GEARED TOWARDS RESILIENCE – Participants together with the selection committee of the recently concluded “Young Leaders for Resilience Program Local Competition” held last October 30, 2019 at the Bellevue Hotel, Muntinlupa City. The selection committee includes Sen. Rodolfo “Pong” Biazon, Mr. Erwin Alfonso (Head, Muntinlupa City Disaster Risk Reduction and Management Office), Mr. Noel Cadorna (Head, City Planning and Development Office), Dr. Emma Porio (Project Leader, CCARPH), Ms. Elvie Sanchez-Quiazon (President, Philippine Chamber and Industry Muntinlupa), Mr. James Christopher Padrilan (Local Government Operations Officer, Department of Interior and Local Government)

Through a partnership between the City of Muntinlupa, Coastal Cities at Risk in the Philippines (CCARPH), and the National Resilience Council (NRC), Muntinlupa City showed its dedication to achieve resilience amidst the increasing number of climate disasters brought about by climate change. The Muntinlupa Resilient Barangay Program was launched on Aug. 7, 2019 through the signing of the partnership agreement by Mayor Jaime Fresnedi along with the barangay captains and officials from all nine barangays in the city. This signing was then followed by a climate disaster risk assessment (CDRA) workshop headed by Manila Observatory (MO), where the barangay officials sat down with MO scientists and characterized the current state of their barangay when it comes to disaster resilience. Integral in the quest for resilience of Muntinlupa is Pamantasan ng Lungsod ng Muntinlupa (PLMun), which serves as the main academic partner within the city of Muntinlupa.

The Muntinlupa Resilient Barangay Program was launched on Aug. 7, 2019 through the signing of the partnership agreement by Mayor Jaime Fresnedi along with the barangay captains and officials from all nine barangays in the city. This signing was then followed by a climate disaster risk assessment (CDRA) workshop headed by Manila Observatory (MO), where the barangay officials sat down with MO scientists and characterized the current state of their barangay when it comes to disaster resilience. A holistic approach to resilience in the city also involves engaging both the public and private sector. Last Aug. 30, the city government together with NRC held a Stakeholders Forum with the various members of the Philippine Chamber of Commerce and Industry - Muntinlupa (PCCI) to be informed about climate disaster resilience and then to assess the current plans and initiatives of the various businesses towards resilience. By engaging the private sector, the city is able to create productive public-private partnerships (PPPs) to harmonize all the efforts in the city towards resilience. NRC also presented in the city’s Executive Legislative Agenda and Capacity Development Formulation Workshop last Sept. 12 to highlight the importance of investing in resources and activities that help the city build disaster resilience. Integral in the quest for resilience of Muntinlupa is Pamantasan ng Lungsod ng Muntinlupa (PLMun), which serves as the main academic partner within the city of Muntinlupa. Through the National Service Training Program (NSTP) of the school, PLMun was able to mobilize its students to create a new cadre of resilience youth leaders for each barangay to help the local government in its various resilience initiatives. A workshop held last Sept. 26-27 had this goal in mind, as the CCARPH team and PLMun conducted a Participatory Community Risk Assessment (PCRRA) in the barangays of Muntinlupa. Here, both students and faculty members from PLMun went down to the barangays and conducted interviews with the residents of the barangays to find out what the situation is like on the ground when a natural disaster occurs. Integrating this kind of information with the city plans and maps of the city allows for a more complete picture of resilience in the city. Last Oct. 29, NRC rolled out for the first time the Barangay Resilience Scorecards, an adapted version of their City Resilience Scorecards, and held a workshop with the barangays to conduct an initial assessment of resilience at the barangay level to better capture this picture of resilience. Directly after this workshop, PLMun participated in NRC’s Muntinlupa City Enterprise Design Thinking Workshop last Oct. 30, where young students worked to create new and innovative tools to help the city in its quest for resilience. This entire partnership wouldn’t have been made possible without the tireless support of Mr. Erwin Alfonso (Head, Muntinlupa City Disaster Risk Reduction and Management Office), Mr. Noel Cadorna (Head, City Planning and Development Office), Dr. Jose David “Pitz” Adriano (Project Development Officer, City Planning and Development Office), Dr. Ellen Fresnedi (President, PLMun) and Dr. Rowena dela Cruz (Director, Community Extension Services, PLMun).
Coastal Cities at Risk in the Philippines
Investing in Climate and Disaster Resilience

Dr. Emma Porio’s presentation panel at the UNU-EHS, UNFCCC Climate Week, Bangkok, Thailand

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GUANGZHOU, CHINA – CCARPH scientists Dr. Gemma Teresa T. Narisma (Executive Director, Manila Observatory), Dr. Faye Abigail Cruz (Laboratory Head, Regional Climate Systems, Manila Observatory), and Dr. Laurice Jamero (Resilience Collaboratory Head, Manila Observatory), joined the Intergovernmental Panel for Climate Change for its Sixth Assessment Report. The specific chapters in the Sixth Assessment Report (Climate Change) 2021: The Physical Science Basis, include the Atlas of regional climate change observations and projections on multiple timescales and on climate change information for regional impact and risk assessment. Dr. Narisma (CCARPH Work Theme 1 Leader) and Dr. Cruz are part of CCARPH Work Theme 1.1, which focuses on characterizing and visualizing climate atmospheric hazards across space and time using state of the science approaches in selected coastal cities. Dr. Jamero, as part of CCARPH 2 Work Theme 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. Their first lead author meeting was conducted in Guangzhou, China from June 25 to 29, 2018. Dr. Emma Porio (Project Leader, CCARPH) is also a contributing author to the IPCC Sixth Assessment Report (Climate Change) Chapter 6 with subsection contribution title, “Smart Cities, Smarter Leaders” The final report is set to be finished in 2022. More information about the IPCC report and chapters can be found in the IPCC website through ipcc.ch/report. Article lifted from: http://www.observatory.ph/2018/10/17/drs-gemma-narisma-and-faye-cruz-join-ipcc-in-china/

