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MANILA
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Synthesis Report

2018-2021

IDRC Project No. 108688 CRM: 0002425

3

Coastal Cities at Risk in the Philippines:
Investing in Climate and Disaster Resilience Project
Technical Report for Year 3
IDRC Project No. 108688 CRM: 0002425



Final Synthesis Report (2018-2021)

IDRC Project No. 108688
CRM: 002425

Coastal Cities at Risk in the Philippines (CCARPH)
Investing in Climate and Disaster Resilience Project
Technical Report for Years 1-3

16 September 2021



PROJECT INFORMATION

IDRC Project Number 108688 CRM: 0002425

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Manila Observatory (MO)
National Resilience Council (NRC)

Location of Study The Philippines

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Report Type Final Technical Report

Date of Submission 2021

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DEDICATION

This Final Synthesis Report by the Coastal Cities at Risk in the Philippines (CCARPH) Project is dedicated to all the hardworking and committed climate change-disaster risk and resilience (CCA-DRR) professionals and practitioners from academe/scientific institutions, government, civil society, and the private sector.

To all the women/men, children, elderly, and persons with disabilities (PWDs) in hazard-prone communities, for their courage and persistence to combat the challenges of climate and disaster-related risks.

Most of all, this report is dedicated to the late Dr. Gemma Teresa T. Narisma, CCARPH Work Package 1.1 leader, Manila Observatory former executive director, Ateneo de Manila University Physics Department professor, and Intergovernmental Panel on Climate Change Working Group I Sixth Assessment Report coordinating lead author, for her unstinting commitment to climate science and action. We, in CCARPH, commit to keeping her legacy alive.

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Acronyms and Abbreviations

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ACERD	Ateneo Center for Economic Research and Development
ACHR	Asian Coalition for Housing Rights
ADMU	Ateneo de Manila University
ADNU	Ateneo de Naga University
AIC	Ateneo Innovation Center
AO	Administrative Order
APAMS	Annual PAASE Meeting and Symposium
APF	All-Pass Filter
APN	Asia-Pacific Network
APSA	Asia Pacific Sociological Association
APS	Asian Peacebuilders Scholars
APT	Asia-Pacific Telecommunity
ARCGIS	Aeronautical Reconnaissance Coverage Geographical Information System
ARISE	Ateneo Research Institute for Science and Engineering
ASEAN	Association of Southeast Asian Nations
ASSRC	ADNU - Ateneo Social Science Research Center
ASTES	Advances in Science, Technology and Engineering Systems
AUN	ASEAN University Network
BAM	Beta Attenuation Monitor
BRACE	Building Resilience Against Climate Effects
BTKI	Buklod Tao Katatagan, Inc.
C/M	Coaching and Mentoring

CABARET	Capacity Building in Asia for Resilient EducaTion
CAO	Central Accounting Office
CBMS	Community Based Monitoring System
CBVNA	Community-based Vulnerability Assessment
CCA-DRR	Climate Change Adaptation and Disaster Risk Reduction
CCARPH	Coastal Cities at Risk in the Philippines
CCC	Climate Change Commission
CCVA	Climate change vulnerability assessment
CDRA	Climate and Disaster Risk Assessment
CESU	City Epidemiology and Surveillance Unit
CGE	Computable General Equilibrium
CORDEX	Coordinated Regional Climate Downscaling Experiment
CPDO	City Planning and Development Office
CReST	City Resilience Suite of Tools
CSO	Civil Society Organization
DA	Department of Agriculture
DEM	Digital Elevation Model
DILG	Department of Interior and Local Government
DOST	Department of Science and Technology
DRA	Disaster Risk Assessment
DRR	Disaster Risk Reduction
DRRE	Disaster Risk and Resilience Education
DRRMO	Disaster Risk Reduction & Management Office
DSA	Department of Sociology and Anthropology
DSM	Digital Surface Model

EAERE	European Association of Environmental and Resource Economists
EAS	East Asian Seas
ECCE	Electronics, Computer, and Communications Engineering
ECQ	Enhanced Community Quarantine
EEC	Ecological Education and Culture
EMB	Environmental Management Bureau
EPWMD	Environmental Protection and Waste Management Department
ES	Environmental Science
ETOP	Education and Training in Optics and Photonics
FAEA	Federation of ASEAN Economic Associations
FIES	Family Income and Expenditure Survey
FDUP	Foundation for Development of the Urban Poor
FGD	Focus Group Discussion
GED	Geomatics for Environment and Development
GDP	Gross domestic product
GHTC	Global Humanitarian Technology Conference
GIS	Geographic Information System
GOLD	Global Observatory on Local Democracy and Decentralization
GPS	Global Positioning System
GREEN	Geared for Resiliency and Energy Efficiency for the ENvironment, total effort of the Philippine Green Building Initiative, Inc., (PGBI)
HEC-HMS	Hydrologic Engineering Center – Hydrologic Modeling System
HEV	Hazards, exposures and vulnerabilities
HLURB	Housing and Land Use Regulatory Board
ICBR	International Conference on Building Resilience
ICOE	International Centres of Excellence

ICLEI	International Council for Local Environmental Initiatives
ICRC	International Conference on Regional Climate
ICSU	International Science Council
ICT	Information and communications technology
IDRC	International Development Research Centre
IEEE	Institute of Electrical and Electronics Engineers
IFPDS	Institute of Fisheries Policy and Development Studies
IFRD	International Food Policy Research Institute
IFSAR	Interferometric Synthetic Aperture Radar
INECAR	Institute for Environmental Conservation and Research
IPCC	Intergovernmental Panel on Climate Change
IRDR	Integrated Research on Disaster Risk
ISMAC	International Symposium on Multimedia and Communication Technology
ISO	Institute of Social Order
ITRMO	Information and Technology Resource Management Office
IWISE	Intergovernmental Panel on Climate Change
JJCICSI	John. J. Carroll Institute on Church and Social Issues
KII	Key Informant Interview
LEAP	Leadership for Adaptive and Proactive Local Government Units
LED	Light emitting diode
LFS	Labor Force Survey
LGU	Local Government Unit
LiDAR	Light Detection and Ranging
LS	Loyola Schools
MGB	Mines and Geosciences Bureau

MDG	Millennium Development Goals
MLC	Maximum Likelihood Classifier
MDRR	Master of Disaster Risk and Resilience
MMDA	Metro Manila Development Authority
MO	Manila Observatory
MSCWS	Mobile Solar-powered Clean Water System
NAMRIA	National Mapping and Resource Information Authority
NAST	National Academy of Science and Technology
NCDR	National Science & Technology Center for Disaster Reduction
NDRRMC	National Disaster Risk Reduction and Management Council
NGO	Non-governmental organization
NN	Neural Network
NOAH	National Operational Assessment of Hazard
NPSP	Natural Products Society of the Philippines
NRC	National Resilience Council
NUS	National University of Singapore
OADF	Optical add-drop filter
OCD	Office of Civil Defense
OLGDS	Our Lady of Guadalupe Diocesan Seminary
OP	Office of the President
OP-AMP	Operational amplifier
PA	Producer's Accuracies
PAASE	Philippine-American Academy of Science & Engineering
PCA	Principal Component Analysis
PDRRMO	Provincial DRRMO

PHILLBO	Philippine League of Local Budget Officers
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PIDS	Philippine Institute for Development Studies
PM	Particulate Matter
PWDs	Persons with disabilities
PSA	Philippine Statistics Authority
PUJ	Public Utility Jeepney
PUVMP	Public Utility Vehicle Modernization Plan
RCM	Regional Climate Models
REEPS	Rokko Environmental Economics and Policy Seminar
RF	Random Forest
RGB	Red Green Blue
RIDF	Rainfall intensity duration frequency
RIEEM	Research Institute for Environmental Economics and Management
SAHW	Solar Auto-Hand Washer
SAM	Social Accounting Matrix
SARIMA/X	Seasonal Auto-Regressive Integrated Moving Average
SD	System Dynamics
SDG	Sustainable Development Goals
SEACLID	Southeast Asia Regional Climate Downscaling
SJ	Society of Jesus
SOLA	Scientific Online Letters on the Atmosphere
SOSE	School of Science and Engineering
SOSS	School of Social Sciences
SPSS	Statistical Package for Social Sciences

SRTM DEM	Shuttle Radar Topography Mission - Digital Elevation Model
SVM	Support Vector Machine
SVR	Support Vector Regression
SWB-AWB	Social Well-being / Asian Well-being Project
TAG	Technical Advising Group
TAME-BC	Transdisciplinary Approach to Mitigate Emissions of Black Carbon
ToT	Training of Trainers
TRAIN	Tax Reform for Acceleration and Inclusion
TTC	Telecommunications Technology Committee
TWG	Technical Working Group
UA	User's Accuracies
UAV	Unmanned Aerial Vehicle
UCCRN	Urban Assessment of Climate Change Research Network
UCLG	United Cities and Local Governments
UERI	Urban Ecosystem Resilience
UNISDR	United Nations International Strategy for Disaster Reduction
UNISDR-ARISE	United Nations International Strategy for Disaster Reduction-Alliance for Disaster Resilience Societies
UAP	United Architects of the Philippines
UMRB	Upper Marikina River Basin
UP	University of the Philippines
UPV	University of the Philippines Visayas
V-Hub	Vehicle communication hubs
Web-GRiD	Web-based Geospatial Risk Data Base for Covid-19 Pandemic Response and Recovery Training Program
ZFF	Zuellig Family Foundation



EMMA PORIO, PHD

Project Leader and Principal Investigator, CCARPH

Professor, Ateneo de Manila University and Science Research Fellow, Manila Observatory

The Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience (CCARPH) overall goal is to enhance the capacity of coastal cities and vulnerable communities in the Philippines to adapt to climate and disaster risks towards resilience in the context of rapid urbanization and economic expansion. CCARPH implemented the new trans-disciplinary resilience research and produced innovative research, tools and technologies that put resilience at the center of risk governance, planning and development. Through collaborative public-private partnerships, the project produced a cadre of resilience scientists, professionals, and leaders engaged in risk and resilience governance. We thank all of our partners and supporters for making this possible!!! We are eternally grateful for your trust, collegiality, professionalism and faith that together we can make a difference!



JESSICA DATOR-BERCILLA

Co-Principal Investigator, CCARPH

Professor, University of the Philippines Visayas

Advocating for science-based decision-making for CCARPH is a vision we endeavored to achieve. Making this possible through transdisciplinary measures that transform resilience from a concept to practice in governance, that averts losses and damages, and saves lives, ecosystems, and assets, is an outcome we are honored to witness. Our gratitude to those who navigated with CCARPH to traverse and overcome the challenges of scientific pursuit and public-private transdisciplinary collaboration so that science can be made more relevant in risk and resilience governance.



MA. ANTONIA YULO-LOYZAGA

Principal Investigator, CCARPH

President, National Resilience Council (NRC)

On behalf of the NRC, I wish to thank the IDRC and the CCARPH Team of the Ateneo de Manila University and the Manila Observatory for the privilege of being able to work together on this groundbreaking project.

I likewise wish to gratefully acknowledge the leadership of Dr. Gordon McBean, Dr. Hassan Virji, Dr. Rajib Shaw, and Dr. Wei-Sen Li in Coastal Cities at Risk I, for laying the foundations for trans-disciplinary action research required to understand the complexity of climate risk in the Philippines.

The role of the private sector in understanding, mitigating, and preventing the generation of risk associated with climate change continues to evolve and needs further investigation. This sector is historically regarded as a donor or benefactor in post-disaster relief or the source of a hazard, rather than an active partner in a whole-of-society effort to reduce risk by investing in adaptation for resilience.

Building on a transdisciplinary approach, CCARPH and the NRC aimed to move away from these roles by applying a systems lens to climate and disaster risk, envisioning shared outcomes, and co-creating opportunities for innovative science and technology-based public-private partnerships. This process enabled the engagement of researchers, expert practitioners, representatives from local and national government, the private and civil society sectors, and the communities themselves in identifying potential pathways and tools to address differential exposure and vulnerability in each city.

As a science- and technology-based public-private partnership, NRC has always held that outcomes of CCARPH embody the convergence of at least three major international agreements: The Sendai Framework for Disaster Risk Reduction, The Paris Climate Agreement, and the UN Sustainable Development Goals. We, therefore, value the

transdisciplinary action research approach to our complex resilience challenges and commit to continue our collaboration with the project leadership.

The work of charting the course towards the institutionalization of new agreements, and the prioritization of investments, policies and actions on risk governance and resilience has just begun.

We, therefore, look forward to continuing this journey towards our country's inclusive and resilient development together – one strategic step at a time.



Project launch with Fr. Jett Villarin (ADMU), Dr. Gordon McBean (ICSU), Dr. Hassan Virji (START), Dr. Wei-Sen Li (NCDR), Dr. Melanie Robertson (IDRC), Ms. Toni Yulo-Loyzaga (NRC), and Dr. Toby Dayrit (AIC) as well as city government representatives from Iloilo, Naga, Navotas, Pasig, Quezon, and Valenzuela; the NRC; CSOs; ADMU officials, professors and students; and project team led by Dr. Emma Porio, project leader. Photos by Andrea Bautista/UCPRO

MESSAGES



HASSAN VIRJI

Emeritus Director

International START Secretariat

Washington DC, USA

CCARPH is a comprehensive multifaceted collaboration between academia, public and private sectors, local government units, and nationally-mandated organizations to instill and nurture resilience at various scales of the society. The program innovated the use of transdisciplinary tools and methodologies to develop strategies for managing complex and interacting challenges at urban scales, especially climate change-associated disaster risks. The stellar effort summarized in this report notes significant academic output, outstanding contribution to fostering capacities of early career researchers and policy makers, and sustained engagement with members of local governments involved in the CCARPH consortium of cities.

MESSAGES



DR. FABIAN M. DAYRIT, RCh

Board of Trustees, Ateneo de Manila University

Academician, National Academy of Science and Technology

The urgency of our task requires that we apply the best science in and with communities to prepare them for the new normal of climate change. Science cannot remain out there, but must become part of governance and the lives of people.



ROBERTO C. YAP SJ

President, Ateneo de Manila University

Project Holder, CCARPH

Throughout history, it has always been the communities at the margins of society that have been the most vulnerable to disasters, both natural and anthropogenic. The global warming and climate change that we are experiencing today, caused in large part by human activities, and the rapid urbanization of the past few decades have exacerbated the risk that vulnerable communities face.

The Coastal Cities at Risk in the Philippines project, with its multi-disciplinary and multi-stakeholder approach, has shone a light on the country's best practices, systems, and policies for disaster risk and resilience as well as the gaps that we have yet to address.

The Ateneo de Manila University, through CCARPH and other projects, remains committed to education and research which will help lead the Philippines to a resilient and sustainable future.



SILVESTRE Z. BARRAMEDA, JR.

*City Director, Department of the Interior and Local Government
Council of Adviser Member, CCARPH*

Climate change and disasters transcend political and geographical boundaries. Hence, there is a need for a deeper collaboration and meaningful link between science and policy; public and private; and individuals and institutions to come up with best-fit innovative solutions for our local communities to prepare, adapt and transform. And guided by good science, local governments are in the best position to champion evidence-based decisions and make resilience happen on the ground.

True to its commitment, CCARPH is a pioneering initiative that recognizes and puts into practice the “intersectionality” and the “transdisciplinarity” of resilience as it nurtures systems thinking in the spirit of risk governance and multi-stakeholdership. I fervently hope that through CCARPH’s initiatives in partnership with our ever-dynamic private sector and robust LGUs we are able to continue creating, sustaining and strengthening the resilience pathway of every Filipino.



JOSE RAMON T VILLARIN SJ

Executive Director, Manila Observatory

Climate change will not be felt so much in averages as along the edges and outliers. Changing normals are driven by extremes as extremes are stretched just as well by shifting normals. The coastline is at the edge of vital environmental changes we are bound to see in the coming years. It is a major frontline in the struggle to climate proof our common home. We thank CCARPH for this privilege of being placed together with other leaders in one of the key frontlines of climate action.



DR. RICARDO G. ABAD

Artistic Director, Areté

Professor Emeritus

Department of Sociology and Anthropology

Ateneo de Manila University

In our increasingly culturally complex, mobile global world, where we even experience the diversification of diversity, we urgently need mediating instrumentalities to enable us to understand each other and forge bonds of collaboration while working for a common cause. Science Communication is one such instrumentality that spurs a convivial interaction between scientists and the public and among scientists, artists, and experts in human communication.



DR. ROSA PEREZ

Science Research Fellow, Manila Observatory

Lead Author, Intergovernmental Panel on Climate Change

CCARPH's workshops on climate expenditures' tagging enlightened the LGUs on the typologies of adaptation and /or mitigation, and how to incorporate these into their programs, projects, and activities as inputs to their Annual Investment Plans (AIPs). Academic partners were also included in the training so that they could assist their respective local government officials in transforming their planning and investment trajectory into science-based and systems-driven interventions.



DR. GREG TANGONAN

*Emeritus Director, Ateneo Innovation Center
Ateneo de Manila University*

At the Ateneo Innovation Center (AIC), we have developed a unique skill set in disaster risk and resilience. We have designed and implemented the following innovations: clean water systems with solar panels, water filtering, and LED lights; an urban rooftop garden with aquaponics for food security; near cloud caching systems with WiFi distribution, a learning library, and an LGU repository of data; UAV imaging and vehicle-to-vehicle communications (V-Hub) beacons, and communications for situational awareness and smart evacuations.

All these are part of a complex system approach to understanding cascaded disasters. We are uniquely positioned to be state of the art in our particular combination of skills and applications, which is critical in disaster risk and resilience.



AUSTERE PANADERO

*President, Zuellig Family Foundation
Former Undersecretary, Department of the Interior and Local Government*

Congratulations, CCARPH! The solid work you have done over the years has significantly contributed to building the body of knowledge and competencies to support the sustained advocacy and practice of resilience in the country. More importantly, the trailblazing work you have initiated in facilitating that science be utilized at the local government level/communities will serve as the benchmark on how academic institutions can improve local actions towards resiliency. The challenge moving forward is how to sustain these gains so that more local issues are addressed and more communities are protected.



UNDERSECRETARY RICARDO B. JALAD

Civil Defense Administrator, Office of the Civil Defense

Executive Director, National Disaster Risk Reduction and Management Council (NDRRMC)

On behalf of the NDRRMC, I thank and congratulate the CCARPH Team for their dedication and perseverance in addressing challenges faced by hazard-prone communities, with the cooperation of various sectors and their capacity building programs. These efforts are testaments to the effectiveness of our whole-of-society approach towards realizing our goal to build safer, climate change-adaptive, and disaster-resilient communities across the entire archipelago. Let us continue to strengthen the use of science-based information and assessment, as well as complement our respective efforts to enhance our planning, capacity building, and strategic actions towards protecting all our countrymen.



HON. NELSON S. LEGACIÓN

Mayor, Naga City

In our continuing battle against the COVID-19 pandemic and other disasters, Naga City has leaped into risk-informed and resilience-driven planning and development. After a training initiated by CCARPH-NRC, we established the Naga City Resilience Council, processed and adopted CDRA, and put up the web-grid dashboard for COVID-19. These empowered the city to effectively use technology and scientific data for our decisions, strategies, and actions. Today, our policies and plans continue to evolve into actual investments for a more resilient city.



DIGNA M. PANER - ALBA, PHD

Dean, College of Humanities and Social Sciences, Ateneo de Naga University

Head, Climate and Disaster Risk Assessment (CDRA), CCARPH-Naga City Local Government

CCARPH is a program driven to help local government units become resilient by using innovative tools and making science-informed decisions to enable them to bounce forward after disasters. In the City of Naga, the three focal areas of the CCARPH Project, in collaboration with the Ateneo de Naga (ADNU), are science and technology, social sciences, and leadership and governance. The data collated and outputs produced by the CCARPH-ADNU sub-project were not simply turned over to city officials, but also brought to the most affected 27 barangays in Naga; this, in pursuit of interdisciplinarity and the use of science-based planning and decision making. The data generated (hazard maps for the physical sciences and social vulnerability index based on CBMS) also provides local government policy makers with a solid risk assessment to decide on the most appropriate programs for a more resilient city.



CLEMENT CASTIGADOR CAMPOSANO, PHD

Chancellor, University of the Philippines Visayas

An archipelago of over 7,000 islands and with 62% of its total population in coastal areas, the Philippines stands to benefit from science-informed development processes, particularly as it seeks to address the vulnerabilities of its diverse communities and ecosystems. CCARPH has worked to ensure that risk and resilience governance benefits from the best available science. In supporting the work of CCARPH, the University of the Philippines Visayas is honored to be in the company of scientists, private sector leaders, and other practitioners behind this initiative.



DR. GAY DEFIESTA

*Vice-Chancellor, Academic, University of the Philippines Visayas
Head, Climate Disaster Risk Assessment, CCARPH-Iloilo City Team
CCARPH-University of the Philippines Visayas*

Integrating social vulnerability analysis into the CDRA provided important insights on how inherent vulnerabilities can exacerbate climate risks and vice-versa. This enhanced CDRA, scaled down to the barangay level, is a significant input to the LGU in formulating appropriate interventions to reduce impacts of climate change on their communities.



VAdm ALEXANDER P. PAMA

*Co-Chair, ARISE Philippines
Former Administrator, Office of Civil Defense
Former Executive Director, NDRRMC
Former Chief, Philippine Navy*

The real essence of a whole-of-society approach to effective and efficient disaster resilience is a comprehensive and inclusive collaboration of stakeholders who “bring to the table” a correct understanding of the causes and effects of disasters and relevant solutions to such. The work of CCARPH, in collaboration with other stakeholders particularly in the co-creation, co-management and co-ownership in resilience-building, is a unique and significant value-added component towards this transformational approach to disaster resilience at all levels of society. The evidence-based inputs to the overall DRR and resilience efforts significantly complements the capacity building and enhancing support and participation of the private sector stakeholders such as ARISE Philippines in order to achieve the desired resilience outcome for the people and communities of the country.



ANNA MARIA KARAOS, PHD

Board of Trustees, Ateneo de Manila University

Former Director, John J. Carroll Institute of Church and Social Issues (JJICSI)

As an NGO leader who has worked for decades with urban poor communities in hazardous areas in Metro Manila, JJICSI found the partnership with CCARPH particularly enabling in bringing science at the forefront of its advocacy for safe communities. With urban poor communities subject to eviction and relocation to off-city resettlement sites, CCARPH equipped us NGOs and our partner communities in resettlement sites with science-informed analysis, policy proposals, and interventions that took into account real conditions on the ground for advocacy with local governments and national agencies.

With CCARPH's support, we conducted a needs and vulnerability assessment on the resettlement communities affected by Typhoon Ulysses. This enabled us to highlight the gender dimension of the devastating typhoon's impact, the deficiencies in infrastructures built by the government, and the local government's lack of preparedness and response. The science-based analysis and resources we accessed from the Manila Observatory and the Ateneo de Manila University helped us formulate capacity-building strategies and policy recommendations to strengthen the resilience of resettled vulnerable communities in what turned out to be unsafe sites in the fringes of the metropolis.



JERRY P. TREÑAS

Mayor, Iloilo City

The Iloilo City Government is grateful to the Coastal Cities at Risk for ensuring we have safe and resilient communities through use of science-based approaches and initiatives toward a more livable Philippines. We are proud to be partners with CCARPH as we share the common vision of having communities that can better prepare, adapt and transform amidst the changing times.



NORALENE UY, PHD

*Member, Experts Pool, National Resilience Council
Researcher, International Recovery Platform Secretariat*

Evidence-based and systems approaches to climate and disaster risk reduction have co-benefits and bring transformational changes to overall risk reduction from prevention and mitigation to recovery. CCARPH's transdisciplinary work, which considers all of society, focuses on at-risk populations, and addresses intersectionality, contributes to resilience-building amidst uncertainty and complexity towards the goal of sustainable development.



MANUEL "KA NOLI" ALCANTARA ABINALES

*Founder, Buklod-Tao, Inc.
MDRR Community Laboratory*

Buklod Tao's 24 years of work in community-based disaster risk reduction has been vindicated by our continuing collaboration with and support of the Coastal Cities at Risk: Investing in Climate and Disaster Resilience (CCARPH) of the Ateneo de Manila University (ADMU), Manila Observatory, and the National Resilience Council.

As a community-based organization, we are very proud of our collaborative work with CCARPH and the students of ADMU's Master of Disaster Risk and Resilience (MDRR) program. Our Bakwit Center, which serves as the MDRR students' community laboratory, has also served many other students and community groups from many schools and communities, thanks to the continuing support of CCARPH! Cheers!

WHO WE ARE

The CCARPH Consortium is composed of the Ateneo de Manila University, Manila Observatory, and the National Resilience Council.

The **Ateneo de Manila University (ADMU)** is a private research university in Metro Manila, Philippines. Founded by the Society of Jesus in 1859, Ateneo is the third-oldest university in the Philippines. Its undergraduate and graduate programs are co-educational and organized into four schools, collectively known as the Loyola Schools, located at its main campus at Loyola Heights. Four professional schools (law, medicine, business, government) occupy campuses in different parts of Metro Manila. The Commission on Higher Education (CHED) has recognized its units in biology, physics, chemistry, mathematics, information technology, entrepreneurship education, English literature, philosophy, sociology, psychology, and business administration as Centers of Excellence while the communication, electronics engineering, environmental science, history, Filipino literature, and political science units have been declared Centers of Development.

The Loyola Heights campus also hosts these research centers: Philippine Institute of Pure and Applied Chemistry (PIPAC) and National Chemistry Instrumentation Center (NCIC), Ateneo Research Institute for Science and Engineering (ARISE), Ateneo Innovation Center (AIC), Ateneo Center for Economic Research and Development (ACERD), Anthropological and Sociological Initiative in Ateneo (ASIA), Global and Area Studies Hub, and the Institute of Philippine (IPC).

In 2021, ADMU ranked the highest among Philippine universities in the Times Higher Education (THE) University Ranking for SDGs Implementation. Also in 2021, the France-based Eduniversal, ranked the Master of Disaster Risk and Resilience (MDRR) as one of the best master's programs in Far East Asia.

The **Manila Observatory (MO)**, a private non-stock, non-profit research institution serving the science apostolate of the Society of Jesus in the Philippines, was established in 1865 in Manila. Inspired by Ignatian spirituality, the MO is committed to a scientific culture for sustainable development of the Philippines in its regional and global context through research excellence in environmental and pre-disaster science, particularly in the areas of atmospheric studies, solid earth dynamics, and instrumentation. It is dedicated to: (1) conduct continuing scientific research, (2) form future scientists, (3) network with allied groups, (4) engage in information, education, communication efforts, (5) collect and manage special research materials, (6) build the capability of institution and local

communities, focusing on the urban environment, and (7) advocate key policies needing scientific inputs.

MO scientists have always been key players in the Intergovernmental Panel of Climate Change (IPCC), with the Sixth Assessment Report (AR6) having four CCARPH-MO climate scientists (Drs. Gemma Narisma, Faye Cruz, Laurice Jamero, and Rosa Perez).

The **National Resilience Council (NRC)** is a science- and technology-based public-private partnership that was organized in 2017 after a series of dialogues, conferences, and consultations that began after Super Typhoon Haiyan. It was convened by the Carlos P. Romulo Foundation to bring together leaders in the national and local government, private sector, the scientific community, and civil society. These efforts were led by former Philippine Foreign Affairs Secretary Roberto R. Romulo who was joined by Mr. Hans T. Sy, then serving on the global board of the UNISDR Alliance for Disaster Resilient Societies (ARISE).

The NRC is co-chaired by Mr. Sy and the Secretary of National Defense Delfin Lorenzana. In recognition of the complexities involved in understanding risk and moving science to action, it has vice-chairs for national and local government, business, academia, and civil society organizations. The council works primarily to enhance evidence-informed risk governance in local governments through multi-stakeholder partnerships and support for transdisciplinary action research. It works in nine local government units, three of which are CCARPH partners, namely: Muntinlupa, Naga, and Iloilo.



WHERE WE WORK

- **Metro Manila** is the largest urban agglomeration in the Philippines, composed of 16 cities and 1 municipality, accounting for 37 percent of the nation's GDP. Home to a population of 15 million, with 40 percent belonging to the informal sector, it is highly prone to typhoons, floods, earthquakes, drought, and sea level rise (SLR).
- **Naga City** in Bicol Region, Southern Luzon, is the region's commercial, industrial, and economic center. However, the city constantly battles climate and weather-related hazards. In late 2020, typhoons Goni and Vampo battered the region in the midst of the Covid-19 pandemic. CCARPH-NRC facilitated climate disaster assessments towards developing a risk-informed, resilience-driven planning and investment to make its development targets in Naga City and Iloilo City.
- **Iloilo City** is the regional hub of Western Visayas and plays a critical role in the region's socio-economic development. The city is also subjected to climate and technological hazards.



OUR PARTNERS

Core Implementing Partners



Strategic Partnerships

- Areté - As ADMU's hub for creativity and innovation, Arété provides space for the university's conventional artistic endeavors but importantly incubates interdisciplinary collaborations to develop new, impactful ideas that arise from the meeting of minds from varying perspectives and disciplines. The Sandbox Programs help resident fellows like CCARPH meet specific objectives through transdisciplinary dialogue and collaboration. Arété has a complex of theaters, art galleries, studios, laboratories, a makerspace, teaching and meeting rooms, and several open areas. These facilities enable it to host, support, and connect academics, artists, professionals, and leaders of different talents and interests whose exchanges will spur creativity and innovation forging unforeseen paths and improving communities. Arété bets the desire of a growing many, coming together to impart and to learn, to be inspired and to be challenged, to focus but still to wander in all that could be done as a collective concerned with what is possibly better.
- Office of Civil Defense, National Disaster Risk Reduction and Management Council (NDRRMC). ADMU represents the scientific research institutions, higher education institutions (HEIs), and the whole academic sector in the NDRRMC. OCD-NDRRMC actively supports the delivery of ADMU's Master of Disaster Risk and Resilience (MDRR), ranked in 2021 by the France-based Eduniversal as one of the best masters programs in Far East Asia.
- The Climate Change Commission's National Panel of Technical Experts include scientists from MO and ADMU.
- Buklod Tao, Inc. and its *Bakwit/Evacuation Center*, based in Banaba, San Mateo Rizal, serves as the MDRR Community Laboratory.

- Women-Led Integrated Community Food Production Program (ICFP) of Disiplina Bignay, Valenzuela City LGU's Department of Agriculture and Human Settlements Office (HSO).





EXECUTIVE SUMMARY

The Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience (CCARPH) worked towards reduced disaster risks and losses, resilience through systems thinking actions, and improved capacities of cities through science-informed plans.

Using transdisciplinarity as a modality of working and systems thinking as an approach, CCARPH is implemented through a partnership between the Ateneo de Manila University (ADMU), Manila Observatory, and the National Resilience Council (NRC). The CCARPH consortium is a private-sector led collaboration for resilience, local government units, and the coastal cities of Naga, Iloilo, and Muntinlupa, among others, in Metro Manila.

Working in three coastal cities of Metro Manila, Naga, and Iloilo, CCARPH advanced intensive knowledge of climate change adaptation and disaster risk reduction for resilience. It invested in: (a) three downscaling climate information, (b) characterizing social vulnerabilities in three cities, (c) analyzing PM2.5 impacts in urban contexts, and (d) examining climate-related morbidity.

To advance methodologies and tools for climate change adaptation and disaster resilience, CCARPH developed an approach for downscaled risk visualization using: (a) remote sensing and geo-spatial data used in three cities, (b) a suite of City Resilience Tools that can inform resilience planning, c) a Computable General Equilibrium (CGE) model with the Social Accounting Matrix (SAM) for local governments, and (d) innovations for incremental adaptation (e.g., technological innovations for community resilience).

It also innovated a range of transformational adaptation through science-informed risk assessments that informed development planning in local governments. The Climate and Disaster Risk Assessments (CDRA) in the cities produced three resilience plans that found their way into the barangay resilience plans of Naga and Muntinlupa cities, as well as in the Comprehensive Development Plan of Iloilo City. In addition to these, a Resilience Innovation Report and a Resilience Toolkit was produced by the project.

Aiming to enhance capacity and transfer of knowledge to different stakeholders, CCARPH, through the Masters in Disaster Risk and Resilience (MDRR) program at the ADMU, produced 12 transdisciplinary graduates. Moreover, it engaged 16

cross-sectoral interns and 48 research fellows, and enhanced resilience knowledge and capacities for socio-ecological systems transitions (e.g., urbanization, development, disaster risk and resilience). CCARPH also improved science-technology for resilience in transdisciplinary, multi-stakeholder public-private partnerships in eight cities, with the latter delivered through the certificate courses with MDRR. Through collaborative public-private partnerships, the project produced a *cadre* of resilience scientists, governance professionals, and leaders engaged in risk and resilience.

Enhanced risk governance was made possible by identifying policy-supported resilience mandates via the Resilience Scorecard, which focused on strengthening socio-ecological and institutional systems in the capacity building process, led by the NRC, in local government units (LGUs). Science-informed decision-making became a central theme in CCARPH's resilience work not only in LGUs, but also among its cross-consortia partnerships, engagements with local, regional, and global civil society organizations, national agencies, and inter-governmental platforms. By bringing the science and technology of climate and disaster risk and resilience to inform the core business of the private sector, government, and civil society, cities are now better informed and equipped to proactively and dynamically adapt to risk governance challenges¹ posed by climate change, the COVID-19 pandemic, and the growing social, political-economic disparities.



¹ See CCARPH Project holder, Fr. Roberto C. Yap, SJ, PhD, addressing the 2021 National Disaster Resilience Month Kick-off Ceremony, <https://www.youtube.com/watch?v=hxMggW8EwYQ>.

THEORY OF CHANGE

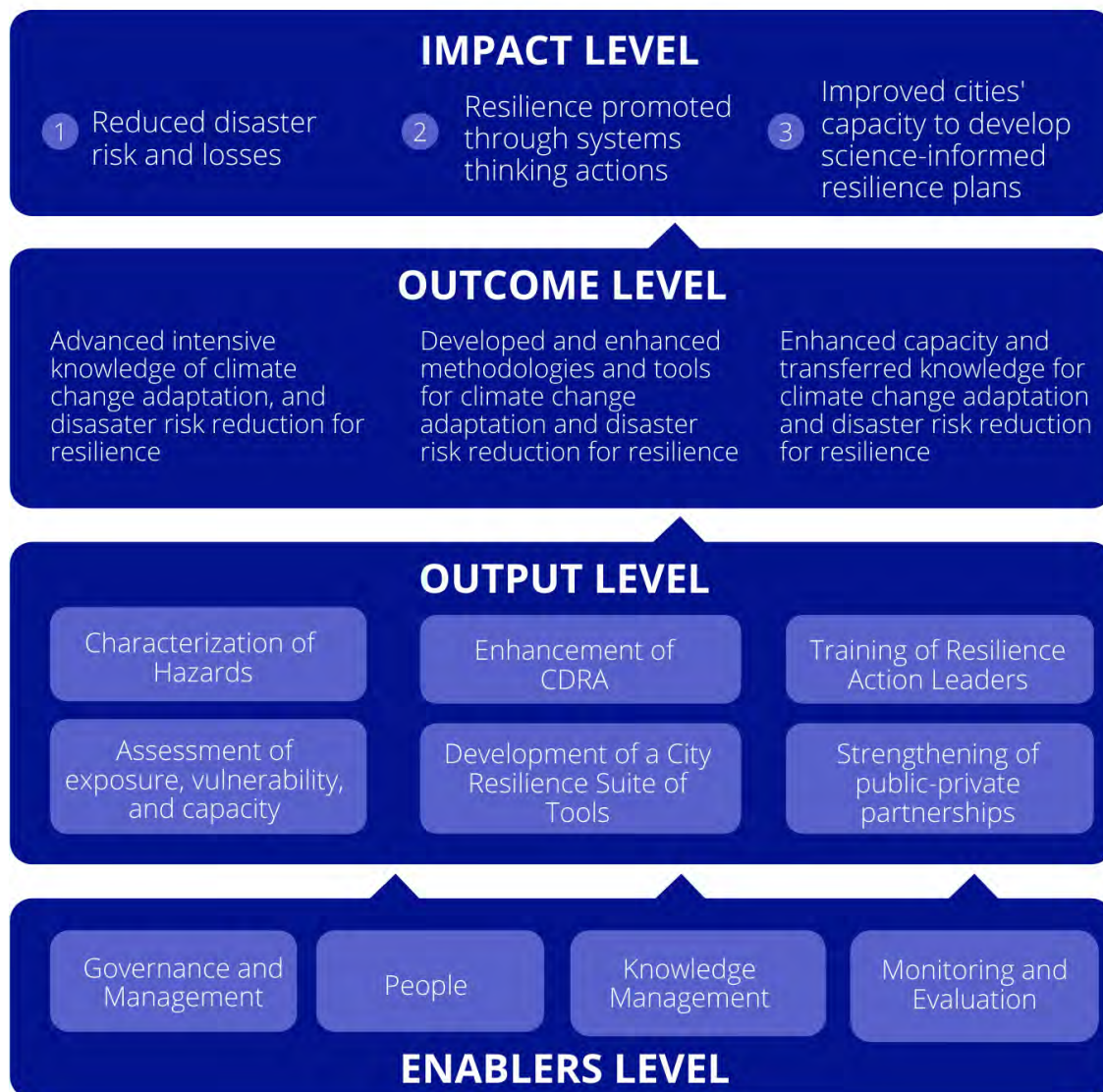



Figure 2. CCAR in the Philippines (CCARPH) Theory of Change

Source: Porio, E., J. Dator-Bercilla and A. Yulo Loyzaga (2021)

The Theory of Change model reflects the contributions of the project with the support of IDRC-Canada, ADMU, MO, NRC, ADNU, UPV and the local governments of Valenzuela City, Pasig City, Quezon City, Muntinlupa City, Naga City, and Iloilo City to deliver results, including team members' efforts and financial resources. Major enablers comprise interconnected elements, which include governance and management, people, knowledge management, and monitoring and evaluation. These support the delivery of results and change with their accountability of governance, inclusive and collaborative approach,



professionalism and profiles as agents of change, efficient and secure handling of information, and a systematic process to improve performance and achieve results.

