Final Technical Report

CBA2017-03MY-PULHIN

Enhancing Climate Risk Resilience through Human Security Development and Capacity Building in the Province of Aurora, Philippines

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Project Overview

Project Duration	**:**	15 July 2017 – 14 January 2020
Funding Awarded	**:**	US$ 71,500 (2 years; extension of 6 months from July 15 2019 to January 14, 2020)
Key organisations involved	**:**	1. College of Forestry and Natural Resources, University of the Philippines Los Baños 2. Provincial Disaster Risk Reduction and Management Office, Provincial Government of Aurora 3. Municipal Disaster Risk Reduction and Management Office Dingalan 4. Municipal Disaster Risk Reduction and Management Office of Baler 5. Municipal Disaster Risk Reduction and Management Office San Luis 6. Municipal Disaster Risk Reduction and Management Office Maria Aurora 7. Municipal Disaster Risk Reduction and Management Office Dinalungan 8. Municipal Disaster Risk Reduction and Management Office Dipaculao 9. Municipal Disaster Risk Reduction and Management Office Casiguran 10. Municipal Disaster Risk Reduction and Management Office Dilasag 11. Climate Change Commission 12. University of the Philippines Resilience Institute

Project Summary

This APN CAPaBLE project supports the national priorities of the Philippine government in providing technical assistance to different local government units (LGUs) in formulating their respective Local Climate Change Action Plans (LCCAP). Activities were conducted during the end part of the project, including the Climate and Disaster Risk Assessment (CDRA) and Participatory Risk and Vulnerability Assessment (PRVA) trainings, to produce the mandatory risk assessment report for LCCAP formulation.

Eight municipalities in the Province of Aurora completed the production of both CDRA and LCCAP. Drafting the CDRA was met with major challenges, particularly lack of data from the different sectors, the steep learning curve to master the CDRA process, and the perceived attitudes of municipal officers to complete the report/plan just for the sake of compliance. On top of this, the institutional capacity analysis of the Aurora LGUs revealed three key areas that need to be improved to enhance resilience towards climate and disaster risks: (1) staffing and workforce ; (2) increased access to financial support from other sources; and (3) development of database management systems.

Each municipality is facing different kinds and magnitude of risks based on geographical location, as well as other related social, environmental, and economic dimensions. What appears to be the one with the highest likelihood and highest degree of consequences is flood. The municipalities in Aurora have various anticipatory actions set in place to respond to different risk events. However, long-term strategies that would target that sources of risks, particularly that of flood, need to be considered for more effective adaptation actions in the future.

The commitment of the Provincial Government of Aurora to capacitate its staff to craft CDRA and LCCAP has been supported with counterpart funding, which led to organization of numerous capacity-building activities.

Through this project, a Technical and Policy Forum was implemented on January 7, 2020. Key agencies involved in the CDRA and LCCAP preparation gathered together to come up with unified policies and guidelines to hasten the preparation of a science-based CDRA and LCCAP to enhance climate change and disaster resilience of LGUs and local communities in the country. This is the first of its kind in the Philippines.

Keywords: climate disaster and risk assessment, local climate change action plan, participatory risk, and vulnerability assessment

Project outputs and outcomes

Project outputs:

1. Eight (8) LCCAP reports where CDRA were incorporated, one for each municipality of Aurora
2. One (1) provincial LCCAP report for the Province of Aurora, incorporating all the results of CDRA and LCCAP of the eight municipalities
3. Four (4) PVRA reports
4. One (1) Proceedings of the Technical and Policy Forum on CDRA and LCCAP

5. Article in the UPLB publication, UPLB Horizon, entitled " INREM-led forum crafts policies for science-based CDRA and LCCAP https://uplb.edu.ph/research/inrem-led-forum-crafts-policies-for-science-based-cdra-and-lccap/

Project outcomes:

1. Enhanced the capacity of LGUs to acquire data, implement research, conduct land capability classification, as well as assess vulnerability and risks associated with future climate scenarios. As a result of the project implementation, members of the technical working group tasked to craft the CDRA and LCCAP per municipality understood the importance of obtaining **correct and updated** data to produce accurate maps.

2. Development of adaptation strategies, including assessment of needed infrastructure to enhance resilience. Infrastructure, in the project context, refer to man-made physical structures to support production of ecosystem goods and services or aid in its delivery (*e.g.*, roads, etc.).

3. Assessment of vulnerability and risks associated with future climate scenarios. Climate risks refer to hydro-meteorological hazards (*i.e.* typhoon, drought, landslide, flood, storm surge, and sea-level rise) and what makes the socio-ecological system vulnerable and exposed to these hazards. The focus on the mentioned extreme weather events is based on the premise that preparations for these would also mean preparation for the long-term effect of climate change, such as increasing temperature and change in rainfall, among other things. In a nutshell, the second objective aims to provide the different parts of the landscape ability to respond or continue its vital function of delivering services despite stresses such as extreme weather events through development of adaptation strategies.

4. While the project is highly localized and focused on one province, it elicited important national and regional implications. It demonstrated how those at the forefront of climate change actions should perform in both short- and long-term adaptation planning, especially with respect to priority services or functions under their jurisdiction. All activities under the resilience framework have to be considered as it necessitates a historical and systems (or landscape) perspective; as well as development of adaptive capacity for all system components (*i.e.* the agents, ecosystems/infrastructure, and institutions).

Key facts/figures

List some notable numbers resulted from or about your project. For example:
- Key figures and numbers from the research, for example: 32 species of amphibia have been identified in the X river basin; 200 herders were affected by Zud in Mongolia, etc.
- General statistics, such as number of young scientists trained.

Potential for further work

The CDRA and LCCAP needs to be updated regularly. Results from CDRA and LCCAP can be derived for other related plans, since these have similar processes. LCCAP should not be construed as a requirement for acquiring funding from the People's Survival Fund (PSF) of the Climate Change Commission (CCC).

Publications

https://uplb.edu.ph/research/inrem-led-forum-crafts-policies-for-science-based-cdra-and-lccap/

Awards and honours

Pull quote

Include a quote from an individual (the head of your organisation, the project leader, a member of the research team, a local trainee, etc.) to demonstrate your project's impact through their perspectives. In your submission, please indicate the name and affiliation of the person quoted.

"As the first Province in the Philippines to craft LCCAP, based from the LCCAPs submitted by the municipalities, we are glad that UPLB chose the Province of Aurora" Cristina Wageyen, PDRRMO - Aurora

Acknowledgments

This project was accomplished with support of various government and non-government organizations in the Philippines:

- Climate Change Commission
- University of the Philippines Resilience Institute
- National Panel of Technical Experts
- Municipal Disaster Risk Reduction and Management Office of Baler
- Municipal Disaster Risk Reduction and Management Office of Dingalan
- Municipal Disaster Risk Reduction and Management Office of San Luis
- Municipal Disaster Risk Reduction and Management Office of Maria Aurora
- Municipal Disaster Risk Reduction and Management Office of Dipaculao
- Municipal Disaster Risk Reduction and Management Office of Dinalungan
- Municipal Disaster Risk Reduction and Management Office of Casiguran
- Municipal Disaster Risk Reduction and Management Office of Dilasag
- Provincial Disaster Risk Reduction and Management Office of Aurora

1. Introduction

In 2007, the Intergovernmental Panel for Climate Change (IPCC) made its strongest statement yet in its Fourth Assessment Report (AR4), when it concluded that the warming of the climate system is unequivocal, and that most of the warming during the last 50 years or so (*e.g.*, since the mid-20th century) is due to the observed increase in greenhouse gas concentrations from human activities. It is also very likely that changes in the global climate system will continue into the future, and that these will be larger than those seen in our recent past (IPCC 2007a).

Warming in the climate system has direct effects on livelihood and increases vulnerability due to lower capacity to prepare, to cope and to recover from shocks and stresses (Department for International Development 2004). Also, climate change is recognized as a major human security issue that poses serious global threat (Dankelman *et al*. 2008). Its impact significantly threatens the security of individuals, security of states and nations, as well as global security of future centuries (Adger 2010). With constant changes in climate, human security might progressively be threatened as livelihoods are undermined (Adger *et al*. 2014). The objective of human security is to protect and safeguard the vital core of all human lives from critical pervasive threats, in ways that enhance human freedoms and human fulfilment (Commission on Human Security 2003).

The Philippines is among the countries most at risk to climatic threats and weather-related events. Nevertheless, it has also come a long way in terms of responding to these threats, among which is the passage of the Climate Change Act (Republic Act or RA 9729) in 2009. In a nutshell, RA 9729 created an enabling environment to bolster climate change governance in the country in compliance with international frameworks (such as the United Nations Framework Convention on Climate Change or UNFCCC) and in line with national and local development initiatives (Adaptation Knowledge Platform 2012). It also established the Climate Change Commission (CCC) as the sole policy-making body mandated to coordinate, monitor, and evaluate the programs and action plans related to climate change.

Section 14 of the Climate Change Act stipulates the involvement of the local government units (LGUs) as the frontline agencies in the formulation, planning and implementation of climate change actions plans in their respective areas. It fosters an inter-LGU collaboration, where barangays prioritize climate change issues and identify and implement best practices, with direct involvement of municipal and city governments. Municipal and city governments shall consider climate change adaptation as one of its regular functions, while provincial governments shall provide technical assistance, enforcement, and information management in support of municipal and city climate change action plans. LGUs are also directed to regularly update its respective action plans to reflect changing social, economic, and environmental issues. In the course of these actions, the national government shall provide technical and financial assistance to LGUs for the accomplishment of its Local Climate Change Adaptation Plan (LCCAP).

Of late, LGUs are working towards satisfying the requirement of completing the LCCAPs. The adaptation planning process involved in accomplishing this has already been laid down, and much of the accomplishments of the Philippines in Climate Change Adaptation (CCA) relate to these. How the adaptation strategies identified and prioritized would be implemented presents another story, as this is the area where the Philippines is usually constrained at different levels of governance (Tan no date). Therefore, there is a need to look into the actual practice of adaptation (Adaptation Knowledge Framework 2012).

This APN CAPaBLE project supports the above national priorities and builds on existing initiatives towards CCA in the country, particularly that of the formulation of the LCCAP by the LGUs. A total of 1,489 municipalities and 145 cities nationwide would need to prepare this action plan. The sheer number of LGUs that need to be capacitated warrants the concerted efforts of government and non-government agencies, including the state universities and colleges, to extend technical services for this gargantuan task.

On top of this, the project aims to go beyond compliance with this local requirement, and develop implementation plans of the adaptation strategies for the major ecosystem services in the provinces' municipalities and eventually contribute to human security and climate risk resilience.

2. Objectives

The overall objective of the CAPaBLE project is to enhance climate resilience in The province of Aurora by developing capacity of the LGU personnel at the provincial and municipal levels by engaging them in the actual preparation of their respective LCCAP.

The specific objectives are:

1. Capacitate LGU personnel on the science, impacts, and responses to climate change and the necessary tools and skills needed in the preparation of LCCAP;
2. Assess the vulnerability, risks, and impacts in the eight municipalities of Aurora using updated climate models, Geographic Information System (GIS), and participatory methods, in partnership with the LGU personnel and other stakeholders;
3. Formulate appropriate local climate change adaptation programs, projects and activities to reduce climate risks, and enhance resilience of the province of Aurora ; and
4. Enhance the resilience of services from ecosystems and social structure/human security to different climate risks.