Canada’s Parliamentary Secretary to the Minister of International Development Visits Research Sites in Metro Manila, Philippines

By: Arjay Dineros

PASIG CITY – Ms. Kamal Khamera, Canada’s Parliamentary Secretary to the Minister of International Development and Member of Parliament for Brandon West in Ontario, visited the research sites of Coastal Cities at Risk in the Philippines (CCARPH): Investing in Climate and Disaster Resilience Project in Marikina City and Pasig City on December 9, 2018. Also part of the visit was Mr. Stephen Weaver (Head, Cooperation of the Embassy of Canada to the Philippines) and Mr. Rusell Milon (Director, Parliamentary Affairs and Issues Management, Office of the Minister of International Development). Dr. Emma Porio (CCARPH Project Leader) led the tour which started in the CCARPH Office, Arete, Sandbox Zone, Ateneo de Manila University Campus and followed by a visit to Barangay Tumana in Marikina City and Manggahan Floodway in Pasig City. Ms. Lisa Cabahug (Senior Manager, Department of Bioengineering and Therapeutic Sciences of University of California San Francisco) and Mr. Arjay Dineros (Research Associate, CCARPH Project) also joined the said site visits.

Photo by: Arjay Dineros

Photo by: Arjay Dineros

Photo by: Arjay Dineros

Photo by: Arjay Dineros
Ms. Ma. Antonia Yulo Loyzaga Takes the Role of Discussant and Panelist in the GP2019 and Annual ARISE General Meeting

By: Ann Maureen Malaki

GENEVA, SWITZERLAND – Ms. Ma. Antonia Yulo Loyzaga (NRC President and CCARPH Co-principal Investigator), took part in the Global Platform for Disaster Risk Reduction (GP2019) on May 13 to 17, 2019 at Geneva, Switzerland. She participated as a panelist for the Stakeholder Forum - Roundtable 3: "Mechanisms of impact: identifying modalities towards a successful Stakeholder Engagement Mechanism (SEM)". Good practices and lessons learned on stakeholder engagement were discussed as well as the possibilities to establish a stakeholder organization for resilience. Ms. Yulo Loyzaga also served as discussant for the Global Science and Technology Road Map Session where the attendees were urged to state specific pledges and contributions for the execution of the Roadmap.

On April 29, 2019, Ms. Yulo Loyzaga spoke about NRC’s work and its collaboration with ARISE Philippines during the ARISE Annual General Meeting held at the Mall of Asia Arena Annex Building, Pasay City. Various representatives from both private and public sectors attended the said meeting with the goal "to create risk-resilient societies".

Good News!

CCARPH now has an official logo.

The logo features the project’s major partner organizations namely, the International Development Research Centre (IDRC), Ateneo de Manila University, the National Resilience Council, and Manila Observatory.

The gradient color scheme from red to blue signifies the change in climate patterns that poses risks to the coastal cities in the country – from intense heat to extreme cold.

Each Work Theme is encouraged to use the CCARPH Logo for official communications related to the project. Ms. Vivien Clarisse Leynes, CCARPH Work Theme 1.2 Research Assistant, now teaching in Valencia, Spain, created the logo.

For CCARPH Advocacy on "The Value of Addressing Vulnerability Reduction in Resilience Work", see this link https://coastalcitiesatriskph.com/2019/05/27/494/
Partners for Resilience: CCARPH Supports the National Resilience Council for the Leadership for Resilient LGUs Program

MAKATI CITY - The CCARPH team led by Dr. Emma Porio (Project Leader, CCARPH) and Academic Partners from Ateneo de Naga University and the University of the Philippines-Visayas participated in the Training of Trainers Workshop for the Academic Partners organized by National Resilience Council last June 11 to 13 at St. Giles Hotel in Makati City. This training is part of the National Resilience Council’s Leadership for Resilient LGUs Program.

Ms. Donna Magno, Iloilo City’s Resilience Officer, shared that newly-elected Mayor Jerry Treñas already promised to construct a Resilience Office. Mr. Renne Gumba (Chief Resilience Officer, Naga City) discussed showcasing climate data and disaster technologies in the Naga City Innovation Market Fair in November. Iloilo and Naga are partner cities of CCARPH.

Manila Observatory scientists Dr. May Celine Vicente, Dr. Rosa Perez, and Dr. Laurice Jamero discussed the Climate and Disaster Risk Assessment (CDRA) Manual including the Hazard-Exposure-Vulnerability-Capacity (HEVC) framework, influence diagram and impact chain. Dr. Porio facilitated the session on Social Dimensions in Risk to Resilience and Rationalized CDRA-based LGU Planning. The sessions will be cascaded by the Academic Partners in localized workshops in CCARPH partner-cities and other cities covered by the NRC Leadership for Resilient LGUs Program to help the LGU officials develop science-informed resiliency plans.

CCARPH Advocating for Local Knowledge Systems on Climate Disaster Risks at the International Conference on Water, Informatics, Sustainability and Environment (iWISE2019) in Carleton University, Canada

Dr. Emma Porio (Project Leader, CCARPH) and Ms. Emily Roque-Sarmiento (Project Manager-Research) presented their research in the International Conference on Water, Informatics, Sustainability and Environment (iWISE2010) in Carleton University in Ottawa, Canada. This presentation entitled, “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” emphasized the importance of transdisciplinarity in understanding different local knowledge systems and experiences on the perceptions of risk, disaster, and resilience. The study is a component of their initial findings in Work Package 1.2, which deals with the evolving exposure and vulnerability of multiple stakeholders to climate and disaster risks. Also part of the research were Ms. Ina Salas and Ms. Vivien Leynes, Work Theme 1.2 Research Assistants.

The presentation is available here: https://drive.google.com/file/d/18Q_f5txQM3gT_a4yv2uevtQBtQ/view. The link to the whole conference can be found here: https://www.iwiseconference.com/2019/index.php/iwise2019-live-stream/.