The project's direct contributions to climate and disaster resilience in the Philippines are the (1) characterization of hazards, (2) assessment of exposure, vulnerability, and capacity, (3) enhancement of climate and disaster risk assessment, (4) development of City Resilience Suite of Tools, (5) training of resilience action leaders, and the (6) strengthening of public-private partnerships in the country. To fulfill impact-level change, the project identifies major areas that orient the aims for 2018-2020. These include the advancement of knowledge on climate change adaptation and disaster risk reduction for resilience, methodologies and tools for CCA-DRR, and the enhancement of adaptive capacity, and the accomplishment of knowledge transfer and mobilization in coastal cities in the Philippines.

Through a transdisciplinary and multi-stakeholder approach, these outcomes catalyze changes and advance resilience through systems thinking actions, reducing disaster risk and losses, and improving coastal cities capacity to develop science-informed resilience plans and budgets. These plans contribute to the overall prioritization and commitment to climate and disaster resilience in the Philippines. The full achievement of such outcomes, however, will not be solely attributable to the project but also from the combined and collaborative initiatives of ADMU, IDRC-Canada, NRC, MO, ADNU, UPV, and the LGUs of Quezon City, Valenzuela City, Pasig City, Muntinlupa City, Iloilo City, and Naga City, with internal and external stakeholders, including those in government, civil society, the private sector, and the communities themselves.

OUR KEY MESSAGES

How climate is changing in coastal cities, drivers, impacts


- Downscaled climate projections indicate warming in the three metropolitan cities by the end of the 21st century. While rainfall volume is uncertain, the probability of heavy rainfall and the frequency of drought events are projected to increase.
- PM_{2.5} exposure of jeepney drivers, and other street-based income earners like women and street children vendors, who are the most exposed; and identifying locations of transport micro-environments that have very high fine particulate pollution.
- While there is cumulative evidence on the incidence of dengue and leptospirosis per increase in climate change indicators (i.e., annual temperature, humidity, and rainfall) in the barangay and city-level, risk recognition among health officials is very low; thus, missing the opportunity to reinvent existing health policies and program designs towards climate resilience.

Drivers of Risks in Coastal Cities

- **Social vulnerability in relation to climate change is contextually driven and evolving.** The most common components of vulnerability across all cities in Metro Manila can be categorized into three principal components: (1) social structure (i.e., age, civil status, sex, education status), (2) housing materials (i.e., houses with makeshift roofs and walls, dilapidated housing units), and (3) housing tenure (i.e., renting status of people, with or without consent). Across all cities, the groupings of these variables changed over the years. Disability and land tenure were dimensions of vulnerability added in more recent years by the Philippine Statistics Authority (PSA). The evolving vulnerabilities and capacities of people/communities in Metro Manila need to be factored in during risk profiling, resilience-driven planning, and in the investments of LGUs and private sector.

In Naga City, socially vulnerable households are characterized by three principal components that account for 65.8% of the total variance. These include: (1) economic incapacity, (2) dependency, and (3) waste management and flood risk.

In Iloilo City, social vulnerability components relative to climate change-related stressors like drought, flooding, storm surges, and COVID 19 include: (1) dependency ratio, (2) sex, (3) disability, (4) access to water, (5) housing materials, and (6) population and population density. Social vulnerabilities of coastline



communities are compounded by the effects of slow-onset events (e.g., sea level rise) and technological hazards (e.g., oil spill).

- **Extreme rainfall adversely affects the welfare of households in the informal sector.** For both income and expenditure, extreme rainfall has a negative and significant effect, suggesting that it lowers household income more pronouncedly in the informal sector than in the formal sector. While households in the formal sector have larger incomes and have more to lose than households in the informal sector, the adverse impact on informal households may be irreversible given their capacity to recover, and their inability to smooth out consumption even during days with normal rainfall. In Metro Manila, women-headed households suffer more damages and losses compared to those headed by males; they also incur higher expenditures in obtaining basic services before, during, and after flooding events.
- **Street-based populations/income earners understand and recognize pollution and pollutants differently from the scientific community.** Street-based populations have interconnecting and hierarchical levels of risks and hazards, with economic and political risks deemed as more detrimental, while climate and disaster risks and hazards are considered as manageable. When shown the effects of air quality on their health (e.g., increased blood pressure and palpitation rates), jeepney drivers were more worried about the potential loss of their livelihoods due to the government's jeepney modernization program, than the impacts of air quality on their health.

Resilience Research Tools and Innovations for Coastal Cities

- **Risk visualization, as an area of research and innovation, is an excellent tool for transdisciplinary applications.** Risk maps produced for Metro Manila, Naga City, and Iloilo City revealed the exposed entities across space, having varying levels of vulnerabilities. Through risk mapping, the possible extent of selected hazards such as temperature, rainfall, tropical cyclones, flood, and storm surges, together with their associated hazards, were visualized and used for transdisciplinary analysis. This informed decision-making in the climate and disaster risk assessments (CDRA) in the cities of Iloilo and Naga, which in turn informed development planning and investments. It is critical that risk assessments are updated and visualized. Dynamic spatio-temporal platforms can support decision-making by providing a common operating platform for early warning and medium- to long-resilience.

- **Systems dynamics transformed from theory to operational tools that inform policy and practice.** In an attempt to make systems dynamics more functional, the Integrated Urban Services Resilience Index (IUSRI) Model, which combines the Urban Ecosystem Resilience Index (UERI) and the Socio-Economic Resilience Index (SERI), and the City Resilience Toolkit (CReST) were developed by CCARPH researchers. In partnership with the LGUs of Pasig City and Valenzuela City, these decision-support tools/models were used to analyze the urban ecosystem resilience of these cities.
- **Economic tools of analysis localized to project climate change impacts on local economies.** Using the dynamic CGE (computable general equilibrium) model calibrated to city-level SAM (social accounting model), the research improved on past attempts to model a city-level economy. A SAM was created from the LGU database of firms and shocks were computed from the regression analysis of climate and economic variables.
- **Climate and disaster risk and resilience analysis informs the crafting of responsive resilience innovations.** The creation of disaster-related technologies that are transferable to communities enable them to capacitate themselves, whether it be for disaster preparedness or response. CCARPH-AIC has installed disaster-related technologies with partner LGUs, schools/universities, and the private sector through partnerships, capacity building, and transfer of technologies.

Advancing Knowledge on Risk and Resilience Governance in Coastal Cities

- **Applying risk and resilience analytics in governance requires the identification of policy support for mainstreaming resilience, including systems thinking and transdisciplinary pathways.** Through the exploratory policy analysis for Transformative Leadership for Adaptive and Productive (LEAP) Local Government Units, entry points for risk and resilience governance that were supported by policy mandates became the foundation for CCARPH's collaboration with the private sector (via the NRC partnership), the LGUs, and other stakeholders. Building on the gains of the CCAR (2012-2016), CCARPH examined how systems thinking for climate and disaster resilience can be embedded and mainstreamed into development planning structures and processes at the national and local levels. All these factors facilitated science-informed capacity building and resilience planning that found its way not only in the Local Disaster Risk Reduction and Management Plans (LDRRMP) but more importantly, in the overall development plans and budgets of LGUs.

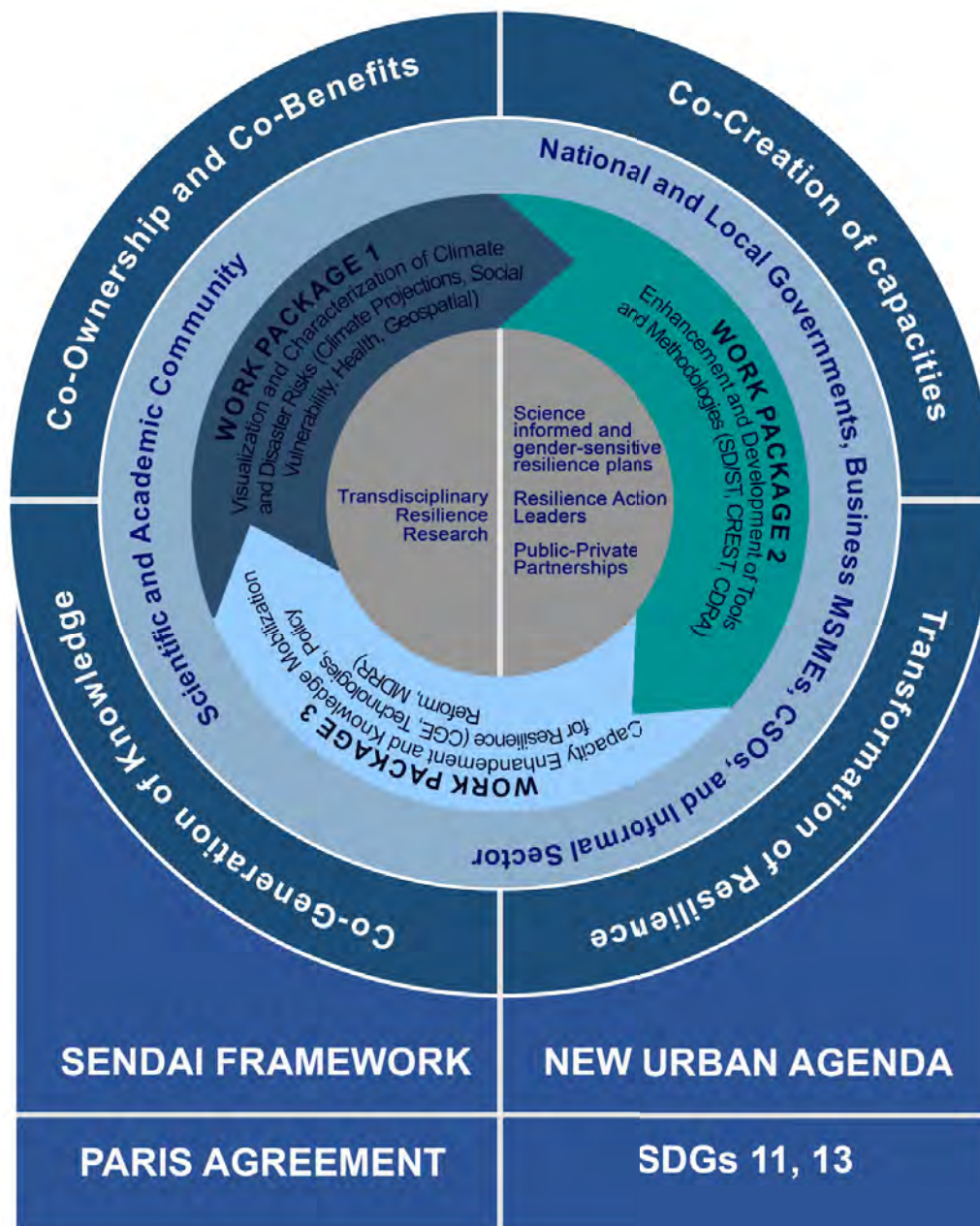
- **The application of intersectionality and transdisciplinarity for resilience are necessary. However, any application of such principles must recognize that they are contextually-driven.**

Intersectionality in the **academe and scientific institutions** means making systems thinking more functionally integrated among different disciplines. In the context of **risk governance**, systems thinking has to be reflected through the interaction between the development pillars of governance: physical, social, economic, environmental, and institutional. Risk and resilience analysis was then mainstreamed into the development planning and budgeting processes through the CDRA capacity-building process. These are then reflected in the CDRA and in the crafting of development plans of LGUs such as the Comprehensive Land Use Plan (CLUP) in Iloilo, and the barangay resilience plans in Naga.

Transdisciplinarity in the academe requires (1) interdisciplinary work and engaging other stakeholders; (2) retooling and training resilience champions in the policy and practice sectors through MDRR and its partners; and (3) innovations for and with communities at risk. **In risk governance**, transdisciplinarity demands inclusion of non-traditional resilience actors such as the **private sector, and civil society**.

Strategic multi-stakeholder engagements enhance risk analysis and resilience planning and implementation: In the context of CCARPH, the work on CDRA provided a platform for engagement between scientists, local government bureaucracy and decision-makers, and other stakeholders. The CDRA informed the preparation of development plans and budgets of LGUs and even influenced the design of COVID-19 pandemic measures for resilient recovery in some cities e.g., Iloilo, Naga, and Ormoc.

RESEARCH FRAMEWORK AND DESIGN



Source: Porio, Emma et al, (2020) in CCARPH Technical Report 2019.

Monitoring, Evaluation, and Learning

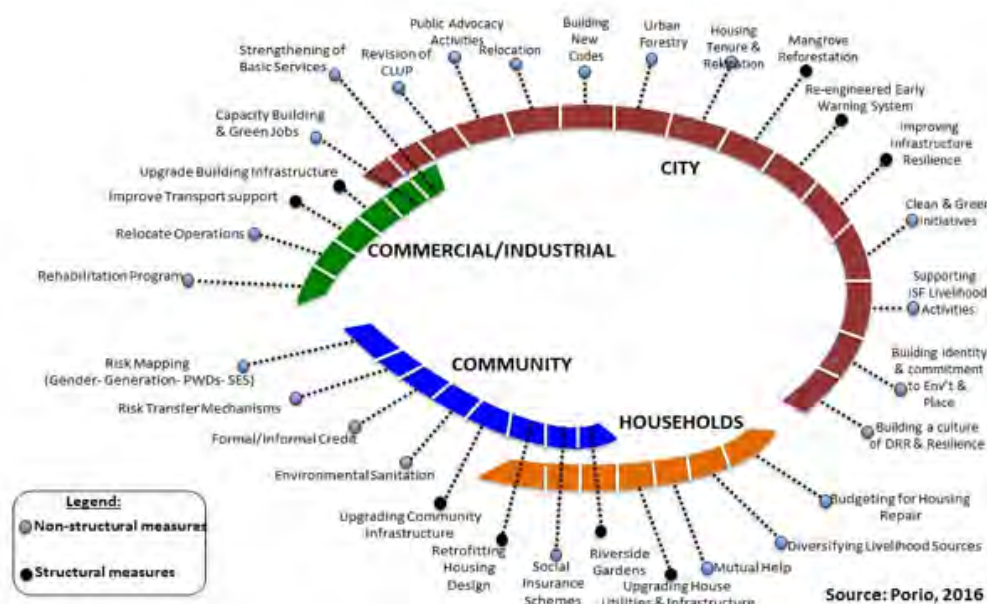
CCARPH regularly organized meetings, dialogues, consultations, and conferences that allowed the research team and partners to strategically plan the implementation of the transdisciplinary action research, as well as assess the project's progress. These sessions resolved issues and differences, yielded lessons and insights for transformative capacity building activities and programs within the team and with the partners/stakeholders.

The list of regular meetings and feedback sessions that enabled adaptive project management, and conferences resulting from transforming lessons to capacity building offerings can be found in the annexes.



CONTRIBUTION TO RESILIENCE AND ADAPTATION RESEARCH AND PRACTICE

The work of CCARPH navigated and unpacked the terrain of climate and disaster resilience. Its analysis examined the distinction between disaster resilience and climate resilience by anchoring it on the guidance from the IPCC's Fifth Assessment Report, the IPCC Special Report on 1.5, and the earlier Special Report on managing risks from extreme events (SREX), as well as from the UNDRR's analysis of resilience. Disaster resilience is akin to **incremental adaptation**, where the integrity and essence of a system or process are the focus of risk management actions. Climate resilience, on the other hand, focuses on actions that intend to make substantive changes in the systems and processes to address climate risks based on **transformational adaptation**. As a result of such analysis, a continuum of actions was developed with CCARPH partners.



ATTEMPTS AT TRANSFORMATIONAL ADAPTATION

1 Actionable Science for Decision-Making: Data Sets Produced

For CCARPH, at the base of its work on climate and disaster resilience, is the research aimed at informing resilience and adaptation decision-making.

<p>WP 1.1.1 Climate Projections Characterizing climate-related and atmospheric hazards, vulnerability and risk across space and time</p> <p>Coastal cities in the Philippines are highly vulnerable to environmental threats, including the impacts of climate change. Climate hazards have disastrous impacts, including loss of life, damage to infrastructure and economy, among others. It is therefore essential for cities to develop appropriate strategies and policies for climate change adaptation and disaster risk reduction to enhance their resilience. An important prerequisite for this action would be a better understanding of the climate and disaster risk, which is also a priority for action according to the Sendai Framework for Disaster Risk Reduction (UNISDR). The hypothesis for this work package is that robust and context-specific scientific knowledge of climate and atmospheric hazards, using state of the science approaches and informed by the needs of end-users and stakeholders, enhance the resilience of coastal cities in the Philippines.</p> <p>This technical paper focuses on the historical and future climate information co-generated in collaboration with the different work packages under the “Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience” project. A comprehensive discussion of how these climate data have been used can be found in the technical reports of the other work packages (i.e. health (Work Theme 1.1) and economics (Work Theme 1.2) sectors, Climate and Disaster Risk Assessment coaching and mentoring project (CDRA C&M; Work Theme 2.2)).</p> <p><i>WP 1.1.1's full technical report is available in this link.</i></p>	<p>Given the complexity of climate change and its impacts on cities and various sectors, co-generation of robust, context-specific scientific knowledge of climate hazards through increased engagement between climate scientists and stakeholders is important in local adaptation planning, and impacts research.</p> <p>Authors: Dr. Gemma Teresa T. Narisma Dr. Faye Abigail T. Cruz Mr. Emilio Gozo</p>
<p>WP 1.1.2 Air Quality An Assessment of Personal Exposure of a High-Risk Occupational Group to Fine Particulate Pollution in Metro Manila, Philippines</p> <p>Metro Manila, Philippines is one of the megacities in Southeast Asia that has PM2.5 concentrations greater than guideline values, with the public utility jeepney (PUJ) as one of the identified sources contributing to fine particulate pollution in the city. The PUJ is the cheapest and most popular mode of transportation, and jeepney drivers (a high-risk occupational group) ply their routes for 10 to 12 hours a day that expose them to very high levels of particulate</p>	<p>While poor air quality continues to contribute to the social and health risks of our communities most especially to high-risk occupational groups such as public utility jeepney drivers, it remains to be an invisible hazard that does not garner the</p>

<p>pollution. Thus, a series of field measurements was carried out for five weeks from November to December 2018 in a high-traffic key site in Metro Manila to characterize the spatial and temporal distribution of fine particulate pollution, and to estimate the personal exposure of jeepney drivers to PM2.5. Real-time PM2.5 personal exposure levels of 31 drivers plying a fixed 10-km route were recorded continuously for 12 hours each sampling day for a week, yielding a total of 1061 complete circuits. Initial sampling results showed that the mean PM2.5 exposure concentration for all runs (weekends included) was 40g m⁻³, a factor of four greater than the mean annual PM2.5 guideline value (10 g m⁻³) set by the World Health Organization. Elevated levels of PM2.5 (hotspots) were also identified for the designated route, and these were consistently observed at intersections and across a shopping mall. To ascertain the accuracy of field measurements, the seven portable PM2.5 samplers used in the study were collocated with a Beta Attenuation Monitor (BAM) for 16 days (N = 368, mean number of sampling points), showing strong linear relationship with the BAM for all seven sensors (R² = 0.83 to 0.85). The results of this study will provide valuable information on the PM2.5 exposure of this occupational group that is most exposed to particulate pollution, as well as the identification of locations of transport microenvironments that have very high fine particulate pollution. Furthermore, the results of this study will offer quantitative evidence that is much needed by the government's Public Utility Vehicle 3 Modernization Plan (PUVMP), a policy program that aims to replace old jeepneys with a more eco-friendly version that produces fewer particulate matter emissions.</p> <p><i>WP 1.1.2's full technical report is available in this link.</i></p>	<p>attention that it should get.</p> <p>Authors: Imee Delos Reyes Dr. Maria Obiminda L. Cambaliza Melliza T. Cruz Gabrielle Frances Leung Dr. James Bernard B. Simpás Dr. Charlotte Kendra Z. Gotangco Katrina Abenojar Carlos Manalo Bernell Go</p>
<p>WP 1.2.1 Health Assessing and Projecting Climate-Related Infectious Diseases in Quezon City</p> <p>In order to determine the association between mean temperature, relative humidity and accumulated rainfall, and dengue and leptospirosis cumulative incidence in Quezon City, Philippines, this study adopted the second step of the United States Center for Disease Control's Building Resilience Against Climate Effects (BRACE) Framework: Projecting Disease Burden. Statistical and spatial distribution analysis were performed to identify the magnitude and distribution of each climate and disease variable, as well as to determine the exposure outcome relationships. Statistical and machine learning methods were used for disease forecasts for the year 2018.</p> <p>Generalized Linear Mixed Modeling exhibited a small but significant increase in annual dengue cumulative incidence if annual relative humidity increases, but no other significant predictor was shown based on observed data. The leptospirosis model showed significant changes affected by all exposure variables, with the greatest effect from maximum and mean temperature. However, precipitation showed an inverse relationship with leptospirosis cumulative</p>	<p>While climate projections downscaled to 25kms and hazards generated by high incidence dengue and leptospirosis are by themselves environmentally driven, thus occurring in clusters, reporting of these diseases are by political-administrative units. There is a need to refine the intersections of analytical concepts and tools so that correlations/relationships can better be established and policy/program design guidance can be achieved.</p>

<p>incidence, contrary to most literature showing a strong positive relationship.</p> <p>Specific barangays were also identified as high-dengue and high-leptospirosis areas using Spatial Autocorrelation, Anselin Local Moran's I, and Getis-Ord Gi* Hotspot Analysis. Leptospirosis was found to be significantly clustered in certain barangays.</p> <p>Disease forecasts using Seasonal Auto-Regressive Integrated Moving Average (SARIMA/X) and Support Vector Regression (SVR) reflected July and August as peak dengue and leptospirosis months, respectively, consistent with 2010-2017. Dengue cases were projected to be significantly less in 2018, while leptospirosis cases showed only a slight decrease.</p> <p>This study serves as a proof of concept of using machine learning methods for disease forecasting at a micro-scale, as well as an illustration of the importance of data robustness. Additional station data in other Quezon City barangays, as well as weekly or monthly barangay disease rates, should be used to ensure validity of model and reliability of results. Following the concept of "garbage in, garbage out", having complete and comprehensive climate and disease data for more reliable exposure-outcome associations can more effectively aid decision-makers in developing evidence-based policy for monitoring climate and disease.</p> <p><i>A more detailed technical report of WP 1.2.1 can be seen in this link.</i></p>	<p>Authors: John Q. Wong, MD, MSc, Anne Kathlyn A. Baladad Krizelle Cleo Fowler Jerelyn Y. Co, MSc</p>
<p>WP. 1.2.2 Social Vulnerability of Street-based Populations An Ethnography of Street-based Populations in Metro Manila, Philippines, and Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risk</p> <p>This paper explores the experiences of exposure to environmental risks of air and noise pollution of street-based populations (SBPs) in Metro Manila, and their local knowledge systems regarding environmental pollution, health, and climate-related disaster risks. In particular, this study 1) characterizes the composition of SBPs and their levels of exposure to air and noise pollution, 2) describes the resource-opportunity structure of the streets and their strategies of coping and responding to air, and noise pollution, as well as to health and climate-related disaster risks, and 3) identifies solution pathways for risk reduction from the perspective of highly exposed and vulnerable populations, as well as from the urban authorities (i.e., community or city officials, and law enforcers). This study argues that amidst the biophysical hazards and threats of urban street life, and the disruptive effects of changing climate conditions, street-based groups construct adaptive strategies as they navigate through contested spaces, institutional constraints, and strategic networks. Through an ethnographic inquiry, the study used in-depth interviews, life histories, participant observation, direct and indirect observation, informal and unstructured interviews, and focus group discussions. This study unveils that their strategic practices are very</p>	<p>While street-based populations are highly exposed to air pollutants, they understand and recognize pollution and pollutants differently from the scientific community and more importantly, the former prioritize their livelihoods in the streets over their health concerns.</p> <p>Authors: Dr. Emma Porio Emily Roque- Sarmiento, MA Maria Rufina L Salas Vivien Clarisse C. Leynes</p>

<p>much informed by their intimate knowledge of street and community power relations embedded in their perilous environment.</p> <p>This paper hopes to contribute to the literature on bridging, translating, and integrating local knowledge systems regarding air and noise pollution to environmental justice and climate disasters in cities. The study results provide valuable insights for the larger scientific community, development practitioners, and policymakers regarding air pollution risks among the most highly exposed and vulnerable street-based population in the cities of the global south.</p> <p><i>The full report of WP 1.2.2 can be accessed in this link. The policy paper submitted to the Quezon City LGU can be accessed through this link.</i></p> <p><i>International Conference on Water, Informatics, Sustainability, and Environment (iWISE 2019), Carleton University, Ottawa, Canada [Video].</i></p>	
<p>WP 1.2.3 Social Vulnerability Analysis using PCA</p> <p>Work Package 1.2.3 described and characterized the social vulnerability of residents living in Metro Manila, Iloilo City, and Naga City using Principal Components Analysis (PCA). Through this method, data on multiple socio-economic indicators can be grouped together with other statistically similar indicators to form general components of vulnerability derived from the relationships between the original collection of socio-economic indicators. The data used in the PCA in Metro Manila and Iloilo comes from the Philippine Statistics Authority (PSA) <i>Census on Population and Housing</i> from the years 1990, 2000, 2010, and 2015. The team from Naga City, on the other hand, used data from the city's <i>Community-Based Monitoring System</i> (CBMS). In Year 3, individual social vulnerability PCA runs for Manila City, Quezon City, and Navotas City were conducted. Throughout all the runs, the PCA yielded a consistently high percentage of variance explained across all cities, indicating that the components extracted were able to represent a large part of the variance in the data.</p> <p>These statistical results show that the structure of social vulnerability among the urban populations are evolving and becoming complex, involving multiple stakeholders. Most of these dimensions of social vulnerability are hardly considered in local climate change adaptation and disaster risk reduction (CCA-DRR) programs, nor in the local governments' annual investment plans (AIPs).</p> <p><i>A summary of PCA runs is available in this link.</i></p>	<p>Components and indicators of social vulnerability determine the key areas of investments for disaster reduction and developing resilience in various communities of practice.</p> <p>Authors: Dr. Emma Porio Dr. Charles Justin See Ms. Emily Roque-Sarmiento Dr. Noralene Uy Dr. Michael Armand P. Canilao Ms. Celine Villanueva Ms. Maria Rufina L. Salas Ms. Vivien Clarisse Leynes Mr. Jose Francisco A. Santiago Ms. Ann Maureen T. Malaki Mr. Jeremiah Morales</p>
<p>WP 1.2.4 Social Vulnerability of Formal and Informal Sectors Impact of Extreme Rainfall Days on the Welfare of Households in</p>	<p>Climate-related losses and damages are highest</p>

the Formal and Informal Sectors

We examine the impact of a weather shock, specifically extreme rainfall days, on the welfare of the households in the formal and informal sectors. We combine the theoretical framework of the household production model in the presence of weather shocks with the dual economy model where sector choice is endogenous. We model the informality or formality of the households as endogenous regimes depending on the net benefits they are likely to get from being in a specific sector. We then estimate a simultaneous equation model with endogenous switching to account for the heterogeneity in the decision to be in the informal or formal sector. This allows us to assess the impact of extreme rainfall days on income and expenditure. We take the case of the Philippines by utilizing household data in 2006 to 2015.

A more detailed technical report of WP 1.2.4 can be seen in [this link](#).

among households with livelihoods/jobs from the informal sector, yet policies and programs for their recovery are least defined.

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WP 1.3.1 Geospatial

Land Cover Change Analysis: This part aims to analyze land cover change of Metro Manila from 2009 to 2018. We collected and pre-processed multi-temporal satellite images from Landsat 5, 7, and 8 and Sentinel 2. The pre-processed images were classified using pixel-based supervised classification techniques including Support Vector Machine (SVM), Neural Network (NN), Random Forest (RF) and Maximum Likelihood Classifier (MLC). The average overall accuracy of NN was roughly 1% higher than SVM and RF and about 8% higher than ML. Less than 33% of the study site's land cover changed. Built-up area gained 10.3 % in nine years with urban expansion rate doubling in the past four years. Vegetation cover lost 12.4% in the same period. Tree cover dropped from 48.9% in 2009 to 42.64% in 2014 but slightly recovered to 43.4% in 2018 which is slightly higher than the 42.8% built-up cover in 2018. Major drivers of land cover change here are urban development, agriculture and mining as their rate exceeded reforestation rate. Our results call for strengthening of the implementation of the UMRB Protected Landscape law to protect and preserve the vegetal cover in the study site. This also calls for equitable land use planning for the watershed and proper implementation for sustainable resource use as less space becomes available for the competing demands.

Assessment of Land Cover Changes: This study extends the study of Perez et al. (2017) done for the Coastal Cities at Risk (CCARPH) Project of the Manila Observatory (MO) which characterized changes in the channel morphology of the Marikina River and its effects on aggravated flood levels in the area. A hydrologic model was developed to characterize the effects of environmental changes, specifically land cover in the watershed scale on the volume and timing of runoff. The capabilities for satellite-based land cover classification of the Geomatics for Environment and Development (GED) Program of MO were utilized for this purpose. The use of rainfall as an input also sets into place a possibility to integrate climate projections in terms of

Land use and land cover changes, detectable through satellite imageries, form critical exposures during disasters. These exposure units together with associated vulnerabilities, such as informality, influence the impact of hazards.

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rainfall intensity duration frequency (RIDF) data for specific areas. In addition, highly urbanized coastal cities with relatively complete ancillary data on physical parameters, as well as exposure and vulnerability variables can be incorporated as new study areas.

Land use classification: Mapping land use classes can be challenging especially in highly-urbanized regions due to the diversity of materials and structures. We aimed to generate a land use classification for Metro Manila by combining spatial data derived from Sentinel-2 image, IFSAR DEM and DSM and segmented WorldView2 images and classified land use using Support Vector Machine. We were able to generate a land use classification with an overall accuracy of 81.6%. Our results show that the addition of informational layers such as height of the structure, dimensions, texture, distance and density improved the classification accuracy by 13.8% higher than when the RGB image classification. In addition, informal settlements can be classified more accurately (PA=85.86% and UA=79.07%). There was a great difficulty in accurately classifying industrial (PA=69.06% and UA=69.32%), commercial areas (PA=66.34% and UA=73.46%) and residential areas (PA=65.92%, UA=70.52%). These results can help in estimating the informal settlement population and exposure to various hazards in Metro Manila.

We also mapped the land use for 2011 using LiDAR DEM, DSM and orthophoto for Metro Manila, Pasig City and Barangay Batasan Hills in Quezon City to apply the methodology using another dataset. Using the same methodology, but without ground truthing activity, results appeared to have overestimated the informal settlements for Metro Manila and Quezon City. The best land use classification was for Barangay Batasan Hills. Even without ground truthing and relying on visual assessment, this exercise showed that adding more spatial information layers enable land use classification. In addition, this study showed that the collection of sufficient training and ground truthing sites are important in improving the land use classification accuracy.

GIS: Metro Manila has been experiencing a variety of natural hazards including climate and weather extremes, flooding, storm surge, tropical cyclones, earthquake and others. While these hazards affect the exposed population and land use/cover types, these exposures likewise affect hazards. Also, hazards, exposures and vulnerabilities (HEVs) distribute themselves unevenly across space and time as well as interact with each other. Hazards may be considered catalysts of disasters, while exposures and vulnerabilities are root causes of disasters. The spatial relationships of these HEV variables are not always examined. Hence, this report aims to visualize and analyze the generated geospatial datasets of the HEVs. Specifically, we considered informality, critical infrastructures, and social vulnerability indicators.

The full technical reports of WP 1.3.1 can be accessed in [this link](#).

WP 1.3.2. Naga City CDRA | Science-Based Method of/for Climate and Disaster Risk Assessment, Data Application, and Information Dissemination towards a Resilient Naga City

The Coastal Cities at Risk in the Philippines (CCARPH) is a program driven to help local government units become resilient by using innovative tools and make science-informed decisions to enable them to bounce forward after disasters. In the City of Naga, the three themes or focal areas of the CCAR Project in collaboration with the Ateneo de Naga are Science and Technology, Social Sciences, and Leadership and Governance. The data collated and outputs produced by the CCARPH-ADNU subproject were not simply turned-over to city officials but brought to the primary impacted units, which are the 27 barangays of the City of Naga, in the pursuit of interdisciplinarity and use science-based planning and decision making. The data generated (hazard maps for the physical sciences and social vulnerability index based on CBMS) also provide the local government policy makers solid risk assessment and the most fitting and appropriate programs for a more resilient city.

The CDRA process being adopted by the Philippine government recognizes that there are varying degrees to which people are susceptible to the effects of natural hazards based on their ability to cope with it (HLURB, 2015). Social vulnerability, however, is partially the product of social inequalities which are social factors that influence and shape the susceptibility of various groups to harm and govern their ability to respond (Cutter et al., 2003). It is then the argument of this study that while Naga City is an established component city, there remain households which are socially vulnerable. It is important that they be characterized to inform the city government of their situation and location for appropriate strategic preparation.

The complete technical report entitled, "Science-Based Method of/for Climate and Disaster Risk Assessment, Data Application, and Information Dissemination towards a Resilient Naga City," is accessible at [this link](#).

The research collaboration with the IDRC-CCARPh paved the way to private-public partnership mainly between the academe (Ateneo de Naga University) and the local government unit (City of Naga). Under Leadership and Governance, and in pursuit of interdisciplinarity to achieve science-based planning and decision making, the data generated was mainstreamed to local leaders (6-8 council representatives and gatekeepers from each of the 27 barangays). All these provided local government policy makers with a solid risk assessment to decide on the most appropriate programs for a more resilient city.

