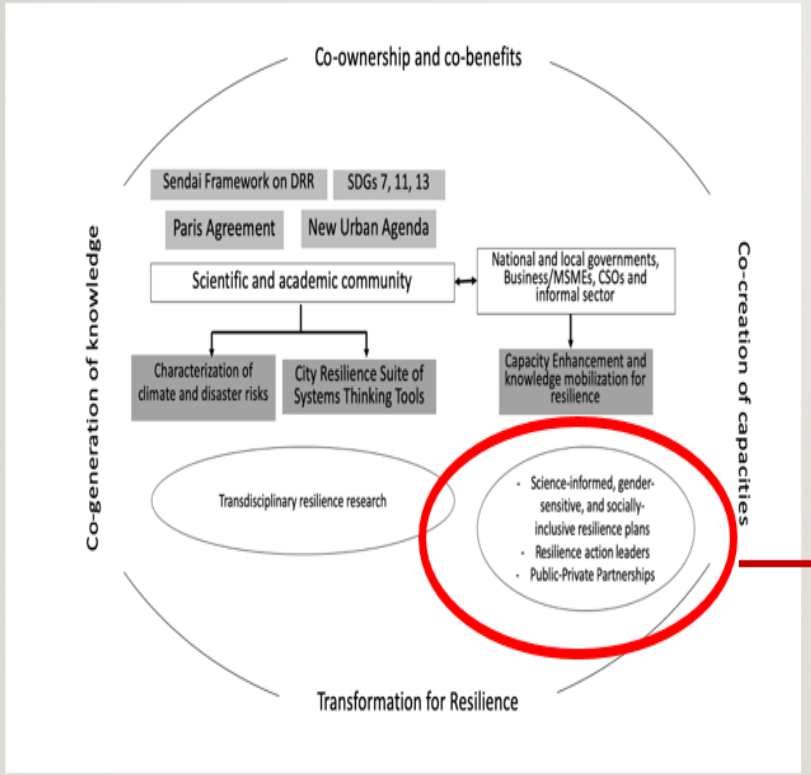
Work Themes (WTs

WT1- Advance knowledge of climate change adaptation and disaster risk reduction for resilience

WT2 – Develop methodologies and tools for climate change adaptation and disaster risk reduction for resilience

WT3 – Enhance capacity and transfer knowledge for climate change adaptation and disaster risk reduction for resilience

CCARPH: Research for Resilient Local Governance and Development



Investing on Climate and Disaster Risk Assessment (CDRA) for CDRA-informed public investment

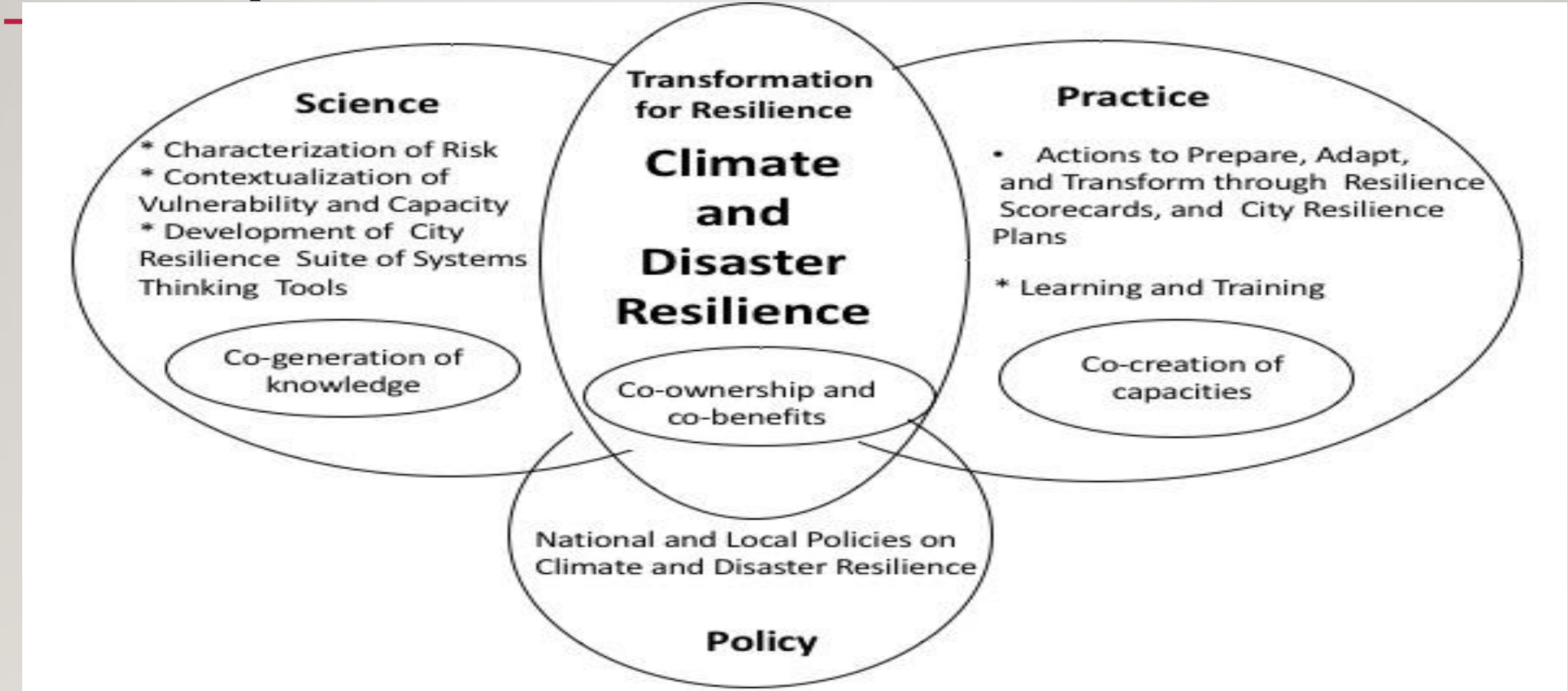
- as input to:

