BOOK 4

Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan

(References)

Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan (LCCAP) Book 4

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Message

We, in the Department of the Interior and Local Government (DILG), through the Local Government Academy (LGA), present this Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan (LCCAP), Books 3 & 4. These two volumes shall serve as the Guidebook on how to build local and practical LCCAPs as well as the toolkits that will be used in planning for climate change.

In the past several years, our country has experienced robust economic growth, and the outlook for future developments remains bright. However, we cannot ignore the onset of climate change and its potential to disrupt the future we have been tirelessly and carefully building.

Our vision of our country's future is to have communities where people enjoy "Matatag, Maginhawa at Panatag na Buhay" (resilient, comfortable and peaceful life), as expressed by Ambisyon 2017. To achieve these goals, we have to address issues on climate change and mitigate its effects at the local level.

May this guidebook serve as a valuable tool to help our local government units in preparing their respective local climate change action plans.

I commend LGA for partnering with the Climate Change Commission (CCC) and United Nations Human Settlements Programme (UN-Habitat) in helping our country pave the way for an adaptive and resilient future.

We are born to adapt to the most difficult scenarios. We, the Filipino people, are a resilient race. While we are vulnerable to the perils that climate change presents, we have in our hands the power to mitigate its destructive effects. To do so requires us to be proactive in our national and local planning to be used side by side with sound climate science.

CATALINO S. CUY
Officer-in-Charge

Message

One of the Department's objectives is to help build local capacities for disaster preparedness and resilience. Local Government Units (LGUs) need to fuse good governance and science in making people and livelihoods resilient at all times against changing climates and the risks they bring to communities over time.

We cannot afford to ignore the lessons of science in understanding the risks we face as a result of exposure to changing climates and once triggered, the vulnerability of lives and property. It is not enough to 'plan to be prepared'. It is more important to be 'prepared over time'.

We need to understand the science of our ecology and appropriate into LGU systems, decisions, resources and capacities the short to long-term actions to make our lives and economic lifelines not only survive but thrive, despite the risks.

This is where good local governance matters. LGUs need to invest in building local capacities now to make communities resilient now and in the future. But first we need to know where we are at, to assess our exposure, risks, and vulnerability, as well as to define our baseline capacities. Then based on resources and vision, we craft what we need to do together, when and how, and agree on the results or conditions we wish to achieve.

This Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plans {LCCAP} Books 3 and 4 provides technical and governance directions on how to build adaptive capacities of LGUs and communities. Through the efforts of the Local Government Academy (LGA), in partnership with United Nations Human Settlements Programme (UN-Habitat) and the Climate Change Commission (CCC), we make this available to LGUs to help define their commitments and actions in pursuit of sustainable local development and make communities resilient at all times.

AUSTERE A. PANADERO
Undersecretary for Local Government

Message

We are facing a deeply troubling reality of climate change. This inescapable phenomenon is beyond our control but it does not prevent us from adapting to it and ultimately overcoming the effects it has on our daily lives.

While Climate Change is all-encompassing and inevitable, man can still learn to live with it with the aid of scientific and practical planning and interventions. With the multiplicity of plans posing a challenge to local government units, how can LGUs be expected to plan for and take action on climate change? Where does climate change fit in terms of an LGU's priorities? What other plans should include and address climate change?

As the training arm of the Department of the Interior and Local Government (DILG), the Local Government Academy (LGA) looks to empower LGUs to get ready for the continuous onset of climate change through its numerous programs and projects.

The **LGU GUIDEBOOK ON THE FORMULATION OF LOCAL CLIMATE CHANGE ACTION PLAN (LCCAP)** was introduced by LGA in 2014 to support LGUs in formulating the LCCAP and mainstreaming it into existing CLUP and CDP and other development strategies across all sectors.

This year, Book 1 of LCCAP Formulation was enhanced to strengthen LGA's advocacies and mechanisms in ensuring that both adaptation and mitigation actions are integrated in climate change plan.

The enhancement of the LCCAP is a joint undertaking of LGA and the United Nations Human Settlements Programme (UN-Habitat) under the Vertical Integration and Learning for Low Emission Development (V-LED) project funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and in partnership with Adelphi GmbH.

I hope that the Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan (LCCAP) Book 4, will further guide LGUs in addressing the challenge of climate change.

MARIVEL C. SACENDONCILLO, CESO III
Executive Director
Local Government Academy

Preface

As the Philippines currently face intensified meteorological calamities due to Climate Change, there is an increased sense of urgency for the country to be more resilient. In 2009, RA 9729 or the Philippine Climate Change Act was enacted in recognition of the need for a more systematic and institutional approach to addressing the potential impacts of Climate Change. Since then, there has been a great shift to incorporate Climate Change as a critical aspect of long-term sustainable development. With this objective in mind, the Local Government Academy, together with the Climate Change Commission and UN-Habitat Philippines, has crafted this Guidebook on the enhanced Climate Change Action Planning process.

This Guidebook primarily serves as a definitive guide for local governments, learning institutions, partner agencies and organizations involved in Climate Change capacity development for LGUs. The material builds upon the success of the first iteration of the Guidebook on Local Climate Change Action Planning and its accompanying Toolkit. It draws from the proven expertise of our partners, Climate Change Commission and UN-Habitat Philippines. It is further improved by the inputs from the participants of the series of Coaches' Training Program on enhanced Local Climate Change Action Planning held in 2017.

It details the specific steps that LGUs must undertake in: (1) Crafting a Local Climate Change Action Plan, (2) Specific planning scenarios, (3) Required local data and information, (4) Points of intersection with other key local plans, (5) Important planning considerations, (6) standard forms and tables, (7) references, and (8) other information needed for the crafting of an Enhanced Local Climate Change Action Plan.

The material incorporates the Climate Disaster Risk Assessment (CDRA) and Greenhouse Gas Inventory (GHGi). The former is a nationally recognized standard tool that helps LGUs objectively assess their locality's level of risk in terms of Climate and Disaster hazards, allowing for a more informed planning and decision-making process. The inclusion of the latter is part of the delivery of our country's commitment to the Paris Accord on Climate Change through which LGUs are able to ascertain their carbon footprints, in order to formulate interventions to facilitate Low Emissions Development in their locality.

With hope, this Guidebook is presented to our dear readers. We are optimistic that together we can band together as a nation of Climate Change Adaptive LGUs with sustained and resilient development.

Acknowledgement

The Local Government Academy would like to extend its heart-felt gratitude and appreciation to the partners who have contributed in crafting this guidebook. Their contributions have enabled the delivery of a material that is truly responsive to the Climate Change Adaptation needs of the Philippines today. Through their efforts, various scientific and technical approaches and paradigms consistent with the national and international Climate Change Adaptation and Mitigation thrusts were pieced together in this Enhanced Guidebook.

We would like to thank UN-HABITAT Philippines for helping us craft the material through their V-LED Project. They have worked tirelessly hand-in-hand with LGA in streamlining and harmonizing the existing Climate Change Adaptation and Mitigation Initiatives into a definitive manual that LGUs can follow with confidence and assurance of quality. Additionally, their technical support during the conduct of a series of Coaches' Training for the Local Climate Change Action Planning is vital to its success.

We also express our appreciation to the Climate Change Commission for their collaboration and assistance in the conduct of the aforementioned series of Coaches' Training on LCCAP. Their support is truly instrumental for the success of these activities as they helped enhance and fine-tuned the contents of this guidebook.

The participants during the Coaches' Training on the Enhanced Local Climate Change Action Planning held during the second semester of 2017 have also greatly contributed to the finalization of this project. The involvement and active participation of DILG Bureaus, DILG Regional and Provincial Focal persons, Local Disaster Risk Reduction and Management Officers, members of the Academe, Civil Society Organizations, and regional representatives of select National Government Agencies have also proved crucial to making this material relatable and responsive to real-world needs.

Truly, this Enhanced Guidebook has been borne out of collaborative and consultative efforts, and is now offered to our country in the name of greater local resiliency and sustainability.

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List of Acronyms

AC	-	Adaptive Capacity
AIP	-	Annual Investment Program
CCC	-	Climate Change Commission
CCET	-	Climate Change Expenditure Tagging
CCVA	-	Climate Change Vulnerability Assessment
CLIRAM	-	Climate Information and Risk Assessment Matrix
CDP	-	Comprehensive Development Plan
CCCM	-	Complementarity- Compatibility-Conflict Matrix
CLUP	-	Comprehensive Land Use Plan
DILG	-	Department of the Interior and Local Government
DRA	-	Disaster Risk Assessment
GAM	-	Goal-Achievement Matrix
LGA	-	Local Government Academy
M and E	-	Monitoring and Evaluation
PAGASA	-	Philippine Atmospheric Geophysical and Astronomical Services Administration
PFCC	-	Planning For Climate Change
HLURB	-	Housing and Land Use Regulatory Board
IPCC	-	Intergovernmental Panel on Climate Change
LCCAP	-	Local Climate Change Action Plan
LDIP	-	Local Development Investment Program
LDRRMP	-	Local Disaster Risk Reduction Management Plan
LOO	-	Likelihood of Occurrence
LRI	-	Local Resource Institute
NCCAP	-	National Climate Change Action Plan
UN-HABITAT	-	United Nations Human Settlements Programme
RCP	-	Representative Concentration Pathway 4.5 and 8.5
RV	-	Relative Vulnerability
SLPBC	-	Synchronized Local Planning and Budgeting Calendar
SOC	-	Severity of Consequence
SUC	-	State Universities and Colleges
TL	-	Threat Level
UNFCCC	-	United Nations Framework Convention on Climate Change
VAA	-	Vulnerability Adaptation Assessment

About the Toolkit

This Toolkit is an accompanying document of the Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan Book 3 (LCCAP). The Enhanced Guidebook focuses on helping LGUs define their local priority actions for adaptation, and detailing the relevant scale (area of implementation) and time (short, medium, long term). Likewise, focus is on introducing the concept of mitigation as co-benefit for adaptation or planning mitigation through the development of local low emission development strategies that result in socio-economic benefits to the locality or a specific development sector. The Enhanced Guidebook will present and outline the LCCAP formulation process and its expected output in a more practical and simple scheme given the diversity of LGUs in terms of capacities (e.g. human, financial) and contexts (e.g. ecosystem, role in local development, development aspirations, etc.).

The enhanced Guidebook for Climate Change and this accompanying Toolkit are organized around a four module strategic planning approach that corresponds to four key strategic planning questions:

WHAT IS HAPPENING?
WHAT MATTERS MOST?
WHAT CAN WE DO ABOUT IT?
ARE WE DOING IT?

Answering these questions requires users to go through a corresponding set of individual steps. Each of the nine planning steps is further broken down into more detailed tasks, many of which are supported by corresponding tools. This accompanying document provides specific instructions for each tool along with blank tool templates. The tools are organized to help planners, or other project facilitators, to navigate through the process for LCCAP formulation.

This toolkit is designed to be flexible. LGUs may be at different stages of climate change planning. While the tools are best used, consistent with the planning framework, every process will be different and may not require that every tool be used. Therefore, if the LGU has already started the preparation of their LCCAP, they may opt to just choose some of the tools here that they think would help them formulate their LCCAP better.

Consistent with harmonization of local planning processes and guides, the enhanced guidebook for LCCAP formulation adopts the Climate Disaster Risk Assessment (CDRA) as advocated by the Housing and Land Use Regulatory Board (HLURB) for land use plan updating. Since the LCCAP is also mainstreamed into the Comprehensive Development Plan (CDP) and linked with Local Disaster Risk Reduction Management Planning (LDRRMP), the LCCAP guide introduces some enhancements/modifications to the CDRA, to respond to the multi-sectoral elements of these plans.

Below are enhancements/modifications introduced to the CDRA, for purposes of multi-sectoral planning:

Purpose

- Addresses climate and disaster risks for local climate change action planning and sustainable development;
- Promotes linkages with the CLUP, CDP and other local level plans; and
- Promotes inter-LGU cooperation.

Fundamental Concepts

- Promotes the concepts of risk and vulnerability, with emphasis on hydromet hazards and changes in rainfall volume and temperature

Framework

- The same mainstreaming framework;
- With emphasis on using CDRA and other tools, methodologies to update LGU database; and
- With emphasis that all local-level plans must refer to the same database and CDRA is one methodology that could promote robust database for CCA/DRRM-compliant.

Steps

- The CDRA Steps are translated into Tasks, considering that the whole LCCAP process comprises 9 (nine) steps.
- Task 1 which is the collection and analysis of climate information is the same with Step 1 of CDRA, but modified by using the Representative Concentration Pathways (RCP) as new projections of PAGASA for the Philippines and with additional elements on integrating magnitude of hazards in the summary of hazards in the LGU.
- Task 4 covers the same exposure database (sensitivity, threat level adaptive capacity), and includes relative vulnerability and estimation of risks. The risk estimation corresponds to multiplying the likelihood of occurrence with severity of consequence, following CDRA's process. Relative vulnerability is determined by dividing the threat level to the adaptive capacity (as provided in LCCAP Book 1 Guidebook). The resulting quotient maintains an analysis of factors of LGU capacity, drivers and barriers covering the dimensions and trends on vulnerability and threats of sectors and sub-sectors to specific hazards.
- Task 5 covers the determination of decision areas and technical findings. The technical findings, in LCCAP guide, are compilation or summary of observations built up from previous analysis of exposure and sensitivity, threat and adaptive capacity as well as estimated risks.
- Task 6 covers the analysis of implications when LGU continues to operate business as usual, given the technical findings in specific locations or decision areas. The analysis of implications on business as usual would drive to determining the key issues and challenges, as well as possible opportunities for climate change actions.
- The ending of Task 6 which are key issues, challenges and opportunities will input to Step 4 of the LCCAP process which is the review of goals and reformulating current objectives into climate objectives, towards options identification, prioritization and investment programming.

Module A

Getting Ready for LCCAP Formulation (What is Happening?)

This module serves as the foundation for a successful LCCAP formulation. It guides LGUs to revisit the visions and goals of plans such as CLUP and CDP and to situate and ensure that adaptation and mitigation actions are integrated and mainstreamed in those plans through LCCAP. Module A will also help LGUs determine the extent of the project and the planning tasks involved as well as identify stakeholders and institutions that should be involved in LCCAP formulation, their tasks, and training needs.

Step	Key Questions
1. Getting Started	1. What are the available data that LGUs can use? Who can help LGUs respond to data gaps? 2. What possible gaps and limitations can an LGU encounter in the LCCAP formulation process? 3. How can LCCAP be better communicated to local decision-makers (i.e. Local Chief Executive and Local *Sanggunian* Members)?
2. Stakeholders and Participation	1. Who needs to be involved at the LGU level and who will lead? 2. What institutions can support and how? 3. Who is going to help train and coach the LCCAP core team ? How can the province support in the training and coaching?

LGUs may skip this module if information on the LGU profile (See LCCAP Section 1: Background) is already available.

Step 1: Getting Started

This task will open the entire process and set the mood for LCCAP formulation. However, if the LGU has already initiated the process of formulating their LCCAP, this step can serve as a review of their climate change adaptation and mitigation actions. The target participants are members of the Local Development Council. It would be ideal for the Mayor, Vice Mayor and members of the City/Municipal Council and the department heads to be present during the general orientation. If the budget allows, all Barangay Captains must also be invited and representatives from different sectors of the LGU.

This Step introduces and approach or tool to work on:

TOOL 1-A. Session Guide: SETTING THE MOOD AND DRAWING COMMITMENTS

Objectives:

1. To achieve a common understanding of the key concepts and contexts of climate change impacts in their locality;
2. To gather support and commitment for LCCAP formulation from key leaders and sectors; and
3. To identify planning framework, timeframe and check on available resources needed for LCCAP formulation.

Duration: 6 hours to 1 day
Procedure: Orientation-workshop

DURATION / TIME	SUBJECT MATTER / ACTIVITY	METHODOLOGY / PROCESS	MATERIALS / RESOURCES NEEDED
30 minutes	Arrival & Registration		LCD for Invocation and Pambansang Awit and PPT on the rationale and objectives (when needed)
	Opening Preliminaries Opening Prayer National Anthem Welcome Messages Introduction of Participants Rationale & Objectives	Opening Program NOTE: It is ideal for the Local Chief Executive give the opening message and set the mood of the activity	

1 hour	**INPUT 1** Understanding CC and DRR Concepts: Evidence-based Adaptation and Planning Key points to be shared/discussed : A. Basic definition of terms relevant to climate change B. RCP: the new projections in the Philippines and its "evolution" from SRES C. Opportunities for local adaptation and mitigation action: examples from what other cities have been doing	A climate science expert or a local resource person on CC & DRR concepts may be invited to input key points A and B. An external resource person can be engaged or the head of the LCCAP Core Team can handle topic C.	PPT PresentationMaps, pictures, illustrations and diagrams would help a lot in understanding concepts & context being discussed.
30- MINUTES	**INPUT 2**. Legal Bases of CCA/DRR Initiatives: Why do LGUs need to formulate a Local Climate Change Action Plan? Discuss the salient provisions of the laws (RA 7160, RA 9729, RA 10121, RA 10174, etc.)	An external expert on CCA/DRRM can be hired, or the head of the LCCAP Core Team can handle the discussions.	PPT Presentation
30 MINUTES	**WORKSHOP 1-Aa** Guide Questions 1. What climatic changes or events have you experienced or observed in our locality in the last three years? 2. Who are the most affected by these changes or events?	Group can be divided to two to discuss WS 1-A.	Photocopies of Workshop 1-Aa
30 MINUTES	Discussion on the results of Workshop 1-Aa	Plenary	Documentation

30 MINUTES	**WORKSHOP 1-Ab** Guide Questions 1. *What initiatives / plan / policies that we have or are doing now that address climate change & DRRM?* 2. *Who is in-charge of those?*	The same groups (organized in WS 1-Ab will tackle the two guide questions for Workshop 1-Ac.	Photocopies of Workshop 1-Ab
1 hour	**WORKSHOP 1-Ac** 1. *Based on what we learned from the inputs today, what are the things that must be done now to address climate change?* 2. *Put the names or Office/Dept. who would lead the action; b) what can the office commit to achieve or do the things that must be done.*	For workshop A-3, It is suggested that the workshop group be structured according to sectors (social, economic, environment, physical/ land use, institutional and infrastructure)	Photocopies of Workshop templates 1-Ac
30 MINUTES	Discussion on the results of Workshops 1-Ab and 1-Ac	Plenary	Documentation
30 MINUTES	Presentation, discussion of the draft Executive Order, creating the LCCAP Core Team	To be presented by the Chair of the LCCAP core team	Comments and inputs
30 MINUTES	Synthesis	Identify key learning, mentioning key actions	Documentation
30 minutes	Closing Ceremonies ▪ Closing messages ▪ Reminders/announcement		

Table 1. Session Guide on Setting the Mood and Drawing Commitments

Workshop Templates for Tool 1-A:

WORKSHOP 1-Aa

1. What climatic changes or events have you experienced or observed in your locality in the last three years?
2. Who are the most affected by these changes or events?

CLIMATE EVENTS/CHANGES EXPERIENCED OR OBSERVED *(WHAT & WHEN & WHERE)*	**WHO ARE AFFECTED?**

Table 2 Workshop 1-Aa Experience on Climate Change and affected constituents

WORKSHOP 1-Ab

3. What initiatives/plan/policies that you have or are doing now that address climate change & DRRM? Who is in-charge of those?

CURRENT INITIATIVES	**PERSON / OFFICE IN-CHARGE**	**AVAILABLE BUDGET/LOGISTICS**

Table 3. Workshop 1-Ab. Climate Change initiatives/plan/policies

WORKSHOP 1-Ac

4. Based on what you learned from the inputs today, what are the things that must be done now to address climate change?

WHAT MUST BE DONE?	WHO WILL DO IT?	WHAT DO WE NEED TO FULFILL/ ACHIEVE IT? *(write the department/office in charge)*	WHAT CAN THE OFFICE COMMIT TO ACHIEVE OR DO THE THINGS THAT MUST BE DONE

Table 4. Workshop 1-Ac. Things that can be done to address climate change.

The figure below supports discussions on mainstreaming climate change into local development planning:

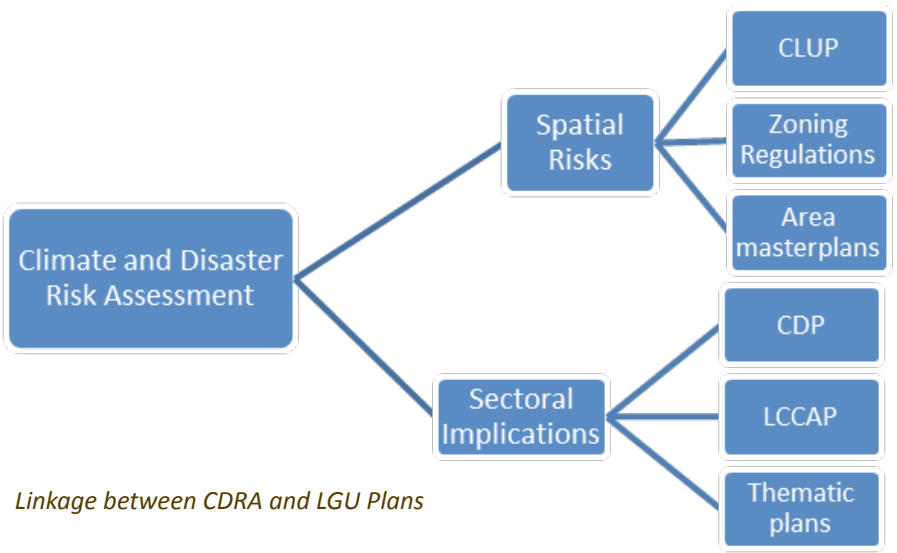


Figure 1. Linkage between CDRA and LGU Plans

TOOL 1-B. Situating the LCCAP in the LGU Plans: Process Check/Guide

Planning guidelines particularly those issued by the DILG emphasize the CLUP and the CDP as the plans fundamentally required of city and municipal LGUs in the Philippines. All other type of plans, i.e., sectoral, thematic, etc., should be mainstreamed into these local plans. To prevent overlapping of processes and outputs that will exact too much time, resource, and effort on the part of the LGU, this step facilitates the LGU assessment on how to mainstream the LCCAP (and even its LDRRMP) into the CLUP and the CDP.