3. Project Site

Aurora province faces the Pacific Ocean and has no barriers to shield it from typhoons coming from the east. The province experiences two main wind currents. From November to April, the trade wind generally reaches the province from an easterly direction. The wind then moves in a south-westerly direction for the rest of the year. The average monthly rainfall is 273.9 millimeters. Rainfall is heaviest during the months of January, February, April, October, and November, while August is the driest month. The province of Aurora has a total land area of 323,954 hectares, representing about one percent of the country's total land area. Being a coastal community, the province is perceived to be highly vulnerable to sea-level rise and coastal flooding and people's livelihood (farming, fishing, and tourism) is highly dependent on natural resources, which are already being adversely affected by climate change, thereby exacerbating poverty in the area.

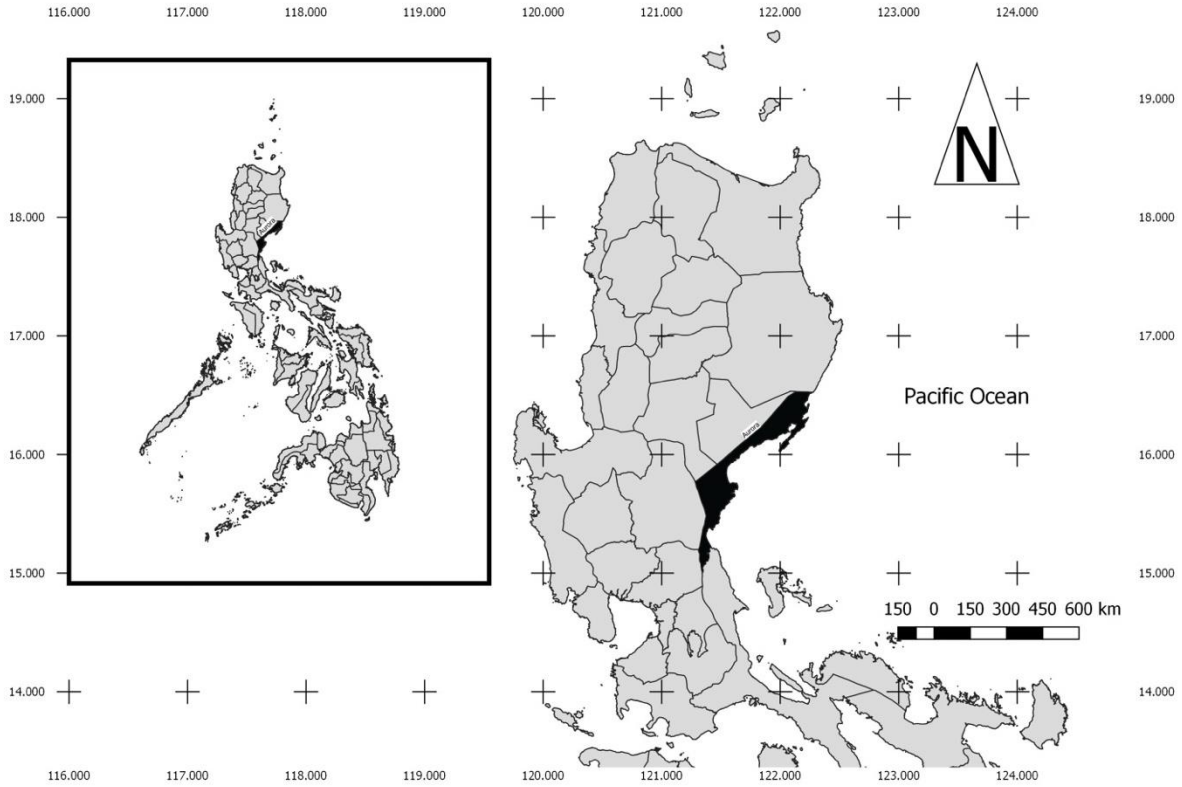

Figure 1. Location map of The province of Aurora, Philippines.

2. Methodology

To satisfy Objective no. 1 **"*to capacitate LGU personnel on the science, impacts, and responses to climate change and the necessary tools and skills needed in the preparation of LCCAP***", the project organized the following activities:

a. Forging of a Memorandum of Agreement (MOA) between UPLB through its Chancellor, Fernando C. Sanchez, Jr and the Provincial Government of Aurora through its Governor, Honorable Gerardo A. Noveras;
b. Conduct of a kick-off activity to officially announce the partnership between the Provincial Government of Aurora and UPLB; and
c. Capacity development activities for the technical working group members from the eight municipalities; conducted both in Aurora and UPLB.

In view of Objective no. 2 "***to assess the vulnerability, risks, and impacts in the eight municipalities of Aurora using updated climate models, Geographic Information System (GIS) and participatory methods, in partnership with the LGU personnel and other stakeholders***", the research team conducted the following activities:

a. Accomplished the Climate Disaster and Risk Assessment (CDRA) form as required by DILG for use of the municipalities;
b. Conduct of Participatory Vulnerability and Risk Assessment; and
c. Use of GIS and overlaying of needed maps.

For Objective no. 3 "***to formulate appropriate local climate change adaptation programs, projects and activities to reduce climate risks and enhance resilience of the province of Aurora***", the team accomplished the following activities:

a. Formulation of LCCAP with assigned UPLB-based project staff to guide the LGUs in accomplishing the different Excel files required in CDRA and translate the same to usable information for LCCAP;
b. Each UPLB-based project staff was given the freedom to regularly interact with their respective assigned municipality throughout the project duration;
c. Provision of logistics to facilitate conduct of capacity building activities for writing, data encoding and interpretation, as well as map production; and
d. Implementation of the Technical and Policy Forum on CDRA and LCCAP.

In view of Objective no. 4 "***to enhance the resilience of services from ecosystems and social structure/human security to different climate risks***", the team conducted the following tasks:

a. Determined the institutional capacity of each municipality by administering an institutional capacity survey questionnaire, before and after the project;
b. Results of the institutional capacity survey served as basis for recommending programs to the LGUs to enhance the human security; and
c. Organized a forum that served as venue for sharing of challenges and lessons learned from the project implementation, involving the different agencies involved in crafting both CDRA and LCCAP.

3. Results & Discussion

3.1. Project Kick-off

The project kick-off was the result of numerous meetings conducted between the Provincial Government of Aurora and UPLB. Initially, UPLB met with the Provincial Disaster Risk Reduction and Management group for crafting of CDRA and LCCAP. The Watershed Profiling component of the project was coordinated with the Provincial Government-Environment and Natural Resources Office (PG-ENRO).

The project kick-off was held in Baler, Aurora, on September 25, 2017. This was attended by some members of the project team and representatives from the different municipalities of Aurora. The project overview was presented and the expected outputs were discussed. Initial situational analysis was also done through a workshop to determine the status of different ecosystem services in the municipalities, including problems, drivers of change, and solutions. Among those identified outputs were the inadequate technical expertise for complying with

national government requirements and strict implementation of formulated plans. These became the focus of the APN CAPaBLE project.

The kick-off activity gave an opportunity for the project members to meet with one of the Board Members (elected official) of the province. As a result, a presentation at the *Sangguniang Panlalawigan* (Provincial Board, or the legislatures of The province of Aurora) on September 26, 2017 was arranged. It served as a venue to inform the decision-makers about the foregoing project, and seek support in creating an enabling environment that would facilitate the formulation of LCCAP in the concerned municipalities.

Photos: (Left) Dr. Rex Victor O. Cruz, giving the project overview and holistic approach to be used in preparing the climate actions plans; (Middle) Representative of one of the LGUs presenting the results of their group workshop; (Right) Dr. Cruz presenting the APN CAPaBLE project to the Sangguniang Panlalawigan (Provincial Board) of the province of Aurora.

Follow-up discussions with the provincial government ensued, and MOA was crafted and signed in November 2017 between UPLB and the Provincial Government of Aurora. In relation, Aurora province allocated PhP 3.5 M for related capacity building activities of its personnel.

3.2. Climate and Disaster Risk Assessment Training

On November 6-10, 2017, the provincial government of Aurora, in partnership with UPLB APN CAPaBLE Project and other government agencies, organized CDRA Training. CDRA is the first document to be prepared by the LGUs in the course of formulating the LCCAP and other development plans. It involves the process of studying risks and vulnerabilities of exposed elements, namely the people, urban areas, agriculture, forestry and fishery production areas, critical point facilities, and lifeline infrastructure associated with natural hazards and climate change. This CDRA report literally constitutes the first half of the LCCAP that each municipality or city would formulate.

The CDRA guidelines are stipulated in the Housing and Land Use Regulatory Board's (HLURB) *Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan.* It presents the different steps involved for climate and disaster risk assessment, including the different data to be gathered and maps to produce. The needed climate scenarios were also provided by the Philippine's Philippine Atmospheric and Geophysical and Astronomical Services Administration (PAGASA).

The UPLB team was tasked to train the participants on participatory approaches for risk and vulnerability assessment, as well as gender analysis. This complements the six-step CDRA process in providing context on the climate and disaster risks identified and ensuring that gender issues are mainstreamed in the adaptation strategies. The results from the participatory approaches also filled the missing data gaps in some municipality sectors. In addition, the UPLB team guided the LGUs on how to integrate the positivist and constructivist approaches to risk assessment to come up with a holistic and grounded results that would aid in developing meaningful adaptation actions.

Participatory risk and vulnerability assessment during the CDRA Training

Acknowledging that capacities in completing the CDRA would not be fully developed in just one training, the UPLB team assigned a project member to oversee the completion of CDRA for the eight municipalities of Aurora, particularly in checking the completeness of data and the compilation of the overall assessment report. Hence, each municipality from the province of Aurora worked with a UPLB project member to monitor the progress in preparing the CDRA, and eventually the LCCAP. Different needs were also addressed following the institutional analysis performed by the project.

3.3. Institutional Capacity Analysis

Through the years, a number of papers have been focusing on the role of institutions for managing disaster risks arising from various sources. Institutions are social concepts which dictate or characterize political, economic, and other social interactions and behaviours in a society (North 1991, Friend & MacClune 2012). An institution consists of both informal rules such as customs, traditions and codes of conduct, and formal rules such as constitutions and other laws. In general, institutions play a key role for stable, valued, and recurring patterns of social behaviour (Huntington 1965). Institutions, therefore, shape and guide actors' behaviour and actions, as well as enable social actors to rally and respond to sustainability challenges through collective action (Ostrom 2000).

Institutions play a role in the levels of exposure, sensitivity, and capacities of individuals, social groups, and social-ecological systems to respond to disaster events. The system of organizational structures, mechanisms and processes, strategies, policies, laws and regulations, and resources and procedures, govern how a country manages disasters and disaster risks (UNDP Bureau for Crisis Prevention & Recovery 2004). Institutional arrangements such as incentive structures, information gaps, and intra-governmental relations affect disaster risk management decision-making (Rao 2013). Lebel *et al.* (2006) contend that states are increasingly managing disaster risks (flood risks were emphasized in their study) through institutional frameworks, instead of simply responding to disaster occurrences. This can be shown in the presence of national institutional frameworks in charge of disaster risk reduction and management in almost all countries.

The adaptive capacities of affected systems, however, also need to consider system (conceptual boundaries in which institutions function) characteristics affecting the function of institutions. Bettini, Brown, & De Haan (2015), propose four interrelated system characteristics and institutional conditions related to adaptive capacities. First is the degree of structural connectedness, or the level of integration between administrative, regulative and legal frameworks, and the cooperation between organizations and other informal relationships. Second is the degree to which the system is attaining its potential, whether the goals or outcomes foundational to the system's purpose, are being attained. Third is the dominant dynamic of the system—maintaining, creating, or disrupting—which dictate the variety of dynamics displayed within and between institutional domains of the system. Fourth and finally, dominant institutional instruments, which generate various institutional work, create varying adaptive capacities. To summarize, the institutional capacity of a particular system (whether a community, society, or organization), is directly correlated with the level of risks and effects of a disaster event (UN-ISDR 2004).