CCARPH Shares Quarterly Updates in the NRC Academic Partners’ Business Meeting

MAKATI CITY – Ms. Emily Roque-Sarmiento (CCARPH Project Manager) and Ms. Ina Salas (Research Assistant) attended the Academic Partners’ (APs) Business Meeting of the National Resilience Council (NRC) on September 19, 2019, in Berjaya Hotel, Makati City. The academic partners of NRC include the Bataan Peninsula State University, Visayas State University, Xavier University – Ateneo de Cagayan, Ateneo de Zamboanga, and the University of the Philippines – Visayas. Manila Observatory and CCARPH were also present to give the APs an update on various project initiatives.

Updates on CCAR were presented, including activities from the month of June to September 2019, and engagements with partner-cities. The updates were also presented on behalf of the Ateneo de Naga University. These were gathered through a Progress Report
Meeting held on September 17 in the CCARPH Office, where representatives from Ateneo de Naga University joined in the meeting and presented their findings to the CCARPH Work Packages through Zoom video conference call.

BANGKOK, THAILAND - Participants of the United Nations Framework Convention on Climate Change (UNFCCC) 2019 Asia-Pacific Climate Week (APCW) on September 2 to 6, 2019 appealed for resolute climate action strategies. They are asking policy makers to include higher goals to significantly reduce greenhouse gas emissions, laws and funding for transition to the use of renewable energies, improved implementation of nature-based solutions for resilience, and better access to climate funds in their Nationally Determined Contributions (NDCs). They donned t-shirts bearing their advocacies. One of these is the advocacy of the Asia Climate Change Consortium (ACCC) and the Coastal Cities at Risk in the Philippines (CCARPH) which is to “increase support for resilience of communities, livelihoods, and ecosystems”.

Dr. Emma Porio and Ms. Jessica Dator-Bercilla, co-Principal Investigators of CCARPH, prepared a paper entitled “Well-Being and Food, Water, Energy, Settlement, Livelihoods Security in the Philippine Archipelago: A Call for Ecosystems-Based Adaptation (EbA), Resilience, and Risk Reduction in Small Islands” for the said event. The paper elaborates how Ecosystems-based adaptation, risk management and improving resilience are important methods for sustainable development. They stated that high biodiversity allows human communities to adapt to climate risks through ecosystem services. They stressed the dependence of human resilience to the status of ecosystems and that a co-beneficial, community-based EbA framework is necessary along with transdisciplinary research, application of research results, investments in risk communication, information dissemination and technical capability building for EbA approaches, and development of new technologies specific to EbA, management of risks, and resilience.
CCARPH Signs Partnership Agreement with the Pasig City Government

QUEZON CITY - Ateneo de Manila University, through the Coastal Cities at Risk in the Philippines (CCARPH): Investing in Climate and Disaster Resilience project, entered a partnership agreement with Pasig City Local Government, through their Disaster Risk Reduction and Management Office. This partnership allows CCARPH team in accessing the city’s datasets for the project to formally share the tools and technologies developed by the team to the city.

A discussion and introduction were headed by Dr. Emma Porio, where representatives from the Ateneo Institute of Sustainability, and ADMU Department of Economics, and the Department of Political Sciences joined in. Hon. Vico Sotto mentioned that among his priorities for the city of Pasig is to develop housing and improve the health centers.

CCARPH, through the Ateneo Innovation Center (AIC), allows the improvement and motivation of this through their projects and initiatives on clean water systems, biomedical technologies, vulnerability mapping, and disaster-resilient communication systems.

Dr. Greg Tangonan (Research Director, AIC) presented their current work on the different technologies used to address the problems of high temperatures in the country, starting from cities. The different technologies used include heat mapping through Infrared Radiation cameras on drones, identifying coping strategies through socioeconomic surveys, and lowering temperatures through green technologies.

For more information, you may visit the following links: coastalcitiesatriskph.com, ctc208lab.wixsite.com/ateneoinnovation, and observatory.ph/

Behind the Scenes of Pasig City’s Journey to be a Smart City

By: Ann Maureen Malaki

PASIG CITY – Smart cities utilize technology in order to enhance the residents’ quality of life. Pasig City moved closer to its goal to be a smart city when it signed a Partnership Agreement with the Coastal Cities at Risk in the Philippines (CCARPH) Project of the Ateneo de Manila University, National Resilience Council, Manila Observatory, and the International Development Research Centre. Since the partnership, CCARPH teams have visited the local government to coordinate with City Officials and look at the available technologies and socio-economic, air quality, and flooding data, among others.

On September 17, 2019, Dr. Emma Porio (CCARPH Project Leader) and Dr. Greg Tangonan (Research Director, Ateneo Innovation Center) spearheaded a team from CCARPH to visit the Pasig City Disaster Risk Reduction and Management Office (PCDRRMO). They saw the collection of impressive tools the city possesses for monitoring the weather, air and water quality, floods, and earthquakes. Closed-circuit television (CCTV) cameras are also scattered throughout the city to ensure that vital information continuously reaches the DRRMO. These cameras are strategically placed near schools and lying-in clinics to ensure the safety of students and expecting mothers. Pasig City has accumulated a significant volume of data; however, the use of these information can still be maximized to aid in better decision making. CCARPH scientists are looking into analyzing the current and historical data from the DRRMO office. Possible studies involve investigating the effect of hazards to the drainage system, traffic flow, access to hospitals or evacuation centers. There is also an opportunity to collaborate with the Rizal Technological University so that the students could use the LGU’s available data for their thesis. (continued on next page)
Ms. Jean Meir Jardeleza (CCARPH Work Theme 2.1 Researcher; Lecturer, Department of Environmental Science) introduced Mr. Joseph Litam and Mr. Joaquin Campos (BS Environmental Science students, Ateneo de Manila University) and Ms. Mikaela Bona (Research Assistant, CCARPH Work Theme 2.2) to key persons including the DRRMO Officers, Ms. Mariel Velasco Dalay and Mr. Jonathan Gocatek (MIS/IT) at Pasig City on October 21, 2019.