Objectives:

1. To enable LGUs determine the linkages between the CLUP, CDP, and LCCAP processes;
2. To facilitate a process that addresses possible overlaps in these processes; and
3. To ensure that the LCCAP is mainstreamed into the CLUP and CDP.

Duration: 1 to 2 hours
Procedure: Sit-down meeting among the core TWG members to determine how the CLUP and CDP may is enhanced using a risk-sensitive approach espoused by VRA (CDRA).

TOOL 1-B. Situating the LCCAP in the LGU Plans: Process Check/Guide

Milestones	First Pass Question	Answer	Second Pass Question	Answer	Courses of Action
Integration into the CLUP	Is the CLUP still in effect?	Yes	Is the CLUP formulated after the issuance of the HLURB Supplemental Guidelines No. 2 (series of 2014)?	No	Revisit CLUP using the CDRA introduced in the HLURB Supplemental Guidelines. The DRVA introduced in Books 1 and 3 may likewise be referred since the tools have been simplified for LGU use. Amendments to CLUP and ZO may result. Proceed with the formulation of the LCCAP.
		Yes		Yes	If CDRA has been adopted, CLUP is assumed to be sensitive to climate and hazard risks, but may be revisited in light of the updated climate change projections issued by PAGASA. Proceed with the formulation of the LCCAP.
		No			Trigger the process of CLUP formulation, adopting the HLURB Supplemental Guidelines for compliance and refer to Books 1 and 3 for simplified tools. Formulation of LCCAP to emanate from this process.
Integration into the CDP	Is the CDP still in effect?	Yes	Has VRA or CDRA been adopted in its formulation?	No	Initiate a Vulnerability and Risk Assessment introduced in Books 1 and 3 of the LCCAP formulation to ensure that CDP is made risk-sensitive. Proceed with the LCCAP formulation.
		Yes		Yes	The CDP may be revisited in light of updated climate change projections from PAGASA. Proceed with the formulation of LCCAP. Where applicable, some of the proposed changes in the CDP may be reflected in the LCCAP, if a difficulty in amending the CDP is encountered.
		No			Trigger the process of CDP formulation, referring to the DRVA in Books 1 and 3 for simplified tools. LCCAP formulation emanates from this process.

Table 5. Process Check Guide –Situating the LCCAP in LGU Plans

TOOL 1-C. Re-visiting the LGU Vision

The LGU's Vision Statement provides an entry point through which risk-sensitivity is integrated into the LGU plans. A half-day session among relevant technical units of the LGU is adequate to revisit the LGU vision and generate element descriptors in the vision if time allows, LGU may also check if existing plans and programs in the local plans are consistent with the vision. Participants are the LCCAP Team, CPDO, Sectoral/Functional committees. The CPDO and the head of the LCCAP Team may jointly facilitate this technical discussion.

Objectives :

1. To identify entry points in the vision to reflect responsiveness to climate and hazard risks;
2. To determine the adequacy of the vision to incorporate risk-sensitivity and propose corresponding improvements; and
3. To tighten the linkage between existing programs and projects with the vision.

Duration : Half-day session on generating element descriptors in the vision and checking if plans and programs in the local plans are consistent with the vision

Procedure : List all the descriptors and the corresponding indicators for sectors and/or subsectors.

Enhance the indicators to reflect adaptation and mitigation factors. Are there missing climate change indicators that should be incorporated in the success indicators?

Development Sector	Descriptors	Success Indicators	Adaptation and Mitigation Indicators
Economic	Progressive	Increased delivery of social services	
		Decreased incidence of poverty	
		Financially stable LGU as shown by increased net equity (difference between assets and liabilities)	

Table 6. Worksheet 1-Ca. Example of Vision-Descriptors and Indicators

Step 2: Stakeholders and Participation

TOOL 2-A. Session Guide for STAKEHOLDERS ANALYSIS AND MAPPING

The term "stakeholder" refers to people, groups, and organizations who have significant and legitimate interest in a specific issue. Mobilizing stakeholders is a key element to improved governance as it builds local ownership and commitment to development activities and processes. In the context of the LCCAP, mobilization of stakeholders is crucial not only in gathering information but also in building consensus and conclusions. Over the long term- the identification of practical solutions to the identified local climate change vulnerability and the delivery and implementation of response actions will be enhanced and will generate momentum to act so plans are actually implemented.

Objective:

To identify the stakeholders who should be involved in the process, along with their interest, capacity and influence to the planning process.

Duration: 1-2 hours
Procedure: Mini-workshop
Participants: Prospective Stakeholders and LCCAP Core Team

Duration/ Time	Subject Matter/ Activity	Methodology/Process	Materials/ Resources Needed
30 minutes	Identification of Stakeholders	OPTION 1: LCCAP Core Team alone • The members of the LCCAP Core team will list all the possible stakeholders to be involved in the planning process (could be specific persons, group or institution as a whole) in column 1 (list the names in small met cards or strips of paper and post it in the column) • Opposite each name, identify their interest in the plan formulation (column 2), the extent of their influence (Column 3), and their capacity to contribute to the planning process (column 4)	List of stakeholders Workshop Matrix 2-Aa

Duration/ Time	Subject Matter/ Activity	Methodology/Process	Materials/ Resources Needed
30 minutes	Stakeholder mapping	• After completing WS Matrix 2-Aa, transfer the names in the mapping diagram – (always refer to the matrix for proper classification) • Stakeholders in quadrant 4 (high stake-high influence)will be the primary stakeholders who should be involved and consulted most of the time • Stakeholders listed in quadrant 2 (high stake-low influence) are the stakeholders who should be present during consultations • Those listed in quadrant 3 (low stake-high influence) may be included in the expanded list of participants during consultations, may be part of the advisory group and can be consulted for specific decisions • Those listed in quadrant 1 (low stake-low influence) will part of the expanded list of participants during consultations	Stakeholders Map Workshop 2-Ab (Figure 5)
	Stakeholders' database	The list must be turned over to the secretariat for records keeping. Ask the secretariat to complete the matrix by adding contact information of each identified stakeholder	

Duration/ Time	Subject Matter/ Activity	Methodology/Process	Materials/ Resources Needed
	WS with stakeholders	OPTION 2: Workshop with actual stakeholders (may be the same group who attended the General Orientation, invite additional stakeholders) • Give each stakeholders small meta cards (4 different colors) and write the following on the card: – White - Name – Green - Stake/interest – Blue - Influence – Yellow- Capacity to contribute • When they finish, ask them to post their cards on the appropriate columns • You may ask them to fill-up cards for other stakeholders they know but are not present during the workshop.	List of stakeholders Same Workshop Matrix 2-Aa (Table 10)
		For the mapping, ask them to: • Get their name cards and place it on the appropriate quadrants based on their own self- analysis Group validation: • To determine the groups perception, ask the group (plenary) whether they agree on the list of names in each quadrant. • If they believe that some names must be transferred to another quadrant, they must state the reason why they believe so. • If there would be transfers, ask the final consensus of the group.	Workshop 2-Ab Stakeholders Map (Figure 5)

Table 7. Session Guide for Stakeholders Analysis and Mapping

Workshop Matrix 2-Aa

STAKEHOLDER *(specific name, institution or group)*	**STAKE** (*why do you have to be part of the planning process?*)	**INFLUENCE** (*what & how much can you contribute to decision making?)*	**CAPACITY** (*what (knowledge/skill/ resources you can contribute to the planning process?*)
(List as many as you can, listing local stakeholders first before external stakeholders)			

Table 8. Workshop Template 2-Ab. Stakeholders Influence, stake and capacity

Workshop 2-Ab. Stakeholders Map/Diagram

A stakeholder map or diagram, as presented below, enables the LCCAP core team to assess how stakeholder interests can influence the LCCAP planning process. The tool below enables the LGU to weigh the influence a particular stakeholder may have and on the basis of this estimation, decide on the extent and level of engagement and collaboration with the particular stakeholder.

Stakeholders Map/Diagram

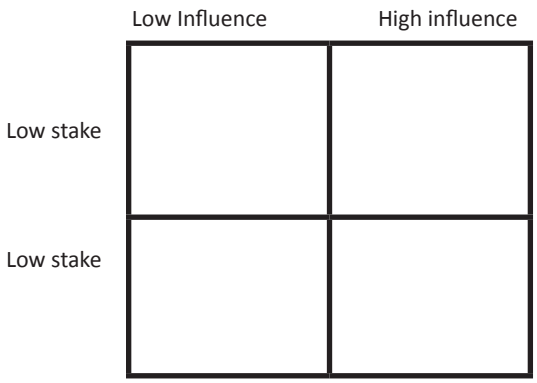


Figure 2. Stakeholders Map/Diagram

Other Tools that can be considered in doing Step 2- Stakeholders and Participation

TOOL 2-B. Training Plan For organization and training of core team

Task:

This may be taken as one specific activity that can be done before the start of the LCCAP formulation. An external consultant or group of experts on climate change planning may be invited to conduct the training. The participants maybe the members of the LCCAP core team and selected stakeholders from one LGU or selected LCCAP core team members of different LGUs within a province. The following training plan may be taken as the basic training for trainers or the LCCAP Core Team. Additional topics and exercises may be added as the training facilitators or consultant may see fit.

Also, there might be a need to conduct specific skills training for some members of the Core Team who will be tasked to conduct specific activity or assessment in the whole LCCAP planning process (e.g. GIS Mapping or Map Reading, Vulnerability Assessment for Agriculture/Health/Coastal & Marine or Fisheries, Infrastructure Audit, etc.).

Objectives:

1. To capacitate the LCCAP Core team and relevant coordinators on how to formulate the LCCAP following the climate disaster risk assessment (CDRA) and GHG inventory for adaptation and mitigation, respectively; and

2. To enhance trainers skills on vulnerability and risk assessments leading to sustainable adaptation options and update their knowledge on GHG inventory leading to mitigation actions.

Duration: Five (5) days
Procedure: Training-workshop
Participants: LCCAP Core Team and relevant stakeholders

Schedule	Training Content
Day 1 – AM Session	Opening Preliminaries Rationale & Objectives INPUT 1 - Understanding Climate Change Concepts & the Local Context Audio-Visual Presentation: SIGNOS (or any appropriate CC Video Documentary)
Day 1 – PM Session	INPUT 2 – Legal Bases for CCA & DRR Planning INPUT 3 – Mainstreaming CCA & DRR in the Local Rationalized Planning System (CLUP, CDP, LDIP, AIP) INPUT 3 – The Local Climate Change Action Plan Framework
Day 2 – AM Session	WORKSHOP 1 – Stakeholders' Assessment & Mapping INPUT 4 – Understanding Climate Data/Scenarios and Projections, role of stakeholders
Day 2 – PM Session	INPUT 5 – Understanding Geo-Hazard Maps & other Spatial Data WORKSHOP 2 – HAZARD MAPPING
Day 3 – AM Session	Game: Where's the Ball? (Optional) Game Processing WORKSHOP 3 – EXPOSURE & SENSITIVITY ASSESSMENT Exposure Assessment & Mapping Sensitivity/Vulnerability Assessment
DAY 3 – PM Session	Game: Spider Web (Optional) WORKSHOP 4 - ADAPTIVE CAPACITY ASSESSMENT Adaptive Capacity of Sectors Adaptive Capacity of Institutions WORKSHOP 5 – RELATIVE VULNERABILITY COMPUTATION
DAY 4 – AM Session	Introduction to Simulation Game (Optional) Simulation Game: Multi-stakeholders Consultation on the Climate Change Vulnerability & Adaptation Plan of LGU X
Day 4 – PM Session	WORKSHOP 6 – OBJECTIVES & OPTIONS IDENTIFICATION WORKSHOP 7 – The Local Climate Change Action Plan Formulation & Integration in other Local Plans
Day 5 – AM Session (Optional)	INPUT 6 – Result-Based Monitoring & Evaluation WORKSHOP 8 - M & E Plan
Day 5 – PM Session	Training Evaluation: What went Well? What Needs to be Improved? Next Steps and Closing Ceremonies

Table 9. Training Plan for Stakeholders and Participation

Options: This training plan may be divided into two sets or a series of training sessions if emphasis is on skills development. It is recommended that the training-workshops for a particular skill be done prior to the actual conduct of the LCCAP process.

A cadre of individuals who will be involved in the LCCAP formulation process will be trained as part of this step. Capacitating the members of the LCCAP core team and other identified stakeholders will promote a deeper appreciation of the process and will build their confidence to lead, support, and facilitate the LCCAP planning and eventually even its implementation.

Upon completing this step, a stakeholder mapping will input into building a list of offices, institutions and individuals who will be involved in the LCCAP formulation. This serves as a resource to the process that can be tapped particularly by the LCCAP core team.

This is very crucial especially in terms of acquiring the necessary scientific and technical information that will inform the formulation process. In the proposed LCCAP outline, the outputs from this step will input into the list of responsible persons or office to contact, collaborate, and coordinate with.

Module B

Data Gathering, Assessment, and Analysis (*What Matters Most?*)

This module guides LGUs on how to gather data, assess their climate change vulnerability and risk, and determine which ones are relevant and should be used as basis for identifying local climate change actions. It aims to support LGUs to (1) further understand climate change and its potential impacts to their locality, and (2) identify key issues, challenges, and opportunities relative to climate change that they should address in view of their development objectives.

Module B only has a single step but it involves the highest number of tasks and processes in LCCAP formulation. Thus, it is divided into two sub-steps for better comprehension. Explained in this module are the critical information on "What is currently happening?" and "What is projected to happen" in the LGU, given the impacts of climate change.

Step 3A: Risk and Vulnerability Assessment requires LGUs to conduct strict and thorough data gathering and analysis for risk and vulnerability assessment. It uses simple ratings and computations based on set criteria in the Climate Disaster Risk Assessment (CDRA) so LGUs can better assess where they are now in climate change adaptation, what and where they should focus on, and when the plans should be implemented.

Step 3B: GHG inventory and review of current mitigation actions, on the other hand, reviews the LGU's emissions and current GHG emission reductions efforts and how it will figure in the formulation of LCCAP.

This module also answers the planning question "What is happening?" with particular focus on the review and assessment, including data gathering, review of current plans and projects, and analysis. Data and information collected from these steps can be overwhelming. Thus, it is important for LGUs to first take an inventory of all available data from its CLUP/CDP (especially when updated), and all other data from the departments. Some data like weather, rainfall, and temperature may be of regional context so it must still be validated with local experiences.

Below are the key questions and elements in Section 2 of the LCCAP that will be responded to by planning step in this module:

Steps	LCCAP
3A. Climate Change Vulnerability and Risk Assessment	Key Questions: 1. What are the Vulnerabilities, Risks, and Opportunities of climate change in your community? 2. What types of climate-related and natural hazards and issues (vulnerabilities & risks) is your LGU currently facing? 3. What are the issues that need to be addressed, considering the plan period, and why they are important based on the sound analysis of impacts of climate change to: a. People/Population b. Basic Services (education, health, water and sanitation) c. Infrastructure d. Economic Activities and general development of the LGU 4. Where in the locality are these climate change issues and hazards happening and are projected to happen? (illustration/mapping) 5. What type of climate related hazards and issues will the LGU face in the future? (summary description) 6. Why and when should action be initiated? (analysis report)

3B. GHG inventory and review of current mitigation actions	Key Questions: 1. What are the emissions and current GHG emission reductions efforts of your LGU? (summary of current GHG emission reduction efforts) 2. What are the accounting results and the scope for the accounting? 3. What are the reasons for having and not having a GHG? 4. What are the planned activities during the planning period of the LCCAP? (inventory) 5. Which sectors can lower emissions in the context of local economic activities, other relevant sector development plans (e.g. transport, energy, industry, etc.) and even the country's NDC if LGU is familiar and could relate/localize?

Answers to the questions above may then be derived from those documents to fill up the corresponding LCCAP Section that the module covers.

Preliminary Step: Determine Areas of Analysis (Geographical Areas) or Ecosystems

Prior to the conduct of Task 1 (Collect and analyze climate and hazard information), the Core Team must first determine the scope and corresponding geographical areas and relevant sectors and sub-sectors in each of the areas to be included in the analysis. Geographical areas can be the ecosystems as indicated in the HLURB Supplemental Guide. Using available or current Ecological Profile and topographic or political maps of the LGU, the LCCAP Core Team will identify the geographical areas and barangays located in these areas

The next page shows a matrix of the geographical areas or ecosystems and the list of possible sectors present in each area.

The barangays in each ecosystem or geographical area are listed based on their location and not in alphabetical order.

The LGU may also follow their established clustering or district groupings in listing the barangays.

Ecosystem	Upland	Lowland	Urban	Coastal
SECTORS	1. **Population** *(Social Sector: i.e, IP groups, migrants, informal settlers)* • **Economic Uses and/or Activities** *(mining, agriculture/ Agroforestry, production forests, etc.)* • **Environment** *(protected areas, watershed, biodiversity, critical habitat, sanctuaries, etc)* • **Critical Infrastructure** *(water reservoir or tanks, cultural bldgs. of IPs; PAMB offices; dams; mining structures, etc.)* • **Lifeline Infrastructure** *(electric towers and lines, telecom towers and lines, water pipes/ system, Roads & bridges, etc)* • **Other Land uses**	1. **Population** *(Social Sector: i.e, IP groups, migrants, informal settlers)* • **Economic Uses and/or Activities** *(industrial parks, farming & agriculture areas/ plantations, recreation or amusement parks; tourism areas, etc.)* • **Environment** *(waste management, pollution sources, eco-parks, etc)* • **Critical Infrastructure** *(government bldgs., hospitals & clinics, schools, evacuation centers, church, cultural & heritage sites, water tanks, airports, terminals, cemeteries, etc.)* • **Lifeline Infrastructure** *(electric lines, telecom lines, roads & bridges, railroads, water systems)* • **Other Land uses**	1. **Population** *(Social Sector: i.e, people,women, children, senior citizens, PWDs, migrants, informal settlers)* • **Economic Uses and/or Activities** *(commerce & trade, business sector, market, labor & employment)* • **Environment** *(solid waste management, pollution sources, eco-parks, etc.)* • **Critical Infrastructure (***government bldgs., hospitals & clinics, schools, evacuation centers, church, cultural & heritage sites, water tanks, banks, terminals, shopping malls, etc.)* • **Lifeline Infrastructure** *(electric lines, telecom lines, roads & bridges, railroads, water & drainage systems)* • **Other Land uses**	1. **Population** *(Social Sector: i.e, people (women, children, senior citizens, PWDs, migrants, informal settlers)* • **Economic Uses and /or Activities** *(fishing, agriculture& Aquaculture or mariculture fish processing, tourism, etc.)* • **Environment** *(coral reefs, seagrass, marine parks, biodiversity, mangrove areas, solid waste management, pollution sources, etc.)* • **Critical Infrastructure** *(government bldgs., hospitals & clinics, schools, evacuation centers, church, cultural & heritage sites, water tanks, sea ports, terminals, fish landings, baywalk, sea walls, etc.)* • **Lifeline Infrastructure** *(electric lines, telecom lines, roads & bridges, water systems)* • **Other Land uses**

Table 10. Ecosystems or Geographical Areas and Sectoral Composition

Step 3a. Risk and Vulnerability Assessment

The figure below is provided to show how the vulnerability and risk assessment is structured. The geographical area at the bottom space is the preliminary task. The next layers are Task 1 (Collect and Analyze Climate and Hazard Information) and Task 2 (Impact Chain Analysis). Next layer is Task 3 (Development of Exposure Database and Analysis of Exposure, Sensitivity, Vulnerability and Elements of Adaptive Capacity. The next layer is Task 4 (Summarizing CCVA and Estimating Risks- Likelihood of Occurrence multiplied by Severity of Consequence). Parameters are provided for both vulnerability and risk analysis. Task 5 (Determining Decision Areas) also provides guides in preparing the maps and discussing the technical findings or summary of findings and analysis per decision area/geographical coverage. Task 6 (Identification of Key Issues Challenges and Opportunities) also guides LGUs in defining the implications under a "business-as-usual" stance or position.

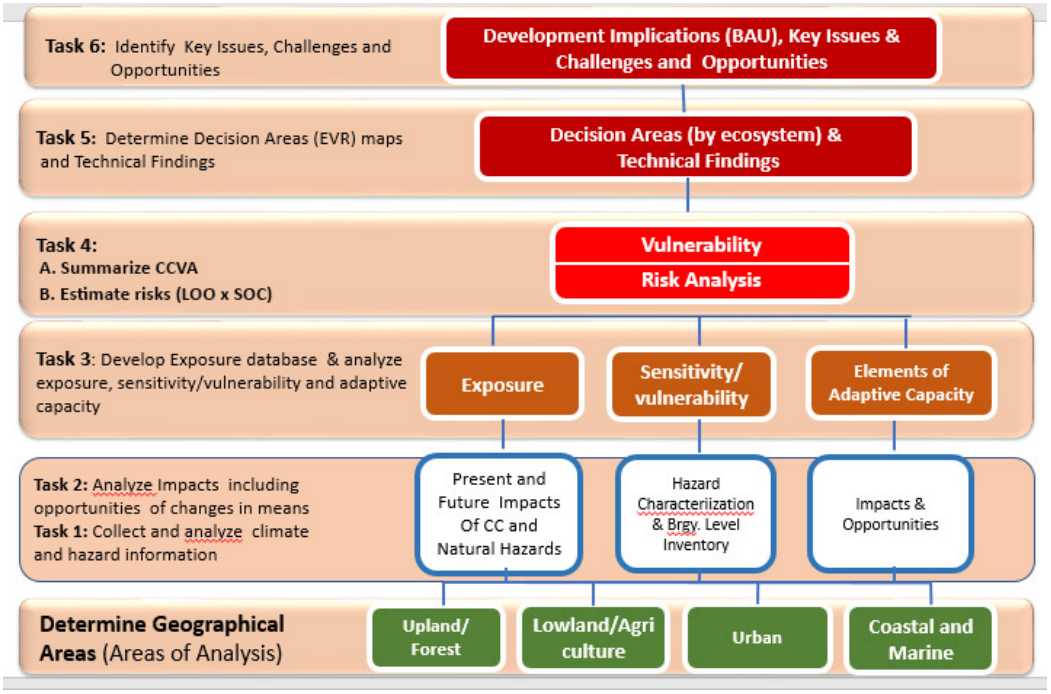


Figure 6. Step 3a and corresponding Tasks to Complete the CDRA

TASK 1. Collect and Analyze Climate and Hazard information

This tool will use the climate information from PAGASA and other geologic data from PHIVOLCS, DENR-MGB, NAMRIA, DOST, OCD and other agencies. Hazard maps and related information about various hazards from mandated agencies shall be used.