Disasters can therefore be partly interpreted as a consequence of institutional failure (Ahrens & Rudolph 2006). It follows that improving the capacity of institutions to cope with disasters ensures resiliency against its impacts. Relying on institutions to mobilize and coordinate needed resources in all phases of the disaster cycle is critical and should therefore be enhanced, monitored, and evaluated (Lebel, Nikitina & Manuta 2006). Building the institutional capacity of a particular system such as a local government unit, can be done in several ways. Ahrens & Rudolph (2006) argue that building institutions should aim the improvement of governance to reduce disaster risks, facilitate relief operations, implement and enforce disaster management policies, as well create socially beneficial institutions.

Improving governance, furthermore, requires the analysis of institutional design and performance, both of which are contextually rooted in national contexts, and economic, social, political and cultural traditions (Lebel et al. 2006). Analyzing institutional design and performance allows the discovery of institutional vulnerabilities, loopholes in design, and weaknesses in implementation processes. In doing so, public participation in managing risks can be formulated; adaptive capacities at multiple levels can be achieved and linked with one another; flood disaster management and climate change adaptation into development planning can be integrated; risk reduction for socially vulnerable groups will be prioritized; and links between knowledge and practice could be strengthened (Lebel, Manuta, & Garden 2011).

Another way to prevent institutional failure is to enhance institutional capacities to make them more resilient. This can be attained by following several steps, as identified by Dodman & Satterthwaite (2008). One, information of climate trends and projections of natural hazards and its associated risks are needed to guide institutional plans. Another is the assessment of climate vulnerability at a particular spatial scale for each distinct social sector. Current development plans and priorities in the light of current climate variability and expected climate change should also be reviewed to develop and prioritise adaptation options. This can be done using consultative tools, such as participatory assessment, social accounting matrices, and cost benefit analyses. Adaptation plans involving institutional frameworks should also have monitoring and evaluation schemes.

For Friend and MacClune (2012), as well as Tyler and Moench (2012), enhancing institutional capacities should take note of four characteristics of institutions if a Climate Resilience Framework is used. First is "access rights and entitlements," which ideally, are enabling conditions which allow collective action and foster equitable access to basic resources. Second is "decision-making processes," which are principles related to transparency, accountability, responsiveness, and dispute resolution processes which are fair and accessible. Third, "information flows" defines how stakeholders' access accurate information for guiding risk and vulnerability adaptation options. Fourth and finally, "application of new knowledge" characteristics allow institutions to generate, exchange, and apply up-to-date knowledge for innovating resilience options. Able institutions, as a result of the sound interaction of these four characteristics, are better equipped for evolutionary change and adaptation towards building disaster resilience (Berkes 2007).

Additionally, Cardona *et al*. (2012) suggest three capacities for institutions to manage disaster risks in the context of resiliency. First is the capacity to anticipate risk. This suggests capacities to prepare for risks, instead of devoting substantial resources to deal with a hazard as it occurs. This capacity is necessary to adapt to climate change, and involves conscious, planned efforts to reduce risk, or to implement anticipatory actions after a disaster event is experienced. Second is the capacity to respond, which spans response from initial reactions, to actions to try to reduce secondary damage once disaster impacts are being felt. Third, is the capacity to recover and change. This capacity pertains to reconstruction efforts after a disaster has been experienced, and is affected by various factors, such as mental and physical abilities to recover, financial and environmental viabilities, and political will.

The role of institutions for disaster resilience is very crucial for a hazard-prone country such as the Philippines. Although the Philippines has a strong set of institutional frameworks related with disaster risk reduction, it is uncertain how these institutions play a role in managing disasters, and challenges remain in measuring and assessing factors related to disaster risks (Alcayna *et al.* 2016). Additionally, Alcayna *et al.* (2016) documents the presence of

institutional capability-building projects being implemented in the country but a number of issues limit the potential of such endeavours. These include the scant data and research for guiding local initiatives towards disaster resilience; the absence of mechanisms to translate research into inform policy and decision-making processes; the lack of updated and sufficient institutional contingency plans for disaster events; and insufficient disaster risk management training for various institutional agents. Additionally, it appears that current institutional frameworks focus on mitigation, response and recovery, and less so on climate resiliency (Domingo 2016).

To fill these information gaps, this report focused on The province of Aurora for guiding institutional capacity building towards disaster resiliency in the Philippines, and for other similarly situated countries worldwide.

An institutional capacity assessment survey was formulated based from Friend and MacClune (2012), and Tyler and Moench's (2012) use of a Climate Resilience Framework. Specifically, a five-point Likert scale of indicators for the following institutional characteristics was determined: "Access Rights and Entitlements", "Information Flows", "Decision-making Processes", and "Application of New Knowledge" (Appendix 1). Additionally, Cardona *et al.'s* (2012) capacities for institutions to manage disaster risks in the context of resiliency were used. Similarly, a 5-point Likert scale ("1" as the lowest, "5" the highest) was used to determine indicators of "Capacity to Anticipate Risk", "Capacity to Respond", and "Capacity to Recover and Change."

A complete enumeration of members of the technical working group (TWG) in charge of disaster risk reduction and management for each municipality, specifically members of the provincial TWG, was surveyed. Due to the current number of respondents, statistical inferences cannot be made, therefore, averages and frequencies were used for this preliminary paper. However, once the necessary number of respondents has been gathered from all TWGs, data will be analyzed using Pearson product-moment correlation coefficient to determine interrelationships between institutional characteristics and formulate necessary measures to enhance resiliency through human security development and capacity building.

1. Demographic Characteristics

Fifty-two (52) respondents answered the institutional capacity questionnaire, or 58% of the expected respondents for this study representing personnel of disaster risk reduction and management TWGs. Most of the employees are natives of Aurora, while 16 respondents are migrants from various municipalities/cities in the country. Everyone has completed at least a college degree, with some respondents having graduate degrees. Respondents have an average of 14.47 years of education, and an average age of 47.47. Most of the employees are male (n=33, or 63%), with only 19 females or 37%. On average, personnel have been working in their respective office for 13.6 years.

2. Access Rights and Entitlements Conditions

Based on Table 1, respondents scored their rights to access necessary resources for performing their respective tasks, as "3.36." This corresponds to the upper half of the median score "Ok" in the 5-point scale. The conditions which scored lower than the median (<3.0)

are (a) number of staff members (2.92) and (b) financial support from other sources (2.98). This suggests that offices are, due to various circumstances unfortunately undetermined in this study, understaffed and in need of additional personnel. High scoring conditions (>3.5), are (a) relationship among staff members of your office (3.69), (b) relationship of your office with other offices within the municipality/city (3.77), (c) relationship of your office with other offices at the provincial level (3.71), (d) and (e) opportunities to attend trainings/seminars/workshops (3.79, 3.68), and (f) financial support within LGU. These scores suggest that a health level of social capital is helping offices, in spite of the lack of personnel and financial support from external sources, achieve their designated tasks and responsibilities.

Table 1. Scores Regarding Access Rights and Entitlements

I. Access Rights and Entitlements Conditions	**Average Score**
1. Location of your office in the municipal/city hall (including the positions of your desk, shelves, documents, etc.)	3.40
2. Number of staff members	2.92
3. Technical capacity of staff members to carry out their responsibilities	3.04
4. Relationship among staff members of your office	3.69
5. Relationship of your office with other offices within the municipality/city	3.77
6. Relationship of your office with other offices at the provincial level	3.71
7. Opportunities to attend trainings/seminars/workshops	3.79
8. Trainings/seminars/workshops attended during the time spent in your office	3.68
9. Financial Support (within the LGU or from the Mayor's office)	3.57
10.Financial Support (provincial level to your municipality/city)	3.33
11. Financial Support from other sources (e.g., private sector, other funding agencies)	2.98
12. Equipment and supplies for daily operations	3.23
13. Access to new technologies to facilitate operations	3.04
14. Existence of rules and regulations within the office to harmonize operations	3.27
15. Developments that happened in your sector/office (in terms of politics/governance)	3.25
16. Physical development in your office	3.08

3. Information Flows Conditions

Four conditions scored lower than the median value of "3" (Table 2). These are: (a) availability of historical records and information with regard to changes/developments in your sector/office, (b) availability of database and other support system for managing records and information, (c) ease in accessing and/or retrieving relevant records and information used by the office, (d) ease in accessing and/or retrieving relevant records and information used by the office, and (e) data/information passed on from previous officials to new ones (or from absent to present staff members). Results show that there is a need to enhance database management

systems and ensure the delivery of needed information in the face of personnel or administrative turnovers. None of the conditions exceeded an average of "3.5" to indicate a degree of "satisfied" regarding information flows in the DRRM institution.

Table 2. Scores Regarding Information Flows

Information Flows Conditions	**Average Score**
1. Access to information/resources at the barangay level	3.00
2. Access to information/resources at the municipality/city level	3.37
3. Access to information/resources at the provincial level	3.27
4. Access to information/resources at the national level	3.10
5. Accuracy of information accessed from different sources	3.13
6. Completeness of information accessed from different sources	3.08
7. Availability of historical records and information with regard to changes/developments in your sector/office	2.88
8. Availability of database and other support system for managing records and information used by the office	2.92
9. Ease in accessing and/or retrieving relevant records and information used by the office	2.96
10. Data/Information passed on from previous officials to new ones (or from absent to present staff members)	2.92
11. Safety of important materials/documents (how these materials/documents are being kept and preserved)	3.12
12. Capacity to produce relevant reports/documents needed by information users	3.35
13. Capacity to package or prepare information produced by the office specific to the needs of the end-users	3.40
14. Dissemination of information to relevant users	3.47

4. Decision-Making Processes Conditions

Only one condition scored lower than the median score: (a) avenue to provide incentives or reward good works (Table 3). This indicates a number of insights regarding decision-making conditions within the institutional set-up. At the superficial level, incentives are perceived as not enough for performed tasks and responsibilities involved with a particular personnel's position. Such condition may eventually affect motivations to perform needed tasks, and thereby reducing the overall capacity of the DRRM-related institution to function. Therefore, incentive schemes should be reviewed and necessary improvements should be implemented. Additionally, none of the decision-making conditions exceeded an average of "3.5" to indicate a degree of "satisfied."

Table 3. Scores Regarding Decision-Making Processes

Decision-Making Processes Conditions	Average Score
1. Regular meetings within the office to discuss issues, etc.	3.44
2. Regular meeting with other sectoral offices at the municipal/city level	3.35
3. Regular meeting with other sectoral offices at the provincial level	3.22
4. Venue for dialogue with constituents/communities to know their needs	3.25
5. Venue to hear feedback from constituents/communities	3.29
6. Participation, cooperation and unity among staff members/officials when finalizing decisions	3.38
7. Decision making following the principle of transparency	3.42
8. Decision making following the principle of accountability	3.44
9. Decision making following the principle of responsiveness	3.42
10. Capacity to implement decisions (*e.g.*, policies, programs) from your sector	3.50
11. Flexibility to change decisions if the need arises	3.50
12. Acceptability of decisions made to the constituents/communities	3.33
13. Mechanism to monitor impacts of decisions made	3.12
14. Avenue to provide incentives or reward good works	2.82
15. Ability to handle conflict situations within the office	3.37
16. Ability to handle conflict situations with other offices	3.23
17. Availability of development plans/strategies to manage concerned sector	3.27
18. Ability to update development plans/strategies to manage concerned sector	3.31

5. Application of New Knowledge Conditions

Everyone is aware about climate change (3.65) but awareness and knowledge about existing watersheds in the province scored lower than the median (Table 4). Information about watersheds in the municipality should therefore be improved to identify drainage basins as well as flood-prone and landslide-prone areas.