The students will assist the LGU on sorting and managing the PDRRMO data. They will also work on a System Dynamics (SD) model of Pasig City for their thesis. Their study will help illustrate how the system should be organized such that the decision making of the Local Chief Executive becomes “systems-oriented”. Information on various sectors such as health, population, tourism, education, housing, utilities, building safety, solid waste management office, land use, zoning, livelihood and employment, expenditures, and investment will be used as input to the SD model while keeping all the private information confidential. The model is expected to be completed by May 2020.

Meanwhile, Work Theme 2.2 (Computable General Equilibrium) is planning to conduct focus group discussions with representatives from the business sector in order to obtain insights on the simulation of impacts of climate events to the economy and the whole system in Pasig.

The results of the studies of the two Work Themes will contribute in rationalizing the significant contribution of the DRRMO equipment for smarter decision making and improved resilience of Pasig City.

ADMU Master of Disaster Risk and Resilience Students Conduct Participatory Community Risk Assessment with Loyola Heights Barangay Council

By: Jeremiah Morales

The CCARPH Team, together with the Master of Disaster Risk and Resilience (DRR203/DRR207) class of Dr. Emma Porio and Dr. Noralene Uy, in partnership with the Barangay Council of Loyola Heights, is doing a Participatory Community Risk Assessment (PCRA) to serve as a preliminary input to the Barangay’s Disaster Risk Reduction and Management Plan (DRRMP). The students conducted an integrated risk assessment (i.e. participatory methodologies integrated with HazardHunter of GeoRisk Philippines, among others). (For more information about HazardHunter, you may visit hazardhunter.georisk.gov.ph)

In the orientation, Barangay Kagawad Florentino D. Murao Jr. presented their “Operation Plan YANIG: Preparation for the Big One”. OPLAN YANIG contained the locations of evacuation sites and various disaster response methods for fire, flood, and earthquake. The presentation also contained rough estimates on the possible number of casualties that may happen during such events. According to Mr. Murao, there is a difference between the number of affected people on a temporal basis. During the day, the highest possible affected population is the transient population, which primarily includes university students; conversely, residents in the Barangay may be of high risk at night.

With Quezon City being the largest city in Metro Manila, Barangay Loyola Heights is strategically situated to raise the need for a risk assessment in preparation for disasters as it is composed of several residential areas and subdivisions, business establishments, primary and secondary institutions, and Higher Education Institutions (HEIs) such as the Ateneo de Manila University.

Prior to conducting the PCRA, Dr. Porio and Ms. Emily Roque-Sarmiento (Project Manager-Research, CCARPH) conducted a study in the area, entitled “From Skies to the Streets: An Ethnography of Street-based Population and their Local Knowledge Systems Regarding Environmental Pollution and Climate Disaster Risks in Metro Manila, Philippines.” (continued on next page)
This input of the Master of Disaster Risk and Resilience (DRR203/DRR207) class of Dr. Porio and Dr. Uy will be beneficial to produce a risk map that could help the residents and the transient population of the Barangay Loyola Heights in increasing their awareness, as well as in resiliently preparing and responding to the possible disaster risks.

Advanced Institute on Disaster Risk Reduction with Systems Approach for Slow-Onset Climate Disasters (AI-SOCD) Report of CCARPH Scientists

By: Jose Francisco Santiago and Maria Rufina Salas

CCARPH scientists headed by Dr. Melliza T. Cruz (Manila Observatory) released a report on their study entitled, “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” last September 2019. Together with Dr. Maria Obiminda L. Cambaliza (Research Scientist, Air Quality Dynamics and Instrumentation and Technology Development, Manila Observatory), Dr. Charlotte Kendra Z. Gotangco Gonzales (Chair, Department of Environmental Science, ADMU; Systems Dynamics/Systems Thinking Work Theme Leader, CCARPH) and other CCARPH scientists, the study focused on the effects of air pollutants (specifically PM1, PM2.5 and CO2 levels) on jeepney drivers travelling along the UP-Katipunan route along Katipunan Avenue in Quezon City. By collecting measurements of the air quality along the route as well as physiological indicators of the jeepney drivers, they were able to show the detrimental effects of the pollution caused mainly by the outdated jeepneys. The next step of their analysis was to create a Systems Dynamics model to show how a jeepney modernization program will prove beneficial for the jeepney drivers by identifying all the integral factors surrounding the implementation of a jeepney modernization program and allow a more holistic analysis before enacting the program. By identifying the pollution levels along the route, the health risks associated with exposure to this pollution and socioeconomic indicators of the jeepney drivers, the study was able to show a more nuanced take on the jeepney modernization program that can inform policymakers in future discussions.

CCARPH Featured in Public Lecture at Riga Technical University

By: Dr. Charlotte Kendra Gotangco Gonzales

RIGA, LATVIA - Last October 17, 2019, Dr. Charlotte Kendra Gotangco Gonzales (Chair, Department of Environmental Science, ADMU; Systems Dynamics/Systems Thinking Work Theme Leader, CCARPH) delivered a public lecture at Riga Technical University entitled, “Systems Thinking for Resilience and Sustainability in Research and Practice.” The seminar was delivered in two parts:

(1) A Systems Approach to Resilience: Insights from Research

An integrative overview was given of recent and ongoing research applying systems thinking and systems dynamics modelling to the different facets of risk, resilience, and sustainability of Metro Manila, particularly in terms of flooding hazards. Examples included the learning and insights from the first Coastal Cities at Risk program, until the current CCARPH

(2) A University Experience of Sustainability and Resilience: Insights from Practice

As a university, we endeavor to "walk the talk," and put into practice what we teach about resilience and sustainability as strategic thrusts of the university. The university itself is also a system of environmental, economic, and social sub-systems working together to provide quality education, and more importantly, quality of life for our immediate community. Campus-based initiatives, along with insights and challenges from dealing with our different stakeholders were shared. (continued on next page)
The network between Ateneo de Manila University, and Riga Technical University was established through the project Capacity-Building in Asia for Resilience Education (CABARET), which is an EU Erasmus+ co-funded programme grant. The scientific mission of Dr. Gotangco to Riga was partially supported by both CABARET and CCARPH projects. In addition to the public lecture, research meetings were conducted with collaborators Dr. Francesco Romagnoli, and PhD student Maksims Feofilovs to design a comparative study applying systems analysis to Riga and Metro Manila.