This task covers four (4) tools. LGUs may adopt table reviews of data, focus group discussions, key informant interviews, consultations with relevant agencies and data validation at the start of the CDRA process because the outputs derived from this step are important bases for analysis in the succeeding Tasks.

Objectives:

1. To understand climate change factors and future climate change scenarios and scientific projections;
2. To identify and characterize the different hazards that would affect different systems and sectors in the LGU;
3. To list down the previous disaster events and the extent of damages to the system and sectors; and
4. To identify the different types of hazards and the degree of impact to each system or barangay and the sectors and sub-sectors in the LGU.

Duration: Five (5) days or more, depending on available data.

Process:

a. Collect and analyze climate information. This task involves identification of climate change factors and projections using Special Report on Emission Scenarios (SRES)[1] or Representative Concentration Pathways (RCP), whichever is available and downscaled for their respective localities. LGUs may partner or coordinate with PAGASA for downscaled projections to be used for LCCAP formulation. Whether LGUs use the RCP or SRES, it is important that they reflect such in the LCCAP and indicate the role of PAGASA in the analysis.

b. LGUs may do some desk reviews of data. Workshops may also be done with some experts from relevant agencies assisting in the workshops.

c. The LGU may refer to the four Tools: 3A.1a to Tool 3A.1d to complete Task 1.

TOOL 3A.1a - Climate Projections and Patterns of Change

a. Identify the climate projections for mid-21st century (2036-2065), the seasonal patterns of change, by inputting the data relevant to the LGU using downscaled RCP 4.5 and 8.5 or SRES whichever is available from PAGASA. A note or footnote explaining which type of climate information was used as reference must be reflected in the matrices.

b. The Core Team may also initially draft the output matrix for this tool and present to the big group (LDC members, Department Heads, and major stakeholders) for their comments and additional inputs about patterns of change.

c. The LCCAP Core Team will use the data from PAGASA (see sample on the next page) and identify the probable impact of the projected patterns of change of seasonal temperature and seasonal rainfall (amount of precipitation) to their sectors and subsectors.

d. Insert additional columns after the information about "patterns of change" to identify what sectors and sub-sectors are affected. Example, the highest possible future rainfall change during the Northeast (NE) Monsoon or Amihan with an increase of 45% precipitation may affect the Social Sector (population, settlements, health and health services, etc.); Economic Sector (agriculture, etc.); Environment (damage to mangroves, coastal defenses, etc.); Physical/Land Use (rain induced-landslides in upland areas, etc.). On the other hand, increase in temperature in the summer months may also affect specific sectors in the geographic coverage or ecosystem.

e. The matrices for Tool 3A.1a is illustrated in the next page using the Climate Information and Risk Analysis Matrix (CLIRAM) tested by PAGASA in Salcedo, Eastern Samar and three cities of Metro Manila: Pasig, San Juan and Marikina to improve uptake of climate change in priority sectors identified in Greater Metro Manila Adaptation (GMMA) project.

f. Annex A of this Toolkit provides the climate change projections (supplied by PAGASA) for RCP 4.5 and RCP 8.5.

CLIRAM Project: Projected Changes in Seasonal Rainfall in the Mid-21st Century (2036-2065) for Eastern Samar relative to 1971-2000							Sector Affected
			Projected Change				
Season	Scenario	Range*	Percent (%)	Rainfall amount (mm)	Projected Seasonal Rainfall Amount (mm)	Information about patterns of change	Identify if Social, Economic, Environment, Physical Land Use and specify their sub-sectors
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
December-January-February (DJF) Observed baseline = 987 mm	Moderate Emission (RCP 4.5)	Lower Bound	-4.2	-41.1	945.9	Minimal to no change	May benefit specific sub-sectors such as Agriculture, etc.
		Median	1.3	12.5	999.5	Minimal to no change	
		Upper Bound	45.0	444.4	1431.4	The highest possible future rainfall change during the Northeast (NE) Monsoon or Amihan shows an increase of 45% . This increase could be detrimental to some sectors of the community, as this season corresponds to the wettest months over the region	
		Lower Bound	-7.9	-77.8	909.2	Minimal to no change	
		Median	13.7	135.2	1122.2	Minimal to no change	
	High Emission (RCP 8.5)	Upper Bound	43.6	430.8	1417.8	The highest possible future rainfall change during the Northeast (NE) Monsoon or Amihan shows an increase of 44%. This increase could be detrimental to some sectors of the community, as this season corresponds to the wettest months over the region	

March-April-May (MAM) Observed baseline = 464 mm	Moderate Emission (RCP 4.5)	Lower Bound	-2.6	-12.1	452.0	Minimal to no change	
		Median	1.8	8.2	472.3	Minimal to no change	
		Upper Bound	17.4	80.8	544.9	Minimal to no change	
	High Emission (RCP 8.5)	Lower Bound	5.8	26.8	490.9	Minimal to no change	
		Median	1.1	5.3	469.4	Minimal to no change	
		Upper Bound	13.0	60.3	524.4	Minimal to no change	
June-July-August (JJA) Observed baseline = 560 mm	Moderate Emission (RCP 4.5)	Lower Bound	-6.7	-37.5	522.3	Minimal to no change	
		Median	-1.1	-6.0	553.8	Minimal to no change	
		Upper Bound	8.3	46.4	606.2	Minimal to no change	
	High Emission (RCP 8.5)	Lower Bound	-14.0	-78.3	481.5	Minimal to no change	
		Median	-0.6	-3.2	556.6	Minimal to no change	
		Upper Bound	9.7	54.6	614.4	Minimal to no change	

September-October-November (SON) Observed baseline = 871 mm	Moderate Emission (RCP 4.5)	Lower Bound	-20.1	-174.9	696.5	The driest possible future rainfall change during the transition period from NE to SW monsoon shows a reduction of 20%	
		Median	-16.6	-144.7	726.7	The most likely future rainfall change during the transition period from NE to SW monsoon shows a reduction of 17%	
		Upper Bound	-3.8	-33.4	838.0	Minimal to no change	
	High Emission (RCP 8.5)	Lower Bound	-22.0	-191.3	680.1	The driest possible future rainfall change during the transition period from NE to SW monsoon shows a reduction of 22%	
		Median	-9.3	-81.3	790.1	Minimal to no change	
		Upper Bound	4.7	40.7	912.1	Minimal to no change	

Table 11. Sample Seasonal Rainfall Projections for 2050 (2036-2065)

** upper: 90th percentile; median: 50th percentile; lower: 10th percentile*

CLIRAM Project: Projected Changes in Seasonal Temperature in the Mid-21st Century (2036-2065) for Eastern Samar relative to 1971-2000						Sectors Affected
Season	Scenario	Range*	Projected Change		Information about patterns of change	Identify if Social, Economic, Environment, Physical Land Use and specify their sub-sectors
			Change in ℃	Projected Seasonal Mean Temperature (℃)		
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
December-January-February (DJF) Observed baseline = 26.1 ℃	Moderate Emission (RCP4.5)	Lower Bound	1.0	**27.1**	Coldest season	
		Median	1.1	**27.2**	27.1 to 27.7	
		Upper Bound	1.6	**27.7**		
	High Emission (RCP8.5)	Lower Bound	1.3	27.4		
		Median	1.5	27.6	27.4 to 28.0	
		Upper Bound	1.9	28.0		
March-April-May (MAM) Observed baseline = 27.7 ℃	Moderate Emission (RCP4.5)	Lower Bound	1.0	28.7		
		Median	1.2	28.9	28.7 to 29.4	
		Upper Bound	1.7	29.4		
	High Emission (RCP8.5)	Lower Bound	1.4	29.1		
		Median	1.6	29.3	29.1 to 29.8	
		Upper Bound	2.1	29.8		

Table 12. Seasonal Temperature Projections for 2050 (2036-2065)

June-July-August (JJA) Observed baseline = 28.3 ℃	Moderate Emission (RCP4.5)	Lower Bound	1.0	29.3		
		Median	1.2	29.5	29.3 to 30.1	
		Upper Bound	1.8	30.1		
	High Emission (RCP8.5)	Lower Bound	1.4	**29.7**	Hottest season	
		Median	1.7	**30.0**	29.7 to 30.5	
		Upper Bound	2.2	**30.5**		
September-October-November (SON) Observed baseline = 27.7 ℃	Moderate Emission (RCP4.5)	Lower Bound	1.0	28.7		
		Median	1.2	28.9	28.7 to 29.5	
		Upper Bound	1.8	29.5		
	High Emission (RCP8.5)	Lower Bound	1.4	29.1		
		Median	1.5	29.2	29.1 to 29.9	
		Upper Bound	2.2	29.9		

** upper: 90th percentile; median: 50th percentile; lower: 10th percentile*

Echague, Isabela. Sample Workshop Output. Hazard Map Inventory and Data Sources: Hazard Characterization

Hazard Maps	Source/s	Scale	Remarks (Which areas/brgys are identified in the map, other info that can be seen in the map)
Flood	MGB	1:50000	43 barangays
Landslide	MGB	1:50000	33 barangays
Typhoon	MGB	1:50000	All 64 barangays
Soil Erosion	MGB	1:50000	14 barangays
Earthquake	PHIVOLCS	1:50000	All 64 barangays
Liquefaction	MGB	1:50000	None
Tsunami	MGB	1:50000	None
Drought	MGB	1:50000	All 64 barangays

Figure 4. Echague Isabela, Sample LCCAP Outputs

TOOL 3A.1b - Hazard Characterization: Hazard Maps and Data Sources

a. In addition to listing down and characterizing all hazards in the LGU, the assessment team will also incorporate into the matrix the scoring/rating of these hazards for:

- Likelihood of Occurrence (which relies more on historical records)
- Hazard characterization based on: spatial extent, frequency or duration, magnitude/intensity, duration, predictability, speed of onset

This is to add value to the information about the hazards that the LGU will have to prepare for and the frequency of its occurrence. This is an improved version of the CDRA matrix of HLURB.

b. The Core Team may also initially draft the output matrix for this tool and present to the big group (LDC members, Department Heads, and major stakeholders) for their comments and additional inputs about patterns of change.

c. Use information and hazard maps from MGB, PHIVOLCS, NAMRIA (if available), and other available CCA-DRRM maps (like those maps produced using LiDAR, REDAS, etc).

d. To determine the Likelihood of Occurrence Score, the team will use the HLURB scoring matrix below:

Indicative Likelihood of Occurrence Scores		
Measure of Likelihood	**Return Period in Years**	**Likelihood Score**
Frequent or very likely	Every 1-3 years	6
Moderate or likely	Every 3-10 years	5
Occasional, slight chance	Every 10-30 years	4
Unlikely, rare event	Every 30-100 years	3
Highly unlikely, rare event	Every 100-200 years	2
Very rare event	Every 200-300+ years	1

Table 13. Matrix for Likelihood of Occurrence

Source: Draft Reference Manual on Mainstreaming Disaster Risk Reduction and Climate Change Adaptation in the Comprehensive Land Use Plans, NEDA-UNDP, HLURB, 2012

In the absence of records, estimation through likelihood occurrence of the natural event (e.g. delphi method, suggested scoring) can be adopted.

Hazard	**Map Information**			Scoring matrix	**Hazard Description If data available from maps)**			
	Source	Scale	Format/ date/ Reference system	Likelihood of Occurrence (Table 15)	Magnitude	Speed of Onset	Frequency and/or Duration	Areas Covered (identify areas - brgys, and/or size or has.)
Flood Susceptibility								
Rain Induced Landslide								
Storm Surge								
Ground Rupture								
Ground Shaking								
Liquefaction								
Earthquake Induced Landslide								
Tsunami								
Volcanic Eruption								
Others								

Table 14. Sample Table for Hazard Characterization

TOOL 3A.1c - Records of Previous Disasters

a. Compile information and records of previous weather and climate related disasters, if possible, within the last 30 years. The team may do archival research of records from libraries or agencies involved in disaster response like OCD, RED CROSS or even from national agencies and churches. They may also do archival research of news clippings of previous hazard/disaster events. In the absence of old records or data, they may conduct interviews or focus group discussion with the Senior Citizens group who can be asked to recall at the very least, the year when the hazard events happened and the areas affected.

b. Collect records of previous disasters and information about its impact to people, structures, damages and economic losses caused by the hazard. This should give the team an idea of the magnitude of the impacts of specific hazard (in many cases, extreme events), and if there are changes of effects over time.

c. Collection of these data maybe done through:
   - Research from agencies, academe and other sources. Just make sure that data sources are properly acknowledged, attributed;
   - Archival research of records from libraries or agencies involved in disaster response like OCD, RED CROSS or even from national agencies and Churches, news clippings of previous hazard/disaster events; and
   - Focus Group Discussions (FGDs) or Key informant Interviews (KIIs) with Senior Citizens group/residents who live long enough to experience such hazards.

d. After collecting the records, validate the data (date of event, areas, people and structures affected or damaged and its corresponding economic values, etc.)

e. While the LCCAP relies mostly on hydromet hazards, the LGU may also consider other natural hazards especially if such natural hazards might exacerbate climate projections. Example: liquefaction may exacerbate flooding if the projection of rainfall volume is heavy during wet seasons. Lahar from volcanic eruptions may silt rivers and riverine and may result to river overflows during wet seasons. For other natural hazards which are not necessarily water-based, but will worsen effects of climate change, LGUs are advised to include them in the analysis.

The matrix for Tool 3A.1c - Records of Previous Disasters is illustrated in Table 17.

Matrix of records of previous disasters which can be summarized as far back as LGUs can gather.

Hazard Events and Description/ Date	Affected Brgys.	Number of Casualties			Number of Affected Persons		No. of Houses Damaged		Damage to Properties (Php)					Source of Information
		Dead	Injured	Missing	Persons	Families	Totally	Partially	INFRA	Agri	Insti	Commercial establishments	Total	
														Disaster Report on _____ (year)

Table 15. Records of Previous Disaster

TOOL 3A.1d - Summary Hazard Matrix per Barangay (by geographic area or ecosystem)

a. Based on the initial data gathering of hazard maps, climate change projections and compilation of disaster data, prepare a barangay-level summary hazard inventory matrix. The hazard inventory matrix describes the level or number of hazards and hazard types per barangays in a municipality/city. Climate change hazards attributed to climate change (i.e. sea-level rise), including past extreme weather events (drought, typhoons) experienced by the barangays in a municipality/city should be included. Data generated from previous exercises are major sources of information for this Tool.

b. Arrange the list of all the barangays per ecosystem, including adjacent barangays. For example, all adjacent barangays in production areas/agricultural areas must be listed together to show the extent of impacts of the same hazard/s in adjacent or adjoining barangays. If data on the extent of exposure or susceptibility to a hazard is available per sitio or purok, it is also best to include it in the summary matrix.

c. Refer to the scientific information and maps in doing this Tool. Put a check mark if the hazard is existing in a barangay.

d. The summary of hazards should capture the following information:
   - Barangays with most number of hazards
   - Hazards common in the barangays
   - Similar hazard/s and the similar or shared impacts and opportunities from climate change.

Barangay *(arranged per area)*	**Flood**	**Rain Induced Landslide**	**Typhoon**	**Storm Surge**	**Sea Level Rise**	**Liquefaction**	**Etc…**
Coastal Brgy A (riverside)							
Coastal Brgy. B (riverside)							
…brgys							

Table 16. Summary of Hazard Matrix per Barangay

Step 3a. Climate Change Vulnerability and Risk Assessment

TASK 2. Analyze Impacts of Hazards Including Opportunities

Adaptation to climate change and mitigation of risks to natural hazards involve a very broad range of measures directed at reducing vulnerability to a range of climatic stimulus (changes in means, variability, and extremes) or hazards. It is therefore important to first identify the potential impacts and the spatial manifestations of climate change. "Impacts" is used to refer to the effects on natural and human systems of physical events, of disasters, and of climate change which can be illustrated through impact chain analysis.[1]

Climate impact chains are general cause-effect relations that describe how, in principle, climatic changes are expected to cause impacts on the sectors of concern. This Task summarizes the initial scoping of potential hazards, including the associated impacts of climate change and hazards, affecting the locality and the sectors within the locality-ecosystem or geographic area.

Objectives:

1. To discuss the impacts and spatial manifestation of these hazards in the life and activities of people and relevant sectors of the LGU; and
2. To identify how climate change and climate trends and projections would directly identify potential opportunities brought about by CC.

Duration: 1 day or more, depending on the number of climate-related hazards

Process:

a. The impact chain diagrams are based on the climate change projections and identified natural hazards affecting the locality.
b. Identify the potential direct and in-direct impacts of climate change to various sectors such as agriculture, built-up/physical assets, water, health, coastal and forestry. LGUs can develop impact chains by either focusing on one sector or covering several sectors. Impact chains provide the most important chains of cause and effect, leading to potential impacts relevant in the planning area. This can help identify key sectors/key development areas where climate change and disasters will likely impact[3].

[1] Discussions lifted from the HLURB's Supplementation Guide on CDRA (2016) with some minor modifications.

[2] Ibid

[3] Ibid

c. It is also best to identify the elements and areas exposed to each particular impact and writing them on the metacards. After identifying the impacts, draw lines connecting the hazard to the direct impact, then to the indirect impacts, so on and so forth. A chain of impacts may connect to two or more hazards depending on the exposure and vulnerability of the LGU to these hazards. This impact chain may be presented like a map or a diagram.

d. The team may conduct do the impact chain analysis through a workshop. The session guide for impact chain analysis workshop is suggested.

TIME	SUBJECT MATTER / ACTIVITY	METHODOLOGY / PROCESS	MATERIALS / RESOURCES NEEDED
	Preparatory Phase		
	1. Get a copy of the output matrix of Tool 3A.1 (climate projection and hazard characterization)		Copy of output matrix of Tool 3A.1
	2. Identify the different systems and sectors and subsectors in the LGU (Based on HLURB & DILG RAPIDs Guidebooks) Ecological Systems: • Forest ➢ Protection Forest ➢ Production Forest ➢ Indigenous Peoples/Communities • Lowland Agricultural Areas ➢ Soil quality ➢ Crops (Major Crops) • Urban Areas ➢ Residential Areas ➢ Business Areas ➢ Parks & Recreation		

TIME	SUBJECT MATTER / ACTIVITY	METHODOLOGY / PROCESS	MATERIALS / RESOURCES NEEDED
	• Coastal & Marine ➢ Fishing Village ➢ Corals Reefs & Seagrass ➢ Mangrove Areas ➢ Aquaculture/Mariculture areas Other Areas: • Freshwater Areas • Mining Areas • NIPAS (Protected Areas) Development Sectors: • Social ➢ Population ○ Women ○ PWDs ○ Children ➢ Housing/Settlements ○ Informal Settlers ➢ Health ➢ Education • Economic ➢ Business Sector ➢ Manufacturing ➢ Labor & Employment ➢ Agriculture Production ➢ Tourism	List	Copy of the ecological profile or CDP & RAPIDs (DILG CDP Illustrative Guide)

TIME	SUBJECT MATTER / ACTIVITY	METHODOLOGY / PROCESS	MATERIALS / RESOURCES NEEDED
	• Environment ➢ Solid Waste Management • Critical Point Infrastructure (Gov't Buildings/Offices, Hospitals & clinics/ health centers, evacuation centers, water storage facilities, ports & airports, post harvest facilities, etc.) • Lifeline Infrastructures (road networks, bridges, water lines, electric/power lines, communication lines, irrigation system, etc.) • Institutional (government services, peace & order, etc.)		
WORKSHOP PROPER			
1 hour	Workshop 3A.2 Guide questions: 1. What are the primary or immediate impact of these hazards to your areas, systems and sectors? 2. Identify the secondary and tertiary (intermediate) impact of the hazard to the LGU areas, systems and sectors. 3. On each metacard, enclosed in parentheses, in smaller font size) the participants may write number and/ or names of affected brgys., and the affected elements and sectors.	▪ Group the participants in accordance with their sectors. ▪ Answers to the guide questions must be written on the met card.	Meta cards, writing pens Option: to document the group output, Workshop Matrix No. 3A.2. maybe used to summarize results but arrows and lines may be used to connect related impacts.