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WP 1.3.3 Iloilo City CDRA

CCARPH, the Resilient LGU Program of the National Resilience Council, Manila Observatory (MO) together with University of the Philippines - Visayas (UPV) and Iloilo City Government conducted a Climate and Disaster Risk Assessment (CDRA) of Iloilo City. Through a series of online meetings between MO and UPV-LGU, an Integrated Risk Analysis (IRA) based on hazard-exposure-vulnerability maps was

This study developed a coaching and mentoring module that increased stakeholder engagement in the Climate and Disaster Risk Assessment (CDRA) process in order to facilitate learning as well

<p>conducted. Adopting a coaching and mentoring approach, MO facilitated various analysis activities that built on the key steps outlined in the Enhanced LGU Guidebook on the Formulation of LCCAP (2017) Book 4 by the Department of the Interior and Local Government (DILG).</p> <p><i>The complete technical report entitled, "Climate and Disaster Risk Assessment for a Resilient Iloilo City," is accessible at this link</i></p>	<p>as co-production of adaptation strategies, thereby enabling much-needed adaptation planning and action.</p> <p>Authors: Ma. Laurice Jamero Gay Defiesta Franco Anthony Agudo Alan Moscoso Leah Araneta Emilio Gozo Marion Dimain Maan Dela Paz Jessica Dator-Bercilla</p>
<p>WP 2.1.1 System Dynamics</p> <p>Given the project's transdisciplinary action research framework, and the whole of the society approach, the System Dynamics (SD) approach analyzes how "the underlying structure of a system can lead to the behaviors and trends which the system exhibits over time" (Forrester 1969). The SD Team came up with these innovative outputs: the Integrated Urban Services Resilience Index (IUSRI) Model (which combines the Urban Ecosystem Resilience Index (UERI) and the Socio-Economic Resilience Index (SERI)), and the City Resilience Toolkit (CResT). These decision-support tools/models were used to analyze the urban ecosystem resilience of cities of Pasig and Valenzuela.</p> <p><i>The complete technical report entitled, "Developing an Urban Ecosystem Resilience Index Using a System Dynamics Approach," is accessible at these links: Technical Report 1, Technical Report 2. https://drive.google.com/file/d/1NNciphAy5heSjksdw6KNKJLrR6EwigRc/view?usp=sharing</i></p> <p>City Resilience Toolkit: A Compendium of Systems Thinking Activities for Resilience Planning</p> <p>Resilience of systems can be defined as the ability of the system to "persist and survive amidst a variable environment" (Meadows 2008, p. 76). In the context of cities, resilience can refer to the ability of the city to sustain operations that promote quality of life for its stakeholders amidst disturbances or hazards. Resilience does not necessarily mean that the city is able to "bounce back" to some pre-hazard state, particularly if that baseline state was suboptimal to begin with. Rather, it means that the city is able to adjust and adapt to changing conditions in order to function optimally. Thus, actions to develop resilience can, and should, be proactive as well as reactive. Such proactive transformation requires careful and deliberate planning.</p>	<p>Systems thinking tools can be explored to integrate resilience in an urban context, and understand the key contributors and their interactions with one another towards evaluating potential policy or management decisions. Tools that facilitate scoping of the issues, stakeholder engagement and action planning can be adapted into different stages of LGU and other stakeholders' strategic planning cycles.</p> <p>Quantitative simulation tools like system dynamics (SD) modeling can be used to develop a tool for resilience assessment and benchmarking. The prototype Integrated Urban Services Resilience Index (IUSRI) model was developed through this project as an integration of the Socio-Economic Resilience Index (SERI) and the Urban Ecosystem Resilience Index (UERI). The design of the IUSRI</p>

<p>The activities in this book were developed from systems thinking frameworks or adapted/enhanced from existing activities to better suit the purpose of applying systems thinking frameworks to resilience planning in three phases: Problem Diagnosis, Stakeholder Engagement, and Action Planning.</p> <p><i>The complete activity book entitled, "City Resilience Toolkit: A Compendium of Systems Thinking Activities for Resilience Planning," is accessible at this link.</i></p>	<p>model utilizes a "services" approach to concretize the concept of resilience. Resilience in the context of cities as systems is framed as the city's ability to sustain services and to achieve its vision of a certain quality of life for its citizens amidst changes or disturbances.</p> <p>These outputs are built on the principle that resilience is not an "add-on" criterion but can be seamlessly integrated into planning process, and into city development. While tradeoffs may exist in prioritizing city services, there are key decisions which can create synergy, and hence resilience, in different sectors, such as if green spaces are cultivated. The models are reflect how appropriate target-setting is crucial for efficient resource distribution.</p> <p>Authors: Dr. Charlotte Kendra Gotangco Gonzales Ms. Jean Meir Jardeleza Ms. Jairus Carmela C. Josol Mr. Carlos Manalo Ms. Katrina Abenojar Mr. Joaquin Ignacio D. Campos Mr. Joseph Emanuel C. Litam</p>
<p>WP 3.1.1 Computable General Equilibrium (CGE) Economic Impacts of Rainfall and Flooding in Valenzuela and Pasig Cities Using a Multi-week CGE Model Analysis</p> <p>This study assesses the impacts of the extreme climate events in a city economy. Using a computable general equilibrium (CGE) model with data calibrated at the city level and at a multi-week period, impacts of extreme climate events are estimated for the Valenzuela and Pasig in</p>	<p>Economics team showed that the quantitative effects on business and other enterprises of the typhoons and other climate-induced disasters in the different local government units has</p>

metropolitan Manila. Hazard data are exploited to construct simulation scenarios for the CGE model. First, the impact of flooding on the labor constraint faced by the different sectors is econometrically estimated. Second, the CGE model analyzes the impacts of the constraints in the utilization of factors over a one year period. Third, a resilience index is constructed analyzing the factors affecting the recovery period of the industries.

The results show that rainfall affects industries differentially and the most resilient sectors are those with the greatest value added. The implications on future modelling are discussed at the end of the report.

The complete technical report entitled, "Economic Impacts of Rainfall and Flooding in Valenzuela and Pasig Cities Using a Multi-week CGE Model Analysis," is accessible at [this link](#).

The journal articles derived from WP 3.1.1 are also available through [this link](#). They are also cited in parts C, E, and O of the [Annexes](#).

been quite large; over a period of several months, the effects range from 5 to 30 percent of the total city's annual output per disaster event.

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Dr. Philip Arnold Tuaño
with Dianne Guevara and
Mikaela Bona

2 Unpacking resilience for a programmatic implementation in risk governance: Defining Resilience with the CCAM-DRR Cabinet Cluster, Executive Branch, Philippine Government

In the Philippines, a convergence platform was created for climate action and risk management - the Climate Change Adaptation and Mitigation and Disaster Risk Reduction (CCAM-DRR) Cabinet Cluster. Together with the lead agencies of the Cabinet Cluster, the NRC and CCARPH helped to clarify the continuum of resilience work through the agreed definition drawn from IPCC and UNDRR definitions. Thus, resilience was defined as a continuum of actions that "anticipate, resist, absorb, accommodate, adapt to, transform, and recover from the effects of natural and human-induced hazards in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions through a whole-of-society approach to risk management".



3 Unpacking resilience for programmatic implementation in risk governance: The Updated National Disaster Risk Reduction and Management Plan 2020-2030, and the ASEAN Agreement on Disaster Management and Emergency Response Work Programme 2021-2025

CCARPH and its implementing partners contributed to the crafting of the [National Disaster Risk Reduction and Management Plan 2020-2030](#) by ensuring a more coherent approach to DRR and CCA in the Philippines. Now a policy, this planning document carries the following outcomes which are among the other outcomes informed by CCARPH's work:

On risk prevention

Outcome 6: Communities have access to effective, responsive, and inclusive social protection, risk financing, and insurance mechanisms.

Outcome 7: Natural resources and ecosystem integrity are improved and sustained.

On preparedness

Outcome 9: Enhanced risk awareness and risk-informed decisions and actions of governments and communities

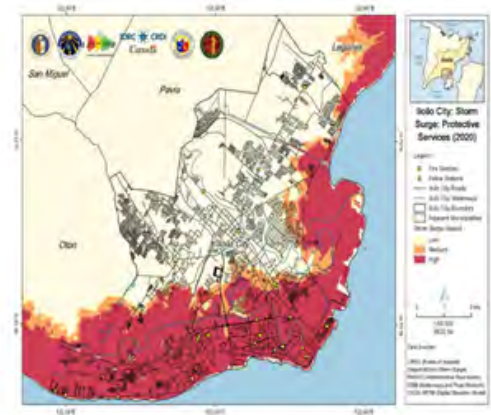


The lead proponents of CCARPH were also part of the expert team that informed the Philippine government's input to the [ASEAN Agreement on Disaster Management and Emergency Response Work Programme 2021-2025](#).

4 Transdisciplinarity and Intersectionality in Science-informed Risk Assessment: The Case of Climate and Disaster Risk Assessment (CDRA)

Under the Philippine laws on Climate Change, [RA 9729](#) and [RA 10174](#), and Disaster Risk Reduction, [RA 10121](#), risk assessments are mandatory to mainstream climate and disaster resilience in development planning. As part of a long-term collaboration with government line agencies and the advocacy on risk assessment that is informed by the state of climate science, a policy was released by the Housing Land Use Regulatory Board (HLURB). The Board has oversight of the preparation of Land Use Plans. In 2019, it upgraded the CDRA process by using the IPCC Assessment Report 6 framework for risk analysis – [HLURB MC 19-06](#).

Climate and Disaster Risk Assessment: Iloilo City



Climate and Disaster Risk Assessment: Iloilo City



Furthermore, under the CCARPH work, the [CDRA process in partner LGUs](#) engaged the physical, social, economic, environmental, and institutional sectors of local governance. The intersectionality was further facilitated by the implementation of the resilience scorecard designed by the NRC, a key implementing partner of CCARPH. The resilience scorecard was designed to measure progress towards evidence-informed leadership and governance in the NRC's Resilient Local Government Unit Program over three phases, namely: Prepare, Adapt Transform.

By requiring the CDRA as an output of the Prepare Phase, NRC, in partnership with CCARPH, strengthened both whole-of-government and whole-of society approaches to climate and disaster risk governance by assisting local governments and their partners in establishing a baseline assessment of risk and a set of goals and milestones for risk reduction and resilience. Moreover, the NRC's engagement of other stakeholders like the academe, civil society, and the private sector enabled the

identification of different pathways and opportunities for synergy towards climate and disaster resilience. These would, in turn, allow each sector to contribute outputs in support of achieving shared resilience outcomes.

Science-informed assessments, intersectionality, and transdisciplinary approaches help transform the processes that can contribute to more responsive, effective, efficient risk management and climate actions of LGUs.

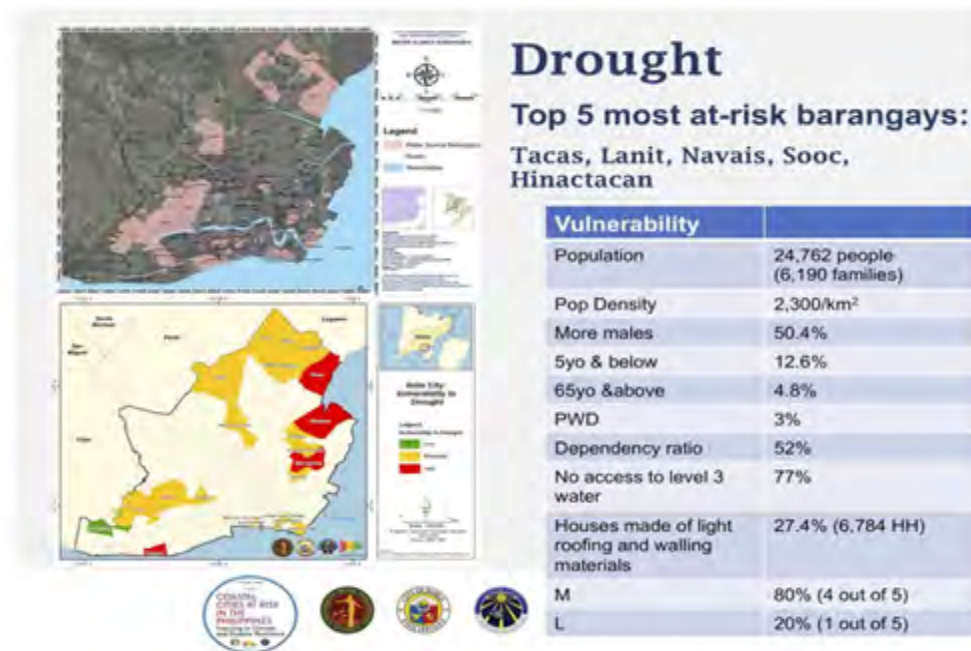
5 Climate and Disaster Risk-informed Development Planning



Planning for climate and disaster resilience requires [the downscaling of climate information](#). Making this information, in processed form, available to LGUs sharpens the planning for climate action and disaster resilience. The [science-informed risk assessment in CDRA through the mentoring of LGUs](#) facilitated a climate- and disaster risk-informed development planning process in local governments. The output of the CDRA informed the various forms of development planning: (1) in Metro Manila, it informed the barangay resilience planning in Muntinlupa, (2) in Naga City, the barangay and housing resilience planning, and (3) in Iloilo City, the preparation of the long-term [Comprehensive Land Use Plan \(CLUP\) 2021-2029](#). The CLUP is the basis of all subsequent term-based plans such as the Comprehensive Development Plan (CDP), the Executive and Legislative Agenda (ELA), the Annual Investment Plan (AIP), as stated in the [Rationalized Planning System of the Philippines](#). For Iloilo City's CLUP, the contributions of CCARPH to adaptation are reflected not only in the assessments, but also in the section that identified the city's priority programs.

6 Risk Visualization and Applied Systems Thinking Tools for Resilience

The [risk-related maps produced under CCARPH](#) that were shared with the LGUs provided a better means for risk visualization and resulted in enhanced risk communication. These enabled informed discussions around options for climate and disaster risk management and actions. In the same light, [the suite of applied systems thinking tools](#) and [CGE modelling](#) gave LGUs additional tools for analysis that can be utilized for resilience planning. These can also be incorporated in the preparation of their Local Disaster Risk Reduction and Management Plans (LDRRMP), the Local Climate Change Action Plans (LCCAP), and the local development plans previously mentioned.



7 Champions for Climate and Disaster Resilience Among Professionals and Practitioners

The Masters in Disaster Risk and Resilience Program, a product of CCARPH offered by Ateneo de Manila University, is now recognized as one of the [best in the Far East](#). The program provides an avenue to enhance climate and disaster resilience capacities, which will continue to benefit the national-local governments, the private sector, and civil society beyond the timeframe of the CCARPH project.

The CCARPH-NRC training workshops with the partner cities, where participants come from the LGU bureaucracy, private sector, civil society, and local academic institutions [[ArcGIS Training](#)] [[Guide to Social Vulnerability Analysis](#)] also created resilience advocates and an emerging “*resilience constituency*” for the local risk governance system.



8 Private Sector Partnership in Resilience Building



CCARPH’s work with the private sector, led by [NRC](#), is a model for collaboration between the private sector, the scientific and academic institutions, the national and local governments, and other stakeholders. NRC endeavored to ensure that [resilience to multiple hazards is embedded in the core business value cycle of the private sector](#). Moreover, this effort was designed to [encourage corporations to understand that business risk encompasses human,](#)

environmental, and technological factors beyond their "fencelines". These include underserved communities in terms of social services and protection, infrastructure, and environmental and human security. CCARPH has partnered with NRC to support training in climate and disaster risk assessments, deepen systems thinking, and improve COVID-19 and multi-hazard response and recovery. Its experts have also participated in the training, coaching, and mentoring of local governments and academic partners in bridging and adaptive leadership governance. In partnership with UNDRR's private sector initiative, ARISE Philippines, NRC established the intersections between the concepts of sustainability, business continuity, resilience, and corporate social responsibility to introduce a process of investing for resilience that co-creates solutions and generates co-benefits for stakeholders in communities.

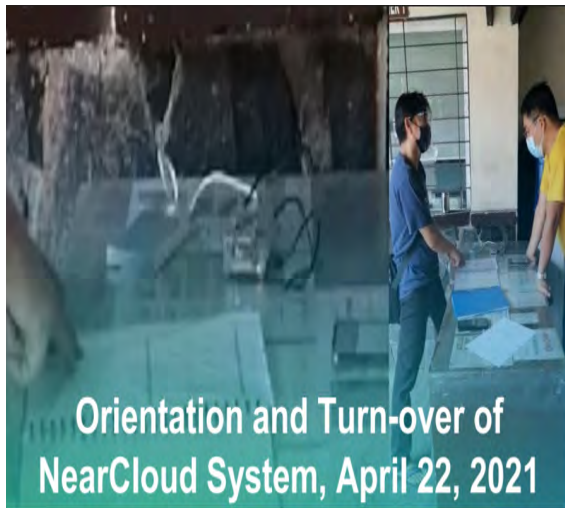


INCREMENTAL ADAPTATION

1. Resilience innovations

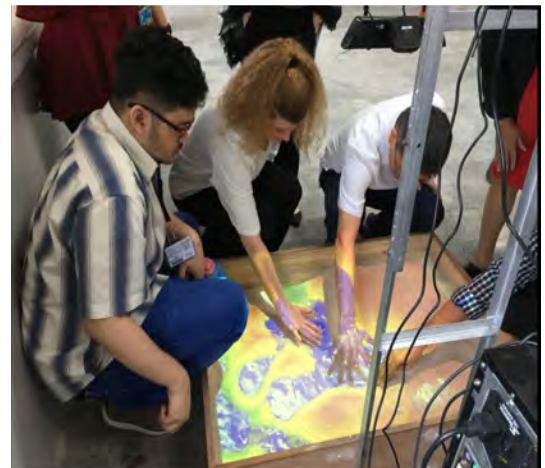
Through the work of the Ateneo Innovation Center, CCARPH fostered incremental adaptation that strengthens both coping and adaptive capacities through innovations in clean water systems, off-grid energy hubs, near cloud systems, and hydroponics farms, among others for community resilience. It also nurtured a culture of co-innovation with local stakeholders.





2. Art as a strategic pathway for risk and resilience communication

Where risk awareness is low and cannot be fostered through normal academic measures, art forms can help raise levels of awareness. This is what CCARPH did with its work on ***Risk, Resilience and Social Inequality*** with ARETE. Art awakens consciousness on risk and resilience that will, hopefully, result in climate action or a movement among a broader base of population.



3. Enabling gender and resilience

CCARPH has been working with different resilience actors from communities, local governments, private sector, line agencies, and civil society [to nurture resilience in various gender roles](#). Resilience is an outcome that is lived in daily struggles with climate and disaster-related risks. CCARPH has helped unpack how this can be done in various strategic engagements and partnerships. This has been facilitated by CDRA's enhanced social vulnerability dimension(s) which highlight the areas for investments in disaster risk reduction and promoting resilience of women, children, elderly, and PWDs.

Moreover, CCARPH has nurtured partnerships for [gender and social transformation in coastal contexts](#) in multiple contexts. This includes partnerships with women-led groups, such as *Integrated Community Food Production (ICFP) program of Disiplina-Bignay*, Valenzuela City, the womens' groups like the [Women's Studies Association of the Philippines \(WISAP\)](#), and [the We Effect \(Sweden/Philippines\)](#) as well as [university partnerships](#) on [gender and resilience](#).

The poster is for a virtual event titled "GENDER AND RESILIENCE IN A COASTAL CITY: STORIES OF EQUITY AND SUSTAINABILITY FROM THE GROUND". It is scheduled for March 22, 2021, from 9:00 AM to 11:00 AM (Philippine Time). A registration link is provided: [REGISTER: bit.ly/Gender-RegForm](https://bit.ly/Gender-RegForm). The poster lists several keynotes, moderators, and panelists, categorized by their affiliations: LGU and Academia, Coastal Communities (Jaro, Iloilo City), and CSOs. Logos of partner organizations like ATENEO, National Resilience Council, Manila Observatory, IDRC-CRDI, and others are at the top. A note at the bottom indicates a "Tentative program".

KEYNOTE SPEAKERS:

- Hon. Jerry Treñas
Iloilo City Mayor, Western Visayas (Philippines)

INTRODUCTORY MESSAGE:

- Dr. Roberto C. Yap, Jr., PhD
Rector of Manila University
- Dr. Clement Camposano
University of the Philippines Visayas

MODERATORS:

- Dr. Emma E. Porto
Coastal Cities at Risk in the Philippines, CCARPH, Ateneo de Manila University / Manila Observatory
- Ms. Ma. Amorita Yulo-Leyte
National Resilience Council / CCARPH, Ateneo de Manila University / Manila Observatory

PANEL OF REACTORS:

- Ms. Natalie U. Lim
Richmonde Hotel Iloilo
- Prof. Jo Firmose
University of the Philippines Visayas
- Prof. Cindy Jimenez
University of the Philippines Visayas

SEMINAR & CLOSING REMARKS:

- Prof. Jessica Deter-Beretta
Coastal Cities at Risk in the Philippines, ADMU / University of the Philippines Visayas
- Prof. Monique Mayorgas
Gender and Development Program, University of the Philippines Visayas

Perspectives from the LGU and the Academia:

- Dr. Gay Defiesta
University of the Philippines Visayas
- Ms. Donna Magno
Iloilo City Disaster Risk Reduction and Management Office (DRRMO)
- Mr. Maurice John Caban
Planning Unit, DSWD IV (Department of Social Welfare and Development)

Perspectives from Coastal Communities: Jaro, Iloilo City:

- Prof. Bernadette Jocsing Albaha (Moderator)
University of the Philippines Visayas
- Ms. Sylvia Elosendo
Aeta Community in Lanit, Jaro, Iloilo City
- Mr. Rogelio Elosendo
Aeta Community in Lanit, Jaro, Iloilo City
- Ms. Ann Catacutan
Tiu Tio Teg Ana Rose Foundation High School
- Ms. Joyce Masancay Nagnal
Tiu Tio Teg Ana Rose Foundation High School

Perspectives from the CSOs:

- Ms. Sonia Cadornigara
Homeless Peoples Federation, Inc.
- Mr. Emmanuel Areno
Iloilo CODE NGO (Caucus of Development NGO Networks)

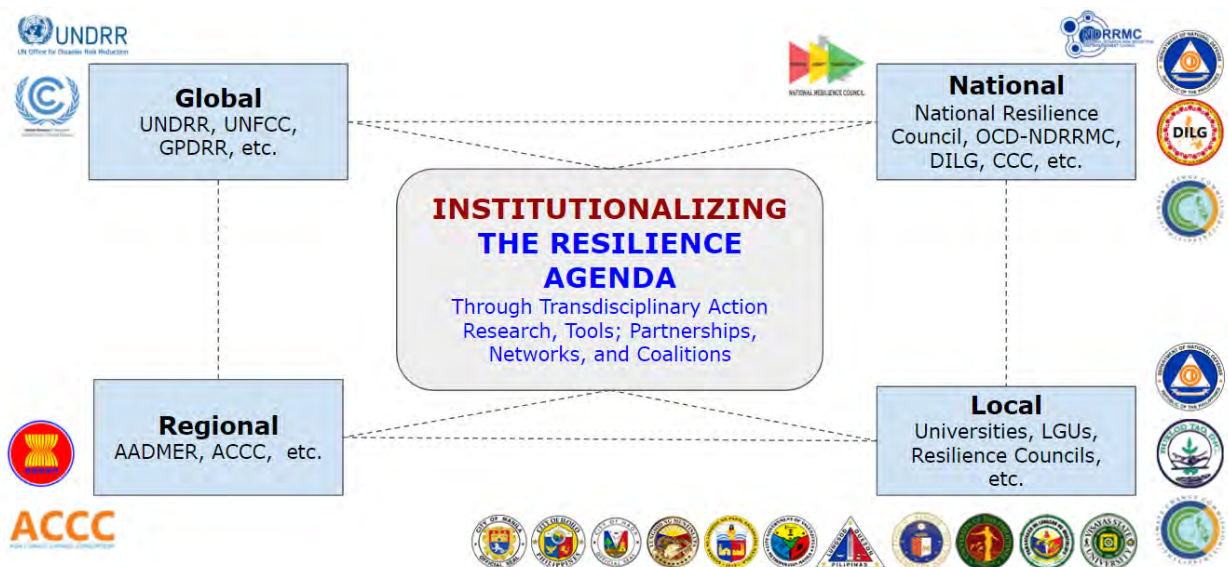
Logos at the top: ATENEO, NATIONAL RESILIENCE COUNCIL, MANILA OBSERVATORY, IDRC-CRDI, and others.

Footer: "Tentative program"

STAKEHOLDER ENGAGEMENT AND IMPACT

Partnerships as a means of strengthening a nest of resilience

CCARPH has created a nest, rather than just a web, of partnerships. Nests are interwoven and strong; nests nurture and allow those they nurture to soar. Such is CCARPH!



Strategy: Vertical, horizontal, intersectional

The overall resilience impact and outcomes cannot be possible without the partnerships that allow for the complementation of assets, skills, knowledge, and resources among various stakeholders. CCARPH worked with stakeholders from various layers of governance, from the barangay (village), city, national, regional, to global levels on matters relevant to resilience. Moreover, CCARPH collaborated with those in communities (e.g., Homeless People's Federation and Buklod Tao, Inc.), the private sector (e.g., via the [Top Leader's Forum](#)), other scientific institutions (e.g., Epimetrix to inform COVID governance in coastal cities), and [gender and resilience champions](#), among others. [\[Gender Month Webinars\]](#) [\[Climate, Covid-19 and City: Intersectoral Linkages of Gender, Ethnicity and Class \(ISA Porto Alegre Forum\)\]](#) [\[APSA 2020 Book of Abstracts\]](#)



Strategic Partnerships

- NRC-CCARPH and the work with local government units

The National Resilience Council (NRC) facilitated the engagement of the private sector in climate and disaster risk reduction and resilience. It developed and is currently implementing its flagship program, the three-year, two-track Resilient Local Government Unit Program (RLGUP). Under the RLGUP, local governments and their internal and external stakeholders define their resilience journeys, chart their roadmap, and measure achievements against indicators on scorecards. NRC requires that LGUs partner with local higher education institutions and both receive capacity development, training coaching, and mentoring support from a technical working group composed of scientists, resource persons, and practitioners.

The NRC is entirely privately funded. Over the three-year program, it encourages partner LGUs and universities to align their investments in disaster risk reduction and resilience building, with the implementation of the RLGUP towards achieving shared outcomes based on international commitments, and national and local policies. The following international commitments guide the RLGUP implementation:

- Sendai Framework for Disaster Risk Reduction
- Sustainable Development Goals
- Paris Climate Agreement

The RLGUP outcomes include:

- Resilient LGU operating systems
- Decreases in deaths, damage and loss
- Development continuity

The three-year RLGUP program features the following science and technology training deliverables:

1. Y1 PREPARE - Climate and Disaster Risk Assessment
2. Y2 ADAPT - Deepening Systems Thinking Certificate Course
3. Y3 Transform - Formulating Research Questions and Choosing the Right Tools

NRC has funded, delivered Nos. 1 and 2, in collaboration with all its LGU partners. Additionally, it conceptualized and co-funded the Web-GRiD COVID-19 Response and Recovery training for LGUs with CCAR, EpiMetrics and Xavier University.

NRC has participated in various conferences with CCARPH, as a conceptualizer, as a speaker, and as an identifier of resource speakers from among its network. It continues to

work with the academic partners of CCARPH partner cities in delivering its RLGUP beyond the project's termination. The universities and their LGU partner report at the end of each year of the program at a colloquium designed to share experiences of successes and failures in their resilience journeys. The colloquium for the Y2 ADAPT is in March 2022.

The NRC has developed a village-level Barangay Resilience Scorecard (BRS) in a board game format which was tested with CCARPH's **enhanced** participatory community-based risk assessment (PCRA)². This is to better understand hazard and risk perceptions, emergency preparedness and risk reduction measures at the smallest political unit. CCARPH-NRC joined forces in implementing it in Muntinlupa City, and it will be tested once again in the City of Manila.

- Engaging local government units

CCARPH's research outputs were used to inform the climate and disaster risks assessments (CDRA) of LGUs. From there, resilience measures were designed and, where applicable, incorporated in the risk reduction, resilience, and/or overall development plans such as [the Comprehensive Land Use Plan \(CLUP\)](#). The [science-informed resilience engagements](#) progress over time to ensure that target outputs are transformed into [outcomes such as in the case of Iloilo City, which is featured in the links in this section](#).

- Climate Change Adaptation and Mitigation-Disaster Risk Reduction and Management (CCAM-DRR) cluster of the government

With NRC's lead, CCARPH's analysis on resilience helped sharpen the resilience understanding in the [TWG of the Climate Change Adaptation and Mitigation-Disaster Risk Reduction and Management \(CCAM-DRR\)](#) cluster of the government on resilience. Further inputs were incorporated in the crafting of the [National Disaster Risk Reduction and Management Plan 2020-2030](#) and in the crafting of the [ASEAN Agreement on Disaster Management and Emergency Response](#).



² Participatory Community Risk Assessment (Cannon et al, 2008) was enhanced in Muntinlupa City utilizing Community-Based Monitoring System (CBMS), Google maps, Hazard Hunter App (cf. GeoAnalytics Portal of the DOST-PhilVocs), and field validations (i.e., walk-throughs, focus groups, and key informant interviews). CCARPH-NRC teams in cities, with CBMS data sets, like Naga City and Muntinlupa, were able to integrate social vulnerability data into the CDRA process. Meanwhile, Iloilo City's CCARPH-NRC's social vulnerability team headed by Dr. Gay Defiesta, painstakingly went through the data sets of the LGU to compute the vulnerability levels of the 86 barangays/villages.

Cross Consortia Engagement of CCARPH

To achieve its transdisciplinary action research goals, as well as its desired outcomes and impacts, CCARPH built partnerships with the following:

For Research and Capacity Building

By partnering with other stakeholders such as the ecosystems-based partnerships for resilience, CCARPH has facilitated the creation of an agenda for collaboration on the resilience of communities and ecosystems in the Philippines and in Asia (e.g., with the [National Research Council of the Philippines \(NRCP\) and the Philippine Social Science Council \(PSSC\)](#) to [advance action research in social-ecological resilience](#), Asian Social WellBeing (ASWB) Research Consortium, [Asian PeaceBuilders Program](#), the [Asia Pacific Sociological Association \(APSA\)](#),), so that climate issues from coastal cities and communities will also become part of the broader agenda for change globally as well as draw attention and commitment to the [value of science in addressing vulnerabilities that drive risks](#).

For Better Risk Governance at the Local, National, Regional, and Global Levels

1. Consortium for ecosystems-based approaches for climate and disaster resilience in small islands to assess and advocate for Well-Being and Food, Water, Energy, Settlement, Livelihoods Security in the Philippine Archipelago: A Call for Ecosystems-Based Adaptation, Resilience, and Risk Reduction in Small Islands;
2. [League of Corporate Foundations](#) to develop a common agenda for resilience governance in the Philippines;
3. Aksyon Klima and DRRNet Philippines on sharpening policies on resilience in the Philippines
4. [Asia Climate Change Consortium](#) to bring better commitment to the resilience of communities and ecosystems in the UNFCCC processes;
5. [ACT Alliance](#) in advocating for investments in vulnerability reduction to avert losses and damages;
6. [World Climate REsearch Program](#) to transform climate research methodologies using transdisciplinary pathways.
7. United Nations University's Institute for Environment and Human Security to highlight the role of [Universities' Climate Action and Ambition](#)

Social media engagement

The project continues to share activities and achievements via its social media platforms: Website (coastalcitiesatriskph.com), Facebook (facebook.com/CCARinthePhilippines), YouTube ([Coastal Cities at Risk in the Philippines](https://www.youtube.com/watch?v=Coastal_Cities_at_Risk_in_the_Philippines)), Instagram ([@ccarph](https://www.instagram.com/ccarph)), and Twitter ([@ccarph](https://twitter.com/ccarph)). After the creation of the CCARPH Facebook page in January 2018, several Facebook groups were also maintained to communicate with partners and stakeholders such as the [MDRR Program](#), [Muntinlupa City](#) and [Valenzuela City](#). The project also uses its ADMU email (ccarph@ateneo.edu) in sending out official communications, i.e., invitations, announcements, and the like. An overview of top posts and visitor information of the project's main social media accounts (website and Facebook) are presented below:

a. Project Website

This essentially acts as a repository of news posts such as ongoing activities of the project research team, partner organizations, and partner universities. From 2018-2021, the top 3 months with the most website views were all concentrated in 2021:

1. March 2021 (4.9K views)
2. May 2021 (4.2K views)
3. February 2021 (3.2K views)

On the website's country demographics for all time, the top 5 countries are:

1. Philippines (35,249 views)
2. United States (1,527 views)
3. Japan (756 views)
4. Canada (519 views)
5. China (288 views)

b. Facebook

The *Coastal Cities at Risk in the Philippines* Facebook page earned 1.5K page likes from 2018 to May 2021. As of May 25, 2021, the most-viewed Facebook posts were the following:

1. Live Webinar, [Engineering Equitable Resilience in Metro Manila, CCARPH-NRC Lecture Series](#) (12.5K reach, February 26, 2021)
2. Third session, [Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia](#), 2020 Lecture Series (5.5K reach, November 3, 2020)
3. Call for Applications, [Master in Disaster Risk and Resilience](#) (5.4K reach, April 6, 2021)

Demographic Profile:

Gender. As of May 25, 2021, the gender demographic profile of the Facebook page was 53.73% female, and 46.27% male.

Location. As of May 25, 2021, 90.2% of the page's followers come from the Philippines. More specifically, they are from the following top cities: Quezon City, Manila City, Naga City, Pasig City, and Muntinlupa City.



A transdisciplinary action research project of:

- ATENEO DE MANILA UNIVERSITY
- MANILA OBSERVATORY
- NATIONAL RESILIENCE COUNCIL
- INTERNATIONAL DEVELOPMENT RESEARCH CENTER

COASTAL CITIES AT RISK IN THE PHILIPPINES
Investing in Climate and Disaster Resilience

ATENEO DE MANILA UNIVERSITY

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EVALUATING THE CCARPH WORK

Proposed vs. Actual Outputs and Outcomes

Based on the CCARPH Proposal, the following are the project outputs in relation to the open access dissemination plan, and their progress and accomplishments:

Output	Progress
Objective 1: Advance knowledge of climate change adaptation and disaster risk reduction	
Scientific papers published in peer-reviewed journals	Completed <i>86 articles (with 128 presentations), 3 expected</i>
Science and Policy Briefs on Climate Change for policy makers, government and civil society	Completed <i>3 Science-policy-practice briefs , 3 expected</i>
Cross-sectoral, transdisciplinary Resilience Research	Completed
Space-based tools and value-added knowledge products	Completed <i>1 delivered, 1 expected</i>
Objective 2: Develop methodologies and tools for climate change adaptation and disaster risk resilience	
1 City Resilience Systems (CRS) dynamic model that can be incorporated in the climate and disaster risk assessment tool (CDRA) used by local government units (1 model each for Pasig and Valenzuela)	Completed <i>2 delivered, 2 expected</i>
1 City CGE model for firms/formal economy in NCR each for: Pasig and Valenzuela	Completed <i>2 delivered, 1 expected</i>
1 GIS and geo-spatial data on infrastructure (MM, Naga and Iloilo)	Completed <i>1 delivered, 1 expected</i>
Objective 3: Enhance capacity and transfer knowledge	
Inter-/transdisciplinary graduates (as of June 2021)	Completed <i>15 graduates, 10 expected</i>
20 cross-sectoral, transdisciplinary interns	Completed <i>16 interns, 20 expected</i>
Resilience innovation reports from the Philippines and Asian countries	Completed <i>20 delivered, 10 expected</i>

Socio-ecological and science and technology trainings for resilience	Completed <i>150 trainees, 150 expected</i>
Transdisciplinary, multi-stakeholder public-private partnerships in 3 cities (City Resilience Council as base)	Completed
3 City Disaster Resilience Plans (through updated CLUP and AIPs/PPAs by June 2021)	Completed <i>3 delivered, 3 expected</i>
Minimum of 3 City Resilience Innovation projects	Completed <i>3 delivered, 3 expected</i>
Submission to the UNFCCC Loss and Damage deliberations on resilience	Completed
Submission to the GPDRR	Completed
1 Resilience Innovation Report	Completed <i>1 delivered, 1 expected</i>


Objective 1: Advance knowledge of climate change adaptation and disaster risk reduction

Scientific papers published in peer-reviewed journals

CCARPH scientists published and/or submitted for publication a total of **86** articles, and delivered **128** scholarly presentations. A list of the publications and presentations from the CCARPH research teams are available in [this link](#).