Table 4. Scores Regarding Application of New Knowledge Capacities

Application of New Knowledge Conditions	Average Score
1. Awareness in the concept of climate change	3.65
2. Awareness in the concept of watershed	3.31
3. Awareness in the watershed (or holistic) approach in managing socio-ecological systems	3.31
4. Awareness and knowledge about the watershed in your municipality	2.87

6. Capacity to Anticipate Risk

All capacities related to the anticipation of risk scored higher than the median, with availability of infrastructures/facilities to respond to climate-related risk events to the concerned sector (evacuation centers, crop dryers, etc.), scoring almost equal (3.04) to the median (Table 5). None scored lower than "3."

High scoring capacities (>3.5) include: (a) thorough knowledge of the sector you are currently working on (status, concerns, challenges, etc.), (b) knowledge of risk events related to the concerned sector at the municipal and provincial level, (c) knowledge of potential impacts of climate-related risk events to the concerned sector, and (d) presence of emergency response system (with organizational chart) in the concerned sector to guide actions and decision making during risk events. This shows that Aurora province at the institutional level, has the capacity to anticipate disaster-related risks.

Table 5. Scores Regarding Capacity to Anticipate Risk

Capacity to Anticipate Risk	**Average Score**
1. Thorough knowledge of the sector you are currently working on (status, concerns, challenges, etc.)	3.56
2. Knowledge of risk events related to the concerned sector at the municipal and provincial level	3.58
3. Knowledge of potential impacts of climate-related risk events to the concerned sector	3.58
4. Availability of human resources to respond to climate-related risk events to the concerned sector	3.27
5. Availability of resources (goods including relief goods, seeds, etc.; funds) to respond to climate-related risk events to the concerned sector	3.35
6. Availability of equipment to respond to climate-related risk events to the concerned sector (communications, vehicles, etc.)	3.17
7. Availability of infrastructures/facilities to respond to climate-related risk events to the concerned sector (evacuation centers, crop dryers, etc.)	3.04
8. Availability of disaster risk reduction and management plan for the sector	3.40
9. Capacity to prepare people/constituents in anticipation of disaster risks	3.48
10. Presence of emergency response system (with organizational chart) in the concerned sector to guide actions and decision-making during risk events	3.55

7. Capacity to Respond

High scoring capacities (>3.5) are: (a) quick response to problems/emergencies (during disasters, calamity or accidents), and (b) efficiency of people/group networks to disseminate information (Table 6). This implies that Aurora province at the institutional level has the capacity to respond to disaster events.

Table 6. Scores Regarding Capacity to Respond

Capacity to Respond	Average Score
1. Quick response to problems/emergencies (during disasters, calamity or accidents)	3.56
2. Effective implementation of guidelines/ protocols (e.g., command responsibility to respond to disasters and risk events)	3.46
3. Efficiency of people/group networks to disseminate information	3.52
4. Capacity to make quick and relevant decisions during risk events (e.g., use of resources and its distribution, prioritization, etc.)	3.48
5. Capacity to manage crisis for the concerned sector during risk events	3.44

8. Capacity to Recover and Change

All capacities related to recovery and change is within the median score (Table 7). While this shows that there is an existing capacity to recover from disasters and implement necessary changes, it also means that improvements can be made to strengthen recovery and building back better.

Table 7. Scores Regarding Capacity to Recover and Change

Capacity to Recover and Change	Average Score
1. Immediate recovery of the concerned sector from impacts of risk events and disasters	3.40
2. Capacity to build better to reduce risks in the future for the concerned sector	3.23
3. Capacity to welcome change brought about by impacts of risk events and disasters	3.46

4.4. Participatory Risk and Vulnerability Assessment

Participatory Risk and Vulnerability Assessment (PRVA) is an investigative method that employs a variety of participatory tools to engage local stakeholders in their own climate and disaster risk diagnosis. It uses the knowledge of the participants to come up with a risk

assessment, which in turn, enables them to analyse their living conditions, share the outcome of the analysis, and plan response strategies.

The PRVA started during the CDRA training held on November 2017, but the assessment for all climate-related extreme events was not completed due to time constraints. Hence, this activity was continued during APN CAPaLE Project even held on April 26-28, 2018. The PRVA was done with the help of graduate students taking DMG 224 (Governance Framework for Disaster Risk Reduction and Climate Change) under the supervision of Dr. Dixon T. Gevana, Dr. Rose Jane J. Peras, and Assistant Prof. Maricel A. Tapia. The activity served as a capacity building opportunity not only for the municipal officers in The province of Aurora, but also for the 12 graduate students. The PRVA involved stakeholder analysis, risk identification, impact and adaptation assessment, and gender analysis.

The UPLB project team, Aurora municipal officers and DMG 224 graduate students completing the participatory risk and vulnerability assessment.

Tables 8 to 13 present the PRVA results for the municipalities of Baler and San Luis. Similar matrices were also prepared for the rest six Aurora municipalities. The results of the PRVA were integrated in the CDRA to come up with an integrated assessment of risk, that also considers its social (including gender), environmental, and economic dimensions.

Table 8 shows the identification of stakeholders with different interests in the municipalities. They were categorized into user groups, mediating institutions, and external interest groups.

Various stakeholders were identified to understand the risk associated with their own interests and concerns. Mediating institutions, groups of people, and government agencies involved in the coordination and disaster recovery were also identified including NGOs that gave technical assistance, funding aid, and provisions for disaster preparedness. External interest group also provided technical assistance, project for humanity and skills on risks, and disaster preparedness

Table 8. Identification of Stakeholders in the Municipalities of Baler and San Luis

Stakeholders	Interests
User Groups: Families of the community including Head of the Family, Senior Citizen, Persons with Disabilities (PWD) & Youth;	Community-based DRR & Management
Farmers	Provision of Crop Insurance, Automatic Weather Station (AWS)
Fisherfolks	Early Warning Device
Indigenous People's (IPs)	Disaster Family Evacuation Preparedness
Business sector	Lending of Heavy Equipment
Women's group	Psychosocial Debriefing
LGUs	DRR Projects
Mediating Institutions: Philippine Red Cross	Technical assistance, Rescue operation
Various NGOs such as Religious Groups	Manpower
Civil Society Organizations (CSOs) i.e. Kabalikat Civicom of San Luis	Manpower
Bureau of Fisheries and Aquatic Resources (BFAR)	Provision of fish nets, motorized boats, fishing gear
National Housing Authority (NHA)	Socialized Housing
Bureau of Fire Protection (BFP)	Manpower, Rescue operation
City Government of Quezon City	Financial assistance
External Interest Group: Gawad Kalinga (San Luis)	
Daluhay (Daloy ng Buhay) (San Luis & Baler)	Environmental conservation, Technical assistance
Habitat for Humanity (San Luis & Baler)	Housing project
Save the Children (San Luis & Baler)	Disaster preparedness for Children & Family
City Government of Quezon City (Baler)	Livelihood Assistance, Provision of MRF (Materials Recovery Facility) such as waste segregation of materials for disposal to those of re-usable items, Provision of Information, Education and Communication (IEC) materials i.e. laptops, sound systems, and LCD projectors

The municipalities of Baler and San Luis are prone to different climate-related risk events, with flood, typhoon, and landslide experienced yearly, was given a likelihood rating of five. Flood and typhoon, however, brought the highest degree of impacts, particularly damage to properties and halting of economic activities that result to loss of income. Another alarming impact of these extreme events is the exposure of vulnerable groups to less than desirable conditions, particularly in evacuation centers, that make them likely to suffer from sexual harassment (Table 10). Looting, escalating prices of commodities, and increase in family expenses were the other domino effects of the climate-related risk events experienced in the municipalities.

Table 9. Risk Identification

Risk Event	History	Likelihood[1]	Comments[2]	Group Affected[3]
Flooding	• 2015 • 2016 • 2017	5	• Damage to properties	• 13 barangays in Baler • 4 barangays in San Luis
Storm surge	• 2014: "Santi"	4	• Livelihood has been affected due to damaged boats of fisherfolks • Livelihood of Resort Owners and Surf Instructors has been affected	• Fisherfolks • Resort owners • Surfing instructors • 2 barangays in Baler • Coastal Barangay of San Luis
Typhoon	• 2015: "Lando" 2016: "Karen & Lawin"	5	• Last Quarter of the Year • Under State of Calamity • Damaged houses, agricultural land, government infrastructures and schools	• Families • Farmers • Fisherfolks • Students • Employees and laborers • Business sectors
Landslide	• 2016	5	• Minimal effect only	• Families

[1] **Likelihood:** 5 – likely to occur once or more annually;
4 – likely to occur at least once a decade;
3 – likely to occur once between 10 and 30 years;
2 – likely to occur once between 30 and 50 years;
1 – not likely to occur in period

[2] **Comments:** Explore the different dimensions of risk, including frequency/magnitude of events, area affected, month/season when the risk event happens, etc.

Table 10. Impact Assessment

	People	Environment (natural and built)	Livelihood/ Economics
Municipality	• Low productivity of products • Delayed delivery of basic services • Human displacement	• Increase in the volume of wastes and debris • Problem in hygiene and sanitation • Rampant illegal logging activities • Timber poaching • Damage to forest and environmental resources i.e. loss of forest cover • Damage to infrastructure and establishments • Damage to coastal areas • Siltation of farm lots	• Decrease in local revenue resources or collection • Increase in price of commodities
Community/ Barangay	• Violation of RA7610 "*An act providing for stronger deterrence and special protection against child abuse, exploitation and discrimination, and for other purposes*" • Vulnerability to sexual abuse (Women & Children) • Looting • Issue on distribution of relief goods		• Increase in opportunities for livelihood assistance i.e. Cash for work and Food for Work
Farm Level	• Damage to agricultural crops, lands, livestock and machineries • Damage to fish pens or fish cages • Damage to fishing gears or boats		• Decrease in production of agricultural products • Increase in farm inputs i.e. Additional fertilizers and seeds
Household	• Damage to houses, appliances and properties		• Increase in expenses • Decrease in family income
Individual (Men, Women, Children	• Men cannot work i.e. Carpentry works • Women do additional chores • Children became disrupted to attending classes, cannot play outside the house • Traumatized • Sickness or health problems • Death • Hunger		• Loss of income • Decrease business opportunities

Adaptation strategies implemented in Baler and San Luis during times of disaster are already in place, and most of these are characterized by anticipatory adaptation responses led by the LGUs. Longer term adaptation that reduces that causes of risks should however be considered in the future, as well as gender sensitivity of such strategies.