**Manila Observatory Scientists’ Collaborate with NASA, US Naval Research Center, and Academic Institutions in the CAMP2Ex Program**

By: Ann Maureen Malaki

QUEZON CITY - On October 3, 2019, the Cloud, Aerosol, and Monsoon Processes - Philippines Experiment (CAMP2Ex) Program held a freestyle talk and exhibit entitled “Developing a Culture of Shared Science between the Philippines and the United States: The Cloud, Aerosol, and Monsoon Processes - Philippines Experiment (CAMP2Ex) Program”. The involved scientists relayed their experiences as part of the program and responded to the questions of the students and weather specialists who attended the activity.

The CAMP2Ex Program studied the effect of aerosols to clouds and rainfall. According to the CAMP2Ex scientists, aerosols from anthropogenic and natural sources can change the size and attributes of clouds droplets, it can either reflect sunlight to space or absorb and trap the heat in the atmosphere. Understanding meteorological processes is a significant part of risk management especially for a country like the Philippines which is exposed to typhoons.

This Program is a collaboration between the National Aeronautics and Space Administration (NASA), US Navy, Naval Research Laboratory (NRL), National Oceanic and Atmospheric Administration (NOAA), Integration Innovation, Inc. (I3), Yulista Tactical Services (YTS), Bay Area Environmental Research Institute (BAERI), National Suborbital Research Center (NSRC), Manila Observatory, Ateneo de Manila University, University of the Philippines, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), and various academic institutions and research organizations.

Manila Observatory Scientists, Dr. Gemma Teresa Narisma (Executive Director, Manila Observatory) and Dr. James Simpas (Head, Air Quality Dynamics and Instrumentation and Technology Development, Manila Observatory), were part of the Mission Management of the CAMP2Ex Program. They are both researchers of the CCARPH Work Theme 1.1, with Dr. Narisma focusing on Climate Projections and Dr. Simpas working on Air Quality.

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**Prepositioning Assets for Community Resilience: AIC Participates in the TALAB 2019**

By: Jeremiah Morales

QUEZON CITY - The Ateneo Innovation Center (AIC), headed by Dr. Gregory Tangonan (Research Director, AIC), once again exemplified their brilliance and expertise in innovation by showcasing several technologies which are helpful during disasters and in times of crisis during a session in the Talakayang Alay sa Bayan (TALAB) 2019. This year’s TALAB has the theme: “Ateneo at 160: Agenda for Hope.” TALAB is an annual event that encourages the students of Ateneo de Manila to participate and engage in the current discourse of our country.

In their event entitled “Prepositioning Assets for Community Resilience,” AIC showcased some of the technologies they have been and are currently working on. Some of which include a smart baby monitoring system for phototherapy, solar-powered filtering systems, mechanical nebulizer, and low-cost disaster communications. (continued on next page)
Mr. Thomas Van Custem, a student from AIC, presented his work on indoor farming system, using hydroponics, to efficiently grow plants indoor using an alternative growing media, instead of soil. One of the advantages of this system is how it uses 90% less water than the conventional farming method—by using only a 1x1 meter space, this system can grow 3 to 10 times more crops all year round. His project uses a smart system where he can monitor the temperature, humidity, and lighting (e.g. the intensity and irradiance), which are crucial for the plants' growth. Mr. Van Custem further explained the importance of this indoor farming system, saying that by the year 2050, 75% of the population will be living in urban areas. The problem with this is how there will be no proper soil due to the prevalence of concrete areas. This indicates that harvesting and cultivating crops will become a problem of cities in the future. With the help of the indoor farming system, this problem can be solved.

After the event, Mr. Kerwin Caballas (Research Assistant, AIC) with Mr. Paul Cabacungan (Operations Manager, AIC) demonstrated the low-cost disaster communication system using only a handheld radio. The system works by converting images into radio waves and transferring it to another device without the need for SIM card or internet connection. This method can be used during disasters when communication signals are usually compromised. Mr. Carlos “Toto” Oppus (Director, AIC) furthers adds that complicated instructions during crisis can now be sent and viewed with ease using this technology.

To know more about their technologies, AIC highly encourages students to visit their office at Room 416, PLDT-CTC Building in the Ateneo de Manila University campus. In line with their objectives, AIC has indeed developed beacons of hope for vulnerable communities.

Environmental Science Students of CCARPH Defend Thesis Proposal on Modeling Urban Ecosystem Resilience

By: Dr. Charlotte Kendra Gotangco Gonzales

QUEZON CITY - Last October 9, 2019, Mr. Joaquin Ignacio D. Compos and Mr. Joseph Emanuel C. Litam (Senior Students, BS Environmental Science, Ateneo de Manila University) successfully defended their thesis proposal entitled, “Developing an Urban Ecosystem Resilience Index Using a System Dynamics Approach.” They are being advised by Dr. Charlotte Kendra Gotangco Gonzales (Chair, Department of Environmental Science, ADMU; Systems Dynamics/Systems Thinking Work Theme Leader, CCARPH), Ms. Jairus Josol (Research Associate, CCARPH), with assistance in data-gathering by Ms. Jean Jardeleza (Research Assistant, CCARPH), who are all CCARPH researchers, as well as faculty and staff of the Department of Environmental Science, and the Ateneo Institute of Sustainability. The defended thesis proposal contributes to the CCARPH Work Theme 2: “Developing City Resilience Suite of Tools for Local Government Units.”