Science and Policy Briefs on Climate Change for policy makers, government, and civil society

The CCARPH research teams on Air Quality and Health produced policy briefs in relation to their respective transdisciplinary studies. These include a scientific summary for policymakers entitled, “An Assessment of Personal Exposure to Pollution of Jeepney Drivers: A High-Risk Occupational Group in Metro Manila, Philippines” ([access here](#)), and a brief on “Understanding the Effect of Climate on Health for City Resilience” ([access here](#)). Policy briefs and analysis on social vulnerability to pollution risk include partnership with TAME-BC and Porio, E., Roque-Sarmiento,, E. Y. Kunz, et al “An Analysis of Philippine Air Quality Policies and Its Implementation” (access here), and resilience partnership with JJCICSI (see: [Towards a science-informed and people-centered resettlement program](#)). This policy paper was submitted to the Philippine Congress’ House Committee Chair on Housing and Urban Development, Congressman Kiko Benitez, who assured the CCARPH Project Leader that the paper will



inform his policy on housing and human settlements for women, children and the elderly in vulnerable communities. Under the Mandanas ruling or the full devolution protocol of the government, Cong Benitez, more socially inclusive housing policies and programs will be enacted and implemented. More importantly, the Social Housing Corporation (SHC) also used the policy paper in tweaking its assessment and design measures for informal settlement housing.

Cross-sectoral, transdisciplinary Resilience Research

CCARPH expanded the 15 (2019) to 16 (2020) academic and research thematic teams, with three more Work Packages: 1) the social ethnography of air quality impacts on the most highly exposed and vulnerable street-based population in Quezon City; 2) economic analysis of the impacts of natural hazards on the informal and formal sectors, and 3) analysis of climate and health impacts, specific to leptospirosis and dengue. In Year 3 (2020), we added, “Community-based Arts as a Vehicle for Social Change and Enhancing Resilience,” with the ADMU Department of Sociology & Anthropology (DSA) and Fine Arts Department, Buklod Tao Katatagan, Inc., (BTKI), and the Integrated Community Food Production (ICFP) program of the Disiplina Village Bignay, Valenzuela City.

Space-based tools and value-added knowledge products


The following transdisciplinary research studies made use of space-based tools and knowledge products towards climate and disaster resilience. These include:

- Work Package 1.1.1. Climate Projections, summarized in the technical report, “Co-generating Climate Hazard Information to Enhance City Resilience in the Philippines” ([access here](#))
- Work Package 1.1.2. Air Quality, summarized in the technical report, “An Assessment of Personal Exposure of a High-Risk Occupational Group to Fine Particulate Pollution in Metro Manila, Philippines” ([access here](#)), and
- Work Package 1.2.1. Health, summarized in the technical report, “Assessing and Projecting Climate-Related Infectious Diseases in Quezon City” ([access here](#))

Objective 2: Develop methodologies and tools for climate change adaptation and disaster risk resilience

1 City Resilience Systems (CRS) dynamic model that can be incorporated in the climate and disaster risk assessment tool (CDRA) used by local government units.

A City Resilience Toolkit (CResT): A Compendium of Activities for Resilience Planning was developed by the transdisciplinary research team on System Dynamics (WP 2.1.1.). The



activities in the book were developed from systems thinking frameworks or adapted/enhanced from existing activities to better suit the purpose of applying systems thinking frameworks to resilience planning in three phases: Problem Diagnosis, Stakeholder Engagement, and Action Planning. A downloadable copy of the book is available via [this link](#).

The climate and disaster risk assessment (CDRA) tool was downscaled into the partner cities of CCARPH including the cities of Naga and Iloilo. A discussion of the Coaching & Mentoring initiatives of CDRA is available in [this link](#). The CDRA is implemented in partnership with the academe and local government of both cities. In Iloilo City, it served as a tool in updating the local government's Comprehensive Land Use Plan (CLUP). See Volume 1 of the Iloilo City CLUP 2021-2029 via [this link](#).

1 City CGE model for firms/formal economy in NCR

The Computable General Equilibrium (CGE) model, with the Social Accounting Matrix (SAM), was downscaled in the Pasig and Valenzuela city LGUs³. With support from the ADMU University Research Council (ADMU-URC), it was expanded to the cities of Naga and Iloilo in 2021. Read more about the CGE training in Iloilo City and Naga City via coastalcitiesatriskph.com

1 GIS and geo-spatial data on infrastructure

Led by the research team from the Manila Observatory, and through the transdisciplinary WP 1.3.1. Geospatial, a report was produced on “Using GIS to Visualize Risk in Metro Manila.” This report aims to visualize and analyze the generated geospatial datasets of the HEVs. Specifically, we considered informality, critical infrastructures, and social vulnerability indicators. Read more via [this link](#).

Objective 3: Enhance capacity and transfer knowledge

12 inter-/transdisciplinary graduates

Ten (10) MDRR graduates Batch 1 completed their degrees in 2020, with five (5) graduate students finishing in 2021. Seven (7) of these graduates are male while eight (8) are female. Twelve (12) innovative capstone projects have been achieved so far; these are “problem-focused, solutions-driven” with a systems lens on climate and disaster resilience challenges. The MDRR graduates’ capstone projects are accessible at [this link](#).

³ Each city had its own tailor-fit CGE-SAM models.

16 cross-sectoral, transdisciplinary interns

In 2018 and 2019, the CCARPH project worked with interns and research assistants (five (5) men and 11 women) from its transdisciplinary work package teams. Two (2) research interns were hired by the Ateneo de Naga University (ADNU) to assist and work with the ADNU Institute for Environmental Conservation and Research to implement CDRA in Naga City. The project also closely coordinated with an intern affiliated with the Valenzuela City Environment and Natural Resources Office (CENRO), especially in engagements for building barangay resilience.

In 2019, CCARPH trained five (5) research interns for Work Packages 1.2 and 3 who, later on, transitioned themselves into the project management team. These research interns were involved in formal capacity-building sessions for a) principal component analysis (PCA), b) remote sensing and geographic information systems through ArcGIS, and c) policy brief writing, among others. The project management team was involved in organizing national and international conferences in resilience, training sessions for barangay resilience with Muntinlupa City and the Pamantasan ng Lungsod ng Muntinlupa, webinars for knowledge dissemination and climate action, and boosting the project's online presence, to name a few.

In 2020, the CCARPH Research Internship Program trained seven (7) successful young researchers from the Ateneo de Manila University School of Science & Engineering (a Bachelor in Environmental Science, and undergraduate students in Physics, Chemistry, and Environmental Science), the Ateneo de Naga University Civil Engineering Department, and the *Pamantasan ng Lungsod ng Muntinlupa* (English translation University of Muntinlupa City). This program was open to [post-graduate](#), [graduate](#), and [undergraduate](#) students. Successful research outputs include the development of a children's storybook on island-based resource management; two research papers on solid waste management in Metro Manila; two infographics on drought and urbanization and micro mobility in Metro Manila; training sessions based on UNDRR-hosted workshops; coconut yogurt video and resilience narratives on covid-19 response; assistance in developing a risk communication plan, and a case study on CCARPH's community partner, Buklod Tao Katatagan, Inc. (BTKI). Two (2) interns continued their work after their research internship by assisting the CCARPH Project Leader in research and teaching for the Master in Disaster Risk and Resilience (MDRR) program.

The Internship Program in 2020 also welcomed the participation of CCARPH and MDRR community-partner, Buklod Tao Katatagan, Inc., led by Mr. Manuel Alcantara Abinales. There were four (4) applicants from BTKI, and two (2) engaged with their co-interns and the CCARPH Project Management Team in the program's weekly meetings. They were able to introduce the BTKI initiatives from the perspective of its youth group, Buklod ng Kabataan, to their co-interns in CCARPH. In 2019, CCARPH received three international

interns from France (Xiali Li from Sciences Po (Paris); Morgan Queffellou from Sciences Po (Bordeaux) and Shao Shiohara (Yokohama University, Japan). In 2021, CCARPH accepted the research proposal of three Environmental Science (ADMU) students to study the supply chain of covid-19 protective gear in Pasig City Health Department.

The summary of CCARPH interns from 2018 to 2020 is available at [this link](#). Note: CCARPH also mentored/trained other researchers on transdisciplinary approaches and methods. See list in Annex

10 resilience innovation reports from the Philippines and Asian countries

Through the transdisciplinary research teams of CCARPH, the project was able to produce 20 technical reports on resilience innovation:

1. Manila Observatory. (2020). [Co-generating climate hazard information to enhance city resilience in the Philippines](#).
2. Delos Reyes, I., Cambaliza, M.O., Cruz, M., Leung, G.F., Simpas, J.B., Gotangco, C.K., Abenojar, K., Manalo, C., and Go, Bernell. (2019). [As Assessment of Personal Exposure of a High-Risk Occupational Group to Fine Particulate Pollution in Metro Manila, Philippines](#).
3. Wong, J., Baladad, A.K., Fowler, K.C., and Co, J. (2020). [Assessing and Projecting Climate-Related Infectious Diseases in Quezon City](#).
4. Porio, E., Roque-Sarmiento, E., Salas, M.R., and Leynes, V.C. (2020). [From the Skies to the Streets: An Ethnography of Street-based Populations in Metro Manila, Philippines and Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks](#).
5. Ravago, M.-L., Pascua, G.G., Acheron, L.D., Gozo, E., Cruz, F., and Narisma, G. (2020). [Impact of Extreme Rainfall Days on the Welfare of Households in the Formal and Informal Sectors](#).
6. Vicente, C., Paraiso, P., and Del Castillo, F. (2020). [Land Cover Change Analysis in Metro Manila and Marikina Watershed Philippines \(2009-2018\)](#).
7. Vicente, C., and Del Castillo, F. (2020). [Assessment of Land Cover Changes to River Runoff and Scenario-based Flooding](#).
8. Vicente, C., and Del Castillo, F. (2020). [Land use classification over a highly-urbanized region using multi-resolution images](#).
9. Vicente, C., and Del Castillo, F. (2020). [Using GIS to Visualize Risk in Metro Manila](#).
10. Vicente, C., Paraiso, P., and Del Castillo, F. (2020). [Informal Livelihoods Survey Along Commonwealth](#).
11. Manila Observatory. (2020). [Naga Disaster Risk Analysis: Typhoon, Flooding, Liquefaction](#).
12. Ateneo de Naga University. (2020). [Social Vulnerability of Naga City Households to Flooding](#).
13. Manila Observatory. (2020). [Naga Climate Risk Analysis](#).

14. Jamero, M.L., Defiesta, G., Agudo, F.A., Moscoso, A., Araneta, L., Gozo, E., Domain, M., Dela Paz, M., Dator-Bercilla (2020). [Climate and Disaster Risk Assessment: Iloilo City](#) for CLUP.
15. Abenojar, K., Jardeleza, J.M., Gontangco Gonzales, C.K., Josol, J.C., Litam, J.E., Campos, J.I. (2021). [Developing a Socio-Economic Resilience Index \(SERI\) Model and an Integrated Urban Services Resilience Index \(IUSRI\) Model using a System Dynamics Approach](#).
16. Campos, J.I., Litam, J.E., Gotangco Gonzales, C.K., Josol, J.C., Jardeleza, J.M., Abenojar, K. (2021). [Developing an Urban Ecosystem Resilience Index Using a System Dynamics Approach](#).
17. Manila Observatory. (2020). [Climate and Disaster Risk Assessment: Coaching and Mentoring](#).
18. Clarete, R., Castillo, C.J., Murong, M., Tuaño P.A., Guevara, D., and Bona, M. (2020). [Economic Impacts of Rainfall and Flooding in Valenzuela and Pasig Cities Using a Multi-week CGE Model Analysis](#)
19. Ateneo Innovation Center. (2021). [AIC Technical report of the 2018-2021 CCARPH project](#).
20. Porio, Emma (2021). [Climate Resilience Initiative in Metro Manila: Participatory Community Risk Assessment and Power in Community Interventions](#).

221 trainees on socio-ecological and science and technology trainings for resilience

The complete list of CCARPH workshop trainees is available in Annex A, Gender Disaggregation of Year 1 to 3 Activities Hosted/Co-hosted by CCARPH. These training sessions from 2018 to 2020 are the training and workshops co-/hosted by CCARPH, including CDRA training. All sessions are listed in Annexes I and J. These trainings focus on capacity-building and knowledge dissemination of science into action (i.e., through LGUs, communities, and representatives from the academe, and private sector).

The CCARPH-NRC trainings cover three types:

- CDRA coaching and mentoring of the LGU personnel from 2018-2021
- Geo-spatial Web GRiD training for COVID tracking in June 2020 [[Link to website post](#), [List of Participants](#)]
- Deepening Systems Thinking for Risk Governance in June 2021. The latter training programs are equivalent to a 3-unit course program in Ateneo de Manila University. [[Link to website post](#), and [Facebook feature](#), [List of Participants](#)]

Transdisciplinary, multi-stakeholder public-private partnerships in 3 cities

The main city partners of CCARPH are: Metro Manila, Metro Naga, and Metro Iloilo. Resilience initiatives, case studies, and effective engagements with the cities' LGUs and academic institutions were carried out in the transdisciplinary, multi-stakeholder partnerships. The CDRA was implemented in the cities of Iloilo and Naga, in partnership with its academic institutions (UPV and ADNU, respectively), and the pertinent representatives from the LGU (i.e., DRRMO, CPDO, City Resilience Council, GAD, CENRO, among others). In partnership with chosen cities and barangays of Metro Manila, the CCARPH conducted transdisciplinary research studies for resilience models (i.e., IUSRI, CResT, and SAM-CGE, with the Pasig and Valenzuela Cities). The project also deployed resilience technologies in chosen barangays of Metro Manila, in partnership with the AIC.

The above partnerships were preceded with the signing of MOUs/MOAs with the mayors and university presidents/academic partners.

All city engagements are summarized in the project resilience toolkit website at: resiliencetoolkit.ph/city-engagements

3 Science-policy-practice briefs (on Metro Manila, Metro Iloilo, and Metro Naga)

The CCARPH Geospatial Work Package team produced a policy brief on “The importance of land use / cover management for flood mitigation” featuring the Marikina City (Metro Manila) watershed ([link](#)). The Integrated Risk Analysis (IRA) of the Manila Observatory with the cities of Iloilo and Naga are also summarized in e-books. The IRA of each city is developed in partnership with their respective LGUs (DRRMO, CPDO, etc.), and academic institutions: University of the Philippines Visayas (Iloilo City), and Ateneo de Naga University (Naga City). The IRA electronic books are available as follows: Iloilo City IRA ([link](#)), Naga City IRA ([link](#)).

3 City Disaster Resilience Plans

Since resilience plans are not mandated by law, the project pushed for the reengineering of those mandated, i.e., the Local Climate Adaptation Plan (LCAP), the City Land Use Plan (CLUP), the City Development Plan (CDP), Annual Investment Plan (AIP), and the Policies, Programs and Activities (PPAs). These then became risk-informed, resilience-driven planning and investment tools. Through Work Package 3 (CCARPH-MO-NRC), our private sector partner, the National Resilience Council (NRC), implemented a double track approach to capacity-building programs (via the *Bridging Leadership*, and the *Science & Technology* lanes). The project devised the CDRA

workshops in order to realign the LGUs' AIPs and PPAs. The Workshop 3 series (Bridging Leadership through Systems Thinking) refocused the LGUs AIPs on resilience.

In June 2021, the NRC, with technical support from CCARPH, delivered the *Deepening Systems Thinking* (DST) course. Designed as the science and technology requirement for the Adapt Phase of the Resilient Local Government Unit Program, this certificate course provides participants with the opportunity to receive academic credits from the Department of Sociology and Anthropology upon enrollment in a disaster risk reduction and resilience-related degree program (e.g., Master of Disaster Risk and Resilience, Master of Transdisciplinary Social Development) at the Ateneo de Manila. The DST aimed to enhance the capacity of LGUs to frame their city's system-of-systems problems, understand intersectionality and linkages between policies, and reflect these in risk-sensitive and resilience-oriented AIPs, budgets, and PPAs. The adjustments to systems, policies, and actions will be presented by the local chief executives at the NRC's March 2022 Colloquium.


Minimum of 3 City Resilience Innovation projects

The CCARPH project advances innovation projects, including deployments and installations of resilience technologies in city and barangay partners (summarized at <https://www.ateneoinnovation.org/>), and the development of city resilience tools, i.e., IUSRI, CReST, SAM-CGE, and CDRA (summarized at <https://resiliencetoolkit.ph/tools-city-resilience/>).

- Mijares, C. Ahon sa Pagbangon (Preparations for Adaptive Resilience) & Community Resilience Toolkit for Youth Resilience Champions in Buklod-Tao, Inc. [\[Link\]](#) [\[Poster\]](#)
- Abad, R. *Risk and Resilience in the City*, Lecture-Doodle. [\[Video\]](#)[\[Transcript\]](#)
- Crisostomo, B.J. *AZUL: Ang Sirena ng Sigwa*, Play. [\[Synopsis\]](#)[\[Script\]](#)
- [Annex 9](#)

6 Science-Policy Briefs on Resilience that inform local, national, regional, and global policy making

The CCARPH project produced science-policy briefs informing policy makers through the following: 12 MDRR program capstone theses (see: [MDRR Policy Brief Compendium](#)), resilience partnership with JJCICI (see: [Towards a science-informed and people-centered resettlement program](#)), and the Policy Brief Series of ADMU's Department of Economics and ACERD (Ateneo Center for Economic Research and Development) (see: [Impact of Extreme Rainfall Days on the Well-being of the Households in the Formal and Informal Sectors](#)).



At the local level, policy recommendations accompanied the [CDRA](#) reports submitted to the LGUs as well as specific recommendations on how to address specific climate-related risks such as [flooding](#) and the [localization of COVID-19 measures](#) in the face of climate and disaster-related risks. At the national level, a joint policy brief was developed on [Ecosystems-based Resilience](#) with various stakeholders. Given the drive of various stakeholders in creating a Department of Disaster Resilience, CCARPH scientists helped [inform the reflection process of various stakeholders](#) that yielded in a [position paper](#) to the Philippine legislature. At the regional and global levels, CCARPH worked with regional civil society groups to inform the [UNFCCC Asia Pacific Climate Week](#) and the [COP25 processes](#).

Loss and Damage Submission to the UNFCCC

CCARPH went through the partnership with community-based partners and regional advocacy partners to be able to influence the submission on Loss and Damage deliberations in the UNFCCC. Manila Observatory, Ateneo de Manila, worked with Christian Aid partners in the Philippines to inform the [Loss and Damage submission of the Asia Climate Change Consortium](#) to the UNFCCC.

Submission to the GPDRR

CCARPH took an indirect route in making a submission to the Global Platform on Disaster Risk Reduction. [CCARPH partnered with ACT Alliance](#), a global alliance of faith-based groups in about 140 countries, on unpacking multi-dimensional vulnerabilities that impact on resilience. The collaboration informed the [submission of faith-based organizations to the GPDRR](#).

1 Resilience Innovation Report

The project communicates and advances its transdisciplinary research through the CCARPH Resilience Toolkit website, accessible at <https://resiliencetoolkit.ph/>. This toolkit is a knowledge database designed to help disaster planners, risk resilience practitioners, and local government units to refer and use various technologies to enhance our cities' climate and disaster risk resilience. Under an agreement with ADMU's Office of the President in 2021, both the resilience toolkit and CCARPH websites will serve as the major monitoring, evaluation, and information dissemination tools of the university, for innovations in gender, climate and disaster resilience, in part to support the ADMU Strategic Plan 2020-2030.



Intended vs. Unintended Outcomes

CCARPH has achieved four major outcomes. First, advancing intensive knowledge of climate change adaptation and risk reduction for resilience in academia, the private sector, and CSO sectors. CCARPH conducted research that used frameworks and approaches that were attuned to the state of climate and disaster resilience science. For instance, the downscaled climate information used the latest CORDEX (coordinated climate downscaling experiment) tools of analysis, which, in part informed the work of the Manila Observatory and Ateneo de Manila in the Intergovernmental Panel on Climate Change (IPCC), National Disaster Risk Reduction and Management Council (NDRRMC), and the Climate Change Commission (CCC). The Social Vulnerability studies also innovated on the use of principal component analysis (PCA), hydrology proximity analysis, and vulnerability indexing (cf. Enhanced Vulnerability Study of Metro Manila and Manila City) to capture specific contexts and drivers that drive vulnerabilities, which in turn, inform development investments of local-national government agencies, the private sector, and CSOs towards community resilience. The use of systems and design thinking in risk governance also provided an avenue for applied research to inform risk management and adaptation pathways in the work of local government units and practitioners.

CCARPH produced downscaled risk maps for risk communication, a suite of systems thinking tools for decision-makers. This methodology analyzes the local economy using the computable general equilibrium (CGE) and social accounting matrix (SAM), a policy-based approach to enhancing resilience in local governments, the Transformative Leadership for Adaptive and Productive Local Government Units (LEAP) manual, that informed the Resilience Scorecard developed through the NRC, and now utilized by partner LGUs of NRC. Moreover, CCARPH also produced innovative technologies for climate and disaster resilience developed by the Ateneo Innovation Center. All these, and more, are evidence of the second outcome of the development and enhancement of methodologies and tools for climate and disaster resilience.

CCARPH, along with its partners such as the NRC, introduced opportunities for transdisciplinary research within academic partners in UP Visayas (UPV), Ateneo de Naga University (ADNU), Pamantasan ng Lungsod ng Muntinlupa (PLMun), and Visayas State University (VSU). These opportunities likewise supported the development of new institutional relationships between academe and local governments, civil society, and the private sector.

Finally, the MDRR program, alongside the various capacity-building initiatives for LGUs, as well as the knowledge-building partnerships with academic institutions and other stakeholders, produced a new set of climate and disaster resilience champions equipped with better competencies (knowledge, analytical skills, capacity to access to resilience innovations and support, i.e. with the private sector). These are evidence of the third outcome achieved by CCARPH.

All these positive outcomes, both intended and unintended, (i.e., producing more publications than expected, crafting more partnerships and collaborative networks which was not a deliverable or expected but necessary to realize the CCARPH goals, **delays**, etc.)

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were due to the commitment of the scientists, external academic partners and stakeholders that climate action towards resilience is a very important existential issue of our time, especially, for us Filipinos in the Ring of Fire. Please see, Fr. Roberto Yap's Address, during the National Disaster Resilience Month Kick Off Ceremony as representative for HEIs in the National Disaster Risk Reduction and Management Council.

<https://www.youtube.com/watch?v=hxMggW8EwYQ>

More significantly, the institutional leadership and allied social capital and trust networks of the consortium members (ADMU, MO, NRC) in government, CSOs/CBOs and the private sector facilitated the achievement of the CCARPH deliverables and beyond. ***More significantly, the IDRC support for science and for CCARPH's transdisciplinary action research transformed our bridging science-policy practices.***



PROBLEMS AND CHALLENGES: OPPORTUNITIES AND RISK MANAGEMENT MEASURES


CCARPH faced several challenges, including, though not limited to the following: (1) change of institutional project holder from Manila Observatory to the Ateneo de Manila University; (2) political transitions and changes of organizational leadership within and without; (3) disciplinary lines of authority in teaching, research and extension programs of HEIs, resulting in the uphill struggle of doing inter-/transdisciplinary work in the university and external partners; (4) sectoral driven planning, investment and development in national and local governments; (5) different performance outcomes and assessment measures in the university, scientific institutions, CSOs, private sector, and local/national government agencies; and most importantly, (6) climate-related shocks and volcanic events from 2018 to 2021, and even more significantly, the (7) COVID-19 pandemic shocks and lockdowns over the past 18 months. Taken together, these biophysical, environmental, social, and pol-economic challenges, were reduced by the following principles of action.

CCARPH-MDRR's principles informing climate action: Problem-focused, solutions-driven with a systems-lens is the key approach in implementing CCA-DRR action research programs in the university and with partners in the private sector, CSOs/CBOs, and the national and local governments. In our meetings, debriefing sessions and consultations/dialogues, CCARPH leaders always emphasized the following principles that should inform our crafting of collaborative partnerships for resilience:

- **To innovate is to collaborate but to innovate successfully is to navigate systems of engagements within the university and with our external public-private partners;**
- **By being solidly together, we can become more and can serve society more efficiently and effectively through our science and technology;**
- **Public-private partnerships, informed by collegiality, generosity and respect, “powers” our medium- and long-term work for community resilience.**

These principles inform CCARPH in creating and nurturing converging “nests of resilience” to produce resilience champions (e.g., researchers, private sector leaders, professionals, practitioners) who walk the talk of resilience in their everyday work and engagements. CCARPH (ADMU-MO-NRC) **enforced** all of these principles with a combination of **material, political-economic, psychological, and spiritual incentives and disincentives** within and without.

Implementing the above principles in transdisciplinary action research with multiple layers of partners and stakeholders in national/local local governments, CSOs/CBOs, and the private sector requires a set of interlocking navigational strategies within/without and a firm but collegial enforcement of incentives/disincentives for collaborative climate action




for resilience. These strategies involve the : (1) crafting of MOUs/MOAs within and across project actors and stakeholders (e.g., tripartite partnerships between CCARPH consortium actors, local chief executive (LCE), and the university partner in the region; (2) creating of new inter-/transdisciplinary structures and processes within the university and beyond, and the 3) forging of new collaborative agreements (e.g., TOR) between CCARPH and other stakeholders (e.g., partnership with ARETE, CBOs, and barangay councils).

Crafting Innovative Solutions Under COVID-19 Pandemic, Climate and Volcanic Shocks

The COVID-19 pandemic lockdown and community quarantine that started in March 2020 transformed CCARPH's program of action by: 1) shifting our delivery of workshops, training, and capacity building programs into online/digital platforms, and 2) creating new programs to respond to the emerging and evolving needs under complex emergencies. The COVID-19 pandemic and lockdown effects exacerbated the climate-related hazards (floods, typhoons, landslides) and geological hazards (intermittent eruption of Taal volcano in 2019-2020). But these challenges also provided opportunities for CCARPH to reinvent and collaborate with public-private sector partners to deliver the following:

- (1) *Acts of Magis* Lectures with the Ateneo Research Institute of Science and Engineering, designed to get the science-technology applications as a proactive response of the university to the urgent needs of society under the the Covid-19 pandemic and lockdowns;
- (2) DRR technologies installed in Marikina City, Pasig City, Cavite in Greater Metro Manila area, Cagayan Valley in Northern Luzon, and Naga City and Caramoan, Camarines Sur after Typhoons Goni and Vampo in late November 2020 ravaged the islands of Visayas and Luzon this also includes the drone assessment of Baras weavers in Catanduanes,
- (3) CCARPH-NRC Capacity Building Programs under lockdown: (a) Web-based Geospatial Risk Database for COVID-19 Pandemic Response and Recovery Training Program, b) Deepening Systems Thinking Certificate Course;
- (4) CCARPH-NRC Webinar Series 2021-2021 (Climate, Covid and the City, APSA 2020; Climate, Resource Management and Human Development Webinars 2020, CCARPH-NRC Lecture Series on Engineering Resilience, Gender and Equity (January 2021-July 2021)
- (5) NRC-ADMU-MO new transdisciplinary action research on Manila City's Social Vulnerability Indexing (NRC signed an MOU with Manila City Mayor Isko Moreno in December 2020 but active implementation started in May 2021).

The above principles of action and programs informed CCARPH in creating and nurturing converging “nests of resilience” to produce resilience champions (researchers, private sector leaders, professionals, practitioners, etc.) who walk the talk of resilience in their



everyday work and engagements. All of these principles, CCARPH (ADMU-MO-NRC) **enforced** it with a combination of **material, political-economic, psychological and spiritual incentives and disincentives** within and without.

Administrative Reflections and Recommendations

Implementing a transdisciplinary action research project within a heavily disciplinary-bounded university structure, and a sectorally-driven national and local government planning and development bureaucracy, pose several challenges and opportunities within and without. But CCARPH's forged collaborative networks, accompanied by instruments pushing for cooperation and solidarity among project partners and stakeholders, surmounted these challenges.


The biggest challenge from the perspective of project leadership, management, and the administrative team, is really the need to create a new breed of scientists, research managers, policy makers, leaders, and personnel who can bridge and translate the principles of climate action to resilience practices. More importantly, there is a need to create a "resilience constituency at the different levels of institutional practice to support the following initiatives: (1) transcending university's disciplinary-bounded research, teaching, and extension programs towards transdisciplinary approaches, and 2) building a new *cadre* of resilience champions, professionals, and practitioners who can implement problem-focused, solutions-driven with a system lens' policies and programs at the national-local governments, private sector, and the institutions of higher learning, and research institutions.

More significantly, implementing a fairly sizable project like CCARPH also needs a dedicated budget line (separate from IDC) for administrative and logistics support from the university. This is important in the Global South where universities are mostly *teaching institutions, not research universities, where administrative and logistics support for research and related external engagements are pretty well-defined*.

Leverage funding support

The CCARPH Consortium (ADMU-MO-NRC) is fortunate to have the generous support of the IDRC, especially in its commitment to produce actionable science for climate and disaster resilience. More significantly, state agencies, universities, and the private sector, if at all, support mostly disciplinary-bound research programs and rarely multi-/transdisciplinary action research programs.

But CCARPH is fortunate to get support from the IDRC for transdisciplinary action research as well as from other institutions and private donors who firmly believe in building adaptive



and transformative resilience as the pathway for resilience action in the university, government, community, and the private sector. CCARPH organized and/or co-hosted workshops, conferences, meetings that, in part, were supported by private sector partners like the NRC (about Php 5M), MO (about Php 2M), and counterpart funding (Php 5M) from ADMU, for a total of about Php 12M ⁴. This does not include ADMU's original counterpart funding support of Php 37 M for the research scientists' salaries/fees mentioned in the 2017 CCARPH proposal. [[CCARPH Conferences, Workshops, Trainings, and/or Travel Finance](#)]

LESSONS LEARNED

Resilience Lessons

In implementing our CCARPH goals, we had to navigate around the political, economic and social priorities of the Local Chief Executive (LCE), the legislative agenda of the City Council and their relationship with their partner CSOs/CBOs, and the private sector actors. Navigation within and across these systems and consensus-building activities (e.g., negotiations, consultations, dialogues, mediation) among stakeholders are central to building stronger networks and coalitions for climate action. More significantly, the new ethics review process instituted in Philippine HEIs caused delays in the mobilization of research project(s) and in engaging partners in the field. However, the resolution of these issues were smoothened and/or facilitated through the social capital/trust networks of the project leader. These ethics review negotiations, however, resulted in the revision of the principles informing the review process in June 2021.

Moving forward, the complexity and dynamics of climate and disaster risk require the building and sustaining of a constituency that is focused on resilience. This would mean a deeper understanding of the structures that foster and deepen exposure, vulnerability, and multi-stakeholder collaboration in identifying pathways to transformation through strategic and collective action.

⁴ CCARPH workshops, conferences, training programs had counterpart support from the Ateneo de Manila University, Manila Observatory, National Resilience Council, partner city LGUs of Naga City, Iloilo City, Muntinlupa City, Valenzuela City, Pasig City, and Quezon City. [Workshops \(2019\)](#), Activities [\(2018-2020\)](#) [\(2021\)](#)

Salient points in lessons learned from 3 metropolitan cities

	Metro Manila (Muntinlupa , Marikina , Pasig & Valenzuela , and QC (w/ varying foci)	Naga	Iloilo City
Resilience Governance	CDRRM/BDRRM as base for City Resilience Council	CDRRM as base for Naga City Resilience Council	CDRRM as base for Iloilo City Resilience Council
Structure (line base of command)	Use the Local DRRM Council Structure and Barangay Council in partnership with CSOs/CBOs as base(s) for capacity building and resilience to strengthen the integrity of resilience governance structures and facilitate climate action	Engage the Naga City Resilience Council and Local DRRM council as base for capacity building and resilience to strengthen the integrity of resilience governance structures and facilitate climate action	Utilize the Local DRRM Council Structure as base for capacity building and resilience to strengthen the integrity of resilience governance structures and facilitate climate action
Mainstreaming protocol	Engaging the City Planning and Development Office in climate and disaster resilience work facilitates mainstreaming in development plans and budgets	Mobilizing the City Planning and Development Office in climate and disaster resilience work and mainstreaming in development plans and budgets	Engaging the City Planning and Development Office in climate and disaster resilience work facilitates mainstreaming in development plans and budgets
	Improving the data management system is a precondition for risk-informed, resilience-driven policies and programs in coastal cities (i.e., finance regular CBMS surveys and application)	Enhancing the data management system is a priority for resilience in coastal cities (e.g., finance regular CBMS surveys and application)	Supporting the data management system is a priority for resilience in coastal cities (e.g support for CBMS surveys and application)

Operations	Systems thinking is useful not only as a tool for analysis but as a mechanism for engagement between members of the LDRRMC	Systems thinking is useful not only as a tool for analysis but as a mechanism for engagement between members of the LDRRMC	Systems thinking is useful not only as tool for analysis but as a mechanism for engagement between members of the LDRRMC
	Mobilize institutions like the academe and scientific institutions and private sector to support LGUs for purposes of empowerment and sustainability	Enhance institutions like the academe and scientific institutions and private sector must remain as support to LGUs for purposes of empowerment and sustainability	Support the academe and scientific institutions and private sector so they remain supportive to LGUs for purposes of empowerment and sustainability
Science-Policy Interface	Interface through the Climate and Disaster Risk Assessment and Barangay Resilience Scorecard applications.	Interface through the Climate and Disaster Risk Assessment.	The starting point of the interface is through the Climate and Disaster Risk Assessment.
Transdisciplinary mechanisms	Transdisciplinary analysis , as part of the CDRA/PCRA/SOVI methodology, requires commitment from all sectors, discipline in the use of tools for analysis, and a conscious application of the principles for inclusion.	Transdisciplinary analysis , as part of the CDRA methodology, requires commitment from all sectors, discipline in the use of tools for analysis, and a conscious application of the principles for inclusion.	Transdisciplinary analysis , as part of the CDRA methodology, requires commitment from all sectors, discipline in the use of tools for analysis, and a conscious application of the principles for inclusion.
Gender and Resilience	Reducing gender vulnerabilities through GAD-DRR focused programs in Valenzuela City, Muntinlupa City,	Gender-based vulnerabilities addressed through the Barangay Mainstreaming Resilience Program in the Barangay	Gender-based vulnerabilities as well as coping and adaptive capacities in coastal cities.


	Manila City, and Pasig City.	Development Plan required by DILG.	
Institutionalization	Multi-stakeholder partnerships (LGU, academe, private sector, CSOs) and collaborative resilience actions via institutional champions and policy, as well as official and documented agreements to ensure institutionalization and sustainability.	Resilience building and nurturing champions in the academe, local governments, partnerships and actions directed at resilience building and policy, as well as official and documented agreements to ensure institutionalization and sustainability.	In the academe as well as in local governments, partnerships and actions directed at resilience-building require institutional champions and policy, as well as official and documented agreements to ensure institutionalization and sustainability.

- **Leadership that supports evidence-based/science-informed decision-making is central to the resilience to climate change and disasters of coastal local governments and communities at risk in Metro Manila, Naga City, and Iloilo City .**

Downscaled climate change, disasters and vulnerability analyses provide the opportunity for an inclusive process of assessing risks. The CCARPH utilized advances in systems thinking via a suite of tools to examine the physical, social, economic, and institutional elements of risks, and applied these to the CDRA of LGUs. The contextualization of vulnerabilities and capacities in the CDRA allowed the research team to better characterize risk and resilience and its trajectory of planning and development applications. This ensures an output that is reflective of the contextual realities of city partners, facilitating the research teams' engagements with other stakeholders in the transdisciplinary processes of action research and applications.

- **Actionable science researches enable climate and disaster resilience through improved tools and methods (e.g., contextualized/localized)**

The researches inspired the crafting of climate and disaster resilience tools: (1) risk maps for the CDRA, (2) suite of City Resilience Tools like the Integrated Urban Services Resilience Index (IUSRI) Model that combines the Urban Ecosystem Resilience Index (UERI) and the Socio-Economic Resilience Index (SERI), and the City Resilience Toolkit (CResT), (3) use of CGE (computable general equilibrium) with SAM



(social accounting matrix), and (4) technology innovations for resilience such as clean water installations, technologies for community resilience like solarRain/solarLED/radio communication installations, solar-powered auto-hand washers, and Near Cloud/EduCloud systems. These increased resilience capacities of our partner institutions and communities.

- **Learning and training are necessary to develop resilience champions among decision-makers, bureaucracy, and practitioners.**


The France-based Eduniversal rated the Masters in Disaster Risk and Resilience (MDRR) program of the Ateneo de Manila University as one of the best graduate programs in Far East Asia, ranking 39th out of 150 countries surveyed in the area of environmental security. Furthermore, building capacities within the bureaucracy of the national CCA-DRR institutions and LGUs are necessary for ensuring the sustainability of resilience actions.