Comprehensive Land Use Plan
Comprehensive Development Plan
Annual Investment Plan
Local Resilience Plan
Local Climate Change Action Plan
Local DRRM Plan
Seal of Good Local Governance-compliance

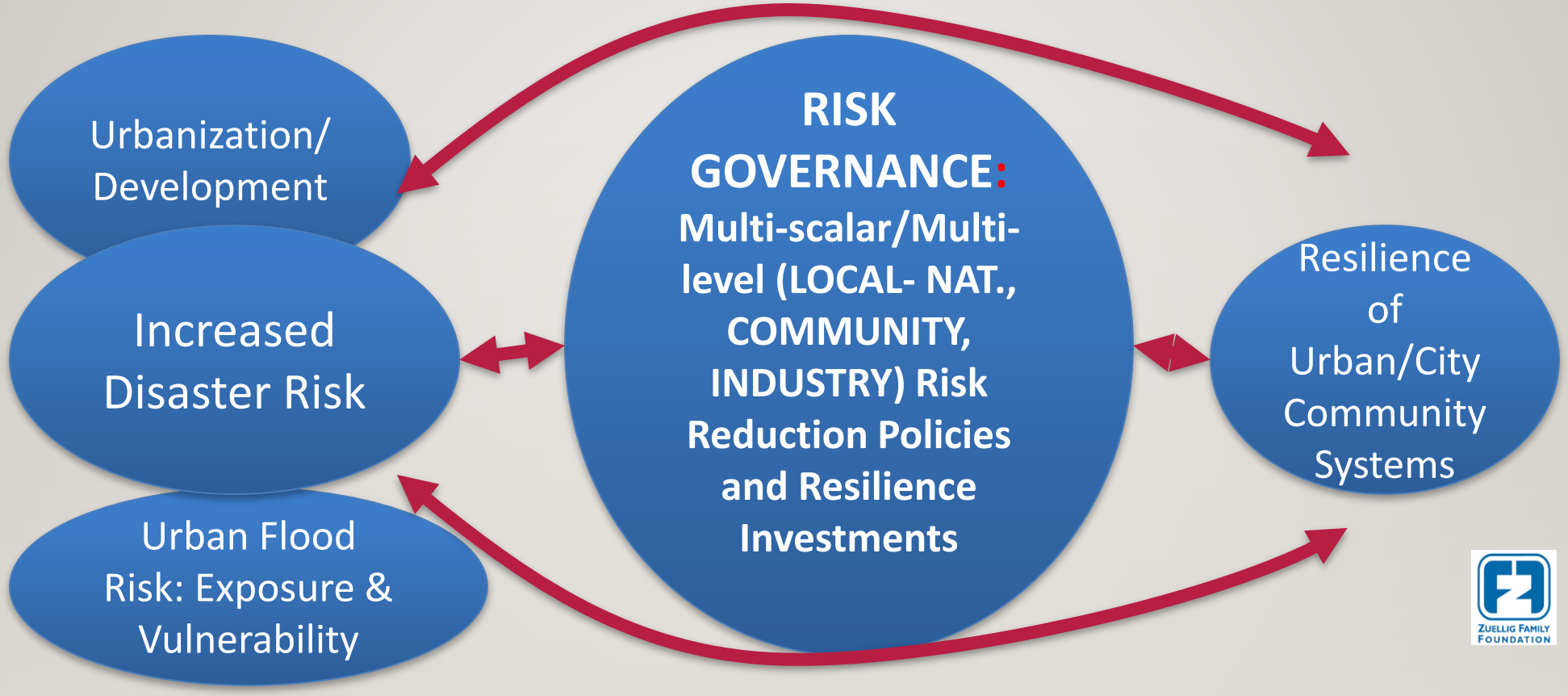
Project Cities

- Metro Manila,
- Iloilo City
- Naga City

CCARPH: Linking Climate and Disaster Science to Policy and Practice



Risk & Resilience of Cities' Social-Ecological Systems



Resilience of urban systems: prepare, adapt and transform

Participation in the NRC Academic Partners' Business Meeting

ADMU Master of Disaster Risk and Resilience Students visit Barangay Loyola Heights