Table 11. Adaptation Strategies

Risk Event	Adaptation strategies – BEFORE THE RISK EVENT ARRIVES	Adaptation strategies – DURING OR AFTER THE EXTREME EVENT
1. Flooding **2. Storm Surge** **3. Typhoon**	• Pre-emptive evaluation • Prepositioning of resources (e.g. Human equipment & tools, food & non-food items) • Pre-Disaster Risk Assessment (PDRA) meeting • Family Warning System (FWS) • Siren / Bandilyo	• Debris cleaning • Search & rescue, and retrieval operation • Distribution of relief good • Post-Damage and Needs Assessment (PDANA) / Rapid-Damage Assessment and Analysis (RDANA) • Psychosocial • Activation of evacuation centers • Activation of response clusters/Incident Command System (ICS) • Provision of livelihood assistance
4. Landslide	IEC Skills and Enhancement Trainings • Community Drills • Simulation Exercise • Structural Mitigation (e.g. Flood control, Slope protection) • Disaster Risk Reduction-Climate Change Adaptation and Mitigation (DRR-CCAM) plans • Agricultural Production Resiliency Program	
5. Earthquake	• IEC • Community Drills • Simulation Drills • Simulation Exercises • Structural Mitigation (e.g. Flood control, slope protection) • Contingency Plan	• Search & rescue, and retrieval

Tables 12 and 13 present the gender analysis done in the municipalities following the Capacities and Vulnerabilities (CAV) Framework. It assessed the strengths and weaknesses of the municipalities in relation to physical/material, social/organization, and motivational/ attitudinal assets (Table 12). This were then disaggregated by gender in Table 13. Results showed the areas in the municipalities that need further improvement to better respond to risk events, such as inadequate manpower and poor participation of communities, and how certain adaptation strategies could be designed to cater to the needs of different groups.

Table 12. Capacities and Vulnerabilities Analysis Matrix

	Vulnerabilities	Capacities
Physical/Material *What productive resources, skills and hazards exist?*	• Houses in flood prone areas • Zoning areas • No barrier against Pacific Ocean • Non-compliance to Bldg. Codes • Catch basin (Baler) • Narrow roads (Baler) • Houses made of light materials (San Luis) • Low household elevation • Narrow drainage system • Lack of training (???) Disaster Risk Reduction and Management (DRRM) funds • Irregular infrastructure audit	• Presence of evacuation center • IEC • Early Warning System (EWS) • Existence of Municipal Ordinances • Institutionalization of DRR & CCA into all Local Development Plan • Capacity Development Training Drills • Rehabilitation of communities living in high risk areas • Availability of DRRM equipment & tools • Crop Insurance • Municipal Building Insurance (San Luis)
Social/Organizational *What are the relationships between people?* *What are their organizational structures?*	• Cultural hindrance • Poor participation of communities to DRR & CCA to programs, trainings & activities • Inadequate no. of manpower for DRR • Political will of barangay officials regarding implementation of projects, programs, etc. • Unorganized or non-functional Barangay Disaster Risk Management Office	• Capacity Development & Trainings, Drills, Workshop, etc. • Existing MOA or Memorandum of Understanding (MOU) with other DRRM related organizations • Conduct of annual rescue Olympics
Motivational/ Attitudinal *How does the community view its ability to create change?*	• Negative attitude or "Kanya-kanya System" • Lack of interest of communities regarding participation in programs and projects • Dependency to LGUs assistance	• Giving of recognition, awards and incentives • Personal accidents • Insurance for Accredited Civilian Disaster Volunteer

Table 13. Capacities and Vulnerabilities Analysis Matrix (by Gender)

	Vulnerabilities		Capacities	
	Men	**Women**	**Men**	**Women**
Physical/ Material *What productive resources, skills and hazards exist?*	• Prone to accident • Short life span • Vices	• Prone to abuses • Not prioritized to attend DRRM activities • Pregnancy • In terms of strength, limited physical activities	• Physically fit • Access to DRR activities • Financial provider • Much capable of doing different activities or tasks	• Highly organized • High charisma • More participative
Social/ Organizational *What are the relationships between people? What are their organizational structures?*	• Discouraged easily • Rejection due to ego	• Overpowered by men in decision-making • Prone to abuses	• More volunteer • Socially-inclined • Leadership	• Action in organization • More committed to duties & responsibilities
Motivational/ Attitudinal *How does the community view its ability to create change?*	• Short-tempered • Less focus than women	• Left alone in the house to take care of the children and the household chores	• High level of self-confidence • Prompt in decision-making	• Have more patience • More focus to do her duties and responsibilities

4.5. Formulation of LCCAP

LCCAP is a strategy document that describes measures and policies of a local government to reduce greenhouse gas emissions (mitigation actions) and increase the community's resilience (adaptation actions) to the impacts of climate change. A requisite in the preparation of the LCCAP is the completion of the CDRA. As of this writing, the eight municipalities in Aurora province are completing their CDRAs, which the project team found to be a big challenge for the LGUs due to lack of data, steep learning curve to master the CDRA process, and the perceived attitude from the municipal officers to complete it just for the sake of compliance, thus affecting the overall quality of the produced report.

In response to this concern, the UPLB team assigned a project member to oversee the progress of each municipality in completing the report that would constitute about 50% of the LCCAP. The team worked closely with the municipalities to monitor completion of each CDRA step, assist in data gathering and preparation of the maps, and come up with a meaningful and grounded assessment integrating the PRVA results that would be the basis for the formulation of adaptation strategies.

A sample CDRA from the Municipality of Casiguran is attached in this report. To complete the first-year APN CAPaBLE project activities, another CDRA progress assessment and reporting was held in Aurora on July 23-27, 2018, to finalize this initial report, and begin the process for LCCAP formulation.

The respective TWGs of each municipality were tasked to write the LCCAP report. Staff members from UPLB were tasked to provide guidance, while some provided expertise in the Green House Gas Inventory portion of the report. The following UPLB staff provided assistance to the specific LGUs:

UPLB Staff	Specific Municipality/Expertise
Dr. Wilfredo M. Carandang Dr. Vida Q. Carandang	Municipality of Baler
Dr. Lorena L. Sabino Dr. Josephine E. Garcia	Municipality of Dingalan
Dr. Catherine C. de Luna	Municipality of San Luis
Dr. Rose Jane J. Peras	Municipality of Maria Aurora
Prof. Liezl B. Grefalda	Municipality of Dipaculao
Prof. Maricel A. Tapia	Municipality of Dinalungan
Dr. Danesto B. Anacio	Municipality of Casiguran
Dr. Dixon T. Gevana Ms. Aileen S. Peria	Municipality of Dilasag
Dr. Florencia B. Pulhin	Greenhouse Gas Inventory
Dr. Cristino L. Tiburan, Jr. For. Leonardo D. Barua For. Nico R. Almarines For. Adrian Pablo V. Sasi	Geographic Information System, Mapping

After the draft LCCAP has been written by the TWG of each municipality, series of refinement workshops were conducted.

Including resource persons from UPLB, a total of one hundred twenty-seven (127) persons attended the three series of training-writeshops. Participants came from the Provincial Climate Change TWG members and eight component municipalities. Provincial TWG comprise of members from DENR-PENRO, Aurora State College of Technology (ASCOT), Provincial DRRM Office, Provincial Planning & Development Office (PPDO), Provincial Engineering Office (PEO), Provincial General Services Office (PGSO), Provincial Environment and Natural Resources Office (ENRO), and Office of Provincial Agriculturist. As partners in the implementation of the project, Municipal TWG Members came from the following key offices:

1. MDRRM Office
2. MPD Office
3. GIS Specialist/Encoder
4. MLGO Office
5. MENR Office
6. Municipal Engineering Office
7. Municipal Agriculturist Office
8. MSWD Office
9. Municipal Health Office
10. ABC President

The program involved three (3) series of training-writeshops for the refinement and/or finalization of enhanced LCCAP conducted by Cluster, to wit:

1. April 1-2, 2019: Central Aurora Cluster (Baler, San Luis, Dipaculao and Ma. Aurora)
2. April 29-30, 2019: DICADI Cluster (Dinalungan, Casiguran, Dilasag)
3. May 20-21, 2019: Dingalan and Provincial Cluster

While the municipal LGUs were writing the LCCAP, the Provincial TWG consolidated and reviewed the CDRA and LCCAP outputs of MLGUs. Provincial DRRM Office served as the facilitator and secretariat of training-writeshops.

As agreed, the MLGU's were tasked to submit the final LCCAP on or before May 31, 2019. The submitted outputs were reviewed by the provincial TWG and concerned UPLB team member assigned per LGU.

On October 20 to 21, 2019, each UPLB team member met with the TWGs of each municipality to present the draft LCCAP. On October 22, 2019, the draft provincial LCCAP was presented by Dr. Juan M. Pulhin and Engr. Cristina W. de la Cruz to the members of the provincial TWG. The provincial LCCAP is the first LCCAP initiated by a province, with the aim of crafting an overall plan that will encompass all the plans of the municipalities in terms of climate change adaptation.

4.6 Coordination meeting with the UP RI

On September 27, 2019, UPLB team went to the office of the UP Resilience Institute in Diliman, Quezon City. The meeting focused on levelling off session with regard to crafting of CDRA and LCCAP, based on field experiences of both the UP RI staff and UPLB team. In addition, the meeting identified ways on how to translate spatial approach of CDRA to sectoral approach for LCCAP.

The meeting yielded a comparison of CDRA and LCCAP Guidelines, as follows:

	CDRA	LCCAP
Exposure Database Structure	Well defined but indicators are not applicable to all LGUs	Uses CDRA exposure database but requires categorization of geographic scope into upland, lowland, urban, and coastal
	Suggestion: Review indicators included in both guidelines	
Degree of Impact	3-scale p.110	5-scale Based on the NDRRMC protocol in declaring state of calamity p.52
	Suggestion/s: - **Harmonize rating scale in order to avoid reprocessing of data** - **Scoring system is not applicable for all LGUs** - **Scoring system should be <u>DECIDED</u> by the LGU** - **Score per indicator**	
Adaptive Capacity	3-scale; exposure unit-based Average Per exposure unit per hazard *UPRI experience: 1 AC for all hazards* p.116	5-scale Affected sector and LGU Per sector per hazard Scoring system not clear: no scoring system for the affected sector but with proposed scoring for LGU indicators
	Suggestion/s: - **Harmonize rating scale in order to avoid reprocessing the data** - **Score per indicator**	
Vulnerability	Use AR5	
Risk	Risk = LOO x SOC Hazard x (Exposure x Vulnerability)	Risk = LOO x SOC Hazard x (Exposure x Vulnerability)
	Suggestion: Incorporate MGB hazard map as one scenario under baseline scenario	
Technical Findings	Per hazard	Per hazard but is summarized as one
	Suggestion/s: - **Develop summarizing method that is consistent for both process** - **Do not summarize all hazards for LCCAP**	
Policy Interventions	Remove this under CDRA	

Members of the UPLB team meets with the UP Resilience Institute to review the CDRA and LCCAP guidelines at the UPRI office in the National Institute of Geological Sciences (NIGS).

4.8 Implementation of a Technical and Policy Forum on CDRA and LCCAP

A Technical and Policy Forum on CDRA and LCCAP was held on January 7, 2020, at the Crowne Plaza Hotel, Pasig City. IdSC-INREM partnered with the Climate Change Commission and the University of the Philippines Resilience Institute in the implementation of the said forum. It is the first of its kind in the Philippines, where the key agencies involved in the CDRA and LCCAP preparation gathered together to come up with unified policies and guidelines to hasten the preparation of a science-based CDRA and LCCAP to enhance climate change and disaster resilience of LGUs and local communities in the country.