- **Private sector partnerships provide the much-needed dynamism and resources to advance resilience actions.**

By partnering with the private sector, through the NRC, in climate and disaster resilience, CCARPH contributed in transforming the academic theories and scientific research outputs into resilience measures via the Resilience Scorecard for LGUs that are informed by national and local government mandates, and international agreements. LGUs can refer to and use it as a tool to measure their resilience progress. CCARPH participated in the capacity building not only of local chief executives (LCES) of different LGUs but, more importantly, in sharpening science-informed climate and disaster resilience in the LGU bureaucracy. The process also led to investments in resilience measures from both the LGUs, the private sector, civil society, and academic partners. To push the boundaries of innovations in risk and resilience, CCARPH supported design- thinking processes, initiated and led by the NRC with IBM, which yielded innovations for climate and disaster resilience from the youth and LGUs. Their output was presented in the Top Leaders' Forum in 2019, which was honored by the presence of the Special Representative of the Secretary-General for Disaster Risk Reduction in the United Nations Office for Disaster Risk Reduction. All these facilitated science-informed capacity building and resilience planning found its way not only in the LDRRM Plans, but more importantly in the overall development plans and budgets of LGUs.

- **Research in climate and disaster resilience has been institutionalized as part of the decision-support system for local and national governments.**

Identifying policy-driven pathways for resilience ensured the utilization of policy-based entry points for resilience actions in LGUs. CCARPH's research informed the preparation of development planning and the budgeting processes of LGUs before the pandemic. It also influenced the design of COVID-19 pandemic



measures for resilient recovery in some cities. These were also made possible through transdisciplinary methods that were anchored on policies for risk reduction, resilience, and climate action. Examples of the avenues for transdisciplinary engagements include the CDRA process and the crafting of climate and disaster resilience actions in the LDRRMPs, and development plans like the Comprehensive Land Use Plan (CLUP) and City Development Plan (CDP), and the Annual Investment Plan (AIP).


Challenges and Opportunities in Developing Science-Informed Approaches for Policy and Practice

- **Enabling mechanisms for intersectionality and transdisciplinarity need to be further developed and advanced in the academic/scientific communities and sectorally-driven national/local government units.**

The academic and scientific communities are still very disciplinal, or at best multi-disciplinary rather than inter-/transdisciplinary in their teaching, research, and extension programs. Action research projects like the CCARPH and the MDRR degree program advance and facilitate cross-disciplinary engagements and provide opportunities for transdisciplinary action. At the Ateneo de Manila University (ADMU) and its partner universities, University of the Philippines Visayas, and Ateneo de Naga University, the climate and disaster risk assessments allow the scientists to engage in multi-stakeholder engagements. In 2021, ADMU, after ranking in the 200-300 level among 1250 universities worldwide in The Ranking of University SDG Implementation, decided to align its teaching, research and extension programs with the SDG goals (e.g., AIC and SOSE-ARISE website links). More significantly, CCARPH under the Office of the President and ADMU's flagship program for climate and disaster resilience, serves as the *de facto* conductor in pushing for more convergence and transdisciplinary approaches in our teaching, research and extension programs. In the University of the Philippines Visayas, transdisciplinarity as a principle is now embedded in policies and programs such as that of the College of Fisheries, a Center of Excellence, as a result of the collaboration with CCARPH.

- **Sustaining resilience investments requires the institutionalization of proposed and ongoing climate actions.**

CCARPH has produced valuable inputs for climate and disaster resilience decision-making. However, to ensure that research outputs become outcomes, they have to find their place in actual decision-making platforms and actual policy decisions. In the context of coastal cities in the Philippines, they have found their way in major development plans like the Comprehensive Land Use Plan (CLUP), Comprehensive Development Plan (CDP), Executive and Legislative Agenda (ELA),



Annual Investment Plan (AIP), and not just the derivative plans such as the Local Disaster Risk Reduction and Management Plan (LDRRMP), Local Disaster Risk Reduction Management Financial Investment Plan (LDRRMFIP), and the Local Climate Change Action Plan (LCCAP).

- **Partnerships with the private sector, LGUs, and other stakeholders for resilience need to be scaffolded by new and adaptive modalities, mechanisms and instruments of partnerships and collaboration.**

In the language of LGUs, these are normally through a Memorandum of Understanding (MOU) and a Memorandum of Agreement (MOA). These partnerships need to consider co-beneficial arrangements and also provide a system of incentives for stakeholders and their partners. In the era of climate risks, surviving, adapting, and thriving are incentives in themselves. Reaching these targets, however, require an *institutionalized system of incentives and disincentives* to sustain transdisciplinary support for resilience. Public-Private partnerships for resilience are essential to achieving this mission.


- **Vertical coherence between national and local policies is critical to national action plans and programs.**

Clear and consistent communication regarding **implementation of international agreements and the achievement of** between local and national governments are critical to giving life and dynamism to national strategies, commitments, and plans. Climate and disaster risk assessments are highly contextual and continuously evolve at the local level. The challenge of local implementation of national policies must be accompanied by clear mandates for local authorities to respond, as needed, to the resilience challenges they face, consistent national-local communication, and an institutionalized but contextualized and adaptive monitoring, evaluation, and learning system. All these need constant follow-up and the vigilance of leaders and other decision makers to invest proactively in climate and disaster resilience policies, programs, and activities.

Prospects For The Future

The Premise: That the twin crises of our time, climate and social inequality, have been exacerbated by the COVID-19 pandemic and community lockdowns, bringing about deepening poverty and precarity among the most vulnerable to climate change.

1) While these challenges have eroded the prospects for post-pandemic resilient and sustainable recovery, it has also led to the emergence of several opportunity structures to strengthen and deepen the inter-/transdisciplinary gains and resilience innovations of CCARPH in the following spaces: Universities/HEIs have proactively responded by aligning



their teaching, research and extension programs with the implementation of SDGs powered by THE Ranking of Universities on SDGs Implementation.⁵ The ADMU's University Gender and Development Office for 2020-2030, for example, identified the areas of gender, climate and disaster resilience, as priority areas for investments in our teaching, research and extension programs. More importantly, CCARPH, through the Office of the ADMU President, has mobilized the following resilience-driven structures: 1) Climate and Disaster Resilience Laboratory at the Ateneo Research Institute of Science and Engineering (ARISE), 2) Ateneo Innovation Center's Community Resilience Laboratories, 3) Environment, Energy and Disasters Laboratory, 4) Anthropological and Sociological Initiative at the Ateneo (ASIA), 5) Manila Observatory's Resilience Collaboratory and 6) ARETE's Science Communication Projects.

2) Science communication for resilience is now given more attention by decision-makers as evidenced by the recognition of the role of scientists and research products in informing decision-making in risk governance. The output of CCARPH researches will continue to inform governance through transdisciplinary action as universities like Ateneo de Manila, University of the Philippines in the Visayas, Ateneo de Naga, and research institutions like the Manila Observatory and Epimetrix⁶ have embraced transdisciplinary pathways in their policies, research, and outreach programs.

3) Opportunities to work with local governments in coastal cities towards resilience will be greater as a result of the following: 1) enhanced policy support for the localization of resilience measures in local, national, regional, global policies; 2) attention to coastal and marine ecosystems in the Climate and Disaster Risk Assessment (CDRA); 3) full devolution of local government functions through the Mandanas ruling in 2022 that will increase financial capacity of local governments for resilience; 4) the Executive Order by the President of the Philippines mandating the conduct of the community-based monitoring system every year, and the creation of the Community-Based Statistics Division (CBSD) in the Philippine Statistics Authority (PSA), which will produce better datasets for social vulnerability assessments for resilience planning.

4) CCARPH was given the opportunity to test a model for collaboration with the private sector that allowed the co-creation of knowledge, co-ownership of the process, and co-benefit from the collaboration. This has opened spaces for collaboration with the private sector towards resilience on which those who were engaged in CCARPH can build on in various layers of risk governance (e.g., WEB-GRID training for LGUs, COVID-19 dashboard with NRC-Epimetrix Initiative).

⁵ The Ateneo de Manila University (ADMU) participated for the first time in 2020 in THE Ranking of University SDG Implementation and ranked highest among Philippine universities (landed in the 200-300 level out of 1250 universities worldwide). CCARPH transdisciplinary action research/data sets contributed much to ADMU's implementation of SDGs 11 (sustainable cities and communities) and 13 (climate action). ADMU climate metrics/indices in the Commission on Higher Education Training for SDG implementation are often cited as model/illustrative examples of SDGs 11 and 13.

⁶ Dr. John, CCARPH health expert, is the Founding Director of Epimetrix, Inc., a private research organization. Dr. Wong is the technical consultant to the Interagency Task Force for COVID-19.

5) UN Secretary General Antonio Gutierrez has issued a common agenda for climate action for its member states to adhere to and strengthened by the Vatican/Pope Francis' call to heal the earth through ***Laudato Si***, which has become the bible for climate action among many civil and ecclesiastical communities. UNFCCC has likewise opened a pathway for enhanced participation for climate action through the Marrakech Partnership for Climate Action. Along with the urgency in and the need for ambitious climate action prescribed by the IPCC Assessment Report 6, CCARPH's innovations in research, knowledge generation and management, and risk governance with its implementing partners such as NRC, AIC, and partner universities, can continue to enable resilience in various stakeholders for climate action. For instance, CCARPH will again co-host the 2021 APSA webinar series, with seven other universities in November 2021 (dovetailing the Glasgow COP 6 meeting), with the theme, *Covid-19 Pandemic, Climate Crisis and Social Inequality: Towards a Resilient Recovery in Asia*.

The new scenarios of the IPCC AR6 highlight the role of inequities and inequalities in climate risks. CCARPH, through its various engagements, has characterized drivers of vulnerabilities as well as measures for reducing multi-faceted inequalities and inequities. These can be used by communities, and national and local governments particularly in coastal cities as we continue to battle the challenges of COVID-19 and health inequities, and multiple climate and disaster-related risks.

All of the above developments bode well for climate justice that gives attention not just to historical emissions but to multi-dimensional inequities that drive vulnerabilities in climate change-related hazards. But while the social, political, economic, and cultural drivers for climate action among public-private institutions and leaders/key actors are very ripe for mobilizing science to action, sadly, support for scientific research and resilience innovation is quite low. The CCARPH experience on actionable science that informs risk governance will hopefully drive better investments for applied resilience science.

CCARPH has been fortunate with its funding support from the IDRC and making all its contributions to climate action possible. Toward sustainable trajectories, the CCARPH Consortium has started a systematic campaign with its public-private sector partners to support science and technology innovations for resilience through local and national government, as well as private sector financing. The prospects for CCARPH's climate resilience innovations are quite promising, exciting, and dynamic for a better future for Filipinos.

Ateneo de Manila shines in THE Impact Rankings debut

Ateneo de Manila University is ranked in the 201-300 bracket of the **Times Higher Education (THE) Impact Rankings 2021**, a global performance table that measures institutions' real-world impact based on the United Nations Sustainable Development Goals (SDGs), out of 1250 universities globally..



ADMU had the highest scores in the ff. SDGs:

- SDG 3: Good health and well-being: rank 101-200 (score: 70.1-77.6)
- SDG 11: Sustainable cities and communities: rank 101-200 (score: 61.9-72.6)
- SDG 16: Peace, justice, and strong institutions: rank 101-200 (score: 63.1-72.9)
- SDG 17: Partnerships for Goals: rank =68 (score: 87.4)



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APPENDICES

CCARPH ORGANIZATIONAL CHART





"This transdisciplinary action research was carried out under the Coastal Cities at Risk in the Philippines: Investing in Climate and Resilience Project, with the aid of a grant from the International Development Resource Centre (IDRC), Canada, and implemented by the Ateneo de Manila University (ADMU), in collaboration with the Manila Observatory (MO), Ateneo Innovation Center (AIC), and the National Resilience Council (NRC)."

(Official Acknowledgement for all research outputs under CCARPH)

Partnership Links

1. Asian Social Well-Being (ASWB) Research Consortium, involving nine (9) universities in Asia, coordinated by Senshu University. The consortium focuses on studying the dimensions of social well-being and happiness. For CCARPH's household survey in 2018, WP 1.2 used ASWB's nationwide survey data on gender, disasters and social well-being.
 - a. See Porio E. (2021) Climate Resilience Initiative in Metro Manila: Participatory Community Risk Assessment and Power in Community Interventions. In: Fritz J.M. (eds) International Clinical Sociology. Clinical Sociology: Research and Practice. Springer, Cham. https://doi.org/10.1007/978-3-030-54584-0_14;
 - b. See Porio, E. (2021). [Urban Poor Community Strategies: Towards a Resilient Recovery from Natural Disasters and the Covid-19 Pandemic in the Philippines](#) in Philippine Journal Development.;
 - c. See Ruslanjari, D., Kusumasari, B., Mei, E.T.W., Warakasih, I., Widowati, D.A., Al Hakim, I.D., Saiya, H.G. [Module 7 on Prevention of and Preparedness for Displacement in the Context of Disaster and Climate Change](#).
2. Asia Pacific Sociological Association, webinars on Climate, Covid-19 and the City [Link to APSA 2020 [Webinar Recordings](#), [Link to Event Page](#), [APSA 2020 Book of Abstracts](#)]
3. Asian PeaceBuilders Program [Link to [Climate, Resource Management, and Human Development \(CRMHD\) 2020 webinars](#); Link to [e-book](#); Link to [Engaging Communities for Risk Governance, Resilience and Sustainability 2021 webinars](#), Link to [course syllabi](#)]
4. United Nations Development Programme (UNDP) with Ateneo de Manila University Gender and Development Office [Link to [Terminal Report](#)]
5. CCARPH-NRC Geo-spatial Web-Grid Training [Link to [website post](#), List of [Participants](#)]
6. Deepening Systems Thinking course, with National Resilience Council and Ateneo de Manila University [Link to [Website Post](#), and [Facebook Feature](#), List of [Participants](#)]

ANNEXES

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Annex 1: CCARPH Outputs and Indicators⁷

Outputs and Indicators	Expected Outputs, Jan. 2018-Dec. 2020	Outputs, June 2021
Objective 1: Advance knowledge of climate change adaptation and disaster risk reduction	(3) City disaster resilience plans	(3) Climate and Disaster Risk Assessments (Iloilo City , Naga City), including Barangay Risk Assessments (Muntinlupa City) ⁸
1.1 Characterize and visualize climate and atmospheric hazards, across space and time, using state-of-the-science approaches in selected coastal cities	(1) City Resilience Suite of Systems Thinking Tools	(2) City Resilience Systems (CRS) dynamic model (IUSRI and CReST)
1.2 Understand the evolving exposures, and contextual vulnerability and capacities of multiple stakeholders	(1) City CGE model for firms/formal economy in the National Capital Region (NCR)	(1) City CGE model for firms/formal economy in the National Capital Region (NCR) [Link]
Objective 2: Develop methodologies and tools for climate change adaptation and disaster risk resilience	(1) GIS and geo-spatial data on infrastructure	(1) GIS and geo-spatial data on infrastructure [Link]
2.1 Examine the elements and indicators of a resilient city, developed by the National Resilience Council, and its application in developing a City Resilience Suite.	(10) Inter-/ Transdisciplinary Graduates	(14) Inter-/ Transdisciplinary Graduates (Annex 5)
2.2 Inform and enhance existing tools and approaches, such as the Climate and Disaster Risk Assessment (CDRA) used in disaster and climate risk governance in the Philippines.	(20) Cross-sectoral interns	(16) Transdisciplinary Research Interns (48) Research Fellows, Associates and Assistants (Annex 7)

⁷ Due to the COVID-19 lockdown from March 16, 2020 up to the present, CCARPH asked IDRC for an extension of the project (June 2021)

⁸ Since Resilience Plans are not mandated by law, the project pushed for integrating them into the documents required by law (i.e., LCAP, CLUP, CDP, AIP, and PPAs)

<p>Objective 3: Enhance capacity and transfer knowledge</p> <p>3.1 Enhance capacity through the newly-created Master in Disaster Risk and Resilience (MDRR) program specially designed for the public and private sectors, and develop risk and resilience research utilisation approaches that can strengthen its implementation</p> <p>3.2 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</p>	(1) Resilience Innovation Report (synthesized from 10 Resilience Innovation Reports from the Philippines)	(1) Resilience Innovation Report [Link]
	(150) Trainees on socio-ecological systems transitions (e.g., urbanization, development, disaster risk and resilience) and science-technology for resilience in transdisciplinary, multi-stakeholder public-private partnerships in eight cities (the latter delivered through the certificate courses with MDRR)	(4343) Trainees on socio-ecological systems transitions (46% male and 54% female) (Annex 4)
	(3) Science-policy-practice briefs (on Metro Manila, Metro Iloilo and Metro Naga)	(3) Science-policy-practice briefs (on Metro Manila , Metro Iloilo and Metro Naga)
	(3) Peer-reviewed articles	(86) Peer-reviewed articles (Annex 2)

Additional Outputs

- 153 Presentations made in international and national workshops, as well as non-academic partners ([Annex 3](#))
- 7 Conferences and Lectures, and Co-/Organized ([Annex 8](#))
- 20 Webinars Co-/Organized ([Annex 8](#))
- 14 Trainings and Workshops Co-/Hosted by CCARPH ([Annex 4](#))
- Risk Communication Innovations ([Annex 9](#))
 - 12 Exhibits
 - 3 Community-Based Arts (CBA) Projects for Resilience
 - 2 Science Communication Projects
- 19 Studies Conducted ([Annex 6](#))
- 11 Awards and/or Recognitions ([Annex 10](#))

Annex 2: List of CCARPH Publications

Newsletters

1. [Coastal Cities at Risk in the Philippines: Investing in Climate Change and Disaster Resilience. Quarterly Newsletter, Vol. 1, Issue No. 1. September 2019.](#)
2. [Coastal Cities at Risk in the Philippines: Investing in Climate Change and Disaster Resilience. Quarterly Newsletter, Vol. 1, Issue No. 2. November 2019.](#)
3. [Coastal Cities at Risk in the Philippines: Investing in Climate Change and Disaster Resilience. Quarterly Newsletter, Vol. 2, Issue 1. January - March 2020](#)
4. [Coastal Cities at Risk in the Philippines: Investing in Climate Change and Disaster Resilience. Quarterly Newsletter, Vol. 2, Issue 2. April - June 2020](#)

Peer-reviewed Journal Articles

2018

Work Package 1

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2. Mapa, D., **Ravago, M.V.**, Albis, M., & Del Mundo, M. (2018). "[The Link between Energy and Poverty: Evidence of Benefits for the Poor](#)," in M.V Ravago, J. Roumasset, and R. Danao (eds.), *Powering the Philippine Economy: Electricity Economics and Policy*. Quezon City: University of the Philippines Press.
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2020-2021

Work Package 1

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Work Packages 2 & 3

1. Buenaventura, A., Calgo, C.J., Bardeloza, D.K.D., **Libatique, N.J., & Tangonan, G.** (2020). [Agent-based modeling of the spread of fire in urban settlements in the Philippines](#). *Proceedings of the Samahang Pisika ng Pilipinas*, SPP-2020-2A-08.
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8. De Castro, K.I., Dingel, B.B., **Libatique, N.**, Dagohoy, J.L., & **Oppus, C.** (2020). Low-cost, low-complexity electronic analogue of the phenomenon known as Relativistic Aberration of Light using OP-AMP-based All-Pass Filter circuits. *Proceedings of the Samahang Pisika ng Pilipinas*. <https://paperview.spp-online.org/proceedings/article/view/SPP-2020-3D-01>
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11. Mamaradlo, J.P., Mercado, N.A.M., **Libatique, N.J.C., Tangonan, G.L.**, Solis, R.J., Rodriguez, V., Dingel, B., Pineda, C., & Lopez, C. (2020). University campus 5G testbed and use case deployments in the Philippines. In B. B. Dingel, K. Tsukamoto, & S. Mikroulis (Eds.), *Broadband Access Communication Technologies XIV* (p. 3). SPIE. <https://doi.org/10.1117/12.2549903>
12. Porio, E., Roque-Sarmiento, E., See, J.C. (2021). [Social Capital and Well-Being: Interrogating Vulnerabilities and Adaptive Capacities and Resilience in Disaster-Prone Communities in the Philippines](#), Social Capital and Well-Being: Interrogating Vulnerabilities and Adaptive Capacities and Resilience in Disaster-Prone Communities in the Philippines.

Working Papers of CCARPH Research Team


2020-2021

Work Package 1

1. Ugay, J., Lavares, M., Cruz, J., & **Muyrong, M.** (2020). [Overhauling Land Transportation in the New Normal and Beyond](#). Working Paper No. 2020-08. ADMU Econ-ACERD.
2. Ateneo Center for Economic Research and Development (ACERD) and faculty members of the Department of Economics of Ateneo de Manila University. (2020). [Reviving the Philippine Economy Under a Responsible New Normal](#). Working Paper No. 2020-07. ADMU Econ-ACERD.

Work Packages 2 & 3

1. Brucal, A., Roezer, C., Dookie, D.S., Byrnes, R., **Ravago, M.V., Cruz, F., Narisma, G.** (2020). [Disaster impacts and financing: Local insights from the Philippines](#). Working Paper 2020-15. ADMU Econ-ACERD.
2. Clarete, R., Tuano, P.A., Castillo, C.J., Muyrong, M. (2021). [Economic Impacts of Rainfall and Flooding on Valenzuela City using a Multiweek CGE Model Analysis](#). Working Paper 2021-01. ADMU Econ SAM-CGE.
3. Clarete, R., Tuano, P.A., Castillo, C.J., Muyrong, M. (2021). [An Analysis Of Sectoral Value Added And Sectoral Recovery From Flooding In A Philippine City: The Case Of Pasig In Metro Manila](#). Working Paper 2021-02. ADMU Econ SAM-CGE.
4. Clarete, R., Tuano, P.A., Castillo, C.J., Muyrong, M., Lubangco, C.K. (2021). [Construction of a City-level Social Accounting Matrix for Climate Change Impact Simulation: An Illustration for the Philippines](#). Working Paper 2021-03. ADMU Econ SAM-CGE.
5. Clarete, R., Tuano, P.A., Castillo, C.J., Muyrong, M. (2021). [Rainfall Impacts on Philippine Firms using Fixed-Effects Panel Data Econometric Analysis](#). Working Paper 2021-04. ADMU Econ SAM-CGE.
6. **Ravago, M-L.V.** & Roumasset, J.A. (2020). [COVID-19 , Coal, and the Energy Transition in the Philippines](#). Working Paper No. 2020-09. ADMU Econ-ACERD.
7. Ruslanjari, D., Kusumasari, B., Mei, E.T.W., Warakasih, I., Widowati, D.A., Al Hakim, I.D., Saiya, H.G. [Module 7 on Prevention of and Preparedness for Displacement in the Context of Disaster and Climate Change](#). Blended Learning Course Module Development on Disaster, Displacement And Climate Change Project. Raoul Wallenberg Institute. 5 April 2021.

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8. Porio, E. (2021). [Urban Poor Community Strategies: Towards a Resilient Recovery from Natural Disasters and the Covid-19 Pandemic in the Philippines](#) in *Philippine Journal Development*.

Annex 3: List of CCARPH Presentations

International Workshops

2018

Work Package 1

1. Narisma, G., F. Cruz, E. Gozo, A. Magnaye, J. Tibay, Understanding Risks to Tropical Cyclones in the Philippines, Consilience, Crises and Collapses: Hazards, Environment and Society in the Indo-Pacific World, Ateneo de Manila University, Quezon City, Philippines, 29-30 January 2018
2. Porio, E. "Coastal Cities at Risk: Investing in Climate and Disaster Risk and Resilience", 9th World Urban Forum, Kuala Lumpur, Malaysia, 10-11 February 2018
3. Porio, E. "Advancing Climate-Resilient and Low Carbon Development in Asian Cities through Transformative Actions" 9th World Urban Forum, Kuala Lumpur, Malaysia, 11 February 2018
4. Porio, E. "Gender, Social Well-Being and Adaptive Capacities in Disaster Prone Communities in the Philippines" Conference on Social Well-Being in Asia, University of Indonesia, Indonesia, 3-6 March 2018
5. Porio, E. "SDGs 2030 and Inclusive Urbanization: What Can the ASEAN Contribute?" at the Conference on Inclusive Urbanization in the ASEAN: Is it Possible?, Chulalongkorn University, Thailand, 31 May – 1 June 2018
6. Porio, E. "Engendering Investments in Climate and Disaster Resilience: Transforming Initiatives in the Philippines and the ASEAN Region" ICLEI World Congress, Montreal, Canada, 15-20 June 2018
7. Porio, E. "Climate and Disaster Risk and Governance: Evolving Exposures and Contextual Vulnerability of Multiple Stakeholders in Metro Manila" at the 2nd International Conference on Water Policy, Urban Water Security, Lee Kuan Yew-National University of Singapore, Singapore, 10-11 July 2018.
8. Porio, E. "Climate and Disaster Risks, Resilience and Sustainability Challenges in Asian Cities" at the International Sociological Association's 19th World Congress of Sociology, Toronto, Canada, 15-21 July 2018
9. Porio, E. "Climate and Disaster Resilience in Asia: Focus on Social Capital, Gender and Trust Networks in Disaster Prone Areas" Plenary Lecture at the International Sociological Association's 19th World Congress of Sociology, Toronto, Canada, 15-21 July 2018

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10. Porio, E. "Sea-Level Change in Philippine Littoral Cities: Crafting Resilience Among Marginal Communities" Translating Sea-level Change in Urban Life: Policies, Practices, and their Intersections in Island Southeast Asia, University of Indonesia and University of Bremen, 5-6 September 2018
 11. Porio, E. "Gender, Social Capital and Socio-economic Status in Disaster Prone Communities" World Social Science Forum, Fuokuka, Japan, 24-28 September 2018
 12. Porio, E. "Climate Disasters in Asia: Challenges and Responses" World Social Science Forum, 27 September 2018
 13. Porio, E. and Uy, N. "Climate and Disaster Science for Socially-Inclusive Resilience Planning and Sustainable Development". Poster presentation at the Workshop on the Status of Science and Technology in Asia for IPCC AR6, Kuala Lumpur, Malaysia, 15-16 November 2018
 14. Porio, E., Uy, N., Dineros A., "Gender, Social Capital and Inequality in Urban-Rural Philippines" Regional Consortium of Well Being Conference, Tokyo, Japan, 22-25 November 2018
 15. Ravago, M. Seminar on "Coping with Disasters due to Natural Hazards: Evidence from the Philippines", Faculty of Political Science and Economics, Waseda University, 25 July 2018
 16. Ravago, M. Seminar on "Coping with Disasters due to Natural Hazards: Evidence from the Philippines", Economics Department, Nihon University, 26 July 2018
 17. Ravago, M. Research Institute for Environmental Economics and Management (RIEEM) Workshop on "Energy Conservation "Nudges": Evidence from a Randomized Residential Field Experiment in the Philippines, Waseda University, 6 August 2018
 18. Ravago M. Conference on Smallholders and Poverty Alleviation in the Asia-Pacific Region by IIAD, CAS, and IFPRI, Beijing, China, 30-31 October 2018
 19. Ravago, M. Federation of ASEAN Economic Associations (FAEA) Conference 2018 on Growing ASEAN: Cooperation and Competition Amidst Disruption, Novotel Hotel, Cubao, 9-10 November 2018

Work Packages 2 & 3

1. Favis, A, **Gotangco, C.K., Josol, J.,** Labaria, C., Lopez, C. Rodolfo, R., and **Uy, N.** "Engagement with Socio-economic Actors: The Ateneo Experience" , International Workshop on Multi-hazard Early Warning and Resilience Building in Coastal Communities, and Capacity Building in Asia for Resilience Education Meeting, Kandy, Sri Lanka, 5-10 March 2018

2. Lagazo, D., de la Cruz, J. A., Solpico, D., Honrado, J., Abrajano, G. D., **Libatique N. J. C.** and **Tangonan, G. L.**, "Resilient Communications and Information Systems for Disaster-Preparedness using UAVs, Beacons and Data Aggregators via DelayTolerant Networks on Sub-GHz Frequencies", IEEE Tencon 2018, Jeju Island, Korea, October 2018
3. **Libatique, N.**, Mano, M., **Tangonan, G. L.**, and Abrajano, G., "International Collaborative Research of Disaster Response Model using Vehicle Communication". 15th APT Telecommunication/ ICT Development Forum, Colombo, Sri Lanka, 11-13 June 2018
4. **Tuaño, P.A. P.**, "Tracking the Economic Impacts of Flooding In Metro Manila: A Multi- Period CGE Analysis" in *3rd International Research Colloquium (3IRC): Business Management Resiliency towards Risk Reduction in Changing Climate: Promoting Financial, Industrial and Environmental Safety*, Quezon City, 13 October 2018
5. **Uy, N, Porio, E., Gotangco, C.K.**, and **Yulo-Loyzaga, A.**, "Advancing resilience thinking and transdisciplinary approaches to disaster risk reduction research and education" Belt and Road Forum for Education Cooperation 2018, Sichuan University, Chengdu, China, 17 December 2018
6. Uy, N. "Advancing Resilience Thinking and Transdisciplinary Approaches to Disaster Risk Reduction Research and Education" at the Belt and Road Forum for Education Cooperation, Chengdu, China, 2018


2019

Work Package 1

1. Abenojar, K., Manalo, C. R., **Gotangco C.K.**, Cruz, M., **Cambaliza M.O.**, "A System Dynamics Approach to Assessing the Health, Environmental, and Socio-economic Implications of the Jeepney Modernization in Metro Manila, Philippines." Poster presentation at the Asia Oceania Geosciences Society 16th Annual Meeting, Singapore, 28 July 2019
2. **Cruz, Cambaliza M.O., Gotangco C.K.**, Lung, **Simpas, J., Wong, J.**, Panti, **Porio, E.**, Delos Reyes, Go, B., Abenojar, K., Manalo, C.R. "Building Urban Resilience: A Systems Approach to Analyzing Social and Personal Health Risks of Jeepney Commuters and Drivers to PM2.5 in Metro Manila, Philippines" Asia-Oceania Geosciences Society 16th Annual Meeting, Singapore, 28 July -02 August 2019
3. **Gozo, E., Cruz, F., Narisma, G.**, Tangang, F., Juneng, L., Ngo-Duc, T., Phan-Van, T., Santisirisomboon, J., Singhruck, P., Gunawan, D., Aldrian, E. "Impact of climate change on extreme rainfall events on coastal cities in the Philippines", [International Conference on Regional Climate - Coordinated Regional Climate Downscaling Experiment \(ICRC-CORDEX\)](#), Beijing, China, 14-18 October 2019
4. **Porio, E., Roque-Sarmiento, E.** "From the Sky to the Streets: An Ethnography of Street-based Populations and their Local Knowledge Systems regarding

environmental pollution and Climate Disaster Risks in Metro Manila". Online presentation at International Conference on Water, Informatics, Sustainability and Environment (IWISE2019), Carleton University, Ottawa, Canada, 07-09 August 2019 <https://www.iwiseconference.com/2019/index.php/iwise2019-live-stream/>

5. Ravago, M. 15th International Conference of Western Economic Association International, Keio University, Tokyo, Japan, 21-24 March 2019
6. Ravajo, M. Rokko Environmental Economics and Policy Seminar (REEPS), Kobe University, Japan, 27 March 2019
7. Ravago, M. 24th Annual Conference of the European Association of Environmental and Resource Economists (EAERE), Manchester, UK, 26-29 June 2019.
8. Ravago, M. Seminar Lecture at Research Institute for Future Design, Kochi University of Technology, Japan, 30 July 2019.
9. M. Cruz, **M. O. Cambaliza**, C. K. Gotangco, S-C C. Lung, J. B. Simpas, J. Wong, R. M. Panti, E. Porio, I. D. Reyes, B. Go, K. Abenojar, C. R. Manalo, K. Fowler, "Building Urban Resilience: a Systems Approach to Analyzing Social and Personal Health Risks of Jeepney Commuters and Drivers to PM2.5 in Metro Manila, Philippines", 16th Asia Oceania Geosciences Society (AOGS) Annual Meeting, Suntec Singapore Convention & Exhibition Centre, Singapore, 28 Jul – 2 Aug 2019.
10. Katrina Abenojar, C. R. Manalo, C. K. Gotangco, M. Cruz, **M. O. Cambaliza**, "A System Dynamics Approach to Assessing the Health, Environmental, and Socio-economic Implications of the Jeepney Modernization in Metro Manila, Philippines", 16th Asia Oceania Geosciences Society (AOGS) Annual Meeting, Suntec Singapore Convention & Exhibition Centre, Singapore, 28 Jul – 2 Aug 2019.
11. Imee Delos Reyes, M. Cruz, **M. O. L. Cambaliza**, C. K. Gotangco, K. Abenojar, C. R. Manalo, B. Go, "Assessment of Jeepney Drivers' PM2.5 Personal Exposure Levels in Metro Manila, Philippines", 16th Asia Oceania Geosciences Society (AOGS) Annual Meeting, Suntec Singapore Convention & Exhibition Centre, Singapore, 28 Jul – 2 Aug 2019.
12. **Cruz, F.T.**, F. Avila, S.M. Visaga, G. Narisma, J.M. Dado et al. Multi-model projections of climate change hotspots in the Philippines. International Conference on Regional Climate (ICRC-CORDEX 2019), Beijing, China, 14-18 October 2019.
13. Gozo, E.C., **F.T. Cruz**, G.T. Narisma et al. Impact of climate change on extreme rainfall events in the Philippines. International Conference on Regional Climate (ICRC-CORDEX 2019), Beijing, China, 14-18 October 2019.
14. Ravago, M. 44th Federation of ASEAN Economic Association, Singapore, 20-30 November 2019.

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15. **Cambaliza, Maria Obiminda L.**, I. Delos Reyes, M. T. Cruz, G. F. Leung, C. K. Z. Gotangco, S-C. C. Lung, J. B. B. Simpás, J. Q. Wong, B. Go, K. Abenojar, and C. Manalo. "Characterization of the spatial and temporal distribution of fine particulate pollution in a Monsoon Asia Megacity: an assessment of personal exposure of a high risk occupational group in Metro Manila, Philippines". IGAC – MANGO 2019 Scientific Meeting and Workshop, 28 – 30 November 2019, Nainital, India.

Work Packages 2 & 3

1. Gotangco, C.K. "Systems thinking for resilience and sustainability in research and practice." Public lecture delivered at the Riga Technical University, Latvia, 17 October 2019.
2. **Tangonan, G., Libatique, N.** and Abrajano, G. "Disaster Resilient Communications and Informations Systems based on the New V-HUB standard" APT Industry Workshop, Tokyo Japan, 11 June 2019
3. Uy, N. "Climate and Disaster Risk in the Philippines: Partnerships and Transdisciplinary Approaches to Building Resilience" at the 13th Kyoto University Southeast Asia Forum, Pasay City, Philippines Novotel Hotel, Cubao. 2019

2020-2021

Work Package 1

1. Porio, E., "Climate, COVID-19, and the City: Challenges to Recovery and Resilience", 15th Asia Pacific Sociological Association 2020 Two-day Webinar on COVID-19, Climate, and Health, 06-07 October 2020
2. Ravago, M-L. V., Pascua, G. G. Y., Acheron, L. D. B., Gozo, E., Cruz, F., Narisma, G. "Impact of Extreme Rainfall Days on the Households' Welfare of the Formal and Informal Sectors". Interrogating Climate Change and Socio-economic and Health Impacts Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
3. Narisma, G., Porio, E., Simpás, J., Cruz, F., Gozo, E., Cambaliza, O., Vicente, C., Perez, R., Ravago, M-L. V., Wong, J., Villarin, J. "Interrogating Climate Change and Socio-economic and Health Impacts" CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
4. Porio, E., "Bridging Science Policy Practice through Transdisciplinary Research and Resilience Innovations: Goals and Perspectives of the Two-Tracked CCARPH International Conference on Resilience" CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020

5. Moscoso, A., Araneta, L., Defiesta, G., Agudo, F., Bercilla, J., Penalosa, J. "Climate and Disaster Risk Assessment for a Resilient Iloilo City" Mainstreaming Climate Disaster Risk Assessment towards a Resilient Local Government System Panel CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
6. Tejada, M., Plopenio, J., Defiesta, G., Sto. Domingo, E., Alba, D. P. "Integrating Science-Based Information towards a Resilient Naga City" Mainstreaming Climate Disaster Risk Assessment towards a Resilient Local Government System Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
7. Vicente, C., Perez, R., Cruz, F.A., Jamero, L., Porio, E. "Mobilizing Climate and Disaster Science with Public-Private Partners (Deepening the CDRA Process)" Mainstreaming Climate Disaster Risk Assessment towards a Resilient Local Government System Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
8. Cambaliza, O., Cruz, M. T., Gotangco, C. K. Z., Delos Reyes, I., Leung, G. F., Lung, S., Simpas, J., Wong, J., Panti, R. M. B., Porio, E., Go, B., Abenojar, K., Manalo, C. "Air Pollution and Resilience in Katipunan – Killing us Softly?" CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
9. Porio, E., Roque-Sarmiento, E. "From the Skies to the Streets: An Ethnography of Street-based Populations and their Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks in Metro Manila, Philippines" Air Pollution and Resilience in Katipunan – Killing us Softly? Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
10. Jose Gabriel Abalos, Jarl Tynan Collado, Miguel Ricardo Hilario, Paola Angela Banaga, Gabrielle Frances Leung, Imee Delos Reyes, Xzann Garry Vincent Topacio, Maria Obiminda L. Cambaliza, James Bernard B. Simpas, Simonas Kecorius, Leizel Madueño, Honey Dawn Alas and Alfred Wiedensohler, "Spatiotemporal characterization of in-vehicle black carbon across different microenvironments in a Southeast Asian Megacity: a case study of Metro Manila, Philippines", American Geophysical Union 2020 Fall Meeting, International, 1 Dec 2020, Online.