CCARPH signs Partnership Agreement with the Pasig City Government

CCARPH participates in UNU-EHS Panel for Universities' Climate Action and Ambition

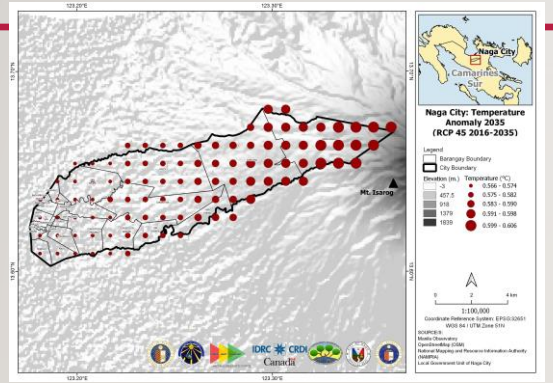
CCARPH, as the Scientific and Academic Partner of the NRC, attends MOA signing between the DSWD and NRC

CCARPH Scientists Obiminda Cambaliza and James Simpas participates in the Cloud Aerosol and Monsoon

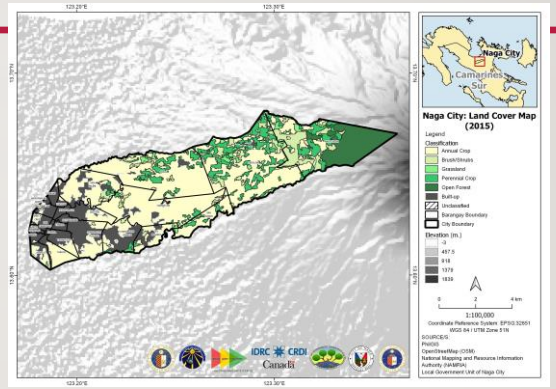
Where are we now? (Accomplishments)

WT1: Co-generation of hazard, exposure and vulnerability maps

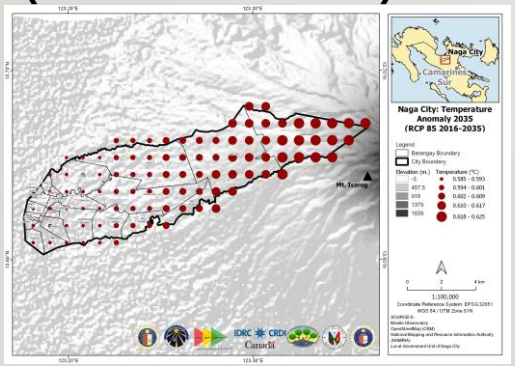
Naga City: Coastal Cities at Risk CDRA



Temperature Anomaly 2035 (RCP 45 2016-2035)



Land Cover Map (2015)