The abstract of the thesis proposal reads as follows: The research aims to assess Urban Ecosystem Resilience of Pasig and Valenzuela City in Metro Manila using a System Dynamics approach. Specifically, it aims to develop an Urban Ecosystem Resilience Index (UERI) to serve as a decision support tool for local governments. The index will be operationalized using Vensim®, a system dynamics platform, to understand long term behavior of cities as socio-ecological systems. In particular, it traces the changes and interactions of urban ecosystem services, urbanization, and long-term hazards such as changes in precipitation. Developing the model will involve creating a stock flow model to show the resilience the urban ecosystem by simulating the delivery of ecosystem services and their trade-offs over time. Sensitivity analysis will also be conducted to determine key variables that contribute the most to urban ecosystem resilience. The model will be validated through key informant interview (KII) with relevant stakeholders such as the local government unit. Lastly, scenario testing will be done to simulate future development scenarios based on proposed development pathways by the LGU obtained from the KII.

The proposed Urban Ecosystem Resilience Index (UERI) will be simulated dynamically over time as a measure of a city's ability to adapt and transform, in the face of socio-economic and demographic changes, as well as on the long-term hazards, in order to sustain the delivery of urban ecosystem services to achieve sustainable development. These ecosystem services can be classified into four major categories: provisioning, regulating, supporting, and cultural services. This model will be combined with another system dynamics-based model for the non-ecosystem services, such as socio-economic factors, education services, health services, ICT services, and disaster and emergency management services. Ms. Katrina Abenojar (Research Assistant), also of the BS
Environmental Science program and now completing a double major in Economics, is currently working on this non-ecosystem services model under the supervision of Dr. Gotangco, Ms. Josol, and Ms. Jardeleza.

Dr. Rosa Perez Represents Dr. Emma Porio/CCARPH in the Workshop on Building Disaster and Climate Resilience in Cities

By: Ann Maureen Malaki

KUALA LUMPUR, MALAYSIA - The Asian Network on Climate Science and Technology (ANCST) SEADPRI- Universiti Kebangsaan Malaysia organized a workshop on Building Disaster and Climate Resilience in Cities on October 15 to 16, 2019 at the Intercontinental Hotel, Kuala Lumpur, Malaysia.

In behalf of the Coastal Cities at Risk in the Philippines (CCARPH) Project, Dr. Rosa Perez presented the challenges to coastal cities specifically the poor quality of life in Metro Manila. She talked about how the project aims to generate solutions based on science that the vulnerable population can apply. She also explained how CCARPH is “linking climate and disaster science to policy and practice” as well as the factors that affect the risk and resilience of social-ecological systems.

Dr. Perez shared the accomplishments of each project Work Theme namely (1) the co-generation of maps on hazard, exposure and vulnerability in Naga, (2) measurement and identification of the impacts of PM2.5, (3) “examination” of the elements of a resilient city, (4) discovery of the change of patterns of informal settlements, (5) preparation of a City Resilience Toolkit, (6) creation of technologies for disaster preparedness, clean water, and resilient communications, (7) incorporation of hazards into Computable General Equilibrium (CGE), (8) vulnerability mapping, and (9) Creation of the Master in Disaster Risk Resilience Program.

The studies will contribute in the improvement of the capacity of all stakeholders towards a “context-sensitive, transdisciplinary, and transformative” risk governance. As Dr. Joy Jacqueline Pereira (Working Group II Vice-Chair) requested, this presentation also serves as Dr. Emma Porio’s and CCARPH’s contribution to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report.

CCARPH Researcher Emilio Gozo Presents at ICRC-CORDEX 2019

By: Jose Francisco Santiago and Maria Rufina Salas

BEIJING, CHINA – Mr. Emilio Gozo (Research Assistant, Manila Observatory) presented his study entitled, “Impact of climate change on extreme rainfall events on coastal cities in the Philippines” in the International Conference on Regional Climate - Coordinated Regional Downscaling Experiment (ICRC-CORDEX) last October 14 to 18, 2019 in Beijing, China. He was accompanied by Dr. Gemma Narisma (Executive Director, MO) and Dr. Faye Cruz (Regional Climate Systems Laboratory Head, MO). Mr. Gozo’s study focused on extreme rainfall events brought about by climate change and its effects on the rapidly growing coastal cities in the Philippines. By using climate projections from the CORDEX Southeast Asia project, he was able to model the changes in rainfall patterns up to 2099, illustrating the drastic changes rainfall patterns will undergo if the global climate continues on its current trend.

Smarter Designs Towards Smarter Cities: CCARPH Research Intern Jeremiah Morales Participates in the 12th PNEE International Conference and Scientific Meeting at Puerto Princesa, Palawan

PUERTO PRINCESA, PALAWAN - Naga City is one of the most progressive cities in the Philippines in terms of economic viability. Being one of the partner cities of the Coastal Cities at Risk in the Philippines (CCARPH) Project of the Ateneo de Manila University, funded by the International Development Research Centre (IDRC) and National Resilience Council (NRC), the continuous need of adapting to the catastrophic effects of climate change has never been this important. Two of the common problems that a developing city is facing are increasing land imperviousness and declining tree cover which are correlated with high heat index. Heat index is defined as a human discomfort index that a person feels as the current temperature mixed with relative humidity has made contact with their body. Mr. Jeremiah Y. Morales together with Ms. Jerleze Mae Q. Osea, both graduates of Bachelor of Science in Environmental Management at the Ateneo de Naga University, have conducted an undergraduate research to tackle and interrogate this emerging problem in Naga City under the guidance of Ms. Shane B. Bimeda, M.S. (Cand.). (continued on next page)
As lead author, Mr. Morales presented their undergraduate research entitled, “Microclimate Variability Analysis and a Proposed Management Plan for the Urban Heat Reduction of Naga City, Camarines Sur”. The paper was accepted for oral presentation at the 12th Philippine Network of Educators on Environment (PNEE) International Conference and Scientific Meeting at Puerto Princesa, Palawan with the theme “Strengthening the Power of Environmental Education Through Innovative Pedagogy to Practice (P2P) Models” held last October 15 to 17, 2019. The activity was spearheaded by the University of the Philippines Los Baños’ School of Environmental Science and Management together with the Palawan State University.