The objectives of the forum were: 1) present current issues and challenges associated with the CDRA and LCCAP preparation based on the experiences of UPLB IDSC-INREM, UPRI, CCC, and other stakeholders; 2) discuss the strengths and limitations of the current CDRA and LCCAP guidelines and processes based on the experience of the different stakeholders; 3) agree on key strategies to develop a unified policy and guidelines that will hasten the preparation of CDRA and LCCAP by LGUs; and 4) formulate action plan towards the issuance of a joint government policy guidelines for a speedy preparation of a simplified, science-based, and more responsive CDRA and LCCAP by all LGUs in the country. CDRA and LCCAP should be mainstreamed by the LGUs in the preparation of their Comprehensive Land Use Plan (CLUP), Comprehensive Development Plan (CDP), and in their Annual Investment Plan (AIP).

Presentations on issues, challenges, and lessons learned on the use of CDRA for LCCAP formulation were shared by the Department of Interior and Local Government through the Bureau of Local Government Development (BLGD-DILG), Department of Human Settlements and Urban Development (DHSUD) (formerly the Housing and Land-use Regulatory Board), Climate Change Commission (CCC), UPLB, UP RI.

Based on the presentations made, the preparation of CDRA as a requirement for the formulation of LCCAP and other plans is constrained by the following factors: 1) steep learning curve, including effective cascading of expertise to the LGUs; 2) lack of manpower; 3) data intensive; 4) sustainability (resources and resource mobilization); and 5) appreciation and accountability of LGUs in preparing CDRA.

The recommendations formulated through a forum resolution were as follows:

1. Institute a focal office/unit for climate change (similar to DRRMO) in the LGUs for both compliance and accountability;
2. Coaching and mentoring (instead of training) of LGUs (specifically those occupying *plantilla* positions and knowledgeable on the subject matter) in the preparation of CDRA and LCCAP, and requiring elected LGU officials to be trained on CDRA and LCCAPs;
3. Appoint an agency tasked to monitor the completion of CDRA and its mainstreaming into development plans, including ensuring the alignment of LCCAP with CLUP and CDP;
4. Tap Higher Education Institutions (HEIs) as technical service providers to LGUs in developing their CDRA and LCCAP, and address issues on resource mobilization;
5. Agree on the scale of government unit for CDRA preparation (whether provincial, regional and national) and capacitate LGUs in enhancing the assessment and mainstreaming the results in their plans. It is recommended that the national government prepares the CDRA, and this goes into the CLUP as a chapter; and,
6. Include some data requirements for CDRA in the Community-Based Monitoring System (CBMS).

The resolution also calls for the creation of an Inter-agency Technical Working Group to develop a unified framework harmonizing the guidelines and tools (such as the probabilistic risk assessment, smooth translation from spatial to sectoral) for CDRA and LCCAP. The TWG should include (*but not be limited to*): CCC, DHSUD, UPRI, NPTE, DILG, NEDA, LGU representatives, UPLB, League of Municipalities, PHIVOLCS, PAGASA, MGB, OCD. The TWG, is suggested to be organized within 30 days from the date of the technical and policy forum.

The resolution will be presented to DILG, who provides guidelines in the preparation or updating of local plans, requiring the integration of disaster risk reduction and management and climate change adaptation and mitigation.

The Forum was attended by 51 participants from NEDA, CCC, NPTE, UP RI, DHSUD (then HLURB), DILG, LGU Representatives from the Province of Aurora, Municipalities of Dingalan, Aurora and Majayjay, Laguna, IdSC-INREM and UPLB-CRSC.

Participants to the Technical and Policy Forum on Climate Disaster and Risk Assessment (CDRA) and Local Climate Change Action Plan (LCCAP) on 7 January 2020 at Crowne Plaza Hotel, Pasig City.

4.9 Contribution to Human Security Development

Human security is one of the seven objectives of the NCCAP leading to resilience and it can be explained as freedom from fear and want and freedom to live in dignity (https://www.un.org/humansecurity/climate-change/, downloaded February 26, 2020). The preparation of the LCCAP by the municipalities entails a detailed assessment of the local context through CDRA to be able to understand the consequences of climate change and its impact on human security.

Freedom from fear can be exemplified by crafting a LCCAP that allows the LGU to be prepared during disasters. Example of these identified activities were:

- Promotion of adaptive designs for housing with government and non-governmental organizations such as the National Housing Authority
- Community-based disaster preparedness and contingency plans that include publicized evacuation routes
- Regular training drills and evacuation rehearsals are performed in partnership with local civil society groups, but only in schools and hospitals
- Disaster response communication protocols
- Watershed management/rehabilitation, protection of mangroves and habitats, environmental quality monitoring, flood control projects, and river rehabilitation programs
- Integrated approach for the prevention and control of illegal and informal settlement or relocation of risk-prone houses into government housing projects

Freedom from want entails provision of livelihood that is resilient even during disasters. These activities that the province of Aurora identified include:

- Skills development and direct assistance
- Farm modernization and Agro-technology application
- Promotion of organic farming
- Livestock and Poultry Quality Enhancement
- Commercial Fishery Revitalization
- Post-harvest facilities modernization and infrastructure support development
- Improvement of business/investment climate
- Establishment of labor-intensive industries to provide livelihood to the population

By placing people (human) at the center, the human security approach encourages the participation of groups or communities to be able provide actions that promotes reduction of risks while utilizing environmental resources in a sustainable manner and at the same time promoting peace and harmony within the community.

5. Conclusions

While training on CDRA has been done to build the capacity of the municipal officers in selected municipalities of Aurora province to satisfy the initial requirements for the preparation of LCCAP, close monitoring and partnership are crucial for them to have a deeper appreciation of the process and imbibe the knowledge and skills needed to produce such report. Indeed, the process of preparing an LCCAP is an uphill climb for the LGUs given that this is a new development in climate risk governance, and that various technical expertise are needed to produce the report.

On top of this, the institutional capacity of the municipal LGUs of Aurora is found wanting to implement climate governance. Specifically, three key areas need to be improved to enhance resilience towards climate and disaster risks. First, is to improve staffing and pool of human resources among offices. The existence of the right number of qualified personnel would greatly increase capacities to manage climate-related disasters and risks. Second, is to increase access to financial support from other sources apart from municipal funds. This can be done through capacity-building in terms of proposal development, project management, or as simple as disseminating information about the existing of funding-entities. Third and final key area, is that database management systems need to be improved. Such systems allow efficient retrieval of relevant information for anticipating risks, determination of inherent capacities to handle disaster events, guidance for efficient courses of action to respond to disaster events, as well as for guiding rebuilding efforts. While a number of strategies can be done to solve these issues, most of which can be broadly addressed through relevant personnel capacity building programs.

4. Future Directions

Provide explanation on further work that has been planned or potentially can be done to continue the project.

The Technical and Policy Forum on CDRA and LCCAP held in January 2020 allowed for the crafting of a resolution. The resolution also calls for the creation of Inter-agency Technical

Working Group to develop a unified framework harmonizing the guidelines and tools (such as the probabilistic risk assessment, smooth translation from spatial to sectoral) for CDRA and LCCAP. The TWG should include (*but not limited to*): CCC, DHSUD, UPRI, NPTE, DILG, NEDA, LGU representatives, UPLB, League of Municipalities, PHIVOLCS, PAGASA, MGB, OCD. The TWG, is suggested to be organized within 30 days from the date of the Technical and Policy Forum on CDRA and LCCAP.

The resolution will be presented to DILG, who provides the guidelines in the preparation or updating of local plans, requiring the integration of disaster risk reduction and management and climate change adaptation and mitigation.

5. References

Provide the references and useful link that supplement or is relevant to your project. Follow the APA style format when citing your references.

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6. Appendix

Conferences/Symposia/Workshops

Agenda/Programme (including title, date and venue)

Participants list (comprising contact details of each participant, including organisation, address, phone number, fax number, and email address)

Funding sources outside the APN

A list of agencies, institutions, organisations (governmental, inter-governmental and/or non-governmental), that provided any in-kind support and co-funding for the project and the amount(s) awarded. If possible, please provide an estimate amount.

List of Young Scientists

Include brief detail (full name, involvement in the project activity) and contact detail (name of institution/country and email address) of your scientists involved in the project. Also include short message from the young scientists about his/her involvement in the project and how it helps develop/build his capacity and the knowledge he gained.

Appendix 1. Memorandum of Agreement between the Provincial Government of Aurora and the University of the Philippines Los Baños

MEMORANDUM OF AGREEMENT

This **MEMORANDUM OF AGREEMENT** executed and entered into by and between:

The **PROVINCIAL GOVERNMENT OF AURORA**, a local government unit established and existing under the laws of the Republic of the Philippines with principal office at Provincial Capitol, Barangay Suklayin, Baler, Aurora, duly represented by its Governor, **HONORABLE GERARDO A. NOVERAS**, hereinafter referred to as **PGA**;

-and-

The **UNIVERSITY OF THE PHILIPPINES LOS BAÑOS,** a constituent university of the UNIVERSITY OF THE PHILIPPINES, the National University of the Philippines, created by virtue of Act No. 1870, as amended and re-organized and operating by virtue of PD 58 and RA 9500, with office address at College, Los Baños, Laguna, represented herein by its Chancellor, **FERNANDO C. SANCHEZ, JR.**, hereinafter referred to as **UPLB**;

WITNESSETH THAT:

WHEREAS, climate change is one of the most alarming phenomenon being felt throughout the world in periods of long drought, abnormal deluges and floods, and more unpredictable weather conditions which have adverse impacts on the economy, environment and communities;

WHEREAS, The Philippines is among the countries considered most at risk to climate change owing to its location and geophysical features;

WHEREAS, The Philippine Government enacted Republic Act 9729, also known as the Climate Change Act of 2009, which designates Local Government Units (LGUs) as the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas;

WHEREAS, Republic Act 10121, otherwise known as the "Philippine Disaster Risk Reduction and Management Act of 2010", declares the national policy to uphold the people's constitutional rights to life and property by addressing the root causes of vulnerabilities to disasters, strengthening the country's institutional capacity for disaster risk reduction and management and building the resilience of local communities to disasters including climate change impacts;

WHEREAS, Section 11 of RA 10121 directly states that "LGUs shall ensure the integration of disaster risk reduction (DRR) and climate change adaptation (CCA) into local development plans, programs and budgets as a strategy in sustainable development and poverty reduction";

WHEREAS, UPLB leads as a public service university and is committed to serve the Filipino nation and humanity. While it carries out the obligation to pursue universal principles, it must relate its activities to the needs of the Filipino people and their aspirations for social progress and transformation (RA 9500);

WHEREAS, UPLB as a constituent university of UP shares this mandate and relate its function to preserve, rehabilitate and improve the environmental ecosystem of the province of Aurora; and at the same time maintain relevant and responsive program in research and extension to strengthen internal capabilities for instruction, as well as external linkages (EO 99-2, UP);

WHEREAS, PGA and UPLB jointly commit to extend full cooperation and support to implement the technical assistance in the formulation of the Local Climate Change Action Plan of the Province of Aurora;

WHEREFORE, the parties stipulates as follows:

I. PROJECT TITLE

This agreement seeks to implement the project entitled "**Capacity Building in the Development of Local Climate Change Action Plan (LCCAP) for the Province of Aurora,"** more particularly described in the approved proposal attached hereto and made as an integral part hereof as Annex A.

II. PROJECT GOAL AND OBJECTIVES

The overriding goal of the project is to formulate a Local Climate Change Action Plan (LCCAP) to empower and sustain communities to address the threats/challenges of climate change consistent with the principles of transparency, accountability and participatory decision-making that will ensure the province's long term goal of being a climate change-adaptive and disaster-resilient community.