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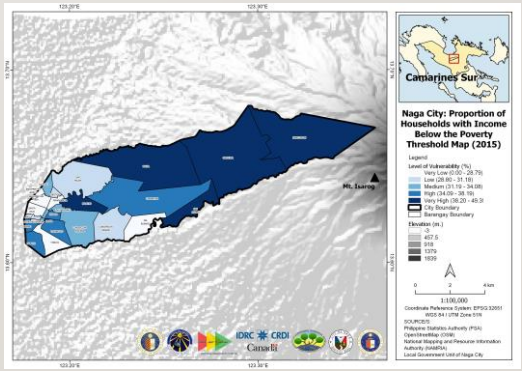
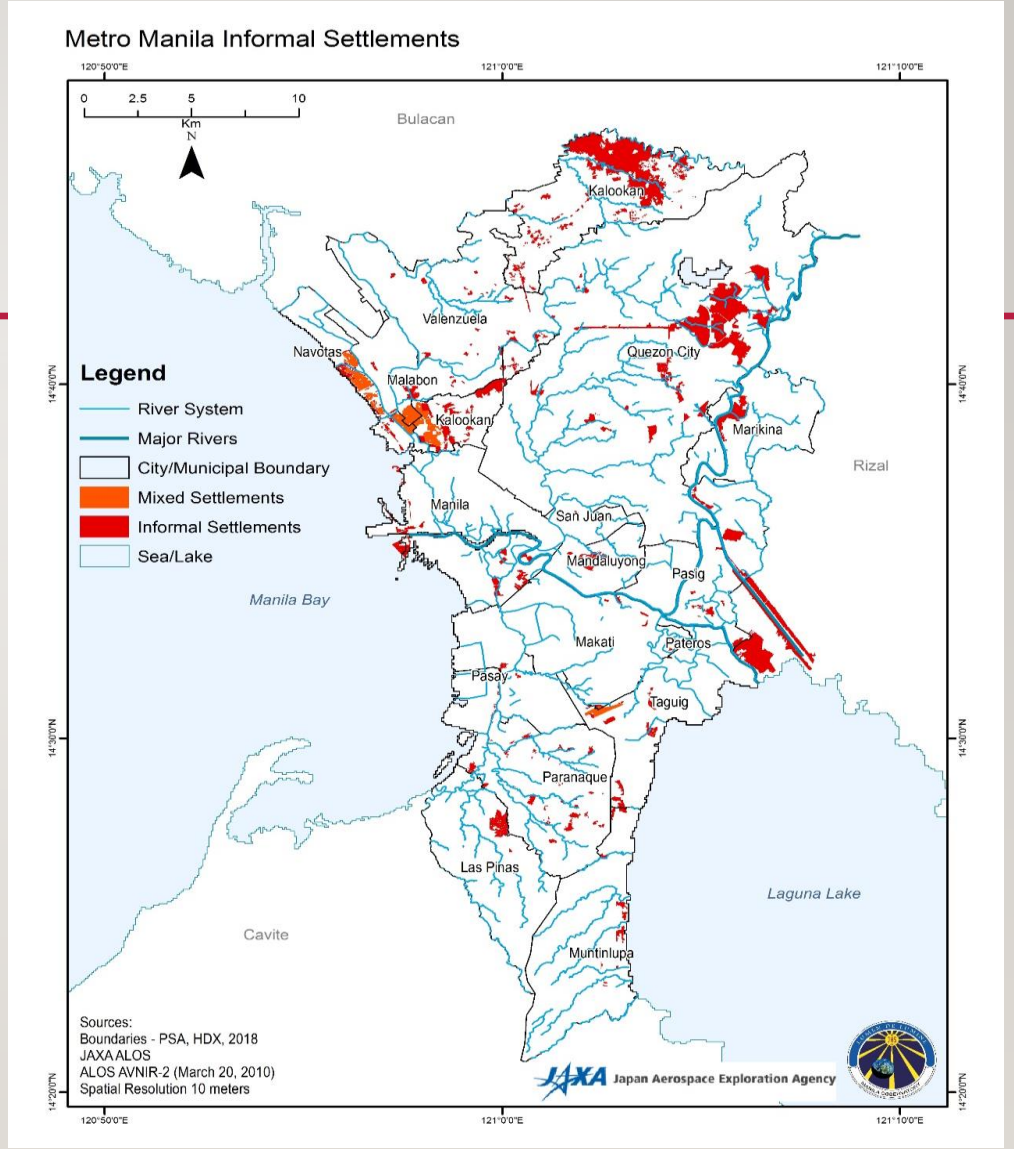