TIME	SUBJECT MATTER / ACTIVITY	METHODOLOGY / PROCESS	MATERIALS / RESOURCES NEEDED
30 minutes	Processing of responses	▪ The facilitator will confirm with the participants whether all hazards and impacts to systems, sectors and subsectors have been covered and identified. ▪ Connect the hazard to direct and indirect impacts by drawing arrows or lines that represent the connection between the hazard, to the primary or immediate impact and intermediate impact. The arrows will also show the integrated impact of the hazard to a number of systems and sectors.	Meta cards, writing pens Workshop Matrix No. A3. results

Table 17. Sample Session Guide for impact Chain Analysis Workshop

TOOL 3A.2 - Impact Chain Diagram: Impacts of Hazard to Multi-Sectors within the Ecosystem

a. The team shall identify the direct and indirect impacts of climate change covering increase in means, extremes and weather variability and the hazards that may affect the sectors and sub-sectors. Impacts may come in positive, such as flood water can encourage rainwater harvesting to be utilized for specific purposes.

b. Analyse CC impacts and hazards of all the barangays per ecosystem. Capture the common features of the area, the extent of exposure to similar hazard/s and the similar or shared impacts and opportunities from climate change. If data on the extent of exposure or susceptibility to a hazard is available per sitio or purok, it is best to do the analysis at that scale.

c. It is advised that the team write down the direct and indirect impacts in metacards so it would be easy to move the cards around as the impact change analysis progresses. Color coding of meta cards maybe done, example, light green for agriculture ecosystem, blue for coastal/marine, dark green for coastal marine or orange for urban ecosystem. This would provide a clearer view of impacts of specific hazards to multi-sectors within an ecosystem. After identifying the impacts, the next task is to draw lines connecting the hazard to the direct impact, then to the indirect impact, etc. A chain of impacts may connect to two or more hazards depending on the exposure and vulnerability of the LGU to these hazards. The impact chain may be presented like a map or a diagram

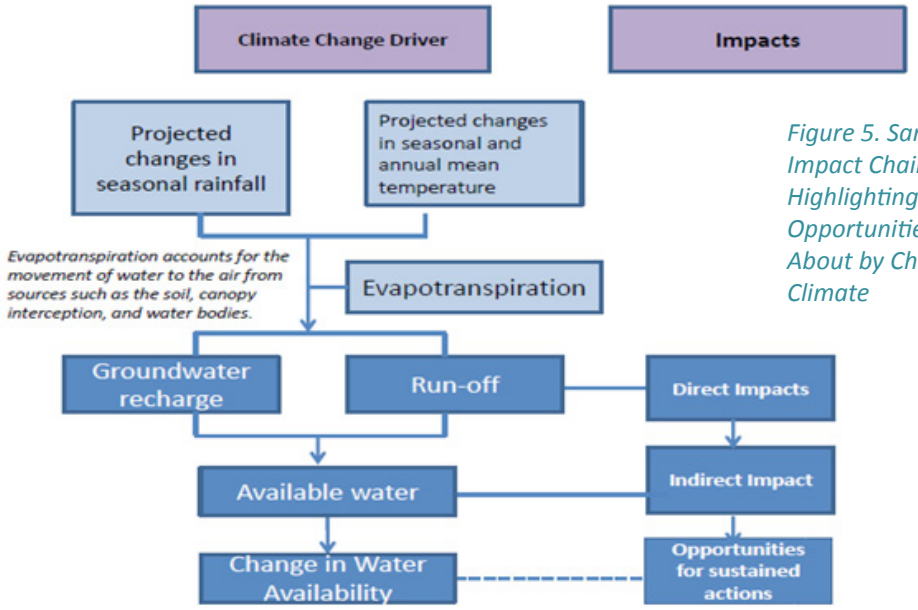


Figure 5. Sample Impact Chain Diagram, Highlighting Some Opportunities Brought About by Changes in the Climate

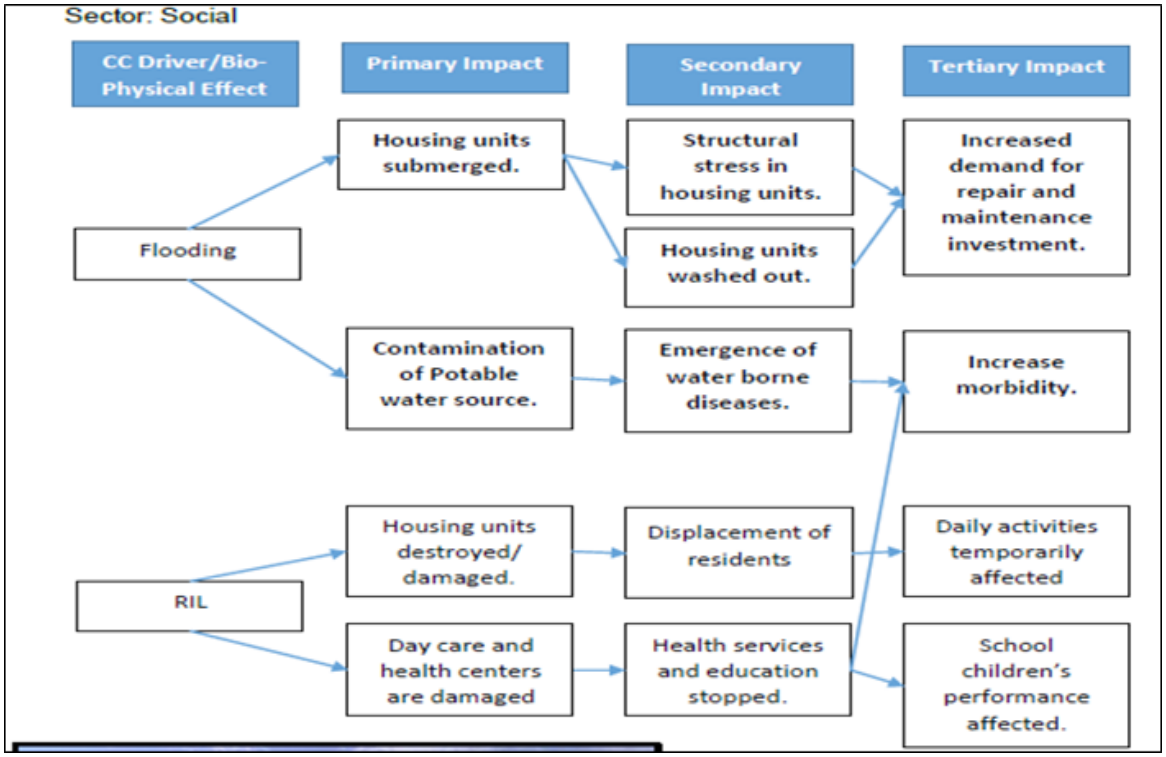


Figure 6. Sample Impact Chain Analysis. Manolo Fortich, Bukidnon LCCAP 2015-2020

Below is a sample table on impact change analysis as organized by one LGU:

Sector: Social

CC Driver	Primary Impact	Secondary Impact	Tertiary Impact
Flooding	Streets are submerged in water Roads and drainage system are damaged Lifelines and other infra structures are damaged Bridge approaches submerged in water School buildings submerged in water Health Centers are flooded Roads & bridges impassable Health workers are among the affected household Destruction of water, electricity, and	Disruption in Mobility of People and Goods Inaccessibility of goods and services Inaccessibility of services Disruption in mobility of people and goods Disruption of classes Disruption of health services delivery (supplies , equipments& records are damage) Delivery of relief services (food/water/medicines) takes time & much effort Non-functional health workers	Low Productivity/High prices of goods Malnutrition Inavailability of food supply/morbidity Low income/low production/low supply School participation attitude of the pupils affected/higher rate of drop outs/Poor quality of education/underemployment or unemployment Increase incidence of infectious diseases, severe or fatal complications of lifestyle related diseases (hypertension/diabetes) increase risk of epidemics Food/Water/Medicine scarcity causing panic, lawlessness, increasing

Figure 7. Impact Chain Diagram of Tudela, Misamis Occidental, LCCAP 2014-2018

Sub-step 3a. Climate Change Vulnerability and Risk Assessment

TASK 3. Develop Exposure Database and Analyze exposure, sensitivity, threat and adaptive capacity of areas and Sectors

For the exposure database, all barangays under each area must be covered in the analysis as identified in the Tool 3A.1d - Summary of Hazards. Use the table generated from Tool 3A.1d as the guide in doing the exposure and sensitivity and adaptive capacity analysis. The following tasks should be done:

Objectives:

1. To prepare an exposure and sensitivity database that will contain quantitative and qualitative information on all the potentially affected elements and sectors of the LGU per hazard;

2. To analyse the risks and level of threats/impact affecting each system and sector per hazard; and

3. To determine the degree of adaptive capacity of the affected communities and sectors and the LGU along six areas: wealth, information, technology, infrastructure, institutional or governance and social capital.

Duration: Three (3) days or more, depending on the availability of data.

Process:

a. For this task, the members of the core team will work on their respective areas/sector for the assessment of exposure and sensitivity of the different elements within their sector. Each of the sector and ecosystem must be assessed with respect to all climate effects and the hazards that affect or possibly affect the sector and ecosystem. All the data used in previous tools must be used as reference and basis for completeness of the analysis.

b. The task involves: (1) organizing the outputs from the previous tasks; (2) analysis of exposure, sensitivity/ vulnerability and adaptive capacity of sectors and activities covering both quantitative and qualitative assessment; and (3) understanding relative vulnerability and risk analysis.

TOOL 3A.3 - Exposure Database

This tool is divided into four parts. The output of the workshops under this tool will form the first part of the Exposure and Sensitivity Database.

1. Tool 3A.3a - Exposure Analysis

a. Using the matrices given in Table 20 (for each sector), list down the barangays under each of the geographical area (Upland, lowland, urban and coastal areas) being analysed for the identified hazard (refer to output of Tool 3A.1d- Summary Hazard Matrix per Barangay.

b. Input the required quantitative data in the column under each indicator. Don't forget to write the unit of measurement (if needed, i.e., hectares, Php, etc).

c. After providing the values of needed data, proceed to qualifying the data by discussing the analysis and summary of findings. On the last column (for each of the matrix answered), summarize the findings and observations. This can be done by sector. It is important that extensive discussions among the members of the sectors be done to generate exhaustive analysis of findings.

NOTE: An excel file for analysis of exposure of urban areas, critical infrastructure and lifeline infrastructures is provided to support Tool 3A.3a. LGUs may also refer to sectoral agencies for specific indicators, such as protected areas and biodiversity, poverty, etc.

The matrices in the next pages provide examples of analyzing the exposure of sectors to specific hazards within the ecosystem or geographical areas.

Sector: Social
Subsector: Population
Hazard: Flooding

Geographical Area or Ecosystem	**BARANGAY**	**EXPOSURE (Agriculture, Livestock & Fisheries: Economic Sector)**					**SUMMARY OF FINDINGS**
		Total Residential Area (hectares)	Total Population	total # of HH	Population Density	% of affected population/ HH (over total population/HH of the brgy)	
Upland	A						
	B						
	C						
	D						
Lowland	E						
	F						
	G						
	…. Brgy						

Table 18. Sample Matrix for Exposure Analysis for Population (Social Sector)

Matrices for Exposure Database and sample entries are provided below and in the next page, respectively. LGUs may organize as many indicators as they can, pertaining to a specific sector and sub-sectors. LGUs are encouraged to refer to the sectors and sub-sectors provided in the Rationalized Local Planning System, in the DILG Illustrative Guide for Comprehensive Development Plan preparation and in other comprehensive development planning guides and tools.

Sector: Economic
Subsector: Agriculture
Hazard: Flooding

Geographical Area or Ecosystem	**BRGY.**	**EXPOSURE (Agriculture, Livestock & Fisheries: Economic Sector)**							**SUMMARY OF FINDINGS**
		Total Agricul-tural Area (hectares)	Total # of farming dependent families affected by the hazard	existing crop/ product being produced	# of farm animals that will be affected by the hazard	# and kind of post harvest facilities that will be affected by the hazard	# of production area (hectares) per crop affected by the hazard	production cost/hectare in Peso that will be lost due to hazard (replacement value)	

Table 19. Sample Exposure Analysis for Natural Resource

Hazard: Flooding

EXPOSURE				SENSITIVITY			
Barangay	Land Use Category	Total Area Allocation per Land Use Per Barangay	Replacement Cost (PHP per Sq. Meter)	Proportion of buildings with walls with light to salvageable materials	Proportion of Buildings in dilapidated/ condemned Condition	Structure not employing hazard resistant building design	No access/ area coverage to infrastructure related hazard mitigation measures
Bonbon	Transmitter	0.03	1000	Moderate	Low	Moderate	Very High
Taboc	Transmitter	2.02	1000	Low	Low	Very Low	Very High
Poblacion	Tourism Areas	0.43	8672	Low	Low	Moderate	Very High
Taboc	Tourism Areas	7.09	8672	Moderate	Moderate	Very Low	Very High
Bonbon	Parks and Play Ground	0.05	3254	Low	Low	Low	Very High
Taboc	Parks and Play Ground	0.30	3254	Residual	Residual	Residual	Very High
Igpit	Light Industries	5.30	8672	Very Low	Very Low	Moderate	Very High
Luyong Bonbon	Light Industries	0.89	8672	Very Low	Very Low	Moderate	Very High
Taboc	Light Industries	0.93	8672	Residual	Residual	Low	Very High
Igpit	Informal Settlers	9.48	3543	Very High	High	Very High	Very High
Luyong Bonbon	Informal Settlers	0.63	3543	Very High	High	Very High	Very High
Poblacion	Informal Settlers	0.15	3543	Very High	High	High	Very High
Taboc	Informal Settlers	0.20	3543	Very High	Moderate	High	Very High
Bonbon	General Residential Areas	11.34	5400	High	Moderate	Moderate	Very High
Igpit	General Residential Areas	35.84	5400	High	Moderate	High	Very High
Luyong Bonbon	General Residential Areas	12.85	5400	Moderate	Moderate	Moderate	Very High
Poblacion	General Residential Areas	14.39	5400	Low	Low	Moderate	Very High
Taboc	General Residential Areas	12.55	5400	Low	Low	High	Very High
Igpit	Commercial	4.22	8672	Low	Low	Moderate	Very High
Luyong Bonbon	Commercial	1.70	8672	Low	Low	Very Low	Very High
Poblacion	Commercial	1.04	8672	Low	Low	Very Low	Very High
Taboc	Commercial	1.51	8672	Moderate	Moderate	Moderate	Very High
Bonbon	Commercial	0.08	8672	Moderate	Moderate	Moderate	Very High
Igpit	Cemetery	1.27	1500	Residual	Residual	Very High	Very High

Figure 8. Sample Exposure and Sensitivity Database. Draft HLURB Supplemental Guideline. 2014. Column 4 illustrates costs for replacement or repair of office equipment, other facilities for necessary for disaster recovery and 'building back better

2. TOOL 3A.3b. Sensitivity Analysis

Sensitivity analysis is the degree to which a system is affected by the biophysical impact of climate change. It considers the socio-economic context of the systems that are exposed. An Excel file is provided for Tool 3A.3b.

Tool 3A.3b will be used to identify the degree of impact of the hazard to the exposed elements, such as:

a. Using the results of the Exposure Analysis (Tool 3A.3a), determine the percentage (%), proportion and other of sensitivity among the exposed elements. Additional columns can be added to facilitate the analysis of sensitivity. The same process shall be undertaken to cover all the ecosystems/geographical areas in the LGU.

b. After quantifying the sensitivity of the sub-sectors, add another column to quantify the data. Summarize the significant findings and observations as illustrate in the next table:

Sector: Social
Subsector: Population
Hazard: Flooding
Area: Upland

BARANGAY	SENSITIVITY (POPULATION/SOCIAL SECTOR)												SUMMARY OF TECHNICAL FINDINGS (SENSITIVITY)
	% of informal settler householdS	% of HH living below poverty line	% of HH with no permanent source of income	% of households living in dwelling units with walls made from predominantly light, salvaged and makeshift type materials	% of young (<5 yrs old)	% of old (> 60 Yrs old)	% of population with no access to safe water supply	% of HH with no access to sanitary toilet	% of HH without access to early warning system	% of HH without awareness about CCA/DRR information	% of household with no access to infrastructure mitigation measures related to hazard	% of HH without access to health services & philhealth	

Table 20. Sample Sensitivity Analysis Matrix for Population

3. TOOL 3A-3c. Determination of Degree of Impact or Threat Level

After determining the number/area/volume of the elements at risk and their level or degree of sensitivity, the next task it to determine the degree of impact or threat level of the sector using the matrix given below (form LCCAP Book 1):

Sector: Social
Subsector: Population
Hazard: Flooding

Areas/ Barangays				Degree of Impact/Threat Level - Index
	EXPOSURE	SENSITIVITY	SUMMARY OF FINDINGS	
Urban Areas **6 barangays (riverside)** **5 brgys in low lying areas**	• 420 individuals (88 HH) or 50% of the total population of 4 highly susceptible barangays are exposed to flooding particularly those living along Tullahan river • ….120 individuals or 32 HH are exposed to flood with a depth of 1.5 meters…. Etc….	• 45% of the households are informal settlers living in make-shift houses made of light and salvageable materials • …10% are children and 5% are senior citizen • 8 PWDs and 2 be- ridden stroke patients • Etc….		4 - High

Table 21. Degree of Impact / Threat Level Assessment Table

Below are parameters to determine the degree of Impacts or Threats of Climate Change:

THREAT LEVEL	DESCRIPTIVE INDICATORS
Very High (5)	• 50% and above of the exposed elements are sensitive to the hazard • Large numbers of serious injuries or loss of lives (more than 50%) or LGU to define what is large for the LGU – what % of exposed population • Regional decline leading to widespread business failure, loss of employment and hardship (systems collapse) • Major widespread damages and loss to environment and infrastructure, with progressive irrecoverable damage (100% replacement costs); (agriculture, fisheries, business, etc) • Local government services would cease to be effective (institutional dysfunction)
High (4)	• 31 - 50% of the exposed elements are sensitive to the hazard • Isolated instances of serious injuries or loss of lives (less than 50%) • Regional local economic development impacts and stagnation; serious impacts on livelihoods • Severe and widespread decline in the quality of life within the community • Severe damages and a danger of continuing damage to infrastructure and environment • Local government services struggle to remain effective and would be seen to be in danger of failing completely
Moderate (3)	• 16 - 30% of the exposed elements are sensitive to the hazard • Small numbers of injuries involving the public • Significant general reduction in livelihoods • Isolated but significant instances of environmental and infrastructure damage that might be reversed with intensive efforts • Local government services under severe pressure on several fronts

Low (2)	• >5 - 15% of the exposed elements are sensitive to the hazard • Minor injuries to public • Individually significant but isolated livelihood impacts • Minor instances of environmental and infrastructure damage that could be reversed • Isolated instances of government services being under severe pressure
Very low (1)	• Appearance of a threat but no actual harm to public safety • 2-5% of the exposed elements are sensitive to the hazard • Minor impact on livelihoods • No or insignificant infrastructure and environmental damage • Minor instances of disruption to local government services

Figure 9. Degree of Impacts or Threats of Climate Change

Sample portion of the summary matrix: this guide uses a 3-point scale for Threat Level.

Exposure	Sensitivity	Impacts	Degree of Impact
(3)	(4)	(5)	(6)
• Approximately 715 persons or (178 families) • 6 hectares of Residential Areas representing 3% of the total residential areas with an approximate replacement value of 324M; • 8.8 hectares of Informal settler areas representing 84% of all identified informal settler areas, with an approximate replacement value of 105M; • 1.4 hectares of Commercial areas representing 12% of all commercial areas with an estimated replacement value of 121M; • 7 hectares of Tourism Areas representing 55% of all tourism areas with an approximate value of 607M; • 1,200 sq meters of Light	•Approximately one-third of the population are dependents •Population growth rate in the affected areas is above the Municipal average •Around a 60% of are informal settlers •Approximately 7% of households are dependent on ground water as the source of drinking water •A significant portion of the population do not have access to EWS •A significant portion of the population are dependent on establishments and production areas located in the impact zone •Affected establishments/areas contributes roughly 30% to the local economy •Local knowledge on the potential impacts of CC (Sea Level Rise/Storm Surge/Coastal flooding) is low •Only 20% of the structures have property insurance	• Increase in the number of severely affected families and possible fatalities and injuries. • Potential submergence of low-lying settlement areas (i,e, residential, commercial, tourism). • Loss of coastal wetlands and other coastal habitats such as mangroves • Reduction in production output/ yield that would significantly impact the local economy • Increased erosion or damage to coastal infrastructure, beaches, and other natural features • Increased costs for maintenance and expansion of coastal erosion/flooding control (natural or manmade)	High (3)

Figure 10. Sample portion of the Summary Matrix (HLURB's Supplemental Guide on Mainstreaming Climate and Disaster Risks in the CLUP (HLURB, CCC, UNDP, Australian Aid, 2014)

4. TOOL 3A.3d. Determining Elements and Scores of Adaptive Capacity

Adaptive Capacity is defined by IPCC Working Group II as the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

There is a need to review the inherent capacities of LGUs to climate change and determine their level of adaptive capacities. For an LGU, adaptive capacity elements are determined by a combination of ability and efforts in both physical elements (infrastructure, material wealth, technology) and social/institutional elements (human/social capital including information, governance/institutional strength,) to adapt to climate change. Sample indicators of the six elements are provided in Toolkit- Facilitators Guide.

Objective: To determine the adaptive capacity of the communities and individuals.

Duration: One (1) day to three (3) days

Procedure:

1. Following the flow of analysis from Exposure, Sensitivity and Threat Level, determine the adaptive capacity by putting in the quantitative and qualitative information based on the indicators in each column for the affected communities. A sample portion of the matrix is given below: (full matrix is given in Table 24.)
2. The members of the Assessment team must list down all items and capacities of the LGU for each dimension and assess its relevance and availability to address the impact of the particular hazard and sector being assessed. After listing all possible answers/items, rate the level of AC of each dimension using the scoring matrix given below to determine the gaps or the capacities that must be enhanced or improved.
3. To determine overall adaptive capacity score: Add all the scores for each dimension then divide by 6. The Answer is the average adaptive capacity of the LGU. However, it is also important to take note of the significant findings (gaps or lacking or weak dimensions) in the summary of findings for AC (to be used in the determination of vulnerability of the sector to the hazard)

Sector: Social (Housing/Settlements)
Subsector: Population
Hazard: Flooding

ADAPTIVE CAPACITY (AFFECTED SECTOR)			ADAPTIVE CAPACITY (LGU)						ADAPTIVE CAPACITY SCORE
G			(include only LGU funds, programs & projects related to agriculture & fisheries)						
% of affected farmers/fisherfolk with access to financial assistance	% of affected farmers/fisherfolk with access to alternative livelihood	% of production areas covered by government extension programs	Wealth	Information	Infrastructure	Technology	Institution and Governance	Social Capital	

Table 22. Adaptive Capacity Elements and Analysis

4. A guide to scoring elements of adaptive capacity is illustrated on the next page. Each element is scored and totaled to get the score of individual element. If all elements have been scored, the team shall derive the average adaptive capacity score.
5. A scoring matrix is proposed to serve as guide in assigning scores/numerical level to represent the relative adaptive capacity of the LGU. But it is suggested that the LCCAP Team review this first, adjust and agree on the final indicators and relevant parameters to be used to represent each level/numerical score for each specific sector. The LGUs actual capacity and inherent limitations will determine the final score that will best represent their level of adaptive capacity or inherent capacity to adapt to climate change.