III. PROJECT FUNDS

The PGA shall provide and manage the project funds in the total amount of THREE MILLION FIVE HUNDRED THOUSAND PESOS **(PhP 3,500,000.00)**, Philippine currency, for a period of six (6) months.

No funds will be transferred by PGA to UPLB, all expenses related to the activities undertaken in accordance with the approved proposal shall be for the account of PGA. The UPLB employees involved in the implementation of the project shall be properly assisted and entitled to per diem or professional fee, as the case may be, for the services rendered.

All fund releases of the project shall be subject to the existing standards of accounting and auditing laws, rules and regulations of the government.

IV. OBLIGATIONS OF THE PARTIES

A. Obligations of PGA

(1) Allow the conduct of a number of focus group discussions at the municipal and provincial levels to discuss the seven (7) strategic priorities to the LCCAP, which are: food security, water efficiency, environmental and ecological stability, human security, and knowledge and capacity development. The other two on climate-smart industries and services and sustainable energy are geared towards mitigation;

(2) Provide staff OR Technical Working Group (TWG) to help in project activities implementation;

(3) Assist in coordination and conduct of focus group discussion at the various levels;

(4) Monitor project implementation in coordination with UPLB and component municipalities; and

(5) Provide and manage research expenses for project implementation.

B. Obligations of UPLB

(1) UPLB through the **Interdisciplinary Studies Center for Integrated Natural Resources and Environmental Management (INREM)** commits to extend technical assistance in the formulation of the Local Climate Change Action Plan (LLCAP) of the Province of Aurora.

(2) Conduct at various levels the following:

- ✓ Natural resource assessment
- ✓ Vulnerability assessment
- ✓ Environment and natural resources accounting
- ✓ Initiation of adaptation and mitigation measures
- ✓ Application of climate adaptation support service
- ✓ Design and implementation of financing schemes; and
- ✓ Integration of climate change into local plans

(3) Conduct focus group discussion at the provincial and municipal levels; and

(4) Monitor project implementation in coordination with PGA and various municipalities.

V. OTHER PROVISIONS

A. Parties, while working jointly for the implementation of the project shall maintain their independence and distinct authorities in accordance with their respective mandates. Nothing shall diminish the full autonomy of either institution, nor constraint be imposed by either upon the other in carrying out the agreement.

B. Any potential outputs, discoveries and/or inventions/innovations that will be covered under intellectual property rights, both parties shall seek an equitable and fair understanding as to the ownership and other property interest that may arise.

C. Those produced by UPLB employees/researchers shall be subject to the provisions of 2011 UP Revised IPR Policy as approved by the Board of Regents during its 1269th and 1273rd meetings held on 3 June 2011 and 29 September 2011, respectively. Provided further, that the ideas and designs made in relation thereto shall be recognized, retained and owned by UPLB employees and UPLB researchers.

D. Any publication arising from this collaborative undertaking shall clearly establish and identify the Parties as the source of the output, with regard to the specific undertaking, commitment and contribution, respectively. The names of the principal authors and/or researchers shall be identified, recognized and included in the report. UPLB shall have the right to freely use all data and findings by virtue of and pursuant to this collaborative undertaking for any of the purposes within its legal mandate.

E. Should any disagreement arise out of the application, interpretation or implementation of this Agreement, the parties shall endeavor to exercise best efforts to amicably negotiate their difference. In case of failure, the rules under Administrative Code of 1987 on dispute between government agencies shall apply.

F. Each party agrees to protect, indemnify and hold the other party free and harmless from any damages or liability whatsoever arising from and against all suits, claims, demands, and liabilities of any nature or kind, including costs and expenses associated therewith, arising out of willful or negligent acts or omissions of the other party's employees, workers, or sub-contractors in the performance of any activity by reason or in connection to the project. Each party shall be liable for all direct and indirect damages that may occur as a result of the willful or negligent performance of their respective works and activities or other endeavors within the site.

G. Nothing in the agreement shall be construed as creating an employer-employee relationship between UPLB and PGA, its sub-contractors, employees, agents or workers.

H. Any amendments, revisions or modifications in the terms of this Agreement shall made in writing and upon mutual consent of the parties.

I. In case of tax incident, all taxes and fees shall be taken from the project fund. All notarial expenses and other fees incident to this contract shall be taken from the project fund. UPLB shall have no special budgetary outlay for the implementation of this project.

IV. EFFECTIVITY AND TERMINATION

This Agreement shall take effect after the same is duly signed by all parties and duly notarized. The project shall be implemented for a period of six (6) months covering the period of July 2017 to December 2017. In case there is a change in actual date of implementation, it shall be requested in writing by UPLB to PGA. The project may be terminated in writing upon mutual consent of the parties in case there is material breach/violation of this agreement.

IN WITNESS WHEREOF, the parties hereto set their hands, this _____ day of _____ at _____.

PROVINCIAL GOVERNMENT OF AURORA (PGA)	**UNIVERSITY OF THE PHILIPPINES LOS BAÑOS (UPLB)**
HON. GERARDO A. NOVERAS Governor	**FERNANDO C. SANCHEZ, JR** Chancellor

WITNESSES

AMADO ELSON A. EGARGUE Provincial Disaster Risk Reduction and Management Officer	**JUAN M. PULHIN** Chair, INREM, CFNR

Certified Funds Available

CARMELITA R. RENON
OIC- **Chief Account, PGA**

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
_____) S.S

BEFORE ME, a Notary Public for _____ personally appeared on _____, the following persons, presenting to me their respective Competent Evidence of Identity, as indicated below:

Name	I.D./CTC No.	Issued At/On
Hon. Gerardo A. Noveras	TIN 161385282	Baler, Aurora
Fernando C. Sanchez, Jr.	ID No. 191003733	Los Baños, Laguna

Known to me to be the same persons who executed the foregoing instrument denominated as MOA between PGA and UPLB, Capacity Building in the Development of Local Climate Change Action Plan (LCCAP) for the Province of Aurora, PhP 3.5M, consisting of five (5) pages including this page, having acknowledged before me that it is their own, respective, free and voluntary act and deed, and the respective agencies that they represent.

TO THE TRUTH OF THE FOREGOING, witness now my hand and notarial seal on the date and at the place indicated.

NOTARY PUBLIC

Doc. No. _____:
Page No. _____:
Book No. _____:
Series of 2017.

Appendix 2. Four-part Institutional Capacities Questionnaire based on a Climate Resilience Framework used by Friend and MacClune (2012), and Tyler and Moench's (2012).

I. Access Rights and Entitlements	
1. Location of your office in the municipal/city hall (including the positions of your desk, shelves, documents, etc.)	☐1 ☐2 ☐3 ☐4 ☐5
2. Number of staff members	☐1 ☐2 ☐3 ☐4 ☐5
3. Technical capacity of staff members to carry out their responsibilities	☐1 ☐2 ☐3 ☐4 ☐5
4. Relationship among staff members of your office	☐1 ☐2 ☐3 ☐4 ☐5
5. Relationship of your office with other offices within the municipality/city	☐1 ☐2 ☐3 ☐4 ☐5
6. Relationship of your office with other offices at the provincial level	☐1 ☐2 ☐3 ☐4 ☐5
7. Opportunities to attend trainings/seminars/workshops	☐1 ☐2 ☐3 ☐4 ☐5
8. Trainings/seminars/workshops attended during the time spent in your office	☐1 ☐2 ☐3 ☐4 ☐5
9. Financial Support (within the LGU or from the Mayor's office)	☐1 ☐2 ☐3 ☐4 ☐5
10.Financial Support (provincial level to your municipality/city)	☐1 ☐2 ☐3 ☐4 ☐5
11. Financial Support from other sources (e.g., private sector, other funding agencies)	☐1 ☐2 ☐3 ☐4 ☐5
12. Equipment and supplies for daily operations	☐1 ☐2 ☐3 ☐4 ☐5
13. Access to new technologies to facilitate operations	☐1 ☐2 ☐3 ☐4 ☐5
14. Existence of rules and regulations within the office to harmonize operations	☐1 ☐2 ☐3 ☐4 ☐5
15. Developments that happened in your sector/office (in terms of politics/governance)	☐1 ☐2 ☐3 ☐4 ☐5
16. Physical development in your office	☐1 ☐2 ☐3 ☐4 ☐5
II. Information Flows	
1. Access to information/resources at the barangay level	☐1 ☐2 ☐3 ☐4 ☐5
2. Access to information/resources at the municipality/city level	☐1 ☐2 ☐3 ☐4 ☐5
3. Access to information/resources at the provincial level	☐1 ☐2 ☐3 ☐4 ☐5
4. Access to information/resources at the national level	☐1 ☐2 ☐3 ☐4 ☐5
5. Accuracy of information accessed from different sources	☐1 ☐2 ☐3 ☐4 ☐5
6. Completeness of information accessed from different sources	☐1 ☐2 ☐3 ☐4 ☐5
7. Availability of historical records and information with regard to changes/developments in your sector/office	☐1 ☐2 ☐3 ☐4 ☐5
8. Availability of database and other support system for managing records and information used by the office	☐1 ☐2 ☐3 ☐4 ☐5
9. Ease in accessing and/or retrieving relevant records and information used by the office	☐1 ☐2 ☐3 ☐4 ☐5
10. Data/Information passed on from previous officials to new ones (or from absent to present staff members)	☐1 ☐2 ☐3 ☐4 ☐5
11. Safety of important materials/documents (how these materials/documents are being kept and preserved)	☐1 ☐2 ☐3 ☐4 ☐5
12. Capacity to produce relevant reports/documents needed by information users	☐1 ☐2 ☐3 ☐4 ☐5

13. Capacity to package or prepare information produced by the office specific to the needs of the end-users	☐1 ☐2 ☐3 ☐4 ☐5
14. Dissemination of information to relevant users	☐1 ☐2 ☐3 ☐4 ☐5
III. Decision-making processes	
1. Regular meetings within the office to discuss issues, etc.	☐1 ☐2 ☐3 ☐4 ☐5
2. Regular meeting with other sectoral offices at the municipal/city level	☐1 ☐2 ☐3 ☐4 ☐5
3. Regular meeting with other sectoral offices at the provincial level	☐1 ☐2 ☐3 ☐4 ☐5
4. Venue for dialogue with constituents/communities to know their needs	☐1 ☐2 ☐3 ☐4 ☐5
5. Venue to hear feedback from constituents/communities	☐1 ☐2 ☐3 ☐4 ☐5
6. Participation, cooperation and unity among staff members/officials when finalizing decisions	☐1 ☐2 ☐3 ☐4 ☐5
7. Decision making following the principle of transparency	☐1 ☐2 ☐3 ☐4 ☐5
8. Decision making following the principle of accountability	☐1 ☐2 ☐3 ☐4 ☐5
9. Decision making following the principle of responsiveness	☐1 ☐2 ☐3 ☐4 ☐5
10. Capacity to implement decisions (e.g., policies, programs) from your sector	☐1 ☐2 ☐3 ☐4 ☐5
11. Flexibility to change decisions if the need arises	☐1 ☐2 ☐3 ☐4 ☐5
12. Acceptability of decisions made to the constituents/communities	☐1 ☐2 ☐3 ☐4 ☐5
13. Mechanism to monitor impacts of decisions made	☐1 ☐2 ☐3 ☐4 ☐5
14. Avenue to provide incentives or reward good works	☐1 ☐2 ☐3 ☐4 ☐5
15. Ability to handle conflict situations within the office	☐1 ☐2 ☐3 ☐4 ☐5
16. Ability to handle conflict situations with other offices	☐1 ☐2 ☐3 ☐4 ☐5
17. Availability of development plans/strategies to manage concerned sector	☐1 ☐2 ☐3 ☐4 ☐5
18. Ability to update development plans/strategies to manage concerned sector	☐1 ☐2 ☐3 ☐4 ☐5
IV. Application of New Knowledge	
1. Awareness in the concept of climate change	☐1 ☐2 ☐3 ☐4 ☐5
2. Awareness in the concept of watershed	☐1 ☐2 ☐3 ☐4 ☐5
3. Awareness in the watershed (or holistic) approach in managing socio-ecological systems	☐1 ☐2 ☐3 ☐4 ☐5
4. Awareness and knowledge about the watershed in your municipality	☐1 ☐2 ☐3 ☐4 ☐5

Table 2. 3-part Questionnaire for Institutional Capacities under a Climate Resilience Framework based from Cardona et al. (2012).