Proportion of Households with Income Below the Poverty Threshold Map (2015)

WT2: Examining the elements of a resilient City

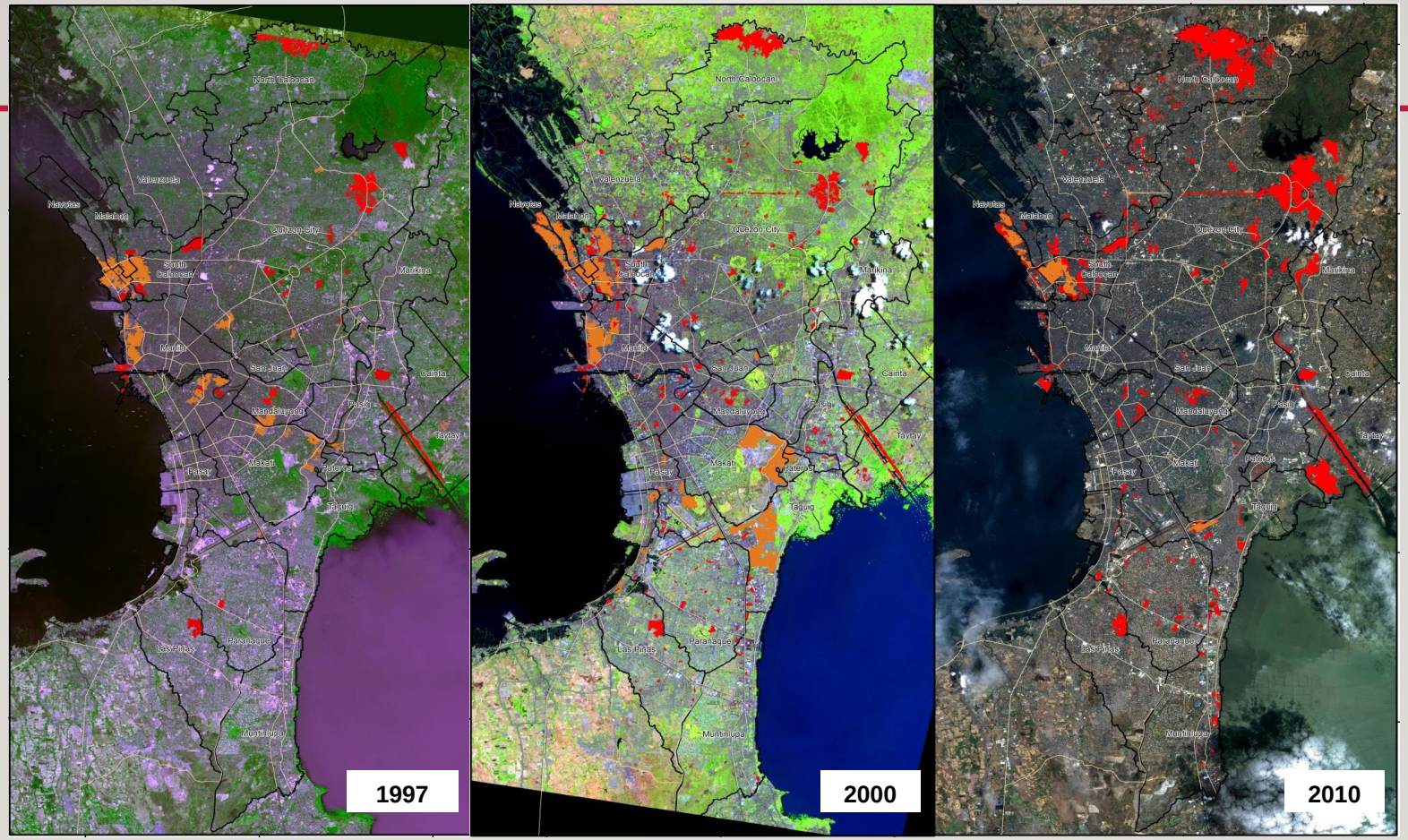
Slums in the Philippine Context

- Characteristics
  - Organic, incremental, fragmented urban environment
  - Sporadic vegetation
  - Varying height
  - Clustered buildings
- Location
  - Tabing Ilog
  - Tabing Dagat
  - Barangay Basura
  - Along the Riles
  - Gillage
  - Undefined Streets