WEALTH	INFORMATION	INFRASTRUCTURE	TECHNOLOGY	INSTITUTION & GOVERNANCE	SOCIAL CAPITAL	AVERAGE ADAPTIVE CAPACITY SCORE
• Funds and funding assistance available in the LGU, • Budget allocation for the sector intended for CCA-DRR • Loans & grants, donation from partners • Etc…	Information disseminated to communities IEC campaign Drills and exercises level of awareness of the people about the hazard and DRRM & evacuation plans EWS system Etc.	Available Climate and disaster resilient infrastructure and facilities Retrofitted infra All weather road networks Functional govt'offices and health facilties Alternate routes Alternate sources of water Safe evacuation centers	Early warning devices Climate smart agriculture practices Equipment and supplies for emergency and climate response Researches & tools Communica tion equipment Power back-ups Etc…	Functional DRRMO Skilled Gov't staff and technicians Functional councils and teams approved Policies for CCA & DRR CCA & DRR related plans Security plans & contingency plan. Updated and complete database & maps	Skilled and available response teams Volunteers groups Partnerships with business and private sector CC & DRR Skilled labor force for emergency and rehabilitation Etc.	
SCORE	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**Average**

Table 23. Scoring the elements of Adaptive Capacity. Suggested Guide

The table below provides examples on elements per dimension of Adaptive Capacity, representing a specific hazard, by sector:

ADAPTIVE CAPACITY DIMENSION	ADAPTIVE CAPACITY SCORE/LEVEL				
	5 (Very High)	4 (High)	3 (Moderate)	2 (Low)	1 (Very Low)
ECONOMIC WEALTH	• Funds or financial resources are enough/ adequate and available financial resources for assistance to **ALL** affected sector; • the people in the affected areas have their own resources to respond to a hazard	• have financial resources for assistance to **AT LEAST 50%** affected sectors • the people in the area have access to resources to respond to a hazard	• with limited financial resources for assistance TO AT LEAST 30% priority affected sectors • the people in the area have limited access to resources respond to a hazard	• have very limited financial resources for assistance ABOUT 15% of affected sectors • affected people have very limited access to resources to respond to a hazard	• no available financial resources for assistance to affected sector • affected people don't have their own resources to respond to a hazard
TECHNOLOGY	• there are equipment available for use and facilities to communicate directly with the people/sector affected	• there are some equipment for use and facilities to communicate with the affected people / sector	• limited equipment and facilities for assistance and communication	• very limited equipment and facilities for assistance	• very few facilities and equipment for use and communication with affected sector/people is difficult

INSTITUTIONS/ GOVERNANCE	• LGU and community leaders are aware and could effectively manage a quick response in the event of a hazard occurrence • there are existing processes and regulations to control the situation • relevant legislations are in place to respond to a certain hazard	• LGU and community leaders are aware and can response in the event of a hazard occurrence • there are processes and regulations but not yet fully implemented nor tested	• LGU and community leaders are aware but management set-up to respond to a hazard is non existent. • Relevant processes, procedures and legislations are passed but implementing guidelines still has to be formulated	• few LGU officials and leaders are aware of the roles and functions during but quick response team to quickly respond during an occurrence of a hazard is yet to be formed • draft process, procedures and relevant legislations still has to be passed	• LGU officials are not fully aware of a hazard or disaster that may occur • there are no definite processes and regulations to control the situation and respond to a certain hazard.
INFRASTRUCTURE	• there is more than adequate transport, water infrastructure, sanitation, energy supply and management and medical services that can be used to respond to a hazard • these facilities and infrastructures are strong enough to withstand a projected hazard and located in safe areas	• there is enough transport, water infrastructure, energy supply and medical service, etc. that can be used to respond to a hazard • facilities and equipment are available but not enough	• there are some infrastructure, transport facilities and necessary equipment that can be used to respond to a hazard but not enough to accommodate a projected impact of a hazard • infrastructure and facilities still has to be retrofitted to ensure its safety and strength during a hazard	• infrastructures are available but there are no facilities that can be used to respond to a hazard • transport services in some possibly affected areas are not available • energy supply	• necessary infrastructures and facilities necessary to respond to a hazard still has to be constructed • existing infrastructures and facilities are not within standard to withstand a projected impact of a hazard

INFORMATION	• LGU and stakeholders in the area/sector are well aware of the hazard and its potential impact to them • communication facilities and procedures are in place to respond in the occurrence of a hazard	• LGU and some stakeholders are aware of the hazard and its potential impact to them	• some degree of awareness of LGU and stakeholders • communication facilities are in place but procedures are not yet in place	• limited awareness of LGUs and stakeholders due to lack of IEC program	• LGU officials and affected communities are not yet fully aware of the hazards and its potential impact
SOCIAL CAPITAL / HUMAN RESOURCES	• there is political willingness to allocate resources to build adaptive capacity of the LGU • there are specific agencies, community groups and/or NGOs that have the mandate and skills to focus on the specific sector/area during occurrence of hazards; partnership with these groups is covered by a MOA • there are trained emergency response teams for this sector/area	• there is some degree of willingness of the leaders to allocate funds to build adaptive capacity of the LGU • some agencies are and NGOs are available and have skills to assist specific sectors during occurrence of hazard • there is a team with basic skills for emergency response	• LGU have political willingness but still has to be convinced to allocate resources to build adaptive capacity of LGUs • there are specific agencies and NGOs with mandate to assist affected communities but still lack skills to respond • Team have been organized for emergency response	• LGU officials still has to be convinced to allocate resources to build adaptive capacity of LGUs • There are limited number of agencies and NGOs with mandate and skills to assists occurrence of hazards • Team for emergency response still has to be organized	• LGU officials still has to be oriented on adaptive capacity building • Specific agencies still has to have clear mandate and plans to assist affected communities • No NGOs with mandate and skills to help specific sector in times of climate hazards • No policies or orders yet for the creation of the team for emergency response

Figure 11. Parameters for Scoring the Adaptive Capacity of LGU to Specific Hazards by Sector

The sample table that captures activities 1- 3 would look like this:

Ecosystem: Urban
Sector: Economic
Subsector: Commercial/ Financial Districts
Hazard: Typhoon

Area/ Ecosys-tem (Col 1)	Brgys (Col 2)	Summary of Findings (Col 3)			Degree of Impact/ Threat Level (Col 4)	Adaptive Capacity (Col 5)						Summary of Findings (Col 6)
		Impacts	**Exposure**	**Sensitivity**		W	I	I	T	I and G	SC	
						average scores of 6 elements						

Table 24. Sample Summary of Threat and Adaptive Capacity

TASK 4. Determining Vulnerabilities and Risks of ecosystems and multi-sectors to specific hazards

Using the results of the previous assessment, this Task summarizes the results of the preceding exposure, sensitivity, and adaptive capacity assessment. In so doing, the LGU will be able to determine the level of vulnerability faced by the affected area, ecosystem, sector, and subsector.

- Vulnerability assessment leads to the identification of factors - social, physical, economic, environmental, cultural, institutional, etc. - that may either increase or decrease the susceptibility of exposed elements to climate change and disaster impacts. The results of vulnerability assessment enable LGUs to focus and address the critical sources of vulnerability of the exposed assets.

- Meanwhile, risks arise as a result of the interaction among the exposed elements, their sensitivity/vulnerability, and the likelihood of occurrence of a hazard. Determining the level of risks that a particular ecosystem or sector faces will help LGUs in prioritizing actions or measures targeted at reducing risks. The level of risk is positively correlated with the level of vulnerability in such a way that if the vulnerability of the exposed elements is high, the level of risk faced by the LGU is most likely high.

Objectives:

1. To summarize the findings and observations generated from exposure, sensitivity and adaptive capacity analysis
2. To determine the level of vulnerability of the exposed systems, sectors and subsectors of the LGU to probable impacts of projected changes in climate and the compounding impacts from natural hazards.

Duration: Three (3) days or more, as needed.

Process:

- The LCCAP Core Team may bring together the same sectoral representatives that worked on the matrices in Task 3 to bring continuity to the assessment process. A one day workshop/writeshop, with the facilitation of the LCCAP Core Team is adequate to complete the summary tables that will be carried forward to the next Task.

- For this Task, each of the sectoral assessment teams must now create the summary table of the assessment findings for Exposure, Sensitivity and Degree of Impact or threat Level, then factor in the findings for Adaptive Capacity (AC) and the AC score to determine the over-all vulnerability of the sector to the hazard.

- For this Task, five tools will be used (Tools 3A.4a to 3A.3e).

TOOL 3A.4a. Summarize findings and Determine Climate Change Vulnerability of the Sector per Hazard (CCVA)

a. This refers to the results of exposure database, the team shall gather and copy the affected Area/Ecosystem in (Col 1), the barangays included in the analysis (Col 2), and the summary of findings in (Col. 3). Ensure that the major and/or critical observations and findings are reflected in the summary and are not missed as the teams synthesize the data.

b. Input the score derived from the analysis of Degree of Impact / Threat Level (Tool 3A.3d) in column 4.

c. Copy and input the summary of findings from adaptive capacity analysis in Tool 3A.3e in Col 5).

d. Analyze and compute for the level of relative vulnerability of the exposed sector to the probable impact of the hazard by dividing the score of the Threat Level (Column 4) with the average score of Adaptive Capacity (Column 6), based on the formula below.

Relative Vulnerability = $\frac{\text{Threat Level (based on exposure and sensitivity analysis)}}{\text{Adaptive Capacity}}$

Where:
Threat Level: 5 – Very High and 1 – Very Low;
Adaptive Capacity: AC is the Sum of all AC indicators/factors;
5 – Very High and 1 – Very Low;

e. The resulting quotient will allow the LGU to determine the level of vulnerability of the affected area/ecosystem and sector/subsector. The equivalent category for the vulnerability score is provided below.

Category of Vulnerability	Vulnerability Score (TL / AC = RV)
High	4.1 - 5
Medium High	3.1 - 4.0
Medium	2.1 - 3.0
Medium Low	1.1 - 2.0
Low	<1 - 1.0

Table 25. Vulnerability Score and Equivalent Category

Threat Level	Adaptive Capacity Scores					Relative Vulnerability				
Very High (5)	1	2	4	5	5	**5**	**2.5**	**1.25**	**1**	**1**
High (4)	1	2	4	2	4	**4**	**2**	**1**	**2**	**1**
Moderate (3)	4	3	5	5	3	**0.75**	**1**	**0.6**	**0.6**	**1**
Low (2)	3	5	3	1	2	**0.66**	**0.4**	**2**	**2**	**1**
Very Low (1)	5	4	3	5	1	**0.2**	**0.25**	**0. 33**	**0.2**	**1**

Table 26. Illustrating the Scoring of Relative Vulnerability

The sample table on the summary of Climate Change Vulnerability Assessment is provided in the table below:

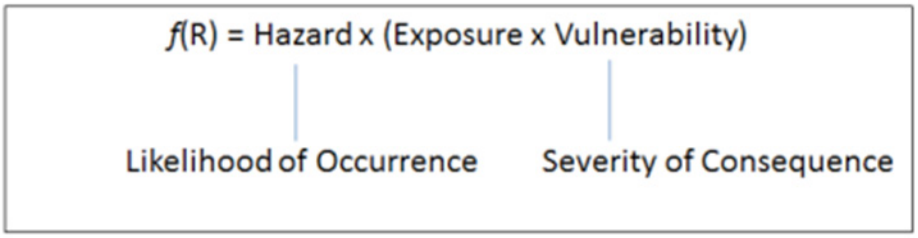
Hazard: Flooding

Area/ Eco-system (Col 1)	Brgys (Col 2)	Summary of Findings (Col 3)			Degree of Impact/ Threat Level (Col 4)	AC score (Col 5)	Summary of Findings, analysis (Col 6)	Vulner-ability Score (Col 7)	Summary of Findings, analysis (Col 8)
		Im-pacts	**Exposure**	**Sensi-tivity**					

Table 27. Sample CCVA SUMMARY

TOOL 3A.4b. Disaster Risk Assessment (DRA)

a. This tool will derive the Disaster Risk Assessment (DRA) to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could potentially harm exposed people, property, services, livelihood and the environment on which they depend. In the context of this guideline, risk is a function of hazard, exposure, vulnerability and adaptive capacity. This is represented by the figure below:



Supplemental Guideline, HLURB, (2016)

b. To analyse risks, get the likelihood of Occurrence (LOO) of the hazards (ex. Flooding) for each system and sector. Below is the LOO derived from Tool 3A.1b (hazard characterization). For easy reference, the LOO table is reflected below.

Measure of Likelihood of Occurrence of the Hazard	Return Period in Years	Likelihood Score
Frequent or very likely	Every 1-3 years	6
Moderate or likely	Every 3-10 years	5
Occasional, slight chance	Every 10-30 years	4
Unlikely, rare event	Every 30-100 years	3
Highly unlikely, rare event	Every 100-200 years	2
Very rare event	Every 200-300+ years	1
Source: Draft Reference Manual on Mainstreaming Disaster Risk Reduction and Climate Change Adaptation in the Comprehensive Land Use Plans, NEDA-UNDP, HLURB, 2012		

Table 28. Likelihood of Occurrence Score

Note: For other hydro met hazards (storm surge, rain induced landslide, etc.), LGUs may consult/coordinate with mandated agencies to derive the appropriate parameters needed for LCCAP formulation.

c. Refer to the summary of findings for exposure, sensitivity and adaptive capacity of the sector, determine the Severity Of Consequence (SOC) and input in the matrix (Parameters for LOO of other hazards such as storm surge, sea level rise, typhoons and strong winds maybe referred to available maps. LGUs are also encouraged to coordinate with mandated agencies for parameters of LOO).

d. A Consequence Table per sector, prepared by the HLURB, is presented below for adoption:

SOC Category	SOC Score	Population	Urban Use Areas	Natural Resource-Based Production Areas	Critical Point Facilities	Lifeline Utilities
Very High	4	≥20% of the population are affected and in need of immediate assistance	≥40% of non-residential structures are severely damaged or ≥20% of residential structures are severely damaged	≥ 40% of exposed production areas/ means of livelihood such as fishponds, crops, poultry & livestock & other agri/ forest products are severely damaged *>40% exposure and sensitivity of the flow of business in Urban Areas*	Damages may lead to the disruption of services which may last one week or more	Disruption of service by lasting one week or more (for MLGUs) and one day for HUCs
High	3	10 - <20%	>20 to <40% .... Or >10-20% ...	20 to <40%	...three days to less than a week	...approx five days for MLGUs and less than 18 hour disruption for HUCs
Moderate	2	>5%-10%	>10 to 20% ... or >5 to10% ...	10 to <20% ...	...one day to less than three days	...approx three days for MLGUs and less than six hour disruption for HUCs
Low	1	≤5%	≤10%... or ... ≤5% ...	<10% and below ...	...less than one day	... approximately one day for MLGUs and less than six hour disruption for HUCs

Table 29. Consequence Table (Severity of Consequence-SOC)

e. Estimate the level of risk by multiplying the LOO Score with the SOC Score to generate the Risk Score. Refer to equivalent Risk Category for the Risk Score derived above.

System:_____
Sector: _____
Hazard: Flooding

Ecosystem/ Barangay	**Likelihood of Occurrence of the Hazard**	SUMMARY OF OBSERVATION/ FINDINGS *(refer to CCVA Summary)*	**Severity of Consequence**	**RISK/THREAT LEVEL***	
				(SCORE)	***(Category)***

Table 30. Sample Table for Risk Score and Category

Risk = Likelihood of Occurrence x Severity of Consequence

Risk = Likelihood of Occurrence x Severity of Consequence

f. HLURB's Supplemental Guideline on CDRA provides the resulting risk scores/categories, and risk maps, will provide a qualitative index of the various location of high risk areas in the locality.

Risk scores reflect possible scenarios:

Likelihood of Occurrence	Likelihood of Occurrence	Severity of Consequence			
		Very High	High	Moderate	Low
		4	3	2	1
Frequent or very likely (1-3 Years)	6	24	18	12	6
Moderate to Likely (>3-10 Years)	5	20	15	10	5
Occasional Slight Chance (>10-30 Years	4	16	12	8	4
Unlikely Improbable (>30-100 Years)	3	12	9	6	3
Highly Unlikely, rare event (>100-200 Years)	2	8	6	4	2
Very rare event (>200 Years)	1	4	3	2	1

Figure 12. Risk Scores and Possible Scenarios (Source: Draft Reference Manual on Mainstreaming Disaster Risk Reduction and Climate Change Adaptation in the Comprehensive Land Use Plans, NEDA-UNDP, HLURB, 2012)

g. The result of the CCVA summary and estimation of Risks above will be carried on to the next tasks

h. The sample summary table of Task 4 is presented in the next page.

Matrix on Summary of Climate Change Vulnerability and Risk Analysis

Area/ Ecosys-tem (Col 1)	Brgys (Col 2)	Summary of Findings (Col 3)			Threat Level (Col 4)	AC score (Col 5)	Summary of Findings (Adaptive Capacity) (Col 6)	Vulner-ability Score TL/AC (Col 7)	Sum-mary of Find-ings, analy-sis (Col 8)	Risk Analysis (LOO x SOC) (Col 9)	Sum-mary of Findings, analysis (Col 10)
		Impacts	**Exposure**	**Sensitivity**							

Table 31. Sample Table on Summary of Climate Change Vulnerability and Risk Analysis

Task 5. Determining decision areas and technical findings

This task will determine decision areas based on summary of findings.

After all the sectors have completed the assessment of their ecosystem and sectors, the core team can now meet as a group to conduct cross-sectoral analysis, determine decision areas based on their technical findings and evaluation of vulnerability and risks.

Two approaches or tools will be used for this Task:

TOOL 3A.5a. Determining Decision Areas and Summary of Findings
TOOL 3A.5b. Mapping Decision Areas

TOOL 3A.5a. Determining Decision Areas and Summary of Findings

Objective: To identify decision areas, i.e., ecosystems and areas within the LGU boundaries.

Duration: Half (1/2) day or more if needed

Process:

A half-day workshop facilitated by the LCCAP Core Team with the sectoral representatives is adequate to complete this Task. It is important to ensure that before reaching this stage, the underlying data have been reviewed and validated in the previous Tasks. The teams working on the matrices should have achieve a high level of confidence on the observations and findings for them to be used as inputs into planning.

a. The sectoral teams will summarize the observations made for the type of identified climate and natural hazards faced by the LGU, for the type of ecosystem, and for each exposed element/sector within this ecosystem.
b. Refer to the findings derived from the working tables prepared in Task 3 which involved the analysis of the exposed elements to climate and natural hazards, their sensitivities, adaptive capacities, vulnerability, and risks.
c. Extend the columns of Exposure Database to facilitate the analysis. Decision areas can be a specific site in the locality or an area cluster with high level of risks
d. Technical findings are summaries of observations determined in Tasks 3 and 4 where areas or elements in terms of the level of risks and contributing factors were analysed.

Below is a table that organizes the tabular decision areas and technical findings:

Decision Areas	Technical Findings
Barra Coastal Barangay	• The area is located along the Iponan river; • These are areas within the high susceptible flood areas, with an estimated flood height of > 1 meter. The estimated likelihood of occurrence is 10-30 years; • Only a tenth of the structures are made from light to makeshift materials, roughly 153 individuals or 38 structures; • Only 20% have property insurance; • Majority of the structures have first floors below the estimated flood depth; and • Risk to property damage range from high to moderate.
Iponan Coastal Barangay	• Risk to property damage is categorized as High; • Land uses are predominantly residential; • Almost 98% of the structures do not have property insurance; • Majority of the structures have first floors below the estimated flood depth; • 70% of the structures in need of minor to major repairs; • Approximately 30% of the structures are made from light to makeshift and salvageable materials; and • Approximately 25% of the structures do not have building permits and locational clearance.

Table 32. Decision Areas and Technical Findings, Task 5 (Example from from HLURB's Supplemental Guide on Mainstreaming Climate and Disaster Risks in the CLUP (HLURB, CCC, UNDP, Australian Aid, 2014)

TOOL 3A.5b. Mapping Decision Areas

The identification of the decision area can be done through overlaying of maps that were produced by the LGU such as exposure, vulnerability and risk maps.