11. Porio, E. "[Prosperity and Inequality in Metro Manila: Equity, Resilience and Sustainability of Cities](#)" The Fourth Online International Lecture Series on Social Inequality. Tohoku University, Japan. 22 January 2021.
12. Porio, E, (2021). [Climate, Covid-19 and City: Intersectoral Linkages of Gender, Ethnicity and Class](#). Closing plenary session of the International Sociological Association (ISA) Porto Alegre Forum. Zoom. 27 February 2021
13. Porio, E. "[Environmental Migration, Human Security, Climate and Disaster Resilience in Philippines Cities](#)" Panel. Environmental migration: different continents, different challenges? Zoom. 31 May 2021
14. **Cambaliza, M.O.**, Delos Reyes, I., Cruz, M., Leung, G.F., Gotangco, C.K., Lung, S.-C.C., Simpas, J.B., Wong, J., Panti, R.M., Porio, E., Go, B., Abenojar, K., Manalo, C., Abalos, J.G., Betito, G., Chan, C., Collado, J.T., de Francisca, A., Topacio, X.G.V. "Characterization of the spatial and temporal distribution of fine particulate pollution in a Monsoon Asia Megacity: an assessment of personal exposure of a high risk occupational group in Metro Manila, Philippines" Tackle Air Quality and Human Health with New Thinking and Technologies, Sustainability Research & Innovation Congress 2021. 14 June 2021
15. Loqueloque, D.A., **F.A. Cruz**, J.M.B. Dado, Projected changes in surface solar radiation and temperature from CORDEX-SEA simulations and their impact on future photovoltaic output in the Philippines. 18th Annual Meeting of the Asia Oceania Geosciences Society, online, 2-6 August 2021.
16. Lagrama, A., **F. Cruz**, J. Dado, Preliminary analysis of wind energy projections in the Philippines based on CORDEX-SEA ensemble. 18th Annual Meeting of the Asia Oceania Geosciences Society, online, 2-6 August 2021.
17. Pillas, E., **F.A. Cruz**, J.M. Dado. Projecting hydropower generation using a process-based flow duration curve model and CORDEX-SEA simulations. 18th Annual Meeting of the Asia Oceania Geosciences Society, online, 2-6 August 2021.

Work Packages 2 & 3

1. Agra, F. A., Bangabang, M. A. F., Dalumpines, W., Hernandez, M. L. P., Mruoka, K., , M. A. M., Penaflorida, A. T., Ramirez, M. A. E., Robles, K. A. M., Wenceslao, S. N. S. C., and Yamashita, K. "Participatory Community Risk Assessment of Informal Settler Communities in Barangay Loyola Heights" CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
2. Baricuatro, Z. D. A., "Urban Flooding in Pampanga: Contextual Drivers, Programs, Projects and Activities (PPAs)" Panel 2 | Bridging the Gap: Policy, Private Sector, Development. Master of Disaster Risk and Resilience Capstone Project



Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020

3. Canaleta, L. S. "Integrating Resilience in the Berde Rating System and in the Philippine Green Building Code" Panel 3 | Alternatives and Solutions for Resilience. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
4. Clarete, R., Tuano, P.A., Muyrong, M., Castillo, C. J., Ocho, D., Guevarra, D., Que, K. "Assessing the Impacts of Climate Change on City-Level Economic Activity: Case of Valenzuela City" Tools and Technologies for Climate and Disaster Resilience Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
5. Dela Merced, P. A. S., "Crafting Monitoring & Evaluation Indicators Towards Recovery of Marawi City" Panel 1 | Disaster Resilience: Frameworks, Indicators and Protocols. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
6. Gotangco Gonzales, C.K., Josol, J.C. Jardeleza, J.M., Abenojar, K., Manalo, C. R. "Systems Thinking Tools for Smarter Cities" Tools and Technologies for Climate and Disaster Resilience Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
7. Gotangco Gonzales, C.K. "Urban Ecological Lifestyles: Promoting Systemic Change". Panel Discussion Toward an Ecological Culture. ASEAN University Network (AUN) Ecological Education and Culture (EEC) Online Conference. 17 November 2020
8. **Jardeleza, J.M, Josol, J.C.** and Lopez, C. "Factors Influencing Disaster Risk and Resilience Education (DRRE) in Asian HEIs", 9th International Conference on Building Resilience (ICBR) Bali, Indonesia., 13-15 January 2020
9. Labrador, S. N. M., "Assessing Health Vulnerability to Climate Change and Public Health Interventions in Batangas Province" Panel 2 | Bridging the Gap: Policy, Private Sector, Development. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020

10. Lee, Y. A. C., "Climate Information For Resilience Building: Communications Criteria for Women Farmers in Naga City" Panel 3 | Alternatives and Solutions for Resilience. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
11. Maksims Feofilovs, Francesco Romagnoli, **Charlotte Kendra Gotangco, Jairus Carmela Josol, Jean Meir Jardeleza, Joaquin Campos Joseph Litam, Katrina Abenojar**, "Assessing Resilience Against Floods With A System Dynamics Approach: A Comparative Study Of Two Models", 9th International Conference on Building Resilience, International, 13 Jan 2020, Nusa Dua, Bali, Indonesia.
12. Tangonan, G., Libatique, N., Oppus, C., Cabacungan, P. "AIC Technologies: A Toolkit for Engineering Resilience" Tools and Technologies for Climate and Disaster Resilience Panel. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
13. Masiglat, A. C. R. "Jail Management and Constructing Resilience in Philippine Jails: The Case of the Manila City Jail" Panel 1 | Disaster Resilience: Frameworks, Indicators and Protocols. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
14. Miranda, R. A. L., "Beyond Command and Control: Assessing Incident Command System in the Philippines" Panel 1 | Disaster Resilience: Frameworks, Indicators and Protocols. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
15. Perez, J. S. "Disaster Risk Reduction Demystified: Localizing the Disaster Risk Indicators in the Philippines" Panel 1 | Disaster Resilience: Frameworks, Indicators and Protocols. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
16. Que, K. B. D., "The Effect of Typhoon Disasters on Labor Market in the Philippines" Panel 2 | Bridging the Gap: Policy, Private Sector, Development. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020

17. Tandoc, E. V., "From Disaster Preparedness to Technology Driven Disaster Resilience: Installation of Clean Water System-Barangay San Andres, Cainta, Rizal" Panel 3 | Alternatives and Solutions for Resilience. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
18. Urcia, F. E. G., "Sustainable Upgrading of Informal Settlements for Resilient Growth in Metro Manila: How can Architecture Help?" Panel 3 | Alternatives and Solutions for Resilience. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
19. Vicente, R. N. B., "Integrating Systems Thinking into the City Resilience Planning in the Philippines" Panel 2 | Bridging the Gap: Policy, Private Sector, Development. Master of Disaster Risk and Resilience Capstone Project Presentations. CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
20. Yulo Loyzaga, A. "Public-Private Partnerships for Resilience: Challenges & Opportunities" CCARPH International Conference on Resilience: Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Resilience Innovations. Arete, Ateneo de Manila University, Quezon City. 7 March 2020
21. Yulo Loyzaga, A. [Integrated Action for the SDGs](#). Panel. Sustainability Research and Innovation Congress 2021. 21 May 2021
22. Yulo Loyzaga, A. [A Dialogue Forum: To Distill from Experiences of Stakeholders, Scalable Strategies for Disaster Risk Reduction and Societal Resilience Building](#). Panel. Sustainability Research and Innovation Congress 2021. 14 June 2021
23. Ravago, M.-L., Pascua, G.G., Acheron, L.D., Gozo, E., Cruz, F., Narisma, G. "[Extreme Weather Events and Households' Welfare in the Formal and Informal Sectors](#)" International Economic Association Online World Congress. Zoom. 6 July 2021
24. Gontangco Gonzales, C., Josol, J.C., Campos, J., Litam, J., Abenojar, K., Mijares, J.J. "[Systems Thinking in Disaster Resilience](#)" Plenary 2: Paradigm of Resilience | International Disaster Resilience Forum. Zoom. 30 July 2021
25. Abenojar, K., **Gotangco Gonzales, C.K.** et al. "Developing an Integrated Urban Services Resilience Index (IUSRI) Model using a System Dynamics Approach," 5th Sustainability Initiatives: Case Studies in Malaysia, Philippines and Indonesia, Oct. 29-30 2020, Far Eastern University (online), Metro Manila.

26. Campos, J.I., Litam, J.E., **Gotangco, C.K.** et al. "Quantifying Urban Ecosystem Resilience using a Systems Approach: The Urban Ecosystem Resilience Index," 5th Sustainability Initiatives: Case Studies in Malaysia, Philippines and Indonesia, Oct. 29-30 2020, Far Eastern University (online), Metro Manila.

National Workshops

2018

Work Package 1

1. **Porio, E., Uy, N.,** and Lat. S., A session on "Cities at Risk: Investing in Climate and Disaster Resilience" at the Ateneo de Naga University 2nd International Research Conference, Naga City, Philippines, 12 April 2018
2. **Porio, E.** and **Uy, N.,** "Engendering Climate and Disaster Resilience Initiatives in the Philippines", 10th National Conference on Women's and Gender Studies of the Women's and Gender Studies Association of the Philippines, Ateneo de Manila University, 23 August 2018
3. Ravago, M. 1st University Research & Innovation Colloquium on "Sabwag: Planting the Seeds of a Vibrant Research Culture in Bicolandia," Ateneo de Naga University, Naga City, 26 February 2018
4. Ravago, M. NAST Regional Scientific Meeting on "Science and Technology-Enhanced Transformation for Sustainability and Resiliency, Bacolod City, 11-12 April 2018
5. **Uy, N., Porio, E.,** and **Yulo-Loyzaga, A.** "Gender, Climate, and Disaster Resilience Initiatives With Multiple Stakeholders", 10th National Conference on Women's and Gender Studies of the Women's and Gender Studies Association of the Philippines, Ateneo de Manila University, 23 August 2018
6. Vicente, M.C. "Mapping Informality in Metro Manila", 10th National Conference on Women's and Gender Studies of the Women's and Gender Studies Association of the Philippines, Ateneo de Manila University, 23 August 2018

Work Packages 2 & 3

1. **Libatique, N., Tangonan, G.,** Abrajano, G., Favila, C., Cabacungan, P., Cua, M., Solpico, D., Lagazo, D., Honrado, J., Sevilla, B., and **Oppus, C.,** "Disaster, Dialogue and Decision Support - AIC's Experience with Communities and Partners", Invited Talk, Consilience, Crises and Collapses – International Workshop on Hazards, Environment and Society in the Indo-Pacific World, Ateneo de Manila University, Quezon City, Philippines, 29-30 January 2018
2. Tejada, M. L. Livelihood vulnerability assessment of selected coastal communities in Caramoan peninsula. Paper presented at the Biodiversity & Education: A Regional Symposium, Naga City, Philippines, October 2018

2019

Work Package 1

1. Cruz, M.T., Cambaliza, M. O., Gotangco, C. K., Delos Reyes, I., Lung, S. C., Simpas, J., Wong, J. Q., Panti, R. M. B., Porio, E. E., Go, B., Abenojar, K., Manalo, C. "Air Pollution and Resilience in Katipunan – Killing us Softly?" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
2. Jamero, L., Vicente, C., Perez, R. "Climate and Disaster Risk Assessment Coaching and Mentoring" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
3. Narisma, G., Porio, E., Simpas, J., Cruz, F., Gozo, E., Cambaliza, O., Vicente, C., Perez, R., Wong, J., Villarin, J. "Interrogating Climate Projections and Socio-economic Impacts" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
4. Narisma, G., Porio, E., Simpas, J., Cruz, F., Gozo, E., Cambaliza, O., Vicente, C., Perez, R., Wong, J., Villarin, J. "Characterize climate-related and atmospheric hazards, vulnerability and risk across space and time" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
5. Penalosa, J., Agudo, F., Bercilla, J., Moscoso, A., Araneta, L., Defiesta, G. "Climate and Disaster Risk Assessment for a Resilient Iloilo City" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
6. Porio, E., Roque-Sarmiento, E. "From the Skies to the Streets: An Ethnography of Street-based Populations and their Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks in Metro Manila, Philippines" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
7. Ravago, M-L. V., Pascua, G. G. Y., Acheron, L. D. B., Cruz, F., Narisma, G. "Impact of Extreme Weather Events on Welfare of the Formal and Informal Sectors" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
8. Tejada, M., Plopenio, J., Sto. Domingo, E., Alba, D. "Science-Based Method of/for Climate and Disaster Risk Assessment, Data Application, and Information

Dissemination towards a Resilient Naga City” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019

9. Vicente, M. C. T. 1st Transdisciplinary Action Research Workshop, Ateneo De Naga University, Naga City, 23 January 2019
10. Wong, J. Q., Balalad, A. K., Fowler, K. C., Co., J. “Assessing and Projecting Climate-Related Infectious Diseases in Quezon City” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
11. Wong, J. Q., Go, B., Fowler, K. “Association between PM 2.5 and Physiological Outcomes” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019

Work Packages 2 & 3


1. Abenojar, Manalo, **Gotangco, Cambaliza, Cruz**. “A System Dynamics Approach to Assessing the Health, Environmental, and Socio-economic Implications of the Jeepney Modernization in Metro Manila”, Poster Presentation for SOSE Research Awards (Undergraduate Category), Arete Roofdeck, Ateneo de Manila University, 6 May 2019
2. Clarete, R., Tuano, P.A., Murong, M., Castillo, C. J., Ocho, D., Guevarra, D., Que, K. “Assessing the Impacts of Climate Change on City-Level Economic Activity” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
3. Gotangco, C. K., Josol, J. C., Jardeleza, J. M., Abenojar, K., Manalo, C. R., Campos, J., Litam, J., Vicente, R. “Interrogating Climate Projections and Socio-economic and Health Impacts: Systems Thinking Lens” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
4. Gotangco, C. K., Josol, J. C., Jardeleza, J. M., Abenojar, K., Manalo, C. R., Campos, J., Litam, J., Vicente, R. “Tools and Technologies for Climate and Disaster Resilience: Systems Thinking Tools for Smarter Cities” Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019

5. Morales, J., Strengthening the Power of Environmental Education through Innovative Pedagogy to Practice (P2P) Models, 12th Philippine Network of Educators on Environment (PNEE) International Conference and Scientific Meeting, Asturias Hotel and Palawan State University, Puerto Princesa City, Palawan, 15-17 October 2019
6. Paner-Alba, D. Local Coordinator and Participant. "Workshop on Building Partnerships for Climate and Disaster Resilience through Trans-Disciplinary Action Research" under the Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience Project, Ateneo de Naga University, 23 January 2019.
7. Tangonan, G., Libatique, N., Oppus, C., Cabacungan, P. "AIC Technologies for DRR Practitioners" Bridging Science-Policy-Practice Nexus Through Transdisciplinary Research and Climate Action. CCARPH Midterm Assessment Conference. Arete, Ateneo de Manila University, Quezon City. 11 November 2019
8. **Tejada, M.L.** & Elicay, R. SP. Grade 12 Career and School Choice Survey. Paper presented at the 2nd Ateneo de Naga University Research and Creative Endeavors Colloquium, Naga City, Philippines, January 2019.

2020-2021

Work Package 1

1. Ravago, M-L.V., "Coal, and the Energy Transition in the Philippines", Parallel Session 8.3: Socio-cultural, Economic and Political Sciences 40th PAASE Anniversary and 2020 APAMS (Annual Scientific Meeting) Philippines, 20 July - 14 August 2020
2. Ravago, M-L.V., "Are Energy Conservation "Nudges" Effective? Evidence from a Randomized Residential Field Experiment in the Philippines", Presentation of Research Results of NAST Awardees 42nd Annual Scientific Meeting National Academy of Science and Technology Philippines, 17 July 2020
3. **Ravago, M-L.V.**, Balisacan, A.M., "Growth and Poverty Since 2000: Does Food Policy Really Matter?", 3rd School of Social Sciences Research Conference, Ateneo de Manila University, 12-16 October 2020
4. Ravago, M-L.V., "Impact of Extreme Rainfall Days on the Welfare of Household in the Formal and Informal Sector", Heed the 3Rs: Economy and Environment Group Philippines Conference 2020, 19 November 2020
5. Ravago, M-L.V., "Growth, Poverty, and Food Policy in the Philippines: Lesson for the COVID-19 Era and Beyond" Panel Discussion on Recent Rice Sector Reforms in Southeast Asia, "Economics of Pandemics: From Response to Recovery to Resilience" 58th Philippine Economic Society Annual Meeting and Conference, Zoom & Facebook Live, 11 November 2020

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6. Porio, E., "Whole of Society in Resilience Building" [Panel Reaction in Faces of Resilience](#), National Disaster Resilience Month Webinar, Zoom & Facebook Live, 9 July 2021

Work Packages 2 & 3

1. Clarete, R., "Capacity development as a pro-competition measure: Case of rice market in the Philippines", Parallel Session 8.3: Socio-cultural, Economic and Political Sciences 40th PAASE Anniversary and 2020 APAMS (Annual Scientific Meeting) Philippines, 20 July - 14 August 2020
2. **Clarete, R., Tuano, O., Muyrong, M., Castillo, C.J.** "Assessing the Impacts of Flooding in Valenzuela and Pasig Cities Using a City-Level Applied General Equilibrium Model", 3rd School of Social Sciences Research Conference, Ateneo de Manila University, 12-16 October 2020
3. Clarete, R., "Policy Pitfall from Assessing RTL Impact in the Short Run". Panel Discussion on Recent Rice Sector Reforms in Southeast Asia, "Economics of Pandemics: From Response to Recovery to Resilience" 58th Philippine Economic Society Annual Meeting and Conference, Zoom Webinar & Facebook Live, 11 November 2020
4. Muyrong, M.S., "Linkages Between Nationalism and Economic Growth: Economic Miracles and Development Puzzles in East and Southeast Asia", 3rd School of Social Sciences Research Conference, Ateneo de Manila University, 12-16 October 2020
5. Muyrong, M.S., "Estimating the Welfare Impact of Early and Correct Detection of Source of Fever", Heed the 3Rs: Economy and Environment Group Philippines Conference 2020, 19 November 2020
6. Muyrong, M.S., "Estimates of Labor Displacement due to ECQ using LFS", "Economics of Pandemics: From Response to Recovery to Resilience" 58th Philippine Economic Society Annual Meeting and Conference, Zoom Webinar & Facebook Live, 20 November 2020

Non-academic Partners

2018

Work Package 1

1. **Porio, E. and Uy, N.**, "Climate Vulnerability, Environmental Security and Risk Governance in Metro Manila" Office of Civil Defense Disaster Risk Reduction and Research Forum, Mandaluyong City, 20 October 2018
2. Porio, E. "Cities as Systems" Asia Dialogues Program 2018 of the Carnegie Council for Ethics in International Affairs, Ateneo Professional Schools, 22 - 26 October 2018

3. Porio, E. "Ecosystem-based Adaptation in Coastal Cities at Risk" Ecosystem Based Adaptation in Small-Islands, Dumangas, Iloilo, 15-16 November 2018
4. Porio, E. A presentation at the ICLEI-Local Governments for Sustainability organized Partnership Hub on "Turning Blue: The Role of Cities in Forwarding Blue Carbon Solutions towards Climate Change Mitigation and Adaptation", EAS Congress 2018, 28 November 2018
5. Defiesta, G. Panel Reactor, Public Forum on Feasting or Fasting on Fish: Filipino Public Opinion on our Fisheries, Marine Resources and Oceans. Organized by IFPDS and OCEANA, 27 November 2018
6. Ravago, M. Philippine Institute for Development Studies (PIDS) Public Seminar on "Disaster Risk Reduction in the Philippines: Challenges and Ways Forward", PIDS Conference Room, 18th Floor, Three Cyberpod Centris North Tower, 20 June 2018

Work Packages 2 & 3

1. **Clarete, R., Muyrong, M., and Tuano, P.**, "Tracking the Economic Impacts of Flooding in Metro Manila: A Multi-Period CGE Analysis" Third International Research Colloquium, Quezon City, 13 October 2018
2. Coastal Cities at Risk in the Philippines, "Risk Governance and Investing in Climate and Disaster Resilience" at the 2018 Area Convention-Seminar of the Philippine League of Local Budget Officers-Luzon (PHILLBO-Luzon), Inc. , Alonte Sports Arena, City of Biñan, Laguna, 19 October 2018
3. **Gotangco, C.K., See, J., Dalupang, J.P., Ortiz, M., Porio, E., Narisma, G., Yulo Loyzaga, A. and Dator-Bercilla, J.**, "Quantifying Resilience to Flooding among Households and Local Government Units using System Dynamics: A Case Study in Metro Manila, Office of Civil Defense Disaster Risk Reduction and Research Forum, Mandaluyong City, 20 October 2018
4. Porio, E. "Interrogating the Social Dimensions (Inequalities: Ethnicity, Identities, Gender, Class) of Human Security and Resilience, Zamboanga City Workshop on Resilience and Human Security, Zamboanga City, 18 August 2018

2019

Work Package 1

1. Air Quality Dynamics, Manila Observatory. Poster presentation about the jeepney driver's personal exposure level in the NGO Summit in the University of the Philippines, 19-20 March 2019
2. Del Castillo, M. F. Poster Presentation for UP NGO Summit Job Fair, Bahay ng Alumni, UP Diliman, Quezon City, 19-20 March 2019

3. Geomatics for Environment and Development, Manila Observatory. "Developing GIS and geo-spatial datasets for informality, infrastructure, other development and environmental critical themes" Poster Presentation for NGO Summit, Philippines, 15 March 2019
4. Narisma, G. T. "Climate Projections" National Disaster Resilience Summit, Quezon City, Philippines, 30 July 2019
5. **Paner-Alba, D., Plopenio, J., Tejada, M., Sto. Domingo, E.** Coordinator/ Resource Person, "[Mainstreaming Barangay Resiliency in Barangay Development Plans 2020-2023 for Building Partnerships for Climate and Disaster Resilience](#) Through Trans- Disciplinary Action Research, under the Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Resilience Project ADMU-CCARPH-ADNU" Museo ni Jesse Robredo, Naga City, 21-24 October 2019
6. Vicente, M. C. T. Megacities at Risk: Engineering Resilience to Seismic Hazards Manila Polo Club, Makati City, 25 April 2019
7. Vicente, M. C. T. CCARPH – NRC Leadership for Resilience – Module 1, Regent Hotel, Padian St., Naga City, 26-27 March 2019

Work Packages 2 & 3

1. Ateneo Innovation Center. MSCWS Trainings (Assembly, Operation and Maintenance) and Installation and how to disinfect contaminated water with chlorine liquid and chlorine test strip on 14 November 2019
 - a. Our Lady of Guadalupe Diocesan Seminary (OLGDS), North Cotabato
 - b. Sto. Nino Parish, Municipality of Makilala, North Cotabato*
 - c. San Miguel Arkanghel Quasi-Parish, Brgy. Kisante, Municipality of Makilala, North Cotabato
2. Ateneo Innovation Center. Near Cloud Technology Training and Turn-over, OLGDS, North Cotabato, 14 November 2019
3. Ateneo Innovation Center. Training of Youth Volunteers on Clean Water System, Near Cloud System and Image Transmission Via Radio, North Cotabato, 16 November 2019
4. Ateneo Innovation Center. Mobile Solar-powered Clean Water System (MSCWS) Training and Installation at Makilala Institute of Science and Technology, North Cotabato, 18 November 2019
5. Ateneo Innovation Center. Training and Demonstration of Near Cloud System, Makilala Institute of Science and Technology, North Cotabato, 18 November 2019
6. Ateneo Innovation Center. Training and Turnover of Near Cloud System, Ateneo de Davao University, 19 November 2019

7. Oppus, C. "DRR Innovation and Technology", National Disaster Resilience Summit, Quezon City, Philippines, 30 July 2019

2020-2021

Work Package 1

1. Porio, E. "Equality First: Towards Gender Equality, Transformative Housing, and Empowerment for the Rural folk" Housing and Habitat webinar by Habitat (Sweden) and We Effect (Sweden). 23 June 2021

Work Packages 2 & 3

1. Dator-Bercilla, J. ["Moving Towards Resilience to Climate Risks and Disasters."](#) "Klimatotohanan" Webcast Series. Climate Reality Project Philippines. 21 November 2020
2. **Gotangco Gonzales, C.K., Jardeleza, J.M., Josol, J.C.,** Manalo, C.R., CCARPH Climate and Disaster Resilience Webinar Series 2020-2021, Session 1: [Systems Thinking for Resilience Planning](#). 22 October 2020.
3. **Gotangco Gonzales, C.K., Josol, J.C., Jardeleza, J.M., Campos, J.I., Litam, J.E., Abeojar, K.** ["System Dynamics Modeling for Quantifying City Resilience"](#) Zoom and Facebook Live. 10 November 2020
4. Porio, E. "What of Society Approach: What does it mean in DRRM?." Resilience Hours Webinar Series: Faces of Resilience. Office of Civil Defense. 9 July 2021.

Annex 4: List of Stakeholder Engagement Events

Gender Disaggregation of Year 1 to 3 Activities Hosted/Co-hosted by CCARPH

YEAR	Gender Disaggregation			
	Male		Female	
	Raw Count	% Male	Raw Count	%Female
2018 ⁹	290	40	349	60
2019 ¹⁰	902	43	1073	57
2020	800	43	929	57
TOTAL	1992	46	2351	54

⁹ The full list of activities and events (with gender disaggregation) hosted by CCARPH in 2018 is available in the [CCARPH Year 1 Report](#), p. 61; this list includes workshops and training.


¹⁰ The full list of activities and events (with gender disaggregation) hosted by CCARPH in 2019 is available in the [CCARPH Year 2 Report](#), p. 167; this list includes workshops and training.

CCARPH Trainings and Workshops 2018

1. **Cruz, F.** Invited Speaker, Bridging Gaps in Science, Policy and Practice for a Resilient Food and Agriculture Systems (Parallel session: Science and Technology), Strengthening resilient food and agriculture systems – Implementing the Sendai Framework for DRR in the Agriculture Sector in Asia and the Pacific, Hanoi, Vietnam, 15-16 March 2018.
2. **Cruz, F.** Participant/Session Moderator, Best Practice Workshop on Climate Change Projections and their Applications in ASEAN Countries, Singapore, 20-23 March 2018.
3. **Cruz, F.** Participant/Presenter, Final Workshop of the First Phase and the Second Technical Workshop of the Second Phase of the Southeast Asia Regional Climate Downscaling (SEACLID)/CORDEX Southeast Asia Project, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia, 7-9 May 2018.
4. Project Inception Workshop with advisors, NRC, LGU, and community-partners Ateneo de Manila University. 24 January 2018.
5. Building Resilience in the Age of Accelerating Change (with Dr. L. Wells). 25 June 2018.
6. **Narisma, G.** Plenary Speaker. Second Training Workshop on Regional Climate Modelling for Southeast Asia, 22-24 October 2018, Hanoi, Vietnam.
7. **Cruz, F.** Invited Speaker, Second Training Workshop on Regional Climate Modelling for Southeast Asia, VNU University of Science, Hanoi, Vietnam, 22-26 October 2018.
8. **Cruz, F.** Participant/Session Moderator, Workshop on Status of Climate Science and Technology in Asia, Kuala Lumpur, Malaysia, 15-16 November 2018.

2019

1. PCRA (with Hazard Hunter App) Training of Banaba CCA-DRR Group with Buklod Tao, Ins, MDRR students and CCARPH in San Mateo, Rizal. 24 February 2019.
2. Ateneo Innovation Center Training for Buklod Tao, Inc. alongside MDRR students 6 May 2019.

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3. **Cambaliza, M. O.** Participant and Session Chair, 2019 Air Pollution Sensing and Health in Asia Meeting and Workshop, Academic Sinica, Taipei, Taiwan, May 17 – 20, 2019.
 9. CCARPH-NRC ToT for Academic Partners. 11-13 June 2019.
 10. Cruz, F. Local Organizer, The 3rd Workshop of the Second Phase of the Southeast Asia Regional Climate Downscaling (SEACLID)/ Coordinated Regional Climate Downscaling Experiment (CORDEX) Southeast Asia, Manila, Philippines, 10-11 July 2019.
 11. Cruz, F. Local Organizer, The 1st DOST-CORDEX Stakeholder Workshop on Climate Information for Local Adaptation in the Philippines, Manila, Philippines, 11-12 July 2019.
 12. CCARPH Midterm Assessment Conference (Project Management Workshop). 11 November 2019.
 13. Ateneo Innovation Center in Kidapawan, Cotabato City. 13-20 November 2019.
 14. Master in Disaster Risk and Reduction in Montalban on HazardHunterPH. 16 November 2019.
 15. **Cruz, F.** Participant/Presenter, Tropical Meteorology, Hydrology, and Disasters Mitigation Forum, Haikou, Hainan Province, China, 21-22 November 2019.
 16. Curriculum Harmonization of National Resilience Council and CCARPH Academic Partners. 28 November 2019.
 17. **Cambaliza, M. O.** Participant and Presenter, 2019 IGAC – MANGO Scientific Meeting and Workshop, Sterling Nainital, India, 28 – 30 November 2019.
 18. **Cruz, F.** Invited Speaker, Workshop on Distilling Climate Information for Sectoral Applications, Ateneo de Manila University, Quezon City, Philippines, 9-13 December 2019.

2020-2021

1. CCARPH International Conference on Resilience (Workshop). 7 March 2020.
2. **Cruz, F.** Panelist, Bridging Science-Policy-Practice Nexus through Transdisciplinary Research and Resilience Innovations (CCARPH International Conference on Resilience), Ateneo de Manila University, Quezon City, Philippines, 7 March 2020.

3. Porio, E. "Environmental Migration, Human Security Climate and Disaster Resilience in Philippine Cities" Orientation training to Pamantasan ng Lungsod ng Muntinlupa (PLMun) Officials, Administrators, and Faculty, May 7, 2021 [[PPT](#)]
4. Policy Writeshop for CCARPH Scientists (with Ms. J. Dator-Bercilla). 12 May 2020.
5. [Web-based Geospatial Risk Database System for COVID-19 Training Program](#) (with National Resilience Council, Xavier University-Ateneo de Cagayan, and EpiMetrics, Inc.). June-September 2020.
6. Porio, E. "Integrating Gender, Climate, and Disaster Resilience to Teaching Research and Extension Programs," Orientation training to Pamantasan ng Lungsod ng Muntinlupa (PLMun) Officials, Administrators, and Faculty, June 11, 2021 [[PPT](#)]
7. CCARPH Geographic Information System (GIS) Training. August 2020.
8. Policy Brief Writeshop for MDRR (with Dr. N. Uy). July 2020.
9. **Cruz, F.** Invited Speaker, International Workshop: Convection-Permitting Modeling for Climate Research – Current and Future Challenges, online, 2-4 September 2020.
10. **Cruz, F.** Invited Speaker, "Science and emerging areas of research for climate policy and development" in "Climate Change and Covid-19: Adapting to Two New Normals", online, 26 February 2021.
11. [Certificate Course on Deepening Systems Thinking for a Resilient Local Government System](#) (with National Resilience Council). 4, 8-11, 23 June 2021.
12. **Cruz, F., L. Jamero.** Speaker/Session Moderator, Webinar on Highlights of the latest IPCC Climate Science Report: A briefing by Manila Observatory Scientists, Philippines, 20 August 2021.