Source: Lungsod Iskwater, 2011;GED, Manila Observatory

Shifting Patterns of Informality



Informal Settlement

Mixed Settlement

Informal settlements (red) appear to be migrating, agglomerating and expanding into large communities: Quezon City, Parañaque, Taytay and North Caloocan

Mixed informal and formal settlements (yellow-orange) are diminishing within and near the core areas of the metropolis in 2010: Malabon, Makati and Taguig

Comparison of results in study years 1997, 2000 and 2010. Red areas are informal settlements while the orange ones are mixed settlements.

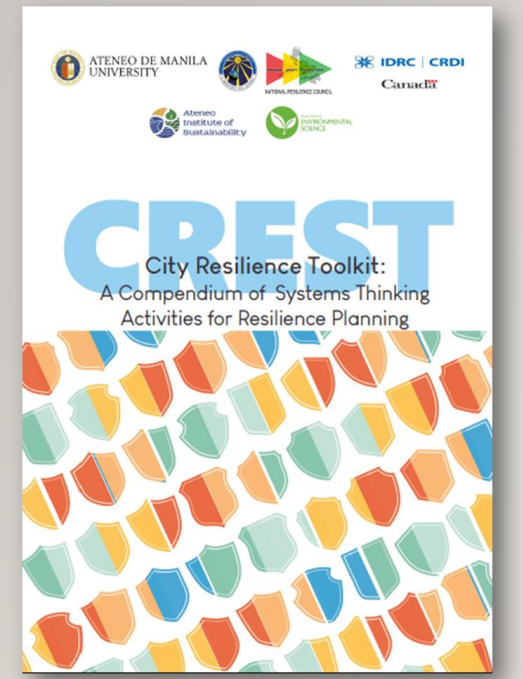
Includes material © CNES 1997 and 2000, Distribution SPOT Image, S.A., all rights reserved and Includes material © JAXA ALOS ANVIR-2 and PRISM 2010, all rights reserved

SOURCE: GED, MANILA OBSERVATORY

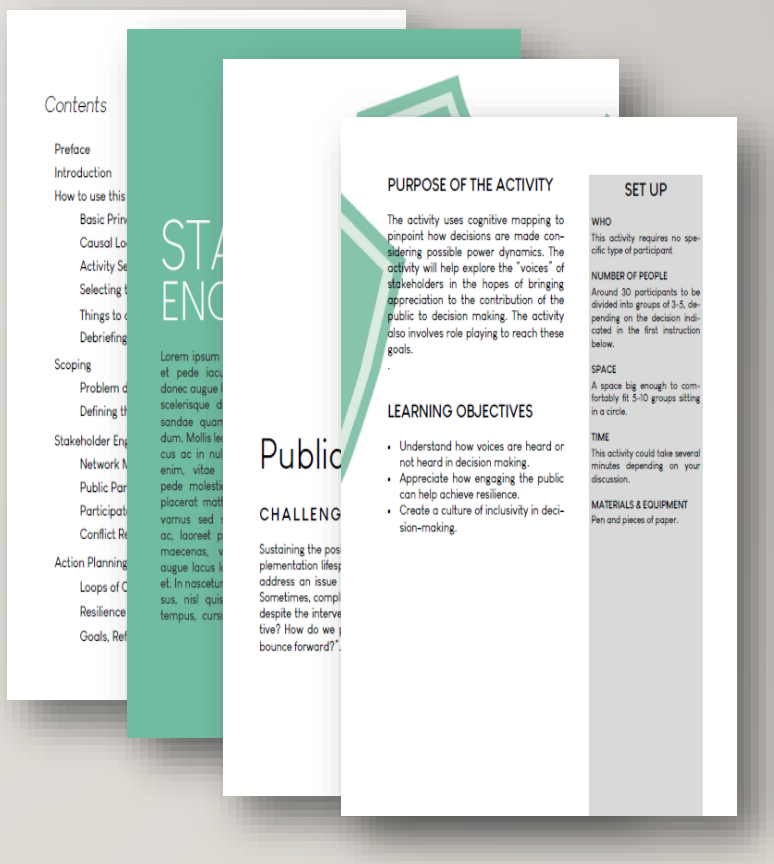
Social Vulnerability to Flooding of Naga City Communities