Their research investigated the average heat index of selected sites at Naga City, Camarines Sur. They have found that increasing land imperviousness and declining tree cover are two factors that greatly affects Naga City’s heat index. Results show that tree cover is negatively related with heat index. This means that if there is a decline in the amount of tree cover, the city will more likely to produce a higher heat index. Another factor that showed significant result with heat index are the impervious surfaces (e.g. concrete roads, cemented infrastructures, and buildings). Based on the study, impervious surface has a positive relationship with heat index which meant that the higher the impervious surface, the higher the heat index will be.

According to their study: “Understanding the impacts of Urban Heat Index in a micro-scale level is of vital importance and a critical issue most especially that urban cities are growing exponentially at a rate that surpasses the ability of nature to heal itself. Nature-based designs plays an integral role on keeping urban cities livable thus, urban cities must redesign their approach as to how they will utilize and develop their lands. Furthermore, studies such as these can prove to be beneficial to Local Government Units as this may be used to support evidence-based programs of the city on the environment.”

To know more about the study, it is publicly available at ResearchGate. Interested individuals/researchers may access it through this link (bit.ly/MoralesOsea) or directly contact the researchers via email at jermorales@gbox.adnu.edu.ph or josea@gbox.adnu.edu.ph
exposure and vulnerability. She enumerated water insecurity, social challenges, cultural challenges, rapid population growth, economic challenges, weak infrastructural and economic bases, and health challenges as the challenges to coastal cities.

Dr. Porio highlighted that the intersections of geo-physical, political, economic, and cultural hazards intensify the climate and disaster impacts on the most vulnerable populations e.g. women-headed households, elderly, persons with disability, incur more costs and losses due to floods.

She shared the CCARPH and National Resilience Council’s model for resilience which consists of (1) co-generation of maps on hazard, exposure and vulnerability, (2) the Resilient Barangay Program, (3) the importance of interrogating community-level vulnerability, (4) the Adopt-a-City Campaign, and (5) Building a Disaster Smart City.

From Risk to Resilience II: CCARPH-Ateneo Innovation Center-INECAR Exhibits Disaster Resilience Technologies at the 1st RESILEX Innovations for Resilient Community in Naga City, Camarines Sur

By: Jeremiah Morales

NAGA CITY - In celebration of the 15th Bicol Business Month 2019, the Naga City Chamber of Commerce with the City Government of Naga spearheaded the 1st Resilience Exposition “RESILEX” Innovations for Resilient Community. The event theme was “Bridging Boundaries in the Millennium Towards the 4th Industrial Revolution”. The RESILEX is a gathering of advocates, practitioners, supporters, and stakeholders which primary concern is to build a resilient country. The event showcased static displays of state-of-the-art technologies, capability demonstrations, blood-letting activity, and first-aid demos which highlighted innovations towards a safer Bicol.

The Coastal Cities at Risk in the Philippines (CCARPH), Ateneo Innovation Center (AIC), and the Ateneo de Naga - Institute for Environmental Conservation and Research (INECAR) joined the event by demonstrating various technologies and maps that are essential to produce a disaster resilient city. The CCARPH-AIC team, represented by Mr. Kerwin Caballas (Research Assistant, AIC), Mr. Lawrence Ibarrientos (Research Assistant, AIC), and Mr. Jeremiah Morales (Research Intern, CCARPH), exhibited the solar-powered water filtering system, Near Cloud Technology, and the Low-cost communication System. These technologies may help Naga City and other interested LGUs to become not only responsive but resilient in the face of disasters.

The solar-powered water filtering system is a technology developed by the AIC that is designed to be self-sustaining and can be deployed in remote and isolated areas. It is made up of materials that are low-cost and readily available which makes it suitable for Local Government Units who want to establish safe and potable water for their constituents. The Near Cloud technology, on the other hand, is a type of mobile cloud storage system that uses low power, terabyte storage and users can access it using their Wi-Fi capable devices. The application of this technology is limitless. For example, Local Government Units can use this technology for storing high resolution maps for land use planning, flooding, healthcare, sensor network (agriculture), etc. In addition, schools can use this as a digital storage of e-books, teaching materials, visual aids, and many more. The low-cost communication system was also brought to the Expo. The system works by converting images into radio waves and transferring it to another device without the use of SIM card or internet. This method can be used during disasters when communication signals are usually compromised. Furthermore, complicated instructions during crisis can now be sent and viewed with ease using this technology. (continued on next page)
The week-long event ended with the presentation of students from Ateneo de Naga University and Bicol State College of Applied Sciences and Technology (BISCAST) for the Innovative Ideas of Youth Resiliency Program held at the SM Cinema 4 where competing teams presented their innovative ideas to guide Naga City for resiliency. The ADNU Team came in 3rd place after competing with other teams from other universities in Camarines Sur.

Master of Disaster Risk and Resilience

From Disaster Preparedness to Technology Driven Disaster Resilience: Installation of Clean Water System - Barangay San Andres, Cainta, Rizal

By: Emmanuel V. Tandoc

Though Cainta has risen to be the most progressive, competitive and most profitable municipality in the Philippines with 4.43 billion worth of assets and is now a first-class municipality, it still lacks a significant level of resilience at the barangay level.