Climate and Disaster Risk Assessment (CDRA) Trainings

Training No.	Date	Title of Event
1	8-9 February 2018	Naga City First Stakeholders Forum, and Launch of the Resilient Naga City Initiative (M-32, F-37)
2	3-4 May 2018	First Stakeholders Meeting and Launch of the Valenzuela City Resilience Initiative (M-38, F-51)

3	10-11 May 2018	First Stakeholders Meeting and Launch of the Resilient Iloilo City Initiative (M-20, F-25)
4	25-28 August 2018	NRC Trainors' Training on the Resilient LGU Systems with academic partners, Pasay City (M-12, F-18)
5	18 September 2018	Launch of the Resilient Iriga City Initiative and First Stakeholders Meeting (M-25, F-31)
6	October 8-12 2018	Training of Trainors with Manila Observatory and National Resilience Council (M-24, F-21)
7	23 January 2019	Transdisciplinary Action Research Workshop, Ateneo de Naga University (M-52, F-33)
8	26-28 March 2019	NRC's Leadership for Resilient LGUs Module 1 Workshop 1 in Naga City (M-22, F-25)
9	21 May 2019	Naga City Community Risk Indexing Workshop (First Run) (M-20, F-18)
10	23-24 May 2019	Iloilo City Convergence Meeting for Resilience, Planning with Manila Observatory (M-11, F-22)
11	21 June 2019	Naga City Naga City Community Risk Indexing Workshop (Second Run) (M-15, F-9)
12	6 August 2019	Facilitator's Workshop for Launch of the Resilient Barangay Program in Muntinlupa City (M-16, F-35)
13	7 August 2019	Launch of the Resilient Barangay Program in Muntinlupa City (M-74, F-67)
14	20-22 August 2019	NRC's Leadership for Resilient LGUs Module 1 Workshop 2 in Naga City (M-11, F-28)
15	26-27 September 2019	September 26 to 27, 2019, Refining and Validating Muntinlupa City Barangay Risk Profile through Participatory Community Risk Assessment (PCRA) Workshop (M-35, F-25)
16	21-25 October 2019	ADNU Conducts Mainstreaming Resiliency in Barangay Development Plans (BDP) of Naga City (M-88, F-84)



17	29 October 2019	Muntinlupa City Consultation Meeting and Workshop on City and Barangay Resilience Scorecards (M-40, F-61)
18	12 March 2020	Naga City Climate and Disaster Risk Assessment Turnover (M-20, F-13)
19	24 August 2020	Iloilo City Climate and Disaster Risk Assessment Turnover (M-5, F-6)

Annex 5: Master's Theses / Capstone Details, Policy Briefs, and E-books

Theses / Capstone projects supervised

Student No.	Student Name	Capstone Title	Year
1.	Que, Kevin Bruce	The Effect of Climate Hazards on Labor Market in the Philippines [Policy Brief]	2020
2.	Canaleta, Levy S.	Integrating Resilience in the Berde Rating System and in the Philippine Green Building Code	2020
3.	Dela Merced, Phoenicia Achaia	The Formulation of Monitoring and Evaluation Indicators for the Rehabilitation and Recovery of Marawi City. [E-book]	2020
4.	Tapnio, Chris J.	Village Level Green-gray Management Strategies for Coastal Protection: The Case of Libjo, Polillo, Philippines	2020
5.	Tandoc, Emmanuel V.	From Disaster Preparedness to Technology Driven Disaster Resilience: Installation of Clean Water System in Barangay San Andres, Cainta, Rizal [E-book]	2020

6.	Perez, Joe-Mar S.	Disaster Risk Reduction Demystified: Localizing the Disaster Risk Indicators in the Philippines	2020
7.	Miranda, Rachelle Ann L.	Order in Disasters: Assessing the Reliability and Effectiveness of Incident Command System in the Philippines	2020
8.	Urcia, Francis Edward G.	New Translations for the Ivatan House: Integrating Resilient and Sustainable Measures for the Rebuilding of Heritage Houses in Itbayat, Batanes [E-book]	2020
9.	Labrador, Stephanie Nadine M.	Assessing Health Vulnerability to Climate Change and Public Health Interventions in Batangas Province	2020
10.	Lee, Ysabel Anne C.	Climate Information for Resilience Building: Communications Criteria for Women Farmers in Naga City	2020
11.	Bangabang, Marie Antoinette F.	Assessing Public Value of Government-led MDRR Interventions: The Case of DOST's Hydromet and EWS	2021
12.	Wenceslao, Shekinah Noa Shelomi C.	The Role Of Facebook In The Disaster Risk Reduction And Management: Case Study Of The Municipality Of Cainta	2021
13.	Hernandez, Ma. Lorena P.	Localizing Climate and Disaster Risk Assessment for Selected Communities in Quezon City and Angat, Bulacan	2021 ⁷
14.	Agra, Flordeliz A.	Categorization of Differential Impacts of Disasters in the Batangas Province, Philippines	2021 ⁷
15.	Masiglat, Alex Czar R.	Disasters and Jail Management: A Study Creating A Disaster Resilience Framework for Philippine Jails - The Case of the Manila City Jail	2021 ⁷

Male-7; Female-8

Annex 6: Studies Conducted


1. Manila Observatory. (2020). [Co-generating climate hazard information to enhance city resilience in the Philippines.](#)
2. Delos Reyes, I., Cambaliza, M.O., Cruz, M., Leung, G.F., Simpas, J.B., Gotangco, C.K., Abenojar, K., Manalo, C., and Go, Bernell. (2019). [As Assessment of Personal Exposure of a High-Risk Occupational Group to Fine Particulate Pollution in Metro Manila, Philippines.](#)
3. Wong, J., Baladad, A.K., Fowler, K.C., and Co, J. (2020). [Assessing and Projecting Climate-Related Infectious Diseases in Quezon City.](#)
4. Porio, E., Roque-Sarmiento, E., Salas, M.R., and Leynes, V.C. (2020). [From the Skies to the Streets: An Ethnography of Street-based Populations in Metro Manila, Philippines and Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks.](#)
5. Porio, E., Canilao, A. and Villanueva, C. (2021). Social Vulnerability Indexing in Manila: A Transdisciplinary Approach to Vulnerability Assessment.
6. Porio, E. (2021). [Climate Resilience Initiative in Metro Manila: Participatory Community Risk Assessment and Power in Community Interventions.](#) Interuniversity Center For Social Science Theory And Methodology, University of Groningen.
7. Ravago, M.-L., Pascua, G.G., Acheron, L.D., Gozo, E., Cruz, F., and Narisma, G. (2020). [Impact of Extreme Rainfall Days on the Welfare of Households in the Formal and Informal Sectors.](#)
8. Vicente, C., Paraiso, P., and Del Castillo, F. (2020). [Land Cover Change Analysis in Metro Manila and Marikina Watershed Philippines \(2009-2018\).](#)
9. Vicente, C., and Del Castillo, F. (2020). [Assessment of Land Cover Changes to River Runoff and Scenario-based Flooding.](#)
10. Vicente, C., and Del Castillo, F. (2020). [Land use classification over a highly-urbanized region using multi-resolution images.](#)
11. Vicente, C., and Del Castillo, F. (2020). [Using GIS to Visualize Risk in Metro Manila.](#)
12. Vicente, C., Paraiso, P., and Del Castillo, F. (2020). [Informal Livelihoods Survey Along Commonwealth.](#)

13. Manila Observatory. (2020). [Naga Disaster Risk Analysis: Typhoon, Flooding, Liquefaction](#).
14. Ateneo de Naga University. (2020). [Social Vulnerability of Naga City Households to Ffemlooding](#).
15. Manila Observatory. (2020). [Naga Climate Risk Analysis](#).
16. Jamero, M.L., Defiesta, G., Agudo, F.A., Moscoso, A., Araneta, L., Gozo, E., Domain, M., and Dela Paz, M. (2020). [Climate and Disaster Risk Assessment: Iloilo City](#).
17. Abenojar, K., Jardeleza, J.M., Gontangco Gonzales, C.K., Josol, J.C., Litam, J.E., Campos, J.I. (2021). [Developing a Socio-Economic Resilience Index \(SERI\) Model and an Integrated Urban Services Resilience Index \(IUSRI\) Model using a System Dynamics Approach](#).
18. Campos, J.I., Litam, J.E., Gotangco Gonzales, C.K., Josol, J.C., Jardeleza, J.M., Abenojar, K. (2021). [Developing an Urban Ecosystem Resilience Index Using a System Dynamics Approach](#).
19. Manila Observatory. (2020). [Climate and Disaster Risk Assessment: Coaching and Mentoring](#).
20. Clarete, R., Castillo, C.J., Murong, M., Tuaño P.A., Guevara, D., and Bona, M. (2020). [Economic Impacts of Rainfall and Flooding in Valenzuela and Pasig Cities Using a Multi-week CGE Model Analysis](#).
21. Ateneo Innovation Center. (2021). [AIC Technical report of the 2018-2021 CCARPH project](#).

Annex 7: Researchers Mentored on Transdisciplinary Action Research Theories, Concepts, and Methods


External Institutional Partners for CDRA Capacity-Building Opportunities

1. Ateneo de Naga University (Social Science Research Center)
2. Naga City Resilience Council
3. Naga City DRRMO (Disaster Risk Reduction and Management Office)
4. University of the Philippines - Visayas
5. Iloilo City CPDO (City Planning Development Office)
6. Iloilo City DRRMO (Disaster Risk Reduction and Management Office)
7. Pamantasan ng Lungsod ng Muntinlupa (University of Muntinlupa City)
8. Muntinlupa City CPDO (City Planning Development Office)
9. Muntinlupa City DRRMO (Disaster Risk Reduction and Management Office)
10. Ormoc City LGU
11. Visayas State University (Gender Resource Center, Climate Research Center)


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12. Cagayan de Oro City LGU
 13. Xavier University (Engineering Resource Center, Research Institute of Mindanao Culture)
 14. Zamboanga City LGU (DRRMO)
 15. Ateneo de Zamboanga University

Research Fellows, Research Associates, and Research Assistants

1. Mr. Emilio Gozo. Research Associate, Regional Climate Systems Laboratory, Manila Observatory. WP 1.1.1, WP 1.2.4, WP 2.2.1.
2. Ms. Melliza Cruz. Research Associate, Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. WP 1.1.2.
3. Ms. Imee Delos Reyes. Research Assistant, Department of Physics, Ateneo de Manila University. WP 1.1.2.
4. Ms. Gabrielle Frances Leung. Research Assistant, Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. WP 1.1.2.
5. Ms. Katrina Abenojar. Research Assistant, Department of Environmental Science, Ateneo de Manila University. WP 1.1.2, WP 2.1.1.
6. Mr. Carlos Manalo. Research Assistant, Department of Environmental Science, Ateneo de Manila University. WP 1.1.2, WP 2.1.1.
7. Ms. Paola Angela Bañaga. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.1.2.
8. Ms. Christine Lo Chan. Research Assistant, Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. WP 1.1.2.
9. Ms. Grace Betito. Research Assistant, Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. WP 1.1.2.
10. Mr. Jarl Tynan Collado. Research Assistant, Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. WP 1.1.2.
11. Mr. Jose Gabriel Abalos. Air Quality Dynamics and Instrumentation and Technology Development Laboratory, Manila Observatory. Research Assistant, WP 1.1.2.
12. Ms. Anne Kathlyn Baladad. Research Associate, EpiMetrics, Inc., WP 1.2.1.

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13. Ms. Krizelle Cleo Fowler. Statistician, EpiMetrics, Inc., WP 1.2.1.
 14. Mr. Jerelyn Co. Data Scientist, WP 1.2.1.
 15. Mr. Charles Justin See. Ph.D. Candidate, La Trobe University, WP 1.2.2.
 16. Ms. Emily Roque-Sarmiento. Project Manager for Research, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 17. Dr. Michael Armand Canilao. Pool of Experts Member, Coastal Cities at Risk in the Philippines/Associate Professor, Archeological Studies Program, University of the Philippines. WP 1.2.2.
 18. Ms. Celine Villanueva. Research Consultant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 19. Ms. Maria Rufina Salas. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 20. Ms. Vivien Clarisse Leynes. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 21. Mr. Jose Francisco Santiago. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 22. Ms. Ann Maureen Malaki. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 23. Mr. Jeremiah Morales. Research Assistant, Coastal Cities at Risk in the Philippines. WP 1.2.2.
 24. Mr. Gerald Gracius Pascua. Lecturer, Department of Economics, Ateneo de Manila University. WP 1.2.4
 25. Ms. Loubill Dayne Acheron. Lecturer, Department of Economics, Ateneo de Manila University. WP 1.2.4
 26. Ms. Patricia Paraiso. Former RS-GIS Specialist, Geomatics for Environment and Development, Manila Observatory. WP 1.3.1
 27. Ms. Flordeliza Del Castillo. Senior RS-GIS Specialist, Geomatics for Environment and Development, Manila Observatory. WP 1.3.1
 28. Ms. Joanaviva Plopenio. Sub-leader, Naga City Case Study/Officer-in-Charge, Institute for Environmental Conservation and Research (INECAR), Ateneo de Naga University. WP 1.3.2

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29. Mr. Elmer Sto. Domingo. Sub-leader, Naga City Case Study/Director, Center for Community Development, Ateneo de Naga University. WP 1.3.2
 30. Mr. Alan Dino Moscoso. Researcher, University of the Philippines Visayas. WP 1.3.3
 31. Mr. Jose Roni S.J. Peñalosa. City Planning and Development Coordinator, Iloilo City Planning and Development Office. WP 1.3.3
 32. Mr. Franco Anthony Agudo. Statistician, Iloilo City Planning and Development Office, Research and Planning Section, Iloilo City Disaster Risk Reduction and Management Office. WP 1.3.3
 33. Ms. Dona Magno. Head, Iloilo City Disaster Risk Reduction and Management Office. WP 1.3.3
 34. Ms. Leah Araneta. Professor, University of the Philippines Visayas. WP 1.3.3
 35. Engr. Paul Cabacungan. Researcher/Operations Manager, Ateneo Innovation Center. WP 2.
 36. Ms. Jean Meir Jardeleza. Lecturer, Department of Environmental Science, Ateneo de Manila University/Project Staff, Ateneo Institute of Sustainability. WP 2.1.1
 37. Ms. Jairus Carmela C. Josol. Part-time Faculty, Department of Environmental Science, Ateneo de Manila University. WP 2.1.1
 38. Mr. Joaquin Ignacio D. Campos. Research Assistant, Department of Environmental Science, Ateneo de Manila University. WP 2.1.1
 39. Mr. Joseph Emanuel C. Litam. Research Assistant, Department of Environmental Science, Ateneo de Manila University. WP 2.1.1
 40. Mr. Marion Dimain. Junior RS-GIS Specialist, Geomatics for Environment and Development, Manila Observatory. WP 2.2.1
 41. Ms. Maan Dela Paz. RS-GIS Specialist, Geomatics for Environment and Development, Manila Observatory. WP 2.2.1
 42. Ms. Marjorie Muyrong. Lecturer, Department of Economics, Ateneo de Manila University/Graduate Researcher and PhD Sociology Candidate, La Trobe University. WP 3.1.1
 43. Ms. Rolly Czar Joseph Castillo. Program Coordinator, Labor Education and Research Network. WP 3.1.1
 44. Ms. Dianne Guevarra. Master of Arts in Economics Student, Department of Economics, Ateneo de Manila University. WP 3.1.1

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45. Ms. Mikaela Bona. Master of Arts in Political Science, Department of Political Science, Ateneo de Manila University/Master of Global Affairs Student, Keough School of Global Affairs, University of Notre Dame. WP 3.1.1
 46. Mr. Cymon Kayle Lubangco. Master of Arts in Economics Student, Department of Economics, Ateneo de Manila University. WP 3.1.1
 47. Ms. Patricia Diana Ayo. Research Assistant and Project Management, Coastal Cities at Risk in the Philippines. Institutionalization Phase.

Transdisciplinary Action Research Interns

1. Ms. Morgane Queffeuilou. Internship in Environment, Health, and Safety with assistance in data gathering, participation in workshops with stakeholders, and contributions to a research report on environmental health and safety policies/practices and urban resilience
2. Ms. Kaori Shiohara, coordination with CCARPH in enhancing her [research proposal](#) on "the use of scientific evidence in climate adaptation policy process in the Philippines: with the focus on flood preventions and relocation of informal settlers in Manila"
3. Ms. Jan Llenzl Dagohoy. Can Drought Affect our Urban Spaces? ([Infographic](#) and [Facebook/Instagram Story Format](#)); How can drought affect the urban population's water and food security in the future? ([Writeup for Infographic](#)).
4. Ms. Relyn Egmlan. Documentation of post-Ulysses community responses in Marikina City.
5. Ms. Rhyzza Nicol Kafilas. Buklod Tao Katatagan, Inc. / Buklod ng Kabataan Documentation of Activities and Organization/Founder History.
6. Ms. Rechiel Mandigma. Buklod Tao Katatagan, Inc. / Buklod ng Kabataan Documentation of Activities and Organization/Founder History.
7. Ms. Alenn Jhulia Prodigalidad. UNDRR Online Workshop and Training: A Summary ([Training Summary Lecture](#)).
8. Ms. Khim Cathleen Saddi. She for the Coast ([Presentation Slides](#) and [Storyboard Draft](#)).
9. Ms. Taflina Grace Sia. Micromobility in Metro Manila: A Future of Sustainable Urban Mobility ([Infographic](#)); Beyond COVID-19: The viability of micromobility in a post-pandemic Metro Manila ([Research Paper Draft](#)).
10. Mr. Kevin Cereza Taguiban. Level of Awareness and Practices on Solid Waste Management (SWM) Among Students in Pamantasan ng Lungsod ng Muntinlupa

Toward the Development of Proposed Solid Waste Management Program Plan ([Research Project Proposal for PLMun National Service Training Program](#)).

11. Mr. Martin Javier Tendero. Solid Waste Management in Metro Manila and its Effect on Flood Risk ([Research Paper](#)).
12. Ms. Therese Anne Francine Yap. Simple and Easy Coco Yogurt Recipe by Ateneo Innovation Center (AIC) to Boost Immune System ([Newsletter Article](#)); Coco Yogurt Recipe Video ([Video Demonstration](#)); Buklod Tao's Journey from Risk to Resilience ([Case Study Outline](#)); Proposed Risk Communication Plan for Buklod Tao ([Risk Communication Plan Outline](#)); Buklod Tao Inc.'s Recent Community Building Initiatives ([Newsletter Article](#)).
13. Mr. Joshua Cabal. Research and Data Gathering of Philippine Macro-level Indicators under Center for Asian Social Wellbeing Studies (CWB) ([Data File](#)).
14. Ms. Melissa Elazegui, Mr. Uriel Victor Escobido, Mr. Amiel Christian Montilla, coordination with CCARPH for partnership with Pasig City LGU, for [Thesis Proposal](#) entitled, "Life Cycle Assessment, System Dynamics Modeling, and Multiple Objective Optimization of the Carbon Footprint and Energy Use of a COVID-19 Vaccine Supply Chain in an Urban Ecosystem."

Annex 8: Conferences, Lectures, and Webinars for Knowledge Dissemination and Climate Action, co-/hosted by CCARPH

- a. [First National Conference on Investing in Climate and Disaster Resilience](#), Ateneo de Manila University. 8 June 2018 [[Event Program](#)]
 - i. Welcome remarks and messages from Villarin, J. (ADMU, MO), Gatchalian, R. (Valenzuela City LGU), Jalad, R. (NDRRMC), Sacendoncillo, M. (DILG), Garilao, E. (ZFF)
 - ii. Porio, E. (ADMU - Dept. of Sociology & Anthropology, MO) and Yulo-Loyzaga, A. (NRC, MO), "Overview of Coastal Cities at Risk in the Philippines: Investing in Climate and Disaster Risk Project and the National Resilience Council" [[PPT](#)]
 - iii. Narimsa, G. (MO) et. al., "Characterizing Climate and Atmospheric Hazards," Work Theme 1: Characterization of Climate and Disaster Risk for Resilience [[PPT](#)]
 - iv. Wong, J. (ADMU - Health Sciences Program) et. al., "Air Quality and Health Impacts," Work Theme 1: Characterization of Climate and Disaster Risk for Resilience [[PPT](#)]
 - v. Porio, E. (ADMU - Dept. of Sociology & Anthropology, MO) et. al., "Understanding Evolving Exposures and Contextual Vulnerability of Multiple Stakeholders to Climate and Disaster Risks," Work Theme 1: Characterization of Climate and Disaster Risk for Resilience [[PPT](#)]


- vi. Gotangco, K. (ADMU - Dept. of Environmental Sciences, AIS) et. al., "Developing a City Resilience Suite of Systems Thinking Tools," Work Theme 2: City Resilience Suite of Systems Thinking Tools [\[PPT\]](#)
- vii. Clarete, R, (UP School of Economics) et. al., "Developing a Local Economic Assessment Tool," Work Theme 2: City Resilience Suite of Systems Thinking Tools [\[PPT\]](#)
- viii. Vicente, C. (MO) et al., "Visualizing Risk and Applications," Work Theme 2: City Resilience Suite of Systems Thinking Tools [\[PPT\]](#)
- ix. Tangonan, G., (ADMU - Dept. of ECCE, AIC) and Dayrit, F. (ADMU - Dept. of Chemistry, AIC) et. al. "Technologies for Disaster Risk Reduction and Resilience," Work Theme 2: City Resilience Suite of Systems Thinking Tools [\[PPT\]](#)
- x. Uy, N. (ADMU - MDRR) et. al., "MDRR and Partnership with the National Resilience Council," Work Theme 3: Capacity Enhancement and Knowledge Mobilization for Resilience [\[PPT\]](#)
- b. [International Workshop on Systems and Technology for Disaster Risk Reduction and Resilience](#). 29 March 2019.
- c. [Manila 2050: Towards a Sustainable Urban Development](#) with Arete and the Embassy of France in Manila. 27 June 2019. [\[Event Program\]](#)
 - i. Opening Remarks
 1. Vilchez, M.L. C. (ADMU OVP, ADMU - Dept. of English)
 2. Rodrigo, M.M. T. (Arete, ADMU - Dept. of Information Systems and Computer Science)
 3. Porio, E. (ADMU - Dept. of Sociology & Anthropology, MO)
 4. Bautista, F. B. (UAP, GREEN, Green Architecture Advocacy Philippines)
 5. Forté, Jean-Jacques (French Embassy)
 - ii. "Impact of rapid urbanization on social structures, communities. How to become a green community?" Moderated by: Aldaba, F. (ADMU - SOSS, Dept. of Economics)
 1. Artigas, A. (Sciences Po Urban School), "The challenge of sustainable green urbanization: bottom up politics to the rescue of grand designs?" [\[PPT\]](#)
 2. Corpuz, A. G. (Urban/Regional Planner, Carlos P. Romulo Foundation), "Public and private urban planning"
 3. Guerrero, M. C. (Green Architecture Advocacy Philippines), "Ecology Link: Green Communities"
 - iii. "Green buildings and green materials. Why a "healthy" green building design is a must for the City of the Future?" Moderated by: Canaleta, L. (ADMU - MDRR, UAP)
 1. Daya-Garcia, L. (UAP, Green Architecture Advocacy Philippines), "Integrated Sustainable Building Ecology"
 2. Cuyno, J.A. M. (Geocycle), "Green building and green cement"

3. Tatlonghari, C. (Leadership in Energy and Environmental Design, Green Architecture Advocacy Philippines), "Certifying green buildings"
4. Lunel, T. (LP4Y), "Green Village in Calauan"
- iv. "Linking urban planners and architects. How to assess the City of the Future as a whole? How to reinforce disaster resilience and urban sustainability?"
Moderated by: Barbaza, R. (ADMU - Dept. of Philosophy)
 1. Yulo-Loyzaga, A. (NRC, MO), "Perspectives on Urban Resilience"
 2. Favis, A.M. (ADMU - Dept. of Environmental Science, AIS), "Linking Sustainability and Resilience: A University Perspective"
 3. Gotangco, C.K. (ADMU - Dept. of Environmental Science, AIS), "Linking Sustainability and Resilience: A University Perspective"
 4. Ramos, R. (Berde), "Urban design and landscape architecture"
- d. Lecture Series: Antilla-Hughes, J. (University of San Francisco) ["The Economic Aftermath of Disaster: Household Poverty and Health Effects of Typhoons in the Philippines."](#) 13 June 2019. [\[PPT\]](#)
- e. ["Bridging Science-Policy-Practice Nexus through Transdisciplinary Research and Climate Action"](#) International Conference, The Loft, 4/F, Arete, Ateneo de Manila University, 11 November 2019. [\[Event Program\]](#)
 - i. Welcome remarks from Villarin, J. (ADMU, MO), Snow, E. (Embassy of Canada in the Philippines), Legacion, N. (Naga City LGU), Dayrit, F.A. M. (ADMU, NAST), Rodrigo, M. T. (Arete, ADMU)
 - ii. Resurreccion, B. (Stockholm Environment Institute), "Gender, Social Equality and Climate Action" [\[PPT\]](#)
 1. Response from Biazon, C.M. (Muntinlupa City LGU)
 - iii. Porio, E. (ADMU - Dept. of Sociology & Anthropology, MO), Yulo-Loyzaga, A. (NRC, MO), Dator-Bercilla, J. (UPC), Panadero, A. (DILG, Zuellig Family Foundation), "Science-Policy-Practice Nexus Session" [\[PPT\]](#)
 - iv. Transdisciplinary Action Research Panel 1: "Interrogating Climate Projections and Socio- economic and Health Impacts," Moderated by Panadero, A. (ZFF, DILG), Barrameda, S. Z. (DILG)
 1. Narisma, G. (MO) et. al. "Interrogating Climate Projections and Socio-economic and Health Impacts," [\[PPT\]](#)
 2. Gotangco, C. (ADMU - Dept. of Environmental Science, AIS), et. al. "Systems Thinking Lens," [\[PPT\]](#)
 3. Wong, J. (ADMU - Health Sciences Program) et. al. "Assessing and Projecting Climate-Related Infectious Diseases in Quezon City," [\[PPT\]](#)
 4. Ravago, M-L. (ADMU - Dept. of Economics) et al. "Impact of Extreme Weather Events on Welfare of the Formal and Informal Sectors," [\[PPT\]](#)
 5. Responses from Yulo-Loyzaga, A. (NRC, MO), Erni, M. G. (NRC), Andres, A. V. / Alzona, P. (Quezon City EPWMD)
 - v. Transdisciplinary Action Research Panel 2: "Mobilizing climate science for resilience through the CDRA process," Moderated by: Dator-Bercilla, J. (UPV)

1. Tejada, M. (ADNU ASSRC) et. al. "Resilient Naga City,"
2. Penalosa, J. (Iloilo CPDO) et. al. "Climate and Disaster Risk Assessment for a Resilient Iloilo City," [\[PPT\]](#)
3. Tejada, M. (ADNU ASSRC) et. al. "Science-based Method of/for Climate and Disaster Risk Assessment, Data Application and Information Dissemination towards a Resilient Naga City," [\[PPT\]](#)
4. Jamero, L. (MO) et. al. "Climate and Disaster Risk Assessment: Coaching & Mentoring," [\[PPT\]](#)
5. Narisma, G. (MO) et. al. "Work Theme 1.1: Characterize climate-related and atmospheric hazards, vulnerability, and risk across space and time," [\[PPT\]](#)
6. Responses from Yulo-Loyzaga, A. (NRC, MO), Erni, M. G. (NRC), Gumba, R. (Naga City Resilience Council), Prilles, W. (Naga CPDO), Magno, D. (Iloilo CDRRMO), Peñalosa, J.R. (Iloilo CPDO), Agudo, F.A. (Iloilo CPDO)
- vi. Transdisciplinary Action Research Panel 3: "Air Pollution and Resilience in Katipunan – Killing us Softly?" Moderated by: Karaos, A.M. (JJCICSI, ADMU)
 1. Wong, J. (ADMU - Health Sciences Program) et. al., "Association between PM2.5 and Psychological Outcomes," [\[PPT\]](#)
 2. Cruz, F. (MO), Cambaliza, M. (MO) et. al. "Air Pollution and Resilience in Katipunan – Killing us Softly?" [\[PPT\]](#)
 3. Porio, E. (ADMU - Dept. of Sociology & Anthropology, MO), and Roque-Sarmiento, E. (ADMU - Dept. of Sociology & Anthropology), "Form the Skies to the Streets: An Ethnography of Street-based Populations and their Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks in Metro Manila, Philippines," [\[PPT\]](#)
 4. Responses from Yulo-Loyzaga, A. (NRC, MO), Erni, M. G. (NRC), Andres, A.V. / Alzona, P.L. (Quezon City EPWMD), Abinales, M.A. (BTKI)
- vii. Transdisciplinary Action Research 4: "Tools and Technologies for Climate and Disaster Resilience: Smarter Leaders for Smarter Cities"
 1. Gotangco, C. (ADMU - Dept. of Environmental Science, AIS) et al. "Systems Thinking Tools for Smarter Cities," Moderated by: Lim, L. (ISO, ADMU), Racelis, M. (IPC, ADMU) [\[PPT\]](#)
 2. Clarete, R. (UP - School of Economics) et. al. "Assessing the Impacts of Climate Change on City-Level Economic Activity," [\[PPT\]](#)
 3. Tangonan, G. (ADMU - Dept. of ECCE, AIC), et. al. "AIC Technologies for DRR Practitioners," [\[PPT\]](#)
 4. Responses from Yulo-Loyzaga, A. (NRC, MO), Erni, M. G. (NRC), Wong, B.M.R. Q. (Pasig CDRRMO), Antonio, A. (Valenzuela CDRRMO)
- viii. Alfonso, E. (Muntinlupa CDRRMO), Medroso, V. (Muntinlupa City CDRRMO), Cardona, N. A. (Muntinlupa CPDO), Adriano, J.D. E. (Muntinlupa CPDO), Presnedi, E. (PLMun), et. al. "Muntinlupa City's Resilience Story" [\[PPT\]](#)

1. Responses from Jamero, L. (MO), Vicente, C. (MO), Porio, E. (ADMU DSA, MO), Lim, L. (ISO, ADMU DSA)
- f. TAME-BC. Clean Air for a Sustainable Future: A Transdisciplinary Approach to Mitigate Emissions of Black Carbon in Metro Manila, Philippines. 2nd Workshop on Project Implementation, Updates, Key Findings, and Solutions. 11-12, February 2020, Faber Hall, ADMU, Quezon City [\[Photo\]](#)
- g. Lecture Series: Kunz, Y. (TAME-BC, Leibniz Zentrum für Marine Tropenforschung). [“Metro Manila's Hidden Disaster: Transdisciplinary Research on Black Carbon Emissions”](#) 20 February 2020
- h. [“Bridging Science-Policy-Practice Nexus through Transdisciplinary Research and Resilience Innovations”](#) Two Track International Conference on Resilience The Loft, 4/F, Arete, Ateneo de Manila University. 7 March 2020. [\[Event Program\]](#)
 - i. Opening Ceremony
 1. Opening Remarks from Villarin, J.R. T. (ADMU, MO), Bautista, E. (ADMU SOSE, ADMU Dept of Mathematics), and Dayrit, F.A. M. (ADMU, NAST)
 2. Dayrit, F. (ADMU, AIC, NAST), “The Challenge of Disaster Migration, the Predictable and Unpredictable” [\[PPT\]](#)
 3. Virji, H. (START) “Resilience Thinking to Action” [\[PPT\]](#)
 4. Yulo-Loyzaga, A. (NRC, MO) “Public-Private Partnerships for Resilience: Challenges & Opportunities” [\[PPT\]](#)
 5. Porio, E. (ADMU - DSA, MO) “Bridging Science-Policy-Practice through Transdisciplinary Research and Resilience Innovations: Goals and Perspectives of the Two-Tracked CCARPH International Conference on Resilience,” [\[PPT\]](#)
 - ii. Track 1: Transdisciplinary Panel Presentations
 1. Transdisciplinary Action Research Panel 1: “Interrogating Climate Change and Socio-economic and Health Impacts” Moderated by Barrameda, S. Z. (DILG)
 - a. Narisma, G. (MO) and Cruz, F. (MO), et. al., “Transdisciplinary Action Research Panel 1: Interrogating Climate Change and Socio-economic and Health Impacts” [\[PPT\]](#)
 - b. Ravago, M-L. (ADMU - Dept. of Economics), et. al., “Impact of Extreme Rainfall Days on the Households’ Welfare of the Formal and Informal Sectors,” [\[PPT\]](#)
 - c. Responses from Yulo-Loyzaga, A. (NRC, MO), Erni, M. G. (NRC), Andres, A.V. / Alzona, P.L. (Quezon City EPWMD)
 2. Transdisciplinary Action Research Panel 2: “Mainstreaming Climate and Disaster Risk Assessment towards a Resilient Local Government System” Moderated by Dator-Bercilla, J. (UPV)
 - a. Moscoso, A. (UPV), Areneta, L. (UPV), Defiesta, G. (UPV), Agudo, F. (Iloilo CPDO), Bercilla, J. (UPV), and Penalosa, J. (Iloilo CPDO),

- “Climate and Disaster Risk Assessment for a Resilient Iloilo City,” [\[PPT\]](#)
- b. Tejada, M. (ADNU ASSRC), Plopenio, J. (ADNU INECAR), Sto. Domingo, E. (ADNU Center for Community Dev’t), and Alba, D. (ADNU - College of Humanities and Social Sciences) “Integrating Science-based Information towards a Resilient Naga City,” [\[PPT\]](#)
 - c. Vicente, C. (MO), et. al., “Mobilizing Climate and Disaster Science with Public-Private Partners (Deepening the CDRA Process),” [\[PPT\]](#)
 - d. Response from Erni, M. G. / Suplido, M.L. B. (NRC), Gumba, R. (Naga City Resilience Council), Agudo, F.A. (Iloilo CPDO), Alfonso, E. (Muntinlupa CDRRMO), et. al.
3. Transdisciplinary Action Research Panel 3: “Air Pollution and Resilience in Katipunan - Killing us Softly?” Moderated by
 - a. Cambaliza, M.O. (MO), et. al., “Transdisciplinary Action Research Panel 3: Air Pollution and Resilience in Katipunan - Killing us Softly?” [\[PPT\]](#)
 - b. Porio, E. (ADMU - DSA, MO), and Roque-Sarmiento, E. (ADMU - DSA), “From the Skies to the Streets: An Ethnography of Street-based Populations and their Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks in Metro Manila, Philippines,” [\[PPT\]](#)
 - c. Response from Andres, A.V. / Alzona, P.L. (Quezon City EPWMD), Marquez, C. (Brgy. Loyola Heights, Quezon City DRRM Council), et. al.
 4. Transdisciplinary Action Research Panel 4: “Tools and Technologies for Climate and Disaster Resilience” Moderated by Panadero, A. A. (ZFF), Porio, E. (ADMU, MO)
 - a. Tangonan, G. (ADMU - Dept. of ECCE) et. al., “AIC Technologies: A Toolkit for Engineering Resilience,” [\[PPT\]](#)
 - b. Clarete, R. (UP - School of Economics), Tuano, R. (ADMU - Dept. of Economics), et. al., “Assessing the Impacts of Climate Change on City-Level Economic Activity: Case of Valenzuela City,” [\[PPT\]](#)
 - c. Gotangco, C.K. (ADMU - Dept. of Environmental Science, AIS), et. al., “Systems Thinking Tools for Smarter Cities,” [\[PPT\]](#)
 - d. Response Cojuangco, F.D. Q. (NRC), Wong, B.M.R. Q. (Pasig CDRRMO), Antonio, A. (Valenzuela CDRRMO), Abinales, M.A. (BTKI)
- iii. Track 2: MDRR Capstone Project Presentations
 1. “Disaster Resilience: Frameworks, Indicators, and Protocols,” Moderated by Lim, T.J. (OCD), Uy, N. (ADMU MDRR), and Porio, E. (ADMU, MO)

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- a. Perez, J. (OCD), "Disaster Risk Reduction Demystified: Localizing the Disaster Risk Indicators in the Philippines" [\[PPT\]](#)
 - b. Masiglat, A.C. (OCD - Region IVA), "Disasters and Jail Management: a Study Creating a Disaster Resilience Framework for Philippine Jails – the Case of the Manila City Jail" [\[PPT\]](#)
 - c. Miranda, R.A. (OCD), "Assessing the Reliability & Effectiveness of Incident Command System in the Philippines," [\[PPT\]](#)
 - d. Dela Merced, P.A. (OCD), "Formulation of Monitoring and Evaluation Indicators for the Rehabilitation and Recovery of Marawi City" [\[PPT\]](#)
 2. "Bridging the Gap: Policy, Private Sector, Development," Moderated by Canilao, M.A. P. (UP - Archaeological Studies Program)
 - a. Labrador, S.N. (PDRMO - Batangas), "Assessing Health Vulnerability to Climate Change and Public Health Interventions in Batangas Province," [\[PPT\]](#)
 - b. Vicente, R.N. (DOST - Advance Science and Technology Institute), "Application of a Systems Problem Diagnosis Approach to Leverage Space-based Decision-support in Disaster Response for Hydromet Hazards in the Philippines," [\[PPT\]](#)
 - c. Baricuatro, Z.D. (PDRMO - Pampanga), "Urban Flooding in Pampanga: Evaluating of Causes and Corresponding Programs, Projects, and Activities (PPAs)," [\[PPT\]](#)
 - d. Que, K.B. (Projects Unlimited Philippines, Inc.), "The Effect of Extreme Weather Hazards on the Philippine Labor Market" [\[PPT\]](#)
 3. "Alternatives and Solutions for Resilience" Moderated by Uy, N. (ADMU MDRR), Porio, E. (ADMU, MO)
 - a. Lee, Y.A. (MO, International Center for Tropical Agriculture), "Climate Information for Resilience Building: Communications Criteria for Women Farmers in Naga City," [\[PPT\]](#)
 - b. Canaleta, L. (UAP), "Integrating Resilience in BERDE and in the Philippine Green Building Code" [\[PPT\]](#)
 - c. Urcia, F.E. (UAP), "New translations for the Ivatan house Integrating DRR and CCA measures for the rebuilding of heritage houses in Itbayat, Batanes" [\[PPT\]](#)
 - d. Tandoc, E. (East West Bank), "From Disaster Preparedness to Technology Driven Disaster Resilience: Installation of Clean Water System - Barangay San Andres, Cainta, Rizal" [\[PPT\]](#)
 4. Agra, F., Banbang, M.A., Dalumpines, W., Hernandez, L., Muroka, K., Molina, M.A., Penaflorida, A., Ramirez, M.A., Robles, K.A., W, S.N.S., Yamashita, K., "Participatory Community Risk Assessment of Informal Settler Communities in Barangay Loyola Heights"

- i. ["Resilient Recovery of the Most Vulnerable: Challenges & Opportunities"](#) Session 3 of NRC's COVID-19 Knowledge Series. 12 May 2020.
 - i. Karaos, A.K. (JJCICSI, ADMU DSA), "Urban Poor Vulnerabilities, Solidarity Networks, and Pathways to Resilience" [[Recording](#)]
 - ii. Pamonag, D. (DSWD), "DSWD's Response to Build the Resilience of the Most Vulnerable," [[Recording](#)]
 - iii. Concepcion, J. (GoNegosyo), "Harnessing the MSMEs from the COVID-19 Impacts: Opportunities and Challenges" [[Recording](#)]
 - iv. Alip, A. (CARD-MRI), "The Role of Microfinance in Cushioning Impacts on the Vulnerable Population" [[Recording](#)]
 - v. Consunji, J. (DM Consunji, Inc.), "Private Sector Role in Alleviating Consequences of Measures on the Workforce," [[Recording](#)]
- j. ["COVID-19 Impacts on Health and Society,"](#) Day 1 of 15th APSA 2020 Two-day Webinar on COVID-19, Climate, and Health. 6 October 2020. ([Book of Abstracts](#))
 - i. Opening Messages from Yap, R. C. (ADMU), Robertson, M. (IDRC - Canada), Canuday, J.J. (ADMU DSA)
 - ii. Hossain, S.Z. (University of Sydney), "Impacts of COVID-19 on Women in the Asia Pacific Region: Sociological Perspectives" [[PPT](#), [Recording](#)]
 - iii. Huong, N.T. (Hanoi University of Public Health), "The Government Response to COVID-19 in Vietnam: Success and Challenges" [[PPT](#), [Recording](#)]
 - iv. Muto, K. (University of Tokyo), "Health Policy Response to COVID-19 in Japan" [[Recording](#)]
 - v. Akram, M. (Aligarh Muslim University), "COVID-19 and Lockdown: Abrupt Measures and Never-Ending Social Miseries" [[PPT](#), [Recording](#)]
 - vi. Saks, M. (University of Suffolk, University of Lincoln, University of London), "The Health Policy Response to COVID-19 in England" [[PPT](#), [Recording](#)]
- k. ["Climate, COVID-19, and the City: Challenges to Recovery and Resilience,"](#) Day 2 of 15th APSA 2020 Two-day Webinar on COVID-19, Climate, and Health. 7 October 2020. ([Book of Abstracts](#))
 - i. Opening Messages from Yap, R. C. (ADMU), Robertson, M. (IDRC - Canada), Canuday, J.J. (ADMU DSA)
 - ii. Porio, E. (ADMU DSA, MO), "Climate, COVID-19, and the City: Challenges to Recovery and Resilience" [[Recording](#)]
 - iii. Wilson, L. (University of Sydney), "COVID-19 and Well-being: The Impact of Environmental Stressors" [[PPT](#), [Recording](#)]
 - iv. Dator-Bercilla, J. (UVP), "Localization: COVID-19 Challenges, Opportunities, Approaches in a Coastal City" [[PPT](#), [Recording](#)]
 - v. Noppaladarom, T. (Community Organizations Development Institute), "COVID-1 Crisis: Urban Poor Communities, Resilience Efforts, Thailand" [[PPT](#), [Recording](#)]
 - vi. Castillo-Carandang, N. (UP Manila - Dept. of Clinical Epidemiology), "Life in the Anthropause" Castillo-Carandang [[PPT](#), [Recording](#)]

- vii. Response from Lampitoc, A. [Recording]
- l. [“Systems Thinking for Resilience Planning,”](#) CCARPH Climate and Disaster Resilience Lecture Series. 22 October 2020. [Event Program]
 - i. Opening Remarks from Porio, E. (ADMU DSA, MO) and Bautista, E. (ADMU School of Social Sciences, ADMU - Dept of Mathematics)
 - ii. Gotangco-Gonzales, K. (ADMU - Dept. of Environmental Science, AIS), “Systems Thinking, Resilience and Strategic Planning,” [Recording]
 - iii. Jardeleza, J.M. (ADMU - Dept. of Environmental Science, AIS), “Presentation of City Resilience Toolkit (CResT),” [Recording]
- m. [Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series.](#) 27 October - 11 November 2020
 - i. [Session 1](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 27 October 2020.
 - 1. Opening remarks by Porio, E. (ADMU DSA, MO)
 - 2. Lim, L. (ISO, ADMU DSA), “Social Transformation and Grassroots Empowerment (STAGE): A Strategy for Promoting Island-Based Coastal Resources Management,” [PPT, Recording]
 - 3. Qutorio, J. (ISO), “Facilitating Mangrove Management in Siruma Camarines Sur (2014-2020),” [PPT, Recording]
 - 4. Saddi, Commentary and Response to STAGE: A Strategy for Promoting Island-based Coastal Resource Management [PPT, Recording]
 - ii. [Session 2](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 29 October 2020.
 - 1. Opening remarks by Porio, E. (ADMU DSA, MO)
 - 2. Hosoda, M. (Seisa University), “Condition of a Sustainable Coexistence Between People and Nature” [PPT, Recording]
 - 3. Redillas, S. (University of Santo Tomas and Letran Manaoag), and Lucero, R. (UP Los Baños, UP Open University), “The Caleruega Philippines Experience: Mirroring Integrity of Creation and UN Sustainable Development Goals” [PPT, Recording]
 - 4. Fung “Toward Integral Ecology Through Coexistential Ecology” [PPT, Recording]
 - iii. [Session 3](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 3 November 2020.
 - 1. Opening remarks by Porio, E. (ADMU DSA, MO)
 - 2. Ramos, G. (Oceana - Philippines), “Mainstreaming Marine Ecosystem Protection for a Climate-Resilient Community” [PPT, Recording]
 - 3. Tabada, M.A. (VSU - Gender Resource Center), and Caparas, M.J. (UNESCO-IHE), “Build, Build, Build: Implications to Resource Management and Community Resilience” [PPT, Recording]
 - iv. [Session 4](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 4 November 2020.