Principal Components	Variables	Loading	% of Variance
1. Economic capacity	Income and employment (rev) Safe housing accessibility (rev) Basic utilities accessibility (rev) Health factors	0.741 0.705 0.663 0.507	28.82%
2. Dependency	Special needs members Dependent rates	0.814 0.598	22.33%
3. Waste management and flood risk	Waste management and flood experience	0.643	14.61%

WT2: City Resilience Toolkit (CResT): A Compendium of Systems Thinking Activities for Resilience Planning



- Mock-up and outline prepared
- Activities for the sections on Problem Diagnosis and Stakeholder Engagement drafted
- Suggested systems thinking- based activities that address common resilience planning challenges, and can be adapted by stakeholders across different sectors to integrate into their respective planning processes
  - Identify common challenges encountered in resilience planning
  - Suggest activities to help address those challenges
  - Compile and adapt existing planning tools and activities
  - Showcase newly-developed systems thinking-based activities
  - Designed for multi-sectoral use



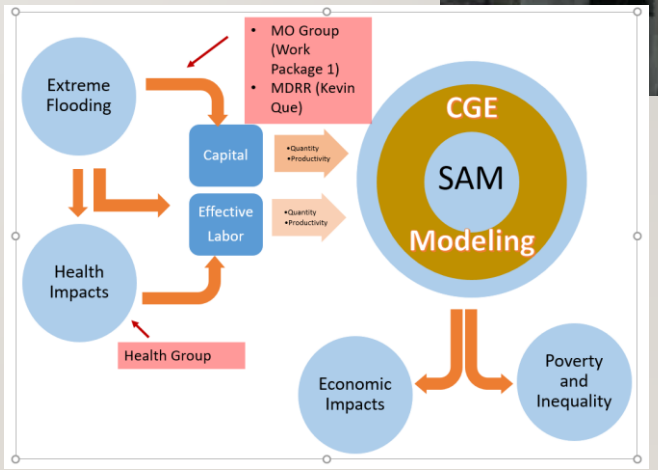
WT2: Focus on Approaches for Resilient systems

The Ateneo Innovation Center, for CCAR

Clean Water Systems; Unmanned Aerial Systems imagery and resilient communications; Near Cloud Networks – cached information for disaster preparedness; 5Gs Technologies for City Resilience (ADMU-Nokia)

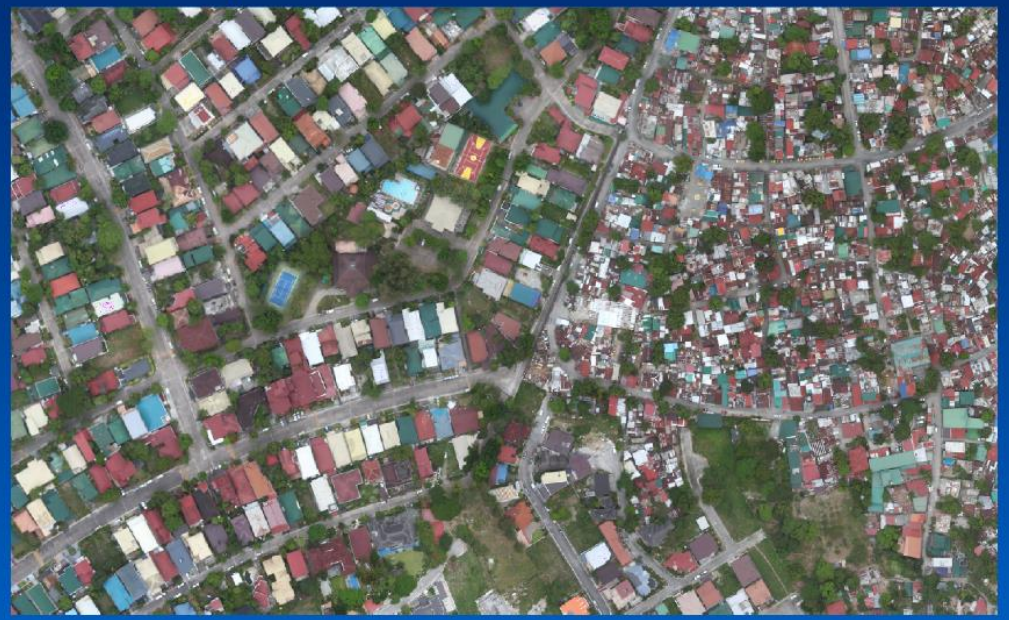
Innovations on CGE Modeling

Incorporating hazards into CGE (e.g. floods); Linkages between hazards, health factors and labor productivity & how LGU spending should change; Microsimulation: Impacts on natural hazards on poverty and income distribution; Impacts of government intervention