Objective: To identify decision areas, i.e., ecosystems and areas within the LGU boundaries and translate into vulnerability maps

Duration: Half (1/2) day or more if needed

Process:

A half-day workshop facilitated by the LCCAP Core Team with the GIS Team, or with the technical team with knowledge on mapping.

a. Prepare map/s indicating vulnerable areas to climate change in the LGU. This will indicate the decision areas which should be the subject of land use related policy and program interventions; and
b. Review the technical characteristics of hazards such as their location, intensity, frequency and probability; the analysis of exposure and vulnerability including the physical, social, health, economic, and environmental dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities in respect to likely risk scenarios

The figure below illustrates an example of vulnerability map:

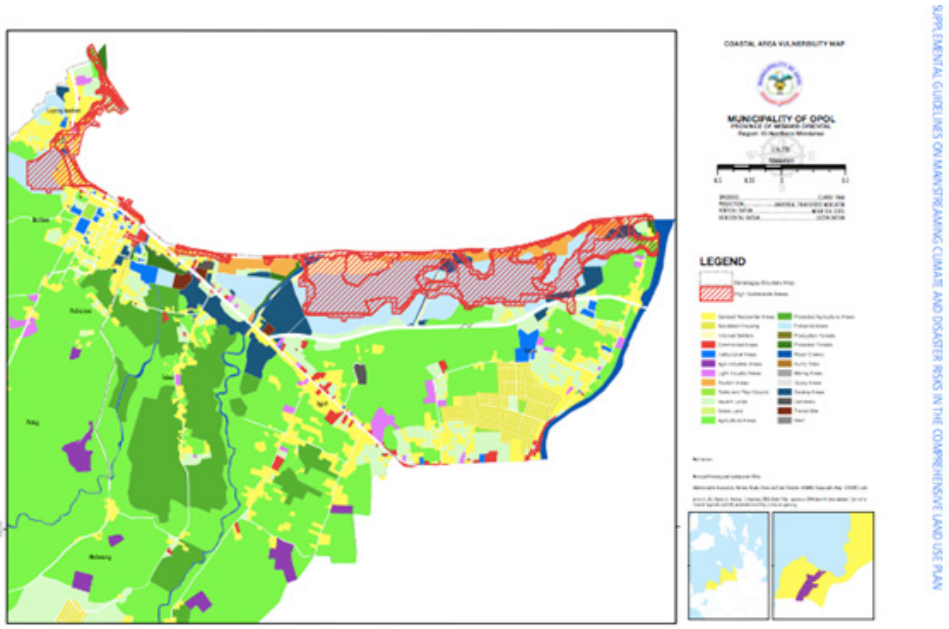


Figure 13. Sample of Map Overlays. Opol, Misamis Oriental. Culled from HLURB's Supplemental Guide on Mainstreaming Climate and Disaster Risks in the CLUP (HLURB, CCC, UNDP, Australian Aid, 2014).

Task 6. Determine Development Implications, key challenges, issues, and opportunities

Using the summary of findings, this task will identify the implications and development issues when LGUs adopt "business as usual" stance or attitude despite risks and vulnerabilities. This task will determine key challenges and issues as well as opportunities as LGUs address each type of climate related hazards, given the implications. The LGU should be able to provide an explanation as to what, why and when actions should be initiated. This task will lead to the initial list of policy interventions, PAPs and other actions that will be processed in the next module. Analysis at this point could be based on:

- the relationship of the challenges, issues, opportunities to the overall development goals of the LGU; and
- the extent to which the implications will deteriorate the quality of life of constituents and how they will undermine the current development efforts of the LGU should no action be done at all.

Objectives:

1. To be able to identify key issues and challenges as well as opportunities in addressing implications of vulnerabilities and risks;
2. To be able to prioritize the ecosystem and sector that would require LGU interventions; and
3. To establish the link between the findings from the vulnerability and risk assessment to development planning.

Duration: Whole-day

Process:

- A whole-day workshop facilitated by the LCCAP Core Team with the sectoral representatives is adequate to complete this Task. By this time, the LCCAP Core Team and the sectoral representatives should have validated and accepted all the findings and observations summarized under Task 5, since these inputs will now be linked to the broader development and sectoral goals and targets of the LGU.

- Only 1 tool will be used for this Task.

TOOL 3A.6a - Determining development implications, key challenges, issues and/or opportunities

a. Building on the tool from Task 5, the LGU evaluates these observations and findings vis-à-vis their own development challenges and targets, especially if these are already articulated in their CLUPs and CDPs.

b. The analysis that can be derived from this table will help LGU determine if the sources of vulnerability and risks can undermine the achievement of their development targets and goals. Conversely, this will determine if the scenarios presented by climate change offer new opportunities that the LGU should be able to maximize.

c. In addition, the vulnerability and risk considerations can be reviewed within broader sectoral assessment. Consistent with the principle of mainstreaming resilience in development planning, the statement of sectoral goals, objectives, and targets, as well as the design of specific programs, projects, and activities should already take into account these risk factors. This will allow the LGU to determine the incremental requirement for addressing the risks within existing sectoral resources.

d. The results of Task 6 are further processed in Module C as inputs not just to the LCCAP formulation, but may also be valuable in CLUP, CDP, and sectoral plan enhancement.

e. The table on the next page shows a summary of Task 6.

Ecoystem: Urban
Sector : Social
Hazard: Flooding

Decision Area **(Baran-gay)** Col (1)	**Exposure** Col (2)	**Summary of Findings** Col (3)	**Risk Score and Category** Col (4)	**Implications** **(If no action is taken)** Col (4)	**Key Challenges and Issues, and Opportunities** Col (5)
Coastal Barangay A	Low lying residential houses contiguous to a major river	• 50% (or 8,000 individuals) of the residents individuals are exposed to high susceptibility floods • Early warning systems are not yet in place • Roughly 44% of the population are below the poverty threshold; no capacity to relocate or implement structural improvements of private homes • LGU does not have enough resources to implement flood control measures	**3** **(High)**	• Potential deaths and injuries due to the absence of early warning system and quality of houses • Significant government resources are needed for rescue and relief operations • Recovery assistance for affected residents cannot be provided from LGU budget, especially to restore destroyed homes and livelihoods	• Affected residents are the poorest in the LGU; high risk undermines poverty alleviation efforts of LGU, per CDP • Affected barangay also reflect poor performance in key social indicators (i.e., prevalence of malnutrition, low performance in school achievement tests, etc.) • There is an opportunity to introduce an integrated package of assistance that will reduce the risks of the communities, linked to incentives to adhere to household and community level risk-reduction measures.

Table 33. Key Challenges, Issues, and Opportunities

Step 3B- GHG Inventory and Low Emission Development

This step is part of the situational analysis in developing local climate actions. It responds to the planning question "what is happening" in the locality when it comes to local greenhouse gas emissions and on-going mitigation-related activities. GHG inventory is an accounting of the GHGs emitted to and/or removed from the atmosphere over a period of time.

This particular step in local climate change action planning provides the basis for mitigation actions and guidance in formulating low emission development strategies.

It aims to:

(1) improve LGU understanding of local GHG emissions attributed to administrative boundary; and
(2) review/elaborate the LGU's current development actions that contribute to GHG mitigation.

With the knowledge, LGUs can align their mitigation activities or low emission development strategy with their national-level targets. National-local programming alignment can offer opportunities for LGUs to implement planned activities hand-in-hand with existing nationally-led programs and activities. It also offers opportunities that will support monitoring of achievement of priorities and targets as outlined in the NCCAP and the NDC.

While this step is new in the context of the enhanced LCCAP Guidebook for LGUs, implementation of this is not new. There are LGUs that conduct GHG inventory as part of government and non-government piloting and demonstration efforts.

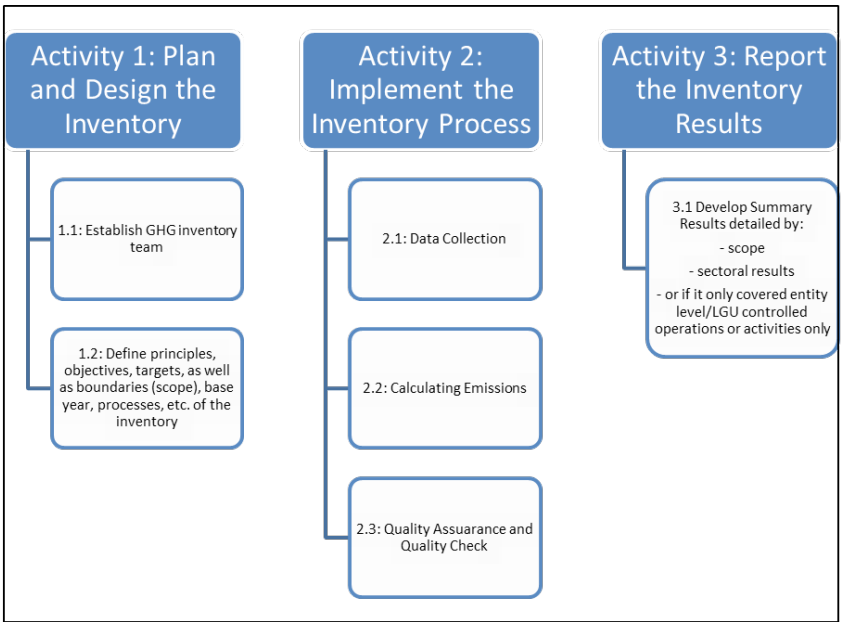
With or without a GHG inventory, this enhanced LCCAP guide encourages LGUs to define low-emission development strategies that (1) support and complement the achievement of their development goals, and (2) sustain their existing mitigation-related activities, which during the period of planning are not tagged or labeled as mitigation activities yet.

Tasks involved for Step 3B

1. Conduct GHG Inventory

LGU-level GHG inventory development would typically go through the process and task illustrated in Figure 18 illustrates an abridged illustration of the process discussed in the "Community-Level GHG Inventory for LGUs in the Philippines - User's Manual" adopted by the Climate Change Commission from the B-LEADERS Project supported by USAID.

Figure14. Abridged illustration of Community Level GHG Inventory



Given the figure above, below is a presentation of the activities that must be undertaken depending on the scenario at the LGU level:

Scenario	Activities given the local scenario	Other considerations
Scenario 1: LGU already conducted a community-level GHG inventory.	1. Review the inventory results and the summary being presented 2. Include the summary table/s of the inventory along with explanations and notations needed in Section 2.2 of the LCCAP	- Consistency with approved technical details (e.g. emission factors) should be ensured
Scenario 2: LGU is currently conducting a GHG inventory during the formulation of the LCCAP	1. Define at what point the LGU is, in the process and proceed from there until the result/report is developed	- Inventory timing must be considered in view of the LCCAP formulation timelines

Scenario 3: LGU conducted a GHG inventory but only at the entity level	1. Review the inventory results and the summary being presented 2. Include the summary table/s of the inventory along with explanations and notations needed	- Probe if there is still a plan to do community-level inventory
Scenario 4: LGU would like to conduct GHG accounting and include relevant activities as part of LCCAP	Conduct the full process, from Task 1 to 3, and go through all activities per task	- Inventory timing must be considered in view of the LCCAP formulation timelines
Scenario 5: LGU does not want to conduct GHG Accounting	No need to go through the tasks and activities as in the illustration	- Probe if there is still a plan to do community-level inventory (for the next iteration of the LCCAP) - Must proceed to Task 2 of this Step

Table 34. Activities to be undertaken for mitigation following the planning Scenarios

2. Review current mitigation activities

It is very likely that LGUs are already implementing mitigation-related activities which were not defined based on the local GHG inventory. Particular actions related to mitigation may be on-going or are part of LGU policies, programmes, projects, and activities consistent with the following national laws:

- Solid Waste Management Act (RA 9003)
- Renewable Energy Act (RA 9513)
- Clean Air Act (RA 8749)
- Clean Water Act (RA 9275)
- Revised Forestry Code (PD 705)
- Local Government Code (RA 7160)
- other related Executive Orders

These projects are already tagged in LGU's Annual Investment Plans (AIP) in view of the DBM, CCC, and DILG Joint Memo Circular 2014-01 and 2015-01 on Climate Change Expenditure Tagging (CCET) as well as the DBM Memorandum 70 that requires LGUs to prepare AIP using a form that already includes CCET.

It is important to include existing activities on mitigation in the situational analysis of LCCAP so that mitigation efforts will be more strategic and would at least have a basis, especially when the objective is to reduce GHG emissions without established baseline from a GHG inventory.

The review of "current mitigation activities" will focus on three references:

1. Current mitigation activities planned and outlined from the Local Development Investment Program (LDIP)
2. Mitigation activities indicated in the current LGU AIP, assumed to have included the CCET
3. Mitigation activities from the current LCCAP

The figure below is used in the coaches training in LCCAP and it illustrates the tasks for each:

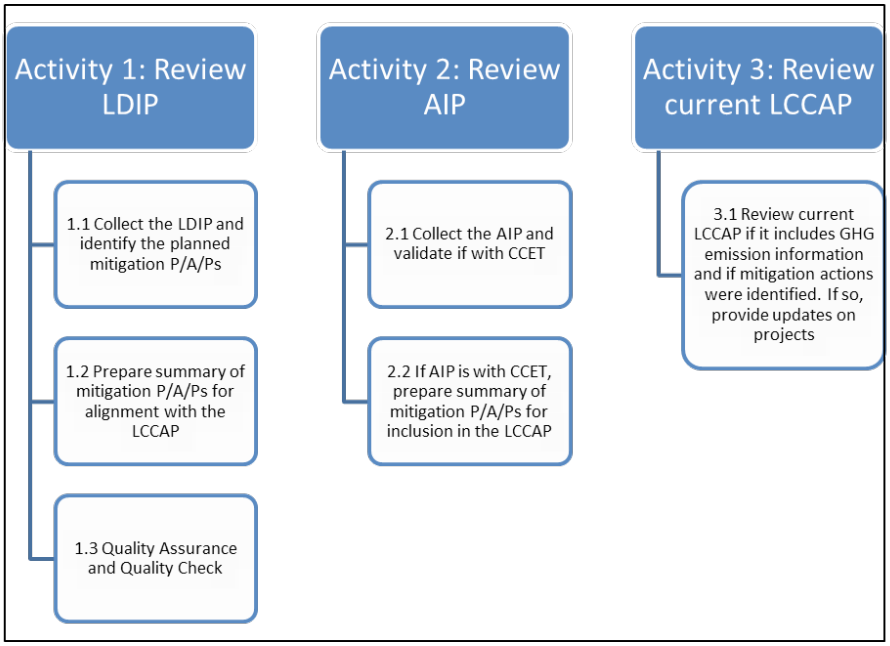


Figure 15. Tasks to Review the Current Mitigation Actions

The main aim of the review, focusing on the planning question "What is happening?" is to understand the current level of actions being done by LGUs on mitigation. The present actions on mitigation will likely indicate the current status of the LGUs in:

1. the level of understanding of the importance and relevance of mitigation actions in their locality;
2 . the interest to pursue climate mitigation and mitigation-related actions; and
3. the ability to link development plans and strategies with investments/resources.

Tools and templates

This enhanced manual promotes the use of the CCC-adopted "Community-Level GHG Inventory for LGUs in the Philippines-User's Manual" (www.climate.gov.ph). But it also considers that some LGUs might have used other inventory tools/processes like the Global Protocol for Community-Scale Greenhouse Gas inventories (www.iclei.org > low carbon-city >gpc) which is likewise consistent with the IPCC standards. What needs to be done, in case another tool was used apart from the CCC adopted tool, is to check for consistency in terms of scope, emission factors, baseline period, etc.

Module C

Planning, Prioritizing, and Budgeting

Module C is reflective of mainstreaming processes as goals and objectives set forth in the current local plans are checked and further reviewed to ensure of their link to climate change following the results in Module B. From those goals and objectives, specific programs, projects, activities, and legislations corresponding to each objective will be determined. Existing implementation instruments of LCCAP such as the LDIP with CCET and AIP with CCET will be adopted in Module C.

While the entire planning process is cyclical and iterative, there are significant gains to be considered in assessing and re-assessing climate change actions against community objectives, technical realities and the local planning context. The end result will be an achievable, comprehensive, and integrated Climate Change Action Plan that recognizes and supports an LGU's most vulnerable and at-risk sectors.

This Module has four steps:

Step	Key Questions
4. Review of Goals and Objectives	• Are current goals and objectives reflected in CLUP. CDP, ELA responsive to issues and challenges on climate change? • If current goals and objectives are to be enhanced to address key issues and challenges, are they also reflective of the goals or the thematic area of the NCCAP?
5. Options Identification	• Can the programs, activities and projects in the CDP and LDIP respond to key issues and challenges defined in Step 3? • For enhanced options, reflective of adaptation and mitigation actions that can reduce risks as reflected in technical findings and implications?
6. Options Assessment	• Are options, as defined, went through participatory process, in terms of prioritization?
7. Implementation	• How much is the total fund required for identified options? Can they be funded by LGU resources, or external support is needed to fund them? Are programs, activities and projects reflective to and aligned with CCET in the LDIP and AIP?

Step 4. Goals and Objectives

This planning step will strengthen the mainstreaming process of the results of the vulnerability and risk assessment (done in Module B) into the mandated LGU plans and programs. Issues refer to concerns, problems, and challenges reflected in the technical findings of vulnerability and disaster risk assessment. Objectives articulate and define these issues so that they can be used in the planning process

There are two accompanying tools to accomplish this Step:

TOOL 4-A Reviewing Current Development Goals and Objectives
TOOL 4-B Setting Objectives to Address Key Issues, Challenges and Opportunities and Aligning with NCCAP Goals

Objective:

1. To check with the goals, objectives and targets of the LGU for the period (short term, medium term & long term goals) as stated in the CLUP, CDP & ELA; and
2. To refer to the result of the Risk and Vulnerability Assessment to determine what CC vulnerabilities you want to reduce and what coping/adaptive capacities you want to enhance.

Duration : 3 hours or more if needed

Participants : LCCAP Core Team and relevant stakeholders

Procedure : This step can be done as a sectoral workshop if the budget allows. At the minimum, the LCCAP Core Team may invite additional three to five members from the sector to form a sectoral team with the Core Team member as Team Leader. This step may be accomplished in one (1) day or more. Use the tool to go through both the goals and objectives.

1st Step Get an updated copy of the CLUP or CDP or ELA (whichever are available) and go through each of the goals and associated objectives per sector.

2nd Step Link the goals/objectives with climate change by matching with technical findings and implications identified in Step 3 to better understand how potential impacts of climate change could be addressed by sectoral goals/objective/s.

3rd Step As a group, agree if there's a need to: a) retain the current objective, b) enhance the current objective or c) formulate new objectives, considering the analysis and discussions done in the first and second steps.

4th Step In any instance where you marked "yes" for an objective, proceed to setting new objectives or enhancing current ones by aligning such objectives to the goals or thematic areas of the NCCAP.

TOOL 4-A Reviewing Current Development Goals and Objectives					**TOOL 4-B. Setting Objectives to Address Key Issues, Challenges and Opportunities**
OBJECTIVES (as stated in the CLUP/ CDP/ELA)		**LINK TO CLIMATE CHANGE** (Refer to relevant technical findings of the sector)	**Is There A Need To Enhance Or Formulate New Objecives?**		**Development Objectives Enhanced or Reformulated to Climate Objectives**
Goal	**Objectives**		YES	NO	
To enhance economic prosperity and social justice	Increase agriculture productivity	80% of fish production areas do not have insurance 30% of riceland affected, planting season reduced, one cropping per year in 4 upland barangays	●		100% farmers adopting climate resilient rice varieties
	Achieve energy sufficiency	Significant portion of land in xxx barangays can be developed for solar farms Increased volume of waterfalls in xxx barangay over XX years Increasing demand for energy due to economic growth	●		Improve energy sufficiency through improved energy mix
	Increase rate of employment to 30% in 2019	Commercial establishments located in safe zones Awareness of private sectors on CCA/DRRM high		●	

Table 35. Template. Reviewing Current Development Goals and Objectives.

TOOL 4-C. Aligning the enhanced development objectives and climate objectives with the NCCAP Goals or Thematic Areas:

Objective:

1. To align objectives with the goals or thematic areas of the National Climate Change Action Plan (NCCAP).
2. To further link the planning objectives to the goals set in the National Climate Change Action Plan (NCCAP).

Duration : 1 hour or more if needed
Participants : LCCAP Core Team and relevant stakeholders
Procedure : This step can be done by the LCCAP Core Team. Use this tool to go check the alignment of climate objectives with the goals of the NCCAP.

1st Step Prepare a table consisting of nine (9) columns.

2nd Step In the first column, list down the development objectives; on the second column list down the climate change objectives. Ensure that these objectives are listed according to sectors: social, economic, environmental, infrastructure, physical/land use.

3rd Step With reference to the NCCAP goals listed in columns 3 to 9, put a check mark is the each development objective of climate change objective is matched with respective NCCAP goal, and an X mark if it does not.

Enhanced Development Objectives	Climate Change Objectives	NCCAP Goals						
		Food Security	Water Sufficiency	Ecological and Environmental Stability	Human Security	Climate-Smart Industries and Services	Sustainable Energy	Knowledge and Capacity Development
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Table 36. Aligning enhanced development objectives and CC objectives with the NCCAP goals.

Below is an example of how an LGU builds on the current goals and objectives in the CDP in defining its objectives according to the goals of the NCCAP:

2. **Goals and Objectives**

2.1. Goals

2.1.1. Build adaptive capacity of the communities;

2.1.2. Increase resilience of vulnerable sectors

2.1.3. Sustainable environment to climate change

2.2. Objectives

2.2.1. To ensure food security and climate-smart services

2.2.2. To ensure water sufficiency and human security

2.2.3. To have safe and stable environment

2.2.4. To have a sustainable infrastructure services

2.2.5. To develop knowledge and capacity for climate change

2.3. Analysis

The municipal government of Prosperidad aims to address urgent and immediate needs and concerns of the people. These pertaining to dangerous events that may occur due to climate change to vulnerable sectors such as agriculture, lifelines, humans and other infrastructure services- it may public or private.

The above objectives will really help in addressing possible adverse effect of climate change. These priorities are aligned with the National Climate Change Adaptation Plan (NCCAP) in pursuit of its long term objectives which are both adaptation and mitigation.