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1. Opening remarks by Porio, E. (ADMU DSA, MO)
 2. Canoy, M.E (Kitanglad Integrated NGOs, Inc.). and Bae Inatlawan, "Capturing Indigenous Perspectives in Ecosystems-Based Adaptation Inside Ancestral Domains" [[PPT](#), [Recording](#)]
 3. Castro-Lee, E (Blue Ridge Brgy. LGU). "Blue Ridge B.R.E.A.T.H.S. (Blue Ridge Environmental and Agricultural Template for Health, Economy and Security)" [[PPT](#), [Recording](#)]
 - v. [Session 5](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 5 November 2020.
 1. Opening remarks by Porio, E. (ADMU DSA, MO)
 2. Wun'gaeo, S. (Chulalongkorn University) et. al., "Mekong River Development Challenges and Responses" [[PPT](#), [Recording](#)]
 - vi. [Session 6](#) of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 11 November 2020.
 1. Opening remarks by Porio, E. (ADMU DSA, MO)
 2. Mijares, C. (ADMU DSA, ADMU Office of University and Global Relations - APS program), "Baon sa Pagbangon (Preparation for Adaptive Resilience): Resources for Community-Based Arts Engagement for Resilience and Sustainability" [[PPT](#), [Recording](#)]
 3. Cabochan, L. (ADMU - Dept. of Fine Arts), "Community-Based Arts as a Vehicle for Social Change and Enhancing Resilience Initiatives" [[PPT](#), [Recording](#)]
 4. Marasigan, A. (ADMU - Dept. of Fine Arts, Arete), "Omehen: The Garden as Chronicle and Strategy of Resistance" [[PPT](#), [Recording](#)]
 - vii. Session 7 of Climate, Resource Management, and Human Development: Community Resilience Initiatives in Asia 2020 Lecture Series. 12 November 2020 (Postponed due to inclement weather, Typhoon Vamco/Ulysses)
 1. Yulo Loyzaga, A. (NRC, MO) "The National Resilience Scorecards (Philippines)"
 2. Fritz, J.M. (University Cincinnati, ISA RC 46) "Community Interventions for Environmental Resilience" [[PPT](#)]
 - viii. Online Class Lecture 1 (Closed to the public)
 1. Sciortino, R. (SEA Junction Thailand), "Social Impacts of Regional integration in the Greater Mekong Sub-region"
 2. Dator-Bercilla (UPV), "Disaster Risk Reduction and The Sustainable Development Goals" [[PPT](#)]
 - ix. Online Class Lecture 2 (Closed to the public)
 1. Prodigalidad, "Essential Elements of City Resilience" [[PPT](#), [Recording](#)]
 2. Porio "Community-Based Initiatives for Resilience in Master of Disaster Risk and Resilience (MDRR) and CCARPH, Ateneo de Manila University" [[PPT](#), [Recording](#)]

3. Sison, Udto, Labsan, et. al. "Integrated Community Food Production (ICPF) in Barangay Bignay, Valenzuela City" [[PPT](#), [Recording](#)]
 4. Abinales "BUKLOD TAO, INC: Envisioning a free, peaceful, progressive, and resilient community" [[PPT](#), [Recording](#)]
- n. ["System Dynamics Modeling for Quantifying Resilience,"](#) CCARPH Climate and Disaster Resilience Lecture Series. 10 November 2020.
- i. Opening Remarks from Porio, E. (ADMU DSA, MO) and Bautista, E. (ADMU School of Social Sciences, ADMU - Dept of Mathematics)
 - ii. Gotangco-Gonzales, K. (ADMU - Dept. of Environmental Science, AIS), "Introduction to the systems approach," [[Recording](#)]
 - iii. Litam, J.E. (ADMU - Dept. of Environmental Science), "Presentation of the Urban Ecosystems Resilience Index (UERI) Model," [[Recording](#)]
 - iv. Gotangco-Gonzales, K. (ADMU - Dept. of Environmental Science, AIS), and Abenojar, K. (ADMU - Dept. of Environmental Science), "Presentation of the Socio-Economic Resilience Index (SERI) Model" [[Recording](#)]
 - v. Campos, J.I (ADMU - Dept. of Environmental Science), "Presentation and Demonstration of the Integrated Urban Services Resilience Index (IUSRI) Model," [[Recording](#)]
- o. ["Engineering Equitable Resilience in Metro Manila: Possibilities for Urban Transformation in Muntinlupa City,"](#) CCARPH-NRC Lecture Series 2021. 26 February 2021. [[Event Program](#)]
- i. Opening Remarks from Yap, R. C. (ADMU), Romulo, R. R. (NRC, Carlos P. Romulo Foundation)
 - ii. Gray, S. (Harvard Graduate School of Design, Sasaki), and Ocampo, M.A. (Massachusetts Institute of Technology, Sasaki), "People, Environment, Development: An Integrated Approach to Resilience in Muntinlupa City" [[PPT](#), [Recording](#)]
 - iii. Response from Villarin, J. (ADMU, MO) [[Recording](#)]
 - iv. Response from Alcazaren, P. (PGAA Creative Design) [[Recording](#)]
 - v. Response from Fresnedi, J. (Muntinlupa City LGU) [[Recording](#)]
 - vi. Response from Biazon, R. (Muntinlupa City LGU) [[Recording](#)]
- p. ["Gender, Climate, and Disaster Resilience: Challenges of Equity and Sustainability,"](#) CCARPH-NRC Lecture Series 2021. 1 March 2021. [[Event Program](#)]
- i. Opening Remarks from Yulo-Loyzaga, A. (NRC, MO), Porio, E. (ADMU, MO)
 - ii. Licuanan, P. (Beijing 95 Chairperson), "Gender and the Environment: Promises Made, Promises Broken" [[PPT](#), [Recording](#)]
 - iii. Resurreccion, B. (Queens University, Stockholm Environment Institute), "Applying a gender intersectional analysis to climate change" [[PPT](#), [Recording](#)]
 - iv. Sta. Maria, A. (Ateneo Law School, Ateneo Human Rights Center), "Integrating Gender, Climate, and Disaster Resilience into the Law School Curriculum" [[PPT](#), [Recording](#)]

- v. Response from Tabada, M.A. (VSU - Gender Resource Center), "Engendering a Gender-Responsive University" [[PPT](#), [Recording](#)]
- vi. Response from Climaco, B. (Zamboanga City LGU) [[PPT](#), [Recording](#)]
- q. ["Gender and Resilience in a Coastal City: Stories of Equity and Sustainability from the Ground,"](#) CCARPH-NRC Lecture Series 2021. 22 March 2021. [[Event Program](#)]
 - i. Opening remarks by R. Yap (ADMU), Camposano, C. (UPV), Yulo-Loyzaga, A. (NRC, MO), Porio, E (ADMU, MO)
 - ii. Treñas, J. (Iloilo City LGU), "Gender and Resilience-building in Iloilo City" [[Recording](#)]
 - iii. Defiesta, G. (UPV), "Gender and Social Vulnerability: The Case of Iloilo City" [[PPT](#), [Recording](#)]
 - iv. Magno, D. (Iloilo City LGU), and Caban, J. (DSWD VI), "Women and Men in Risk Reduction Decision Making in Coastal Cities and Contexts" [[PPT](#), [Recording](#)]
 - v. Elosendo, S. (Aeta Community in Lanit, Jaro), Elosendo, R. (Aeta Community in Lanit, Jaro), Catacutan, A. (Tiu Tio Teg Ana Rose Foundation High School), and Nagnal, J. (Tiu Tio Teg Ana Rose Foundation High School), "Conversations on Gender roles in food and water security amongst displaced and resettled indigenous peoples" [[Recording](#)]
 - vi. Cadornigara, S. (Homeless Peoples Foundation), "Localized COVID-19 Intervention: The Homeless People's Federation Philippines Experience" [[PPT](#), [Recording](#)]
 - vii. Areno, E. (ICODE NGO), "Gender, Intersectionality (poverty and privilege, age, disability, etc.) in the Localization of COVID 19 prevention, mitigation, response among riverine and coastal communities: Initiatives from ICODE" [[PPT1](#), [PPT2](#), [Recording](#)]
 - viii. Perspectives from the Private Sector by N. Lim (Richmonde Hotel Iloilo) [[Recording](#)]
 - ix. Applications to the University and Teaching; Response by C. Jimenez (UPV) [[PPT](#), [Recording](#)]
 - x. Closing Remarks by M. Muyargas (UPV) [[Recording](#)]
 - xi. Gender, addressing inequalities, resilience, and sustainable development by J. Dator-Bercilla (UPV) [[PPT](#), [Recording](#)]
- r. ["Gender, Environment, and Housing Resilience: Challenges of Equity and Sustainability,"](#) CCARPH-NRC Lecture Series 2021. 31 March 2021. [[Event Program](#)]
 - i. Opening remarks from Yulo-Loyzaga, A. (NRC, MO), Porio, E (ADMU, MO)
 - ii. Ocampo, M.A. (Massachusetts Institute of Technology, Sasaki), "Centering Women in Resilience Planning and Design" [[PPT](#), [Recording](#)]
 - iii. Karaos, A.K. (JJCICSI, ADMU DSA), "Women's Experiences During Typhoon Ulysses" [[PPT](#), [Recording](#)]
 - iv. Response from Benitez, F. (House Committee on Housing and Urban Development, Negros Occidental LGU) [[Recording](#)]

- v. Response from Payot, J. (Social Housing Finance Corporation, ADMU DSA), "From Vulnerability to Resilience through a systems approach to housing" [[PPT](#), [Recording](#)]
- vi. Response from Soto, J. (We Effect Philippine Country Office), "Gender & PWD sensitive, green architecture and engineering for resiliency" [[PPT](#), [Recording](#)]
- vii. Response from De Rosas Ignacio, M.A. (KASAGANA-KA / K-Coop), "Kasagana-ka Coop: Gender, Environment, Housing Resilience" [[PPT](#), [Recording](#)]
- s. "[Systems Thinking for Resilient and Inclusive Development](#)," CCARPH-NRC Lecture Series 2021. 27 April 2021. [[Event Program](#)]
 - i. Opening remarks from Yulo-Loyzaga, A. (NRC, MO), Porio, E (ADMU, MO)
 - ii. Reynolds, W. (USAID, ADMU DSA), "The Use of Influence Diagrams in Qualitative Systems Analysis of Socio-cultural Systems" [[PPT](#), [Recording](#)]
 - iii. Tangonan, G. (ADMU - Dept of ECCE, AIC), "The Present Normal of Cascading Disasters" [[PPT](#), [Recording](#)]
 - iv. Response from See, J. (La Trobe University, ADMU DSA) [[Recording](#)]
 - v. Response from Aldaba, F. (ADMU SOSS, ADMU - Dept. of Economics) [[PPT](#), [Recording](#)]
 - vi. Response from Bautista, E. (ADMU SOSE, ADMU - Dept. of Mathematics) [[Recording](#)]
 - vii. Response from Canilao, M. (UP Diliman - Archaeological Studies Program) [[Recording](#)]
- t. "[Frameworks for Equitable and Sustainable Social-Ecological Transitions](#)," Session 1 of Engaging Communities in Risk Governance, Resilience, and Sustainability 2021 Webinar Series. 13 July 2021. [[Event Program](#)]
 - i. Opening remarks from Porio, E. (ADMU DSA, MO)
 - ii. Hosoda, M. (Seisa University), "Condition of a Sustainable Coexistence between People and Nature," [[PPT](#), [Recording](#)]
 - iii. Fung, J. (ADMU - Loyola School of Technology) "Toward Integral Ecology through Coexistential Ecology," [[PPT](#), [Recording](#)]
 - iv. Porio, E. (ADMU DSA, MO), "Systems Thinking for Risk Governance, Resilience, and Sustainable Development" [[PPT](#), [Recording](#)]
- u. "[Deepening Systems Thinking for Risk Governance, Equity and Resilience](#)," Session 2 of Engaging Communities in Risk Governance, Resilience, and Sustainability 2021 Webinar Series. 15 July 2021. [[Event Program](#)]
 - i. Opening remarks from Porio, E. (ADMU DSA, MO)
 - ii. Yulo-Loyzaga, A. (NRC, MO), "Deepening Systems Thinking and NRC's LGU Resilient Program," [[PPT](#), [Recording](#)]
 - iii. Tolibao, C. (Ormoc City LGU), "Deepening Systems Thinking for Risk Governance, Resilience, and Development: The Practitioner's Perspective" [[PPT](#), [Recording](#)]

- iv. Tabada, M.A. (VSU - Gender Resource Center), "Deepening Systems Thinking for Risk Governance, Resilience, and Development: The View from the Academe," [[PPT](#), [Recording](#)]
- v. Gomez, R. (Ormoc City LGU), "Deepening Systems Thinking for Risk Governance, Resilience, and Development: The Mayor's Perspective," [[PPT](#), [Recording](#)]
- v. "[Disaster Risk Reduction and Management: Community Resilience Innovations](#)," Session 3 of Engaging Communities in Risk Governance, Resilience, and Sustainability 2021 Webinar Series. 19 July 2021.
 - i. Opening remarks from Porio, E. (ADMU DSA, MO)
 - ii. Uy, N. (International Recovery Platform), "Community-based Disaster Risk Reduction and Management: Good Practices and Lessons Learned" [[Recording](#)]
 - iii. Mijares, C.C. (ADMU DSA, ADMU Office of University and Global Relations - APS program), "Crafting Adaptive Resilience and Community Resilience Toolkit: The Case of Buklod Tao Youth," [[PPT](#), [Recording](#)]
 - iv. Marasigan, A. (ADMU - Dept. of Fine Arts), "Omehen and E-punla: Gardens as Method, Meeting, and Moment" [[PPT](#), [Recording](#)]
 - v. Abinales, M. (Buklod Tao Katatagan Inc.), "Constructing Community Resilience: The Case of Buklod Tao" [[PPT](#), [Recording](#)]
 - vi. Porio, E. (ADMU DSA, MO) "Systems Thinking and Transdisciplinarity in Community Resilience Innovations," [[PPT](#), [Recording](#)]
- w. "[Local Resource Management, Resilience and Sustainability](#)," Session 4 of Engaging Communities in Risk Governance, Resilience, and Sustainability 2021 Webinar Series. 22 July 2021.
 - i. Opening remarks from Porio, E. (ADMU DSA, MO)
 - ii. Fritz, J.M. (US Environmental Protection Agency's National Environmental Justice Advisory Council, ISA RC 46), "Environmental Justice, Housing and Dispute Intervention," [[PPT](#), [Recording](#)]
 - iii. Soto, J. (We Effect Philippines), "Gender Equality in Housing, Cooperatives, and Community Pantries," [[PPT](#), [Recording](#)]
 - iv. Tusalem, B. (Juilo and Florentina Foundation) "Gender-sensitive Climate and Disaster Resilient Housing Designs and Technologies with Food Security & Urban Agriculture: A Management Systems Approach," [[PPT](#), [Recording](#)]
 - v. Porio, E. (ADMU DSA, MO), "Embedding Systems Thinking and Transdisciplinarity in Gender-sensitive and Climate Resilient Housing Innovations," [[PPT](#), [Recording](#)]

Annex 9: List of Risk Communication Innovations

Exhibits

2018

1. [Risk to Resilience Interactive Exhibit](#) . Arete, Ateneo de Manila University. 24 January - 12 December 2018.
2. Risk to Resilience Exhibit in the [Resilience Market Place Innovation Forum](#). SMX Convention Center. August 2018. [[Link1](#)] [[Link2](#)]

2019

1. [SAGIP Makeshift Disaster Intervention Technology](#). Arete, Ateneo de Manila University. February 2019.
2. [CCARPH Risk to Resilience Exhibit](#) in the OCD Disaster Summit. Quezon City. 20-21 July 2019.
3. [CCARPH-AIC-INECAR Disaster Resilience Technologies Exhibit in the 1st RESILIEX Innovations for a Resilient Community](#). Naga City. 22-25 Oct 2019.
4. [Risk to Resilience Exhibit in the November 11 CCARPH Midterm Conference](#). Arete, Ateneo de Manila University. 11 November 2019.
5. [MDRR Capstone Projects Exhibit in the November 11 CCARPH Midterm Conference](#) Arete, Ateneo de Manila University. 11 November 2019.
6. [CCARPH Risk to Resilience Exhibit in NRC's Top Leaders Forum](#). SMX Convention Center. 12 November 2019.
7. [CCARPH Risk to Resilience Exhibit in the Manila 2050: Towards a Sustainable Urban Development with Arete and the Embassy of France in Manila](#). Arete, Ateneo de Manila University. 27 June 2019.
8. CCARPH Risk to Resilience Exhibit in the DILG Orientation of Newly Elected Officials

2020

1. Launch of the [Virtual SAGIP Exhibit](#). Online. January 2020.
2. CCARPH Risk to Resilience Conference in the Mar. 7 "Bridging Science-Policy-Practice Nexus through Transdisciplinary Research and Resilience Innovations" International Conference. Arete, Ateneo de Manila University. March 2020.

Community-Based Arts (CBA) for Resilience

1. Mijares, C. Ahon sa Pagbangon (Preparations for Adaptive Resilience) & Community Resilience Toolkit for Youth Resilience Champions in Buklod-Tao, Inc. [\[Link\]](#) [\[Poster\]](#)
2. Marasigan, A., "Omehen: The Garden as Unfinished Chronicle and Ongoing Strategy of Resistance" [\[YouTube\]](#) [\[Presentation\]](#) [\[Link\]](#)
3. Marasigan, A. "Omehen and E-punla: Gardens as Method, Meeting, and Moment" [\[YouTube\]](#) [\[Presentation\]](#)
4. Marasigan, A. & the Institute of Social Order (ISO). E-Punla: The Garden as a Nexus of the Digital Realm and the Climate Crisis. [\[Link\]](#) [\[Facebook Feature 1\]](#) [\[Facebook Feature 2\]](#) [\[Facebook Feature 3\]](#)
5. Labsan, L., Cabochan, L., & Udto, A.J. Integrated Community Food Program (ICFP) [\[Link\]](#) [\[Poster\]](#)

Science Communication Projects

1. Abad, R. *Risk and Resilience in the City*, Lecture-Doodle. [\[Video\]](#)[\[Transcript\]](#)
2. Crisostomo, B.J. *AZUL: Ang Sirena ng Sigwa*, Play. [\[Synopsis\]](#)[\[Script\]](#)

Annex 10: Awards and Recognitions Received

1. Cambaliza, M.O., [Top Awardee of the School of Science & Engineering - Ateneo Research Institute of Science & Engineering \(SOSE-ARISE\) Publication Awards](#). 2020
2. Campos, J.I.D, and Litam, J.E.C. (V BS ES), with faculty advisers Gotangco Gonzales, C.K. and Josol, J. [Citation Award for Seniors Group Research](#) and Seniors Award for "Developing an Urban Ecosystem Resilience Index Using a System Dynamics Approach" Ateneo de Manila University. 2020
3. Itchon, G.S., Lo, D.S., Vallente Jr., J.R., "Web-GRiD: A Decision Support Tool for Local Government Units (LGUs) in COVID-19 Response and Recovery Operations". [First place in Poster Presentation and 3-minute Pitch: Professional Category, Northern Mindanao Consortium for Health Research and Development](#). November 2020
4. Narisma, G. (LA), Cruz, F. (LA), Perez, R.T. (LA), Jamero, L. (CA). Lead and Contributing Authors, Intergovernmental Panel for Climate Change (IPCC) Sixth Assessment Report. [\[Link\]](#)
5. Oppus, C., [Top Awardee of the School of Science & Engineering - Ateneo Research Institute of Science & Engineering \(SOSE-ARISE\) Publication Awards](#). 2020
6. Porio, E., Lead Author (LA) for the Equity, Development, and Informality Chapter in the Third Assessment Report on Climate Change and Cities (ARC3.3), Earth Institute, Columbia University, forthcoming, Cambridge University Press (2022)

7. Porio, E., [Review Editor for the Journal Frontiers in Sustainable Cities](#), Editorial Board, Cities in the Global South, 2021.
8. Ravago M.-L. V., [Outstanding Book Award for co-authoring the book "Powering the Philippine Economy: Electricity Economics and Policy"](#) (with co-authors James Roumasset, Rolando Danao; published by UP Press; ISBN: 978-971-542-879-8), 2020 National Academy of Science and Technology (NAST) Awards. 2020
9. Simpas, J.B., [Top Awardee of the School of Science & Engineering - Ateneo Research Institute of Science & Engineering \(SOSE-ARISE\) Publication Awards](#). 2020
10. [ADMU's Master of Disaster Risk and Resilience Program among Far East Asia's Best](#), Eduniversal Ranking. 2021

Annex 11: Monitoring, Evaluation, and Learning Opportunities (Meetings)

- Reference folders: [ [Meetings](#),  [Conferences and Workshops](#)]

2018

- Coastal Cities at Risk (CCAR) 2 Project Coordination Meeting, January 23, 2018, LH 404, Dean's Conference Room, Leong Hall
- CCAR2 Project Coordination Meeting, June 22, 2018
- First Stakeholders Forum Naga City, February 8, 2018, Avenue Square, Naga City [[Website post](#)]
- Meeting with National Resilience Council, April 16, 2018, CTC 401, Ateneo de Manila University
- Meeting with National Resilience Council, August 7, 2018, Bank of Singapore, 3/F George SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- Meeting with Naga City Team, and NRC, September 19, 2018
- Lunch Meeting with MDRR Students, September 29, 2018
- Strategic Planning Workshop with NRC, October 24, 2018, College '66 Co-Lab, 3rd Floor, Arete, Ateneo de Manila University
- Meeting with Valenzuela City TWG on Barangay Resilience, with ADMU and NRC, November 13, 2018, Valenzuela City Hall
- Meeting with National Resilience Council, December 5, 2018, CTC 401, Ateneo de Manila University

2019

- CCARPH Research Coordination Meeting, March 18, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University [[Photos](#), [PPTs](#)]
- Internal Project Meeting / CCARPH Coordination Meeting, April 12, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University [[PPTs](#)]

- CCARPH Meeting with Pasig City Government, April 24, 2019, 8th Floor Conference Room, Pasig City Hall [[Photos](#)]
- Valenzuela City Resilience Council Meeting re: Search on Data Sets, April 30, 2019 [[Website post](#)]
- CCARPH Project Management Team Meeting, April 30, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- CCARPH Internal Project Meeting, May 28, 2019 [[PPTs](#)]
- Iloilo City Convergence Meeting for Resilience, Planning with Manila Observatory, May 23-24, 2019 [[Website post](#)]
- Project Management Team Meeting, May 30, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- Project Management Team Meeting, June 10, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- CCARPH Internal Project Meeting with PI, July 4, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University [[PPT](#)]
- CCARPH Internal Project Meeting, June 20, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University [[PPTs](#)]
- NRC Academic Partner's Business Meeting, September 19, 2019, Berjaya Hotel, Makati City [[Program](#), [Photos](#), [Website Post](#)]
- Muntinlupa City Consultation Meeting and Workshop on City and Barangay Resilience Scorecards, October 29, 2019
- Weekly CCARPH Project Management Meeting, September to December 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- CCARPH Internal Project Meeting, September 17, 2019, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University [[Photos](#), [PPTs](#)]

2020


- Research Team Writeshop, January 20, 2020, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- Meeting with Muntinlupa City DILG Director Bing Ferino, January 28, 2020, Muntinlupa City [[Social Media post](#)]
- CCARPH-NRC Meeting with Manila City LGU, February 4, 2020, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- Climate Change Commission Meeting, February 4, 2020, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- CCARPH Project Management Team Meeting, February 5, 2020, Eduardo J. Aboitiz Sandbox Zone, 3/F Georg SK Ty Learning Innovation Wing, Arete, Ateneo de Manila University
- Muntinlupa TWG Meeting - Brgy. Resilience Planning Workshop, February 6, 2020, Muntinlupa City

- Discussion of transdisciplinary action research initiatives in Valenzuela City, February 13, 2020, Mayor's Office, Valenzuela City Hall [[Social Media post](#)]
- NDRRMC-NRC Technical Working Group Meeting on Harmonization and Convergence, February 18, 2020, Old Conference Room, 2F Floor Old NDRRMC Bldg., Natividad Avenue, Camp Aguinaldo, Quezon City [[Website post](#)]
- Bi-weekly CCARPH Project Management Team Meeting, April to December 2020, Google Meet / Zoom
- Meeting of the OCD Technical Advising Group (TAG) for the development of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025, June 26, 2020, Zoom [[Photo](#)]
- Iloilo CDRA Team Coordination Meeting, July 2, 2020, Zoom
- Research Team Meeting on CCARPH Lecture Series, July 15, 2020, Zoom [[PPT](#)]
- MDRR Handover Meeting with Dr. Aileen Guzman, July 21, 2020, Zoom
- Weekly CCARPH Interns' Meetings, July to November 2020, Google Meet
- Meeting with CCARPH Council of Advisers, August 15, 2020, Google Meet
- Meeting with CCARPH Council of Advisers, August 15, 2020, Zoom
- Meeting with new CCARPH Project Holder and ADMU President, August 27, 2020, Zoom [[Photo](#), [PPTs](#)]
- NRC Report to the Local Chief Executive Hon. Mayor Jaime Fresnedi of Muntinlupa City, August 27, 2020
- CCARPH-NRC Meeting on Systems Thinking Course and Institutionalization, September 1, 2020, Zoom
- CCARPH Research Team Meeting: Institutionalizing Climate and Disaster Resilience in ADMU-MO-NRC/LGU and CSO Partners, September 24, 2020, Zoom [[Photos](#), [PPTs](#)]
- Meeting with Pasig City LGU, October 8, 2020, Zoom [[Photo](#), [PPT](#)]
- Meeting with PLMun, October 21, 2020, Zoom
- Ocular visit to Barangka Barangay Hall to test Solar Auto-Hand Washer (SAHW) system, October 23, 2020, Marikina City Hall
- Final CCARPH Research Team Meeting/Thanksgiving Meeting, November 26, 2020 [[PPT](#)]
- CCARPH-NRC Meeting on Deepening Systems Thinking course and Ways forward for Muntinlupa City, December 4, 2020, Zoom
- Meeting on Program of Instruction for Deepening Systems Thinking course, December 10, 2020, Zoom
- Economics Team Meeting and Orientation led by Dr. Ramon Clarete on SAM-CGE with Naga and Iloilo City teams, December 10, 2020, Zoom
- CCARPH End-of-Year Updates Assessment Meeting, December 16, 2020, Zoom
- Meeting on Program of Instruction for Deepening Systems Thinking course, December 16, 2020, Zoom
- NRC Board Meeting, December 18, 2020, Zoom [[Photo](#)]
- Demo 1 / Resilience Toolkit Presentation to Scientists, December 21, 2020, Zoom
- Meeting with Dr. Mylene Lising on Sustainable Solutions for Cagayan, December 22, 2020, Zoom

2021

- Weekly Project Management Meeting, January to June 2021, Zoom

- CCARPH PMT Meeting re: APSA 2020 Article, January 15, 2021 [[Website post](#)]
- NRC StratPlanning Workshop, January 18, 2021, Zoom
- Meeting re: IRA E-book of Naga and Iloilo City, January 18, 2021, Zoom
- CCARPH-AIC Meeting in preparation for partnership with Brgy. Maybunga and Pasig City RAVE (Rainforest Adventure Experience) Park group, January 28, 2021, Zoom
- Demo 2 of CCARPH Resilience Toolkit, January 29, 2021, Zoom
- CCARPH-AIC meeting with Brgy. Maybunga and Pasig City RAVE (Rainforest Adventure Experience) Park group, February 1, 2021, Zoom
- Meeting with H.E. Mr. Shambhu S. Kumaran, Ambassador of India to the Philippines, February 2, 2021, Zoom [[CCARPH PPT](#)]
- CCARPH meeting with JJCICSI, February 8, 2021, Zoom [Link to [Policy Brief](#)]
- Meeting with Atty. Junefe Payot and JJCICSI, February 11, 2021, Zoom
- NRC Strategic Planning Part 2, February 12, 2021, Zoom
- Meeting with ISO and Omehen re: E-punla, February 17, 2021, Zoom
- Meeting with Prof. Wijitbusaba Ann Marome / R-CES Network, February 23, 2021, Zoom
- Meeting re: Intl Climate Disaster Resilience conference, March 9, 2021, Zoom
- Meeting with Manila Observatory re: Institutionalization, March 19, 2021, Zoom
- Meeting with MO and CCARPH & MDRRM, March 24, 2021, Zoom
- Meeting with ISO and Omehen re: E-punla, March 24, 2021, Zoom
- Meeting re: CCARPH-NRC-MO Manila City SoVi partnership, March 29, 2021, Zoom
- Meeting re: CCARPH-NRC-MO Manila City SoVi partnership, April 6, 2021, Zoom
- Meeting with CCARPH Council of Advisers
- Turnover Meeting of CCARPH Resilience Toolkit Website, April 7, 2021, Zoom
- Weekly Meeting with Ateneo de Manila University Gender & Development Office for Gender, Climate, and Disaster Resilience partnership with UNDP, April to May 2021, Zoom
- Meeting re: CCARPH-NRC-MO Manila City SoVi partnership, April 15-16, 21 2021, Zoom
- Meeting re: Discussion for institutionalization initiatives of CCARPH-AIC, April 28, 2021, Zoom
- Meeting and Preparations with AIC re: Installations for Brgy. Maybunga Hall and Pasig City RAVE, April 30, 2021
- DOST - NRC Team Convergence Meeting, April 30, 2021, Zoom
- Meeting with PLMun re: preparations for mainstreaming gender and resilience, April 30, 2021, Zoom
- Meeting with project pool of expert and principal investigators (Dr. Canilao, Ms. Bercilla, and Mr. Cua) re: CCARPH deliverables, May 3, 2021, Zoom
- Institutionalization Meeting with SOSE and SOSS Deans, May 4, 2021, Zoom
- Arts 181 Meeting re: E-punla, May 5, 2021, Zoom
- Meeting with SOSE-ARISE, May 10, 2021
- Meeting with SOSE-ARISE re: transdisciplinarity in climate and disaster resilience science, May 10, 2021
- Meeting with Asian Peacebuilders Scholarship programme manager, May 10, 2021, Zoom
- Meeting with CCARPH project advisers, May 13, 2021, Zoom

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- Meeting with DSA professors, Atty. Payot, and Dr. Soco re: climate, vulnerability, and urban development research study, May 15, 2021, Zoom
 - Meeting with Resilience Toolkit website developers for final editing agreements, May 17, 2021, Zoom
 - Institutionalization Meeting with MO, ADMU Physics, SOSE-ARISE, May 19, 2021, Zoom [[Website Post](#)]
 - Institutionalization Meeting with SOSS and ADMU Economics, May 24, 2021, Zoom
 - Meeting with Visayas State University Gender Resource Center and Ateneo de Manila University Gender Development Office, May 31, 2021, Zoom
 - Meeting with ES students re: Pasig City LGU engagement of incoming senior Environmental Studies students, June 5, 2021, Zoom
 - Meeting with SOSE re: MDRR executive program courses, June 7, 2021, Zoom
 - Consultation Meeting with CCARPH Council of Advisers, June 19, 2021, Zoom



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