Towards Vulnerability Mapping on High Resolution Aerial Images: Roof Detection, GIS and Machine Learning Techniques

Dean Karlo D. Bardeloza, MS,
Nathaniel Joseph C. Libatique, Ph.D.,
Gregory L. Tangonan, Ph.D.

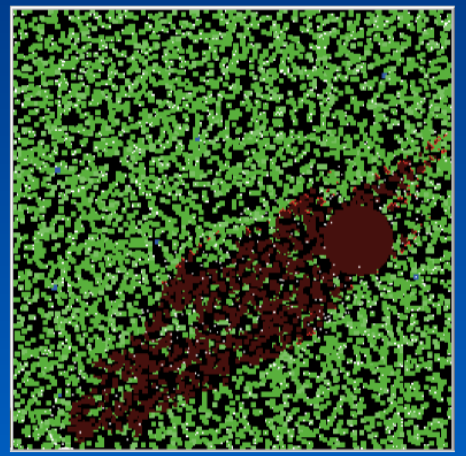


Example of Information Layer

Information Layers

Analysis of the Spread of Fire using NetLogo

Gregory L. Tangonan, Ph.D.,
Aria Buenaventura, BS Physics



WT3

Work Theme Leader: Ms. Antonia Yulo-Loyzaga (Manila Observatory/National Resilience Council)

Deliver multi-stakeholder and transdisciplinary work with the **National Resilience Council** to inform policy reform and/or formulate public and private practice on resilience, including plans and actions for Resilient Cities 2022

Enhance capacity through the **Master in Disaster Risk Resilience (MDRR) Program** designed for public/private sectors

Required Subjects

Foundational Courses (21 units)

DRR 201	Theory and Practice of Disaster Risk and Resilience	3
DRR 202	Hazard Assessment (Integrated Risk Assessment)	3
DRR 203	Risk and Resilience: Focus on Climate Disasters, Development and Humanitarian Action	3
DRR 204	Risk Governance	3
DRR 205	Technologies for Disaster Resilience	3
DRR 206	Disaster Risk Statistics and Data Analysis	3
DRR 207	Quantitative-Qualitative Research Methods for Disaster Risk and Resilience	3

Electives (6 units)

Graduate Seminar (3 units)

Special Project (6 units)

DRR 295	Project I	3
DRR 296	Project II	3

TAKE AWAY MESSAGES: Risk Resilience and Governance

Need to disaggregate vulnerability and exposure to risk: by social-ecological system/place-based vulnerability (Cutter et al.) and by social vulnerability *gender, generation, geography→ income and livelihood resilience (formal-informality intersections)

Need to disaggregate adaptation measures by group (urban poor, gated communities, gender, generation) and by sector (commercial-industrial)

Transformation of social insurance/capital and trust networks after extreme events/cascading disasters

Research results help build the capacity of local govts, urban poor communities/sectors

Building towards resilience and risk governance that is

Context-sensitive, transdisciplinal, transformative possibilities for people and communities

THANK YOU!!

Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience

Project Overview

Dr. Emma E. Porio. Project Leader
Professor, Department of Sociology and Anthropology, Ateneo de Manila University
Science Research Fellow, Manila Observatory

With Fr. J. Villarin, SJ,PhD Ma. Antonia Loyzaga and Jessica Dator-Bercilla, Drs. Uy, Rosa Perez, Greg Tangonan, Fabian Dayrit, Nat Libatique, Carlos Oppus, Paul Cabacungan, Gemma Narisma, Faye Cruz, Obimilinda Cambaliza, James Simpas, May Celine Vicente, Kendra Gotangco, Philip Tuano, Ramon Clarete, Majah Leah-Ravago, John Wong, MD, Katja Baladad