This research would like to introduce a technology-based resilience innovation with the help of the Ateneo Innovation Center right in the heart of the most depressed barangay in Cainta, Barangay San Andres. It has the highest population of informal settlers, second highest in terms of population, and caters to more than 16,000 families. It is listed as among the depressed, earthquake prone, and fire prone areas of Cainta.

The research hopes that the Municipal Local Chief Executive (LCE) will take notice of this effort and decide to propagate the project to all of its 7 Barangays.

Integrating Resilience in the BERDE Rating System and in the Philippine Green Building Code

By: Levy S. Canaleta

The country’s national voluntary green building rating system known as Building for Ecologically Responsive Design Excellence (BERDE) and the Philippine Green Building Code (PGBC) are both focused on the design of sustainable buildings. While the buildings compliant to any of the two can be said to have minimal negative effects on the environment, they need to be resilient for them to be truly sustainable. Though some of the provisions in BERDE and in PGBC inherently promote resilience, most are still tied to the reduction of energy resource consumption. It is therefore the main objective of this study to analyze how to explicitly integrate resilience concepts in the two. Three of the world’s most resilient green building rating systems will be reviewed on how they achieved the integration. Their reviews will be contextualized against the country’s legislations and the country’s geographic and tectonic conditions; to come up with recommendations for the integration.

As contrasted against the Leadership in Energy and Environmental Design (LEED) rating system launched in 2000 in the US, BERDE being launched in 2009, is relatively new. As it treads on its way towards becoming more comprehensive with its annual revision, it is ideal that we address it’s gap in terms of the promotion of resilience. While LEED had been the popular option in the country, BERDE is starting to gain prominence with its more contextualized approach attuned to the local conditions.

In 2015, the Department of Public Works and Highways (DPWH) established the PGBC as the referral code of the National Building Code on sustainable designs. As a code, PGBC is a mandatory regulation hence, if integrated with resilience and when adopted skillfully, its impact can change the building environment rapidly and extensively.

The reviews from the other international rating systems Comprehensive Assessment System for Built Environment Efficiency (CASBEE), DGNB, and RELI, which are known as among the world’s most resilient, will help achieve the objective.
Disaster Risk Reduction Demystified: Localizing the Disaster Risk Indicators in the Philippines

By: Joe-Mar S. Perez, MPA

Disaster risk reduction (DRR) practitioners and researchers generally refer to the World Risk Index to understand the overall level of disaster risk in the country. According to the said report, the Philippines is ranked the third (3) country at risk to disasters globally. Given the disaster risk index ratings published by the World Risk Index and the existence of other indicators in the literature, the study aims to develop a set of localized indicators for use in the country. The main end use of these indicators will be the Office of Civil Defense (OCD), as the implementing arm of the National Disaster Risk Reduction and Management Council (NDRRMC). Content analysis, survey, interviews, and focus group discussions will be used as methodologies. Quezon City will be used for testing the implementation of the localized disaster risk indicators to be developed out of the study.

The Philippines, commonly known as the “laboratory” of disasters, serves as one of the subjects of interest by DRR researchers and practitioners. Given the disaster risk attributes of the Philippines, it is ranked as the third country that is at risk to disasters globally, according to the World Risk Index.

Project Holder
Fr. Jose Ramon T. Villarin, S.J., Ph.D. (ADMU/MO)

Principal Investigators
Dr. Emma Porio (ADMU-DSA/MO, Project Leader)
Ms. Ma. Antonia Yulo Loyzaga (NRC)
Ms. Jessica Dator Bercilla

Council of Advisers
Anna Marie “Jing” A. Karras
Silvestre “Sly” Z. Barrameda, Jr. CESE
Austere A. Panadero
Dr. Fabian Antonio M. Dayrit

CCARPH Research Team
Dr. Gemma Narisma (MO/ADMU)
Dr. Fabian Dayrit (ADMU-SOSE)
Dr. Gregory Tangonan (ADMU-AIC)
Dr. Ramon Clarete (UPSE)
Dr. Charlotte Kendra Gotangco (ADMU-ES)
Dr. John Wong (ADMU-SOSE)
Dr. Faye Abigail Cruz (MO)
Dr. James Simpas (MO/ADMU)
Dr. Ma. Obiminda Cambaliza (MO/ADMU)
Dr. Melliza T. Cruz (MO)
Dr. May Celina Vicente (MO)
Dr. Rosa Perez (MO/NRC)
Ms. Jessica Dator-Bercilla (UPV/NRC)
Dr. Nathaniel Libatique (ADMU-AIC)
Dr. Philip Tuano (ADMU Economics)
Mr. Justin See (ADMU-DSA)
Dr. Noralene Uy (ADMU/CO)
Ms. Ma. Antonia Yulo Loyzaga (NRC)
Dr. Gay Defiesta (UPV)
Dr. Digna P. Alba (ADNU-CHSS)
Ms. Jonaviva “JanJan” C. Plopenio (ADNU-INCEAR)
Dr. Marlyn C. Lee-Tejada (ADMU-ASSRC)
Dr. Majah Leah V. Ravago (ADMU-SOSE)
Dr. Laurice Jamero (MO)

Project Management Team of CCARPH
Ms. Emily Roque-Sarmiento (Project Manager/Research)
Ms. Denise Gonzalez Dacera (Project Manager/ADMU/Logistics)
Ms. Theima Selga (Finance Officer)
Ms. Jirehline Zerrudo (Project Assistant)
Ms. Maria Rufina Salas (Project Staff/Research Assistant)
Mr. Jose Francisco Santiago (Project Staff/Research Assistant)

Partner Organizations
National Resilience Center (NRC)
Manila Observatory (MO)
Ateneo Innovation Center (AIC)

Academic Partners
Ateneo de Naga University (ADNU)
Pamantasan ng Lungsod ng Muntinlupa (PLMun)
University of the Philippines Visayas (UPV)

To learn more about the project, you may contact ccarph@ateneo.edu, or visit our website at coastalcitiesatriskph.com