I. Capacity to Anticipate Risk	
1. Thorough knowledge of the sector you are currently working on (status, concerns, challenges, etc.)	☐1 ☐2 ☐3 ☐4 ☐5
2. Knowledge of risk events related to the concerned sector at the municipal and provincial level	☐1 ☐2 ☐3 ☐4 ☐5
3. Knowledge of potential impacts of climate-related risk events to the concerned sector	☐1 ☐2 ☐3 ☐4 ☐5
4. Availability of human resources to respond to climate-related risk events to the concerned sector	☐1 ☐2 ☐3 ☐4 ☐5
5. Availability of resources (goods including relief goods, seeds, etc.; funds) to respond to climate-related risk events to the concerned sector	☐1 ☐2 ☐3 ☐4 ☐5

6. Availability of equipment to respond to climate-related risk events to the concerned sector (communications, vehicles, etc.)	☐1 ☐2 ☐3 ☐4 ☐5
7. Availability of infrastructures/facilities to respond to climate-related risk events to the concerned sector (evacuation centers, crop dryers, etc.)	☐1 ☐2 ☐3 ☐4 ☐5
8. Availability of disaster risk reduction and management plan for the sector	☐1 ☐2 ☐3 ☐4 ☐5
9. Capacity to prepare people/constituents in anticipation of disaster risks	☐1 ☐2 ☐3 ☐4 ☐5
10. Presence of emergency response system (with organizational chart) in the concerned sector to guide actions and decision-making during risk events	☐1 ☐2 ☐3 ☐4 ☐5
II. Capacity to Respond	
1. Quick response to problems/emergencies (during disasters, calamity or accidents)	☐1 ☐2 ☐3 ☐4 ☐5
2. Effective implementation of guidelines/ protocols (e.g., command responsibility to respond to disasters and risk events)	☐1 ☐2 ☐3 ☐4 ☐5
3. Efficiency of people/group networks to disseminate information	☐1 ☐2 ☐3 ☐4 ☐5
4. Capacity to make quick and relevant decisions during risk events (e.g., use of resources and its distribution, prioritization, etc.)	☐1 ☐2 ☐3 ☐4 ☐5
5. Capacity to manage crisis for the concerned sector during risk events	☐1 ☐2 ☐3 ☐4 ☐5
III. Capacity to Recover and Change	
1. Immediate recovery of the concerned sector from impacts of risk events and disasters	☐1 ☐2 ☐3 ☐4 ☐5
2. Capacity to build better to reduce risks in the future for the concerned sector	☐1 ☐2 ☐3 ☐4 ☐5
3. Capacity to welcome change brought about by impacts of risk events and disasters	☐1 ☐2 ☐3 ☐4 ☐5

Appendix 3. Climate and Disaster Risk Assessment (CDRA) Training Program

LCCAP FORMULATION PHASE 1 & 2: TRAINING-WORKSHOP ON CLIMATE AND DISASTER RISK ASSESSMENT (CDRA)

November 6-10, 2017/Baler, Aurora

Day/Time	Activity	Responsibility Center
	DAY 1 (NOVEMBER 6, 2017)	
8:00-8:30 AM	Arrival & Registration of Participants	Secretariat
8:30-9:00 AM	Preliminaries • Invocation • National Anthem • Acknowledgement of Participants • Message	 PDRRMO Amado Elson A. Egargue Gov. Gerardo A. Noveras
9:00-9:15AM	Overview of the Orientation Seminar	PDRRMO
9:15-10:00 AM	Mainstreaming Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) in the Local Rationalized Planning System	DILG
10:00–12:00 Noon	Climate Change Related Hazards and Projections	PAGASA-DOST
12:00-1:00 PM	**Lunch Break**	
1:00– 3:00 PM	Geohazard Assessment Methodology (Rain-induced Landslide, Flooding and Geohazard Maps)	DENR-MGB Region 3
3:00-5:00 PM	Earthquake Hazard	PHIVOLCS
5:00-5:30 PM	Overview of Climate and Disaster Risk Assessment (CDRA)	DILG
5:30-6:00 PM	Lecture on Task 1- Collection and analysis of climate change and hazard information	DILG
6:00-7:00 PM	Workshop 1 • Projected Changes in Climate Variables • Hazard inventory matrix • Records of disasters • Hazard susceptibility inventory matrix	Participants Resource Persons
	DAY 2 (NOVEMBER 7, 2017)	
8:00-8:30 AM	Preliminaries • Invocation • Recap	Secretariat
8:30-9:30 AM	Lecture on Task 2- Analysis of impacts of hazards and climate change	DILG
9:30-11:00 AM	Workshop 2 • Climate change impacts • Hazard impacts	Participants Resource Persons
11:00-12:00 noon	Lecture on Task 3- Development of Exposure database	DILG
12:00-1:00 PM	**Lunch Break**	
1:00-3:00 PM	• Workshop 3.1: Population Database • Workshop 3.2: Natural Resource Database • Workshop 3.3: Critical Facilities Database • Workshop 3.4: Lifeline Facilities Database • Workshop 3.5: Urban Use Database	Participants Resource Persons
3:00-4:00 PM	Lecture on Task 4.a- Climate Change Vulnerability Assessment (CCVA)	DILG
4:00-7:00	• Workshop 4.1: Impact Area and Climate Stimuli • Workshop 4.2: Population CCVA • Workshop 4.3: Natural Resource CCVA • Workshop 4.5: Lifeline Facilities Database • Workshop 4.6: Urban Use Database • Workshop 4.6 CCVA Summary Matrix	Participants Resource Persons

Day/Time	Activity	Responsibility Center
DAY 3 (NOVEMBER 8, 2017)		
8:00-8:30 AM	Preliminaries • Invocation • Recap	Secretariat
8:30-9:30 AM	Lecture on Task 4.b- Greenhouse Gas (GHG) Inventory and Review of Current Mitigation Actions	PDRRMO
9:30-11:30 AM	Workshop 4.7: GHG Inventory for LGUs • Stationary energy combustion • Electricity consumption • Mobile Combustion (Transportation) • Waste Sector • Agriculture Sector • Forestry and other Land-Use	Participants Resource Persons
11:30-12:00 Noon	Workshop 4.8: Review of Current GHG Emission Mitigation Actions	Participants Resource Persons
12:00-1:00 PM	**Lunch Break**	
1:00-2:00 PM	Lecture on Task 5- Disaster Risk Assessment (DRA)	DILG
2:00-4:00 PM	Workshop 5 • Likelihood of occurrence • Exposed elements • Consequence Analysis • Risk Estimation • Adaptive Capacities Analysis • DRA Summary Matrix	Participants Resource Persons
4:00-5:00 PM	Lecture on Task 6- Identification of key issues, challenges and opportunities	DILG
5:00-7:00 PM	Workshop 6: Development Implications, Key Issues, Challenges and Opportunities	Participants Resource Persons
DAY 4 (NOVEMBER 9, 2017)		
8:00-8:30 AM	Preliminaries • Invocation • Recap	Secretariat
9:30-12:00 Noon	Lecture/Workshop on Participatory Approaches (Stakeholders/Institutional)	U.P. Los Baños, Laguna
12:00-1:00 PM	**Lunch Break**	
1:00-6:00 PM	Combining Results of CDRA and Participatory Approaches using IPCC Framework	U.P. Los Baños, Laguna
DAY 5 (NOVEMBER 10, 2017)		
8:00-8:30 AM	Preliminaries • Invocation • Recap	Secretariat
8:30-10:30 AM	Consolidation	Participants Resource Persons
10:30-12:00	Output Presentation per LGU	Participants
12:00-1:00 PM	**Lunch Break**	
1:00-2:30 PM	Continuation... Output Presentation per LGU	Participants
2:30-3:00 PM	Synthesis and Next Steps	DILG
3:00-4:00 PM	Closing Program	PDRRMO
HOME SWEET HOME		

Appendix 4. Climate and Disaster Risk Assessment (CDRA) Presentation/ Participatory Vulnerability and Risk Assessment Program

Day/Time	Activity	Responsibility Center
	DAY 1 (April 26, 2018)	
3:00-4:00 PM	Arrival & Registration of Participants	Secretariat
4:00-4:25PM	Preliminaries - Invocation - National Anthem - Acknowledgement of Participants	PDRRMO Engr. Amado Elson A. Egargue
4:25-4:30 PM	Overview of the Program	PDRRMO
4:30-5:00 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 1	Casiguran, Aurora, UPLB Critique Team
5:00-5:30 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 2	Dinalungan, Aurora, UPLB Critique Team
5:30-6:00 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 3	Dilasag, Aurora, UPLB Critique Team
6:00-6:30 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 4	Dingalan, Aurora, UPLB Critique Team
6:30 PM	**Dinner**	
	DAY 2 (April 27, 2018)	
8:00-8:30 AM	Preliminaries - Invocation - National Anthem - Acknowledgement of Participants - Message	PDRRMO Engr. Amado Elson A. Egargue Gov. Gerardo A. Noveras
8:30-9:00 AM	Orientation on Participatory Vulnerability and Risk Assessment	UPLB
9:00-11:30 AM	Breakout Sessions (Workshop per Municipality)	UPLB Team, Participants
11:30-12:00 Noon	Presentation of Workshop Outputs per Municipality	Participants
12:00-1:00 PM	**Lunch Break**	
1:00-3:30 PM	Breakout Sessions (Workshop per Municipality)	UPLB Team, Participants
3:30-4:00 PM	Presentation of Workshop Outputs per Municipality	Participants
4:00– 4:30 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 5	Dipaculao, Aurora, UPLB Critique Team
4:30–5:00 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 6	Ma. Aurora, Aurora, UPLB Critique Team
5:00–5:30 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 7	San Luis, Aurora, UPLB Critique Team
5:30-6:00 PM	Climate and Disaster Risk Assessment (CDRA) Output Presentation of LGU 8	Baler, Aurora, UPLB Critique Team
6:00-6:30 PM	Synthesis and Closing Program	
6:30 PM	**Dinner**	
	DAY 3 (April 28, 2018)-optional	
8:00-12:00 Noon	LCCAP Consultation with LGUs with incomplete CDRA	UPLB Team, LGUs
12:00-1:00 PM	**Lunch Break**	
	HOME SWEET HOME	

Note: It depends to LGUs if they are interested and willing to work on Saturday, specially those with incomplete CDRA .

Appendix 5. Sample CDRA prepared for the Municipality of Casiguran.

This would be the basis of the municipality's LCCAP, as well as other development plans.

Appendix 6. Sample LCCAP prepared for the Municipality of Dingalan.

Appendix 7. Proceedings of the Technical and Policy Forum on CDRA and LCCAP