Figure 16. Goals and Objectives Setting, Prosperidad, Agusan del Sur LCCAP, 2014-2017

Some LGUs align the NCCAP goals or thematic areas against objectives, prior to defining the PPAs and policy/ legislative options as shown in table below:

Priority Areas-NCCAP	Objectives	PAPs	Policy/Legislative Options
Water sufficiency	To assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality and promote conservation	1. Profiling of existing watersheds 2. Conduct gendered vulnerability and risk assessment of water resources and infrastructures 3. Rehabilitate degraded watersheds 4. Rehabilitation of LGU Water System 5. Formulation of financing plan for water sector	Enact ordinance Banning cutting of trees at the water shed Formulate and review LGU Water System Plan (MW4SP) Tree growing policy
Climate-Smart Industries and Services	To prioritize the creation of green and eco-jobs and sustainable consumption and production	1. Waste segregation at source, discard recovery, composting and recycling in existing industries 2. Joint conduct of oil spill drill	Adapting and Building resilience of industrial, agricultural and food security systems to climate change at multiple levels
Sustainable Energy	To prioritize the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy	1. Assessment of functionality of existing solar power 2. Feasibility study of mini-hydro plant 3. Study of other renewable energy options	Adapt low cost remedies that are compatible with sustainable development agenda Adapt policy portfolios promoting sustainable development agenda

Figure 17. Part of Jimenez, Misamis Occidental LCCAP, 2015-2020

Capacity building programs for climate risk reduction are very important elements in increasing capacities of LGUs to adapt to or mitigate the negative effects of climate change. LGUs may consider the integration of System on Competency Assessment for Local Governance (SCALOG) in developing knowledge and capacity for climate change. Starting off from objectives setting, SCALOG should translate up to PAPs and reflected in the LCCAP.

Other Tools that can help LGUs perform Step 4:

TOOL 4-D Objective Indicators (Descriptive)

Every objective needs an indicator so that the objectives can be measured, compared and used to help assess climate change options. Objective indicators also help to form the basis of a monitoring and evaluation program to make sure that the options are helping support the objective they were intended to (e.g. how well be Option X improving community issue Y?).

Objective : To derive indicators for objectives linked to climate change

Duration: Half-day workshop, or as needed

Procedure: Meeting-type or workshop

This step can be done as a sectoral workshop if the budget allows. At the minimum, the LCCAP Core Team may invite additional 3-5 members from the sector to form a sectoral team may be accomplished in one (1) day.

Fill in Table 39 as a desk exercise. Review, revise and confirm with your LCCAP core planning team and/or stakeholder advisory committee.

If choosing to fill out the table with the core planning team and/or stakeholder committee, follow these steps:

1st Step Note that “low” for all cases = no or little change from the current situation. Discuss and confirm what the current situation is for particular objective based on findings from the Vulnerability and Risk Assessment, or other development plans and documents where required. “Medium” indicator can also serve as baseline, based on the VRA findings and upon agreement by the team and stakeholders.

2nd Step Fill out the “medium” column with a description that is about “half-way” to the “high” (i.e. only some of the situation imagined in the “high” description has come to pass).

3rd Step Fill out the “high” column where “high” = the “best” outcome. For a descriptive indicator activity like this, a general description of the desired “best case” future outcome is all that is required.

In cases where more descriptive indicators are used, "low" typically would be described as "no or little change from the current situation", while "medium" would describe a potential change to the "low" situation where some progress has been made. "High" would describe a situation where a great deal of progress has been made and the objective has almost been met. The description of the current situation for "low" should come from the Vulnerability Assessment.

Example:

- Low: No change from current situation. Government does not provide support when faced with floods or other emergencies.
- Medium: Some change from current situation. Government response has improved and they are providing some support for people affected by emergencies.
- High: Government provides excellent emergency response and support for people affected by emergencies.

OBJECTIVE	LOW	MEDIUM	HIGH
EXAMPLE Improve and safeguard settlements	No or little change from the current situation	Planning for improved land management started, some housing Upgraded as demonstration project.	Improved land management Regime and housing upgrades.
	No or little change from the current situation		
	No or little change from the current situation		
	No or little change from the current situation		
	No or little change from the current situation		

Table 37. Objective Indicators. Source: PFCC TOOLKIT, UN-Habitat, 2016 (with some modifications to be consistent with existing processes) in the philippines

Note: The DILG's Local Planning Illustrative Guide for Formulation and Updating of the Comprehensive Development Plan (CDP) provides indicators-based ecosystem and a "Shopping" for LGU-specific Rationalized Planning Indicators which can support in drawing indicators for the objectives.

Step 5. Options Identification

This step will match programs, activities and projects to concrete climate change actions that will address the technical findings from the vulnerability and risk assessments. This facilitates identification of viable options and packages of interventions that will yield the most benefits.

There are two approaches or Tools that will support in working on Step 5

TOOL 5-A. Determining options from technical findings and objectives
TOOL 5-B Organizing Options According to Sector and Time Frame
TOOL 5-A. Determining options from technical findings and objectives

Time Required: Half-day (1/2) workshop with core planning team and/or advisory planning group. or longer when needed.

Procedure:

1st Step Fill in the matrix below (first four columns- decision area, technical findings, implications, objectives) following the results of previous steps.

2nd Step Add additional sector rows when necessary.

3rd Step Using the CDP or LDIP, note down (as a group) current programs, activities and projects (PAPs) which you think can operationalized the objectives. If done using note cards, be sure to capture final matrix.

4th Step New adaptation and mitigation options maybe determined if the current PAPs in the CDP or LDIP do not correspond to operationalizing the objectives.

5th Step List down the agreed options in fifth column. Identify as many as possible for both the adaptation and mitigation options

Below is a sample table that illustrates the identification of options from objectives:

Example: Goal: Create a prosperous economy				
Decision Area	**Technical Finding**	**Implications**	**Objective**	**Potential Options**
Urban Ecosystem (Urban Area)	Roads susceptible to erosion and becomes impassable during floods	When not addressed immediately, critical point facilities will sustain long term damages and may result to more expensive replacement costs.	Ecological and Environmental Stability (NC-CAP) To Improve road infrastructure	- Install better drainage culverts (could be an opportunity for employment program for urban poor) -- Build dikes along the river -- "Low regrets" infrastructure upgrades (e.g. dikes, diversion channels, drainage systems) -- Capacity building for GIS team to update hazard maps -- Climate-proof exposed roads (e.g. raised road bed above flood level)
Example: Goal Promote community wellbeing				
Decision Area	**Technical Finding**	**Implications**	**Objective**	**Potential Options**
Coastal Marine Ecosystem (Coastal areas)	Severe storms and flooding increase the risks of informal settlements at river mouth	Delayed interventions may cause Injuries and even deaths.	Human Security (NCCAP) To alleviate conditions of informal settlements	-- Update maps and land uses to zone most vulnerable areas for non-settlement uses -- Develop community warning and evacuation systems -- Risk prediction and mapping -- Update local building codes – climate proof construction -- Local economic development strategy with "green jobs" component

	Increased flood incidents contaminate water-supply Drought – limited supplies in summer months	Delayed interventions may increase exposure of children, women and elderly to water- borne diseases	Water Sufficiency and Human Security (NCCAP) Protect drinking water supply	-- Eliminate contamination sources by zoning industrial activity to new locations -- Water conservation program -- "Low regrets" option (e.g. Strengthen partnership with DOH and provincial government for improvement of water conditions. -- Climate-proof existing reservoir and facilities -- Develop or expand reservoir to ensure adequate water supply during droughts -- Build new reservoir in a safe area
Example: Goal: Reduce poverty				
Decision Area	**Technical Finding**	**Implications**	**Objective**	
Upland Ecosystem (Agriculture) - 9 barangays	As projected, extreme events by 2050 will increase with rainfall volume above 300mm Major informal markets (talipapa, community markets, post-harvest facilities) located in RIL areas will be severely affected during heavy rains	6 post harvest facilities (PHFs) would mean more than 50% reduction in incomes of 56 farmer families if no immediate interventions will be introduced in the area; Most children of these farming facilities are school-age and may not reach to secondary level when RIL is not addressed.	Ecological and Environmental Stability Knowledge and Capacity Building (NCCAP) To Improve informal market infrastructure and PHFs	-- Local economic development strategy with "green jobs" component -- Develop new informal markets and PHFs in accessible, RIL-free area -- New building code -- Climate proof construction designs -- Monitor market days lost to flooding -- "Low regrets" infrastructure upgrades (e.g. erosion defense) -- Community warning and evacuation system -- Disaster Response Plan – relief aid -- Strengthen networking and partnership with TESDA for alternative livelihood for women in the area.

Table 38. Objectives to Options (WORKSHEET, PFCC Toolkit, UN-Habitat, 2014)

TOOL 5-B Organizing Options According to Sector and Time Frame

Even if the LCCAP is suggesting a three-year term, it is always possible that there are long-term options that are identified to reduce the risks. It is suggested that LGUs need to closely examine the time horizon of each option, identify the phasing of project implementation and if completion would require more than the tie horizon in the LCCAP, reflect the remaining activities for next LCCAP updating.

Time Required : 3-4 hours

Procedure

- Begin reorganizing options in each sector by potential time frame and decide as a team if projects are:
    - Short-term = relatively small-scale, lower cost or easier to implement activities that could be likely be implemented in 1 to 2 years.
    - Medium-term = Moderately larger projects that would be more expensive than the short-term projects and because of cost, technical or other factors, likely would take between 3 and 5 years to be implemented.
    - Long-term = large-scale, relatively complex projects with potentially challenging or complicated implementation requirement, funding requirements, phasing, needs, etc. Long-term projects may also be reflected both in LCCAP and in the medium-term Comprehensive Development Plan.

Time Frame	Sector: _____			
	EXAMPLE Water & Sanitation	EXAMPLE Settlements	EXAMPLE Education	EXAMPLE Health Services
Short-term Options (1-3 years)	Community warning systems	Shelter Assessments	School drills	
Medium-term Options (6) years				
Long-term Options (6+ years)				

Table 39. Organizing Options to Time Frame. PFCC TOOLKIT, UN-Habitat, 2016 (with some modifications to be consistent with Philippine processes.

Example of local climate change actions set according to time frame:

ENVIRONMENT						
List of Projects	Project Cost In '000 peso	Schedule of Implementation/Allocation				
		2015	2016	2017	2018	2019
Establishment of Municipal Sanitary Landfill	10,000	1,000	3,000	3,000	3,000	
Establishment of Municipal Recovery Facility	1,000	100	300	300	300	
Billion Trees Project	500	100	100	100	100	100
Purchase of Garbage Equipment	1,000		1,000			
Establishment of natural river control along flood-prone areas	15,000	5,000	5,000	5,000		
Delineation of Barangay Boundaries	4,500	3,000	1,500			

Figure 18. Adaptation Projects Under the Environment Sector, Mallig, Isabela, LCCAP

The Sample Table shows sectoral projects organized according to Time Frame.

Time frame	Sector				
	Water and Sanitation	**Economy & livelihoods**	**Health**	**Agriculture**	**Environment and Ecosystem**
Short-term Options (1 – 2 years)	A) Clean-up and improve maintenance of existing drainage culverts B) Storm water management system for informal communities C) Install better drainage culverts D) Develop community warning & evacuation systems E) New building codes	A) Local economic development strategy – "green" jobs B) Climate-smart employment programme (e.g. mangrove planting) C) Clean-up / maintenance programme for drainage culverts (employment programme) D) New building codes – climate proof construction E) Disaster Risk Reduction Plan F) Improved hazard mapping	A) Health promotion activities (e.g. awareness program, community clean-up) B) Urban heat island Programs (e.g. tree planting) C) Zone most vulnerable areas for non-settlement uses D) Develop community warning and evacuation systems E) Disaster Risk Reduction Plan	A) Urban agriculture program B) Integration of food security into relevant plans and strategies (e.g. land use plan, local economic development strategy) C) Water conservation program –drought awareness D) Improved rural-urban linkage E) Water quality monitoring program (in harbour) F) Water quality early warning / alert for high pollution, "no fishing"days G) Drought warning system	A) Create protected area for mangroves B) Mangrove replanting program C) Public education program D) Development guidelines (upstream development)

Time frame	Sector				
	Water and Sanitation	**Economy & livelihoods**	**Health**	**Agriculture**	**Environment and Ecosystem**
Medium-term Options (3 – 5 years)	A) Repair and improvement of "low regret" infrastructure (dikes, diversion channels)	G) Climate proof exposed roads (i.e. raise road bed above flood level) H) Develop new informal market I) Build dikes along the river J) Repair and improvement of "low regret" infrastructure	F) Climate proofing vulnerable infrastructure (e.g. waste waterplant) G) Improved health infrastructure H) Develop and implement new building codes – climate proof construction, urban heat island materials and shading, building ventilation, etc. I) Restoring and expanding urban water bodies	H) Expanded or improved reservoir I) New groundwater recharge infrastructure (e.g. infiltration ponds, wells) J) New flood protection infrastructure (e.g. diversion channels, storm water infiltration ponds) K) "Low regrets" infrastructure improvements (sewage, drainage systems)	A) Develop local standards and / or harmonize with state / national standards (if applicable)
Long-term Options (6+ years)		K) "Low regrets" infrastructure improvements (water supply & treatment) L) Climate proof existing reservoir and facilities M) Build new reservoir in a safe area	J) Improved training in health sector K) Development of urban wind corridors	L) New reservoir in hazard-free area M) New sub-surface reservoir to eliminate summer water losses N) Eliminate contamination sources by zoning industrial activity to new locations	F) Eliminate contamination sources by zoning industrial activity to new locations

Table 40. Sample Adaptation Options according to time frame (PFCC Toolkit, UN-Habitat, 2014)

Step 6: Project Assessment

Direct ranking of options is the first step in the more detailed assessment process. It allows participants (core planning team, stakeholder advisory group) a chance to vote for their "favorite" options, or the ones they think would be best to implement from the list of high ranked options from TOOL 5-A (Determining options from technical findings and objectives).

Step 6 introduces TOOL 6-A on Technical Screening and Ranking of Options. This tool offers a process where options are ranked according to specific parameters.

Rationale: The intent of this activity is to create a direct-ranked list of options to be used for more detailed assessment using TOOL 6-B and other tools offered in this Toolkit.

Time Required: Half-day workshop with core planning team and/or Sectoral Committees and stakeholders

Procedure:

1st Step Fill in the matrix as a group activity with your core planning team and/sectoral committee. You can do the activity as one large group, or break into smaller teams and compare and discuss results at the end. The criteria, or considerations, to guide this first level of screening criteria and a potential scoring scale for each criterion include:

Stakeholder acceptability: Would local residents accept it?

High = more than 70% of residents in the area
Medium = 50-70% of residents in the area
Low = < 50%

Technical feasibility: Is design Organization and Management (O and M) available?

(3) High = design already available
(2) Medium = city has resources to develop design, implement and maintain
(1) Low = no available design and resources develop design, implement and maintain

Urgency of implementation: Is this action urgently needed to address current risks and Vulnerabilities?

(3) High = extremely urgent
(2) Medium = urgent
(1) Low = somewhat urgent

Ease of implementation: Can LGU implement or need support?

(3) High = city can implement this without external support
(2) Medium = city can implement this with some support
(1) Low = city cannot implement this without external support

Relative effectiveness: How well would it work relative to other options?

(3) High = needed in order to deliver objectives and other options
(2) Medium = would contribute to other options
(1) Low = would somewhat contribute to other options

Cost: Is it a financially realistic option? Does the city have funding or potential access to funding to cover the costs?

(3) High = financially realistic with available funding
(2) Medium = more limited funding opportunities
(1) Low = expensive and limited funding opportunities

Mainstreaming potential: Could it be integrated with existing local government planning and policy development?

(3) High = yes, easily and fully through many plans and strategies
(2) Medium = yes, partly but with more time and through more limited plans and strategies; (1) Low = relatively limited potential, would require additional activities

Multi-sectoral and multi-objective: Would it address objectives in other sectors?

(3) High = yes, significant cross over with other sectors and objectives
(2) Medium = some cross over with other sectors and objectives
(1) Low = little cross over with other sectors and limited impact on other objectives

2nd Step Enter options into worksheet. Use a new worksheet for each sector.

3rd Step Working with your remaining list of options, go through each of the options and score them against the criteria. Go criterion by criterion, i.e. score all your options against the first criterion and then score all your options against the second criterion, and so on through the whole list.

The scoring uses a 5-point scale:

High	=	3
Medium	=	2
Low	=	1

The Technical Working Group can also use middle scores where there is discussion on:

Medium-High	=	2.5
Medium-Low	=	1.5

The sample table (Tool 6-A: Technical Scenarios & Ranking of Options):

Options	Acceptability	Feasibility	Implementation ease	Urgency	Effectiveness	Cost	Mainstream Potential	Multi-sectoral	Score	Rank
EXAMPLE:										
Option **A**	2	1	3	5	3	1	4	4	23	4th
Option **B**	2	2	2	4	3	2	4	5	24	3rd
Option **C**	1	1	1	1	3	3	2	3	15	7th
Option **D**	3	3	3	3	3	4	4	3	24	3rd
Option **E**	4	4	4	4	4	3	3	5	31	1st
Option **F**	2	3	1	2	3	1	4	4	20	6th
Option **G**	3	3	3	3	3	1	2	3	21	5th
Option **H**	3	4	5	2	3	4	1	4	26	2nd
Option **I**										
Option **J**										
Option **K**										
Option **P**										

Table 41. Technical Screening and Ranking of Options TABLE PFCC TOOLKIT, UN-Habitat, 2016 (with some modifications to be consistent with Philippine processes)

Other tools, which LGUs may opt to adopt are provided to support Step 6:

TOOL 6-B Direct ranking or assessing of options.

Time Required : 1 hour-2 hours.

Procedure: The activity can be done with the core planning team and stakeholder advisory group working together in plenary, or using "dot voting" where each participant gets four sticky dots that they can place in any combination next to the potential options. They can also use pens to mark their votes.

1st Step Grouped by sector, make a list of highly ranked options from TOOL 5-D using either a flip chart or by putting them in chart using your computer. Be sure to leave room for voting on the options.

2nd Step Give each participant sticky dots per sector. They can also use pen to mark their votes. Ask participants to "vote" for their favorite options using their four dots or four check marks (if they are using pens). Votes can be used in any combination (i.e. all one option, or spread in any combination between two and four options).

3rd Step Tally votes per sector and write down how each option ranked (i.e. 1st, 2nd, 3rd, etc.)

4th Step Discuss with participants. Why did they vote for the options they did? Are there any surprises with the ranking (i.e. some low ranking or high ranking options that were not expected)?

OPTIONS	VOTES	RANK
OPTION A		5 (tie)
OPTION B		4
OPTION C		6
OPTION D		3
OPTION E		1
OPTION F		2
OPTION G		5 (tie)
OPTION H		

Table 42. Direct Ranking of Options. PFCC TOOLKIT, UN-Habitat, 2016 (with some modifications to be consistent with Philippine processes

TOOL 6-C. Goal-Achievement Matrix (GAM)

Summary of Sector Scores, Goals-Achievement Matrix								
Proposed Projects	Sector							
	A	B	C	D	E	F	TOTAL SCORE	RANK
Proj. 1								
Proj. 2								
Proj. 3								
Proj. 4								
Proj….n								

INSTRUCTIONS:

1. Agree among the sectors which of the projects can respond more to sectoral goals.
2. List all sector scores for each project.
3. Sum the scores for each project, and list the total score in the column provided.
4. List the rank of each project based on the total scores (highest rank goes to the project with the highest total score) in the last column.
5. Interpretation: The resulting ranking represents the collective evaluation of the project proposals by the LCCAP Core Team.

Table 43. Goal-Achievement Matrix or GAM. (Rationalized Local Planning System, RPS. Department of the Interior and Local Government, 2005)

TOOL 6-D. Urgency Test

The urgency test is being advocated in the Rationalized Local Planning System (RPS). LGUs may use this Tool to prioritize or assess programs, activities and projects.

CRITERIA FOR PRIORITIZING PROJECTS: Urgency Test

CATEGORY	GENERAL CRITERIA
Urgent	Projects that cannot be reasonably postponed Projects that would remedy conditions dangerous to public health, safety and welfare Projects needed to maintain critically needed programs Projects needed to meet emergency situations
Essential	Projects required to complete or make usable a major public improvement Projects required to maintain minimum standards as part of on-going program Desirable self-liquidating projects Projects for which external funding is available
Necessary	Projects that should be carried out to meet clearly identified and anticipated needs Projects to replace obsolete or unsatisfactory facilities Repair or maintenance projects to prolong life of existing facilities
Desirable	Projects needed for expansion of current programs Projects designed to initiate new programs considered appropriate for a progressive community
Acceptable	Projects that can be postponed without detriment to present operations if budget cuts are necessary
Deferrable	Projects recommended for postponement or elimination from immediate consideration in the current LDIP Projects that are questionable in terms of over-all needs, adequate planning, or proper timing.

Table 44. Urgency Test. Rationalized Local Planning System, RPS. Department of the Interior and Local Government, 2005

TOOL 6-E: Prioritization of Options

Rationale: This tool, as reflected in LCCAP Book 1, intends to prioritize programs, projects and activities and identify appropriate timeline for each. Results of this TOOL can also result to recommending policies that would enable the implementation of the prioritized actions

Time required: 1 day or as necessary

Process: Using the long list of options identified in TOOL 5-B (Organizing Options According to Time Frame) arrange the list according to priorities and timeline.

1st Step Using the output in TOOL 5-B, prioritize the identified options through direct ranking using sticky dots of different colors representing basis for ranking.

2nd Step Give each participant sticky dots per color and ask them to put their dots in the options they choose or prioritize. They may use one or two sticky dots at certain options which they strongly believe should be prioritized.

3rd Step After all the participants have cast their votes, tally the number of sticky dots per option and rank them accordingly. The number of dots shall be equal to the number of participants casting their votes.

RANKING shall be represented by different colors:-

RED for URGENCY – this option must be on top priority because of it must be implemented immediately to significantly reduce the hazards or risk of identified vulnerable people and places. Options gaining the most number of red dots is perceived to be the most urgent, in decreasing order.

YELLOW for RESOURCES – the option that would require the most resources. Put your yellow dots to options where you would put your resources or where you would invest.

GREEN for FEASIBILITY OR EFFECTIVENESS - which option could be implemented and work well relative with other options given the necessary design, implementation and maintenance support and resources. The option must also be acceptable with the beneficiary or community.

Other basis may be identified and assigned a corresponding color. It is advised that each color be posted in different columns for ease in tallying. A facilitator maybe needed to process the ranking. Projects with most number of red maybe deemed priority projects.

TOOL 6-E. Prioritization of Options

OBJECTIVES	LINK TO CLIMATE CHANGE	LIST OF PROGRAMS, PROJECTS, ACTIVITIES & POLICIES *(per objective)*	VOTES *(sticky dots)*	RANK
Cut and paste the answer to this columns from your output in TOOL 5-B.		Option 1	●● ●	*1*
Objective 1	Option 3	Option 2	●●	*3*
	Option 4			
	Option 5 …		●●●	2
Objective 2	Option 2	Option 1		
	Option 3			
	Option 4			
Objective 3		Option 1		
		Option 2		
		Option 3		
		Option 4		
		Option 5		

Table 45. Prioritization of Options. LCCAP Guidebook, Book 1. Local Government Academy

TOOL 6-F. Screening for Complementarity-Compatibility-Conflict Matrix

Conflict-Compatibility-Complementarity Matrix							
Proposed Projects	**Proj. 1**	**Proj. 2**	**Proj. 3**	**Proj. 4**	**Proj. 5**	**Proj. 6**	**Proj…n**
Proj. 1							
Proj. 2							
Proj. 3							
Proj. 4							
Proj….n							

INSTRUCTIONS:

1. Indicate relationships among the proposed projects.

   a) If relationship is one of conflict (where the expected benefits of the projects tend to nullify each other or when the implementation of one obstructs the implementation another), mark the appropriate cell with an X.

   b) If relationship is one of complementarity, mark the appropriate cell with an O.

   c) If relationship is one of compatibility (or if the two projects are neutral to each other), leave the cell blank.

2. Projects which conflict with many or most of the other projects should be removed from the initial list.

3. Projects which conflict with some but are compatible or complementary with others may be reformulated to resolve the conflict(s).

Table 46. Screening for Complementarity-Compatibility-Conflict Matrix (Rationalized Local Planning System, RPS of DILG, 2005)

Step 7: Implementation

Implementing the LCCAP shall follow the investment programming, budgeting and implementation cycles as provided in the updated Synchronized Local Planning and Budgeting Calendar issued by the DILG.

Further, this Step provides an opportunity to maximize the Climate Change Expenditure Tagging (CCET) by ensuring that programs, projects and activities reflected in the CCET are directly responsive to climate change issues.

TOOL 7-A. Local Development Investment Program (LDIP) Summary Form with Climate Change Expenditure Tagging (CCET)

Time Required: As performed by the LGU following the investment programming calendar.

Process: Together with the Budget Officer or all members of the Local Finance Committee (Budget, Treasurer and LDPC), the Core LCCAP team may review the priority climate change options and ensure that they are inputted into the last three columns of the LDIP Summary format and AIP Summary form as illustrated below.

The matrix below is provided for medium-term LDIP with Climate Change Expenditure Tagging (CCET). Source: DILG Illustrative Guide on CDP Preparation, 2016

Table 47. Local Development Investment Programming (LDIP) with CCET

LOCAL DEVELOPMENT INVESTMENT PROGRAM

Summary Form

for Planning Period: 2017-2022

Years Covered: 2017-2019

City/Municipality: _____

☐ No Climate Change Expenditure (Please tick box if your LGU does not have any climate change expenditure)

AIP Reference Code (1)	Program/ Project/ Activity Description (2)	Implementing Office/ Department (3)	Scehdule of Implementation		Expected Output	Funding Source (7)	Amount (In Thousand Pesos)				Amount of Climate Change Expenditure (In Thousand Pesos)		
			Start Date (4)	Completion Date (5)			Personal Services (PS) (8)	Maintenance and Other Operating Expenses (MOOE) (9)	Capital Outlay (10)	Total (8+9+10)	Climate Change Adaptation	Climate Change Mitigation	Climate Change Typology Code

Prepared by: _____ Attested by: _____ Certified correct and approved by the LDC:

Local Planning and Development Coordinator | Local Budget Officer | Local Treasurer | City/Municipal Mayor/LDC Chairman

TOOL 7-B. ANNEX B- Annual Investment Program (AIP) Summary Form with Climate Change Expenditure Tagging (CCET)

Time Required: As performed by the LGU following the processes established in the Synchronized Local Planning and Budgeting (SLPBC) processes.

Process: Together with the Budget Officer or all members of the Local Finance Committee (Budget, Treasurer and LDPC), the Core LCCAP team may review the priority climate change options reflected in the LDIP.

Following the annual investment programming processes as scheduled in the SLPBC, LGUs must review the prioritized climate change options and input into the appropriate columns of the AIP Summary form.

Project briefs must be prepared to clearly explain the essence of the options.

The matrix below is provided as a summary form for AIP with Climate Change Expenditure Tagging (CCET):

Annex B
AIP Form and Instructions

CY _____ Annual Investment Program (AIP)
By Program/Project/Activity by Sector
As of _____

Province/City/Municipality: _____

☐ No Climate Change Expenditure (Please tick the box if your LGU does not have any climate change expenditure)

AIP Reference Code (1)	Program/Project/Activity Description (2)	Implementing Office/ Department (3)	Schedule of Implementation		Expected Outputs (6)	Funding Source (7)	AMOUNT (In Thousand pesos)				AMOUNT of Climate Change expenditure (In Thousand Pesos)		CC Typology Code (14)
			Start Date (4)	Completion Date (5)			Personal Services (PS) (8)	Maintenance and Other Operating Expenses (MOOE) (9)	Capital Outlay (CO) (10)	Total (11) 8+9+10	Climate Change Adaptation (12)	Climate Change Mitigation (13)	
General Services (1000)													
Social Services (3000)													
Economic Services (8000)													
Other Services (9000)													

Prepared by:

Planning Officer
Date: _____

Budget Officer
Date: _____

Attested by

Local Chief Executive
Date: _____

Table 48. Annual Investment Program(AIP) with CCET. Source: DILG Illustrative Guide on CDP Preparation, 2016

TOOL 7-C. Project Brief Outline

To better prepare the LCCAP core team in defending the prioritized adaptation and mitigation options during the technical budget hearings, Step 7 offers an outline of project brief. The PAPs that are included in the AIP will be translated through project briefs following the contents below:

Project Title	As a result of technical findings and implications
Target sector & no. of beneficiaries,	To already highlight the sensitivity sectors as identified in the vulnerability and risk assessment.
Decision areas	Where the action would take place (priority areas)
Timeframe of implementation	Time frame of the project must reflect the whole project cycle. Even if the LCCAP has a time horizon of 3 years, Projects beyond three years must be clearly presented in phases, so that specific phases which may not be covered within the three-year horizon of the LCCAP can be carried forward to the next LCCAP updating. The M and E must also be able to reflect the both the completed phase and on-going phase.
indicative cost	As reflected in the AIP. Remaining activities/phases can be carried forward to the next LCCAP updating.
Potential partners	Stakeholders, External support, Other partners

Table 49. Sample Project Brief Outline

LGUs are encouraged to cover substantive information in the project brief, such as, but not limited to the following:

a. Key activities that are programmed according to time slices. For example; Project Identification, Project Preparation Project Appraisal and Financing may take several years; Detailed Design, Project Implementation and Project Operation may take three years; Monitoring and Evaluation may be done annually;

b. If a project takes five years to implement, but the LCCAP has a time horizon of three years, it is important that the remaining activities be carried out in the next updating of the LCCAP;

c. Reflective of time slices to know which activities can be implemented within the time horizon of the LCCAP; and

d. Reflective of objectives, scope, target clientele or beneficiaries, organizational structures.

The figure below illustrates the time slices of projects which can be covered in the current LCCAP and the remaining activities to be forwarded and reflected in the next LCCAP updating.

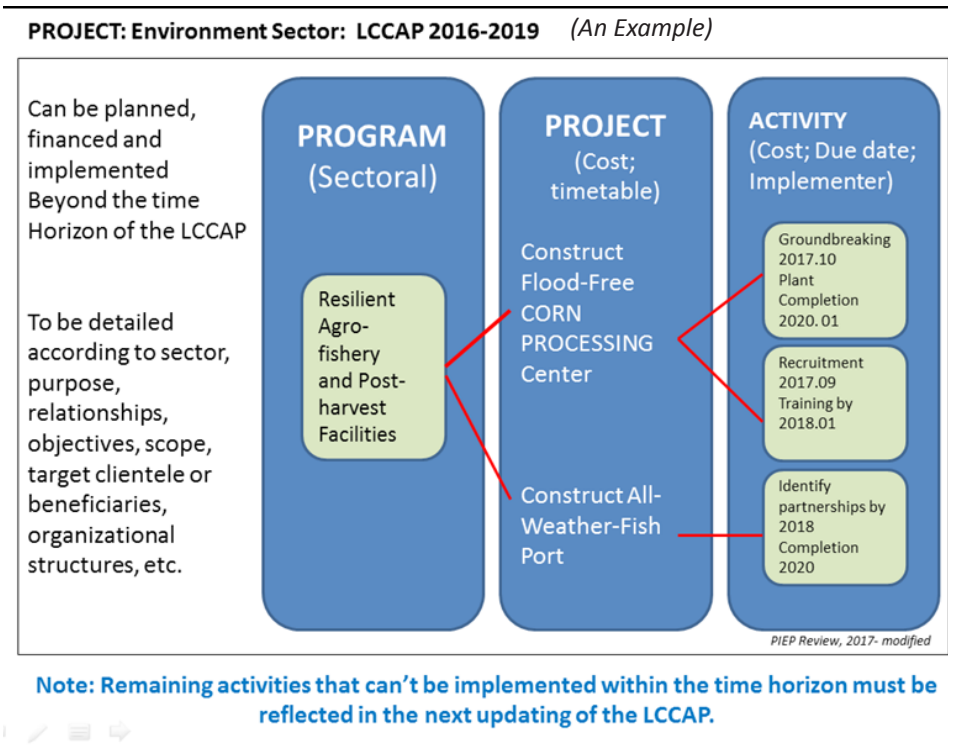


Figure 19. Project Cycle Showing the Time Slices Required of Certain Projects

Accessing Windows of Opportunities to implement adaptation and mitigation funding

Unlike the LDRRMP, which has legal provision for budgetary allocation, the priorities of the LCCAP has no legal premises in terms of direct funding. LCCAP actions can be funded out of the regular budget of the LGU or explored fund can be resourced. For this reason, mainstreaming climate change into the CLUP and CDP are crucial to increase the chances that the priorities for climate action will find their way into the medium-term and annual LGU budgets. Thus, there is a need for LGUs to access other windows for funding the adaptation and mitigation projects, In case the LCCAP Team decides to create a stand- alone LCCAP Plan that can be used in proposal writing or project development for fund sourcing, the group must follow prescribed formats of the potential funding source or agency.

Module D

Monitoring, Evaluation, Adjusting and Modifying

Often overlooked or downplayed, monitoring and evaluation is one of the most critical steps in the entire planning process. This module will help ensure that changes in local priorities (i.e. community objectives) can be accommodated so that LCCAP remains responsive to community needs over time. This involves the following two tasks: preparing the monitoring and evaluation framework and evaluate the results of the plan LGUs may also need to develop some new indicators in order to monitor both plan processes (i.e. are people and agencies doing what they agreed to do?) and plan outputs (are the activities/actions having the desired results?). Sample monitoring forms and worksheets are provided in this Module.

The monitoring framework and programme will help to determine what gets monitored, how, when and by whom. They will also identify how this information is shared with stakeholders, including partner agencies and organizations assisting with implementing certain actions, and the broader community.

Step	Key Questions
8. Monitoring and Evaluation	1. Are project or programme stakeholders and agencies doing what they agreed to do in Step 7 – Implementation? 2. Are the programs and projects referenced in the LDIP and AIP to using the climate expenditure tagging processes? 3. Is the climate change adaptation and mitigation programs, project and policy (i.e. the actions selected in Step 6) having the desired effect? 4. Is the quality review and control mechanism used to review the LCCAP?
9. Adjust and Modify	1. Does the LGU update its LCCAP regularly based on the information collected from measuring progress and reviewing results of its climate change actions? 2. Does the LGU strategize on how to incorporate the updated LCCAP into other local development plans?

Step 8- Monitoring and Evaluation

The objective indicators, developed by the core planning team and stakeholder advisory committee in Step 4: Goals and Objectives, serve as the starting framework for monitoring and evaluation. They will likely need to be revised and updated at this stage in order to adequately measure the final plan actions

TOOL 8-A: LCCAP Work Plan and Performance Indicators

Time Required: 4 hours, with the Local LCCAP Core team plus validation with departments and functionaries and major stakeholder advisory group.

Rationale: Tool 8-A provides a worksheet for measuring accomplishments of Book 1 of priority programs, activities and projects. Added values to this are the OVIs or objectively verifiable indicators that will measure the success of implementation of the LCCAP.

Procedure: The LCCAP Core Team will review the outputs in previous steps, particularly the objectives set and the PAPs generated in Step 5. The results of the CDRA and GHG inventory must be ready to ensure that all sectors are covered.

Objectives (Per Sector)	Priority Programs, Activities, Projects & Policies			Indicators (Objectively Verifiable Indicators Of Success/ performance)	Institutions /Sectors Or Department Involved/In-Charge	Resources Required (Identify Where it in included: (LDIP or AIP of Yr____)
	Short Term (1-3 years)	Medium Term (4-6 years)	Long Term (7 years & above)			
Inputs in these columns must be taken from the results of Workshops on Step 4 (Goal/Objective Review, Setting) and 5 (Options Identification). *As suggested in Step 5, programs and projects may take several years to complete, more than the time frame of the LCCAP. Thus, they must be reflected in the workplan to see progress of implementation in the next updating of the LCCAP.* *Always refer to CDRA results to keep the links.*						

Table 50. LCCAP Work Plan and Performance Indicators. Adopted from Book 1 of LCCAP Guide.

Other Tools for Step 8:

TOOL 8-B. Monitoring Framework: End-of-Term Accomplishment Report

Time Required: 1 to 2 hours, plus review with the Local Finance Committee, core planning team and/or stakeholder advisory group.

Rationale: Tool 8-A provides a worksheet for end-of-term report, consistent with mainstreaming climate change into local development plans. The purpose of this activity is to monitor disbursements of expenditures of adaptation and mitigation options.

Procedure: The LCCAP Core Team may also refer to the sample worksheet below to monitor and evaluate the accomplishments of LCCAP formulation:

End-of-Term Accomplishment Report

Year___ (three-year time horizon)

Programs and Projects per Sector	Output Indicators Target Accomplishment	Target	Accomplishment	Beneficiary (sector)	Area Covered	Estimated Project Cost (Php)	Actual Disbursement
1. Social Sector	Number of barangays covered by micronutrient supplementation	All barangays	50% of barangays	Women and Children	50 % of barangays	2 Million	
	Number of barangays covered by nutrition education	All barangays	20% of barangays	Women and Elderly/Senior Citizens	30 % of barangays	1.2 Million	
Water Supply Project	% of total number households covered	5% of all households	10% of all households	Urban Poor	Barangay Poblacion	5 Million	
2. Economic Sector							

Table 51. Monitoring Framework. Accomplishment Report. Adopted from DILG Illustrative Guide, 2016 (with modification).

TOOL 8-C. Questions and Indicators Benchmarks for Monitoring and Evaluation

Time Required : 1 to 2 hours, plus review with core planning team and/or stakeholder advisory group.

Rationale : Provides a series of questions that can be asked to help evaluate the Climate Change Action Plan. The first set of questions pertains to individual actions from your Plan and should be answered for each action. The second set of questions relates to the plan as a whole and should be answered once as they relate to the entire Climate Change Action Plan.

The second set of questions also considers the larger climate change context (i.e. vulnerability) and how changes in local climate conditions (exposure, sensitivity, adaptive capacity) may warrant a more comprehensive review and evaluation of the Climate Change Action Plan.

Procedure: Go through the evaluation questions as a desk exercise or with the LCCAP core planning team. TOOL 8-C can help the LCCAP Core team in monitoring the extent of project implementation, although this can be made optional. The may change or improve the evaluation questions as they see fit.

QUESTIONS TO ANSWER – for each action	RESPONSES (Yes or No) and qualify
Adequacy and Effectiveness	
Has the Climate Change Action Plan action been satisfactorily implemented?	
Has the action adequately achieved its stated objective(s)?	
Have sufficient resources been organized to carry out the action?	
Have the leadership and capacities of the individuals and organizations involved been sufficient?	
Will the partnerships and networks formed in the process of implementing the action be sustained?	
Have the adverse outcomes, both anticipated and unexpected, been adequately addressed?	
Have the process indicators from Tool 8-A been met, or are they on track to being met?	
Can the results be sustained?	

QUESTIONS TO ANSWER – for each action	RESPONSES (Yes or No)
Efficiency	
Could resources have been used differently or been substituted to produce more results within the estimated costs?	
Could the same results been achieved for less money or effort?	
Would a different action have produced the same or better results at a lower cost?	
Were the resources managed in the most efficient way possible to achieve the objectives?	
Local Context and Conditions	
Have local climate conditions and circumstances changed (exposure, vulnerability, etc.)?	

Do the new climate conditions necessitate new or revised actions (phasing, scope, etc.)?	
Has new climate change information emerged that needs to be addressed (e.g. funding, resources, capacity, etc.)?	
Have local priorities changed (i.e. are community objectives being weighted differently)?	
Adjustment and Recommendations	
How must the Climate Change Action Plan (overall and individual actions) be changed to better meet objectives?	
Have climate and/or community conditions changed so much that a complete review of objectives and actions is necessary?	

Table 52. Questions and Indicators Benchmarks for Monitoring and Evaluation. Municipal Climate Change Action Plan Guidebook. Canada-Nova Scotia Agreement on the Transfer of Federal Gas Tax Funds Canada. Nova Scotia & Municipal Relations. 2011 (modified for purposes of LCCAP process in the Philippine)

TOOL 8-D REVIEW MECHANISM OF THE LCCAP

Time Required : 1 day or more, if needed

Rationale: Tool 8-D is the LCCAP proposed outline: The review will be done to match the completeness in the LCCAP as against the outline. The outline will guide the LGU, through the LCCAP Core Team in reviewing if basic elements, and outputs are captured in the LCCAP process, and if evidence-based planning is adopted. It is advised that in doing Tool 8-D, major stakeholders who participated in the LCCAP process be invited.

Procedure: The review will be done through a workshop where sectoral committees take charge of reviewing their respective concerns and present the outputs in a plenary to allow other committees to also comment and if needed, enhance the review results.

It is also suggested that the LGU complete Tool 8_D prior to submitting the LCCAP to the Sanggunian for legitimization.

LCCAP Outline	Coverage	Checklist & Deliverables
	A. Existing LCCAP Core Team or Sectoral/Functional Committee	☐ Present the number and date of Executive Order or Administrative Order creating the LCCAP Core Team or Sectoral/Functional Committee ☐ List of stakeholders consulted during Plan preparation

Section 2: Climate Information and Situational Analysis This section will provide information on "What is currently happening and is projected to happen;" in the LGU given the impacts of climate change. As the basis for the adaptation actions to be presented in Section 4.1, this section will provide summaries and description of the vulnerabilities, risks, and opportunities due to climate change the LGU is confronted with both now and in the future. In view of the mitigation related actions that will be outlined in Section 4.2 , this section should present the scope and key findings from GHG accounting and if such is not yet available state the reasons for having or not having a GHG inventory	B. Climate Change Issues & Hazards Provide information on significant climate change issues and hazards affecting your municipality and why they have been flagged as being important. C. Infrastructures: Critical Point Facilities and Lifelines D. Population This section will provide information about who might be most adversely affected by climate change issues within the municipality (and when necessary, with adjoining LGUs E. Affected Ecosystems This describes areas identified as being subject to climate change issues. Affected locations cover the ecosystems: urban, coastal/ marine, upland/forest, agriculture etc. It also describes specific ecosystems where problems have occurred in the past and are highly likely to occur (refer to likelihood of occurrence) F. Economic Implications This will provide information on the potential economic implications of climate change within the LGU and within the province (if included in the analysis)	*Key Content* *2.1 Vulnerabilities, Risks, and Opportunities* ☐ *Summary description of what type of climate related hazards and issues (vulnerabilities & risks) the LGU is **currently facing** (considering the plan period) and details why these are important to be addressed based on sound analysis of impacts to:* ○ *People/Population* ○ *Basic Services (education, health, water and sanitation) and Infrastructure* ○ *Economic Activities and general development of the LGU* ☐ *An illustration/mapping of where this current climate issues, hazards are happening in the locality* ☐ *Summary description of what type of climate related hazards and issues the LGU will face in the future and provide the analysis as to why and when actions should be initiated* ☐ *An illustration/mapping of where this future climate issues or hazards are happening or manifesting impacts in the locality* Show Maps: ☐ Exposure ☐ Vulnerability ☐ Risk ☐ A description of any stakeholder involvement during this step Exposure and Sensitivity database: ☐ Critical Point Facility map and/or exposure database ☐ Lifeline map and infrastructure.

		Map overlays (when available): ☐ That indicates whether or not these facilities fall into risk areas within their location. ☐ Technical discussions describing specific issues that will affect the infrastructures (critical point facilities and lifelines) ☐ Identification of those facilities and infrastructure considered to be important during an emergency (when available) ☐ A description of any stakeholder involvement during this step.
		1.2 Emissions and current GHG emission reductions efforts When available, the summary of GHG accounting results and explanation of the scope for the accounting. State the reasons for having and not having a GHG inventory activities during the planning period of the LCCAP Summary of current GHG emission reduction efforts based on the current AIP and LCCAP The explanation which sectors the LGU see lowering emissions is possible vis-à-vis local economic activities, other relevant sector development plans (e.g. transport, energy, industry, etc.) and as indicated in the LDIP ☐ A description of any stakeholder involvement.

LCCAP Outline	Coverage	Checklist & Deliverables
Section 3: Objectives of the Plan *This section should present the goal/s of the LCCAP and how such relates and is/are aligned with the local development goals presented in the CLUP and CDP/ELA. It should likewise present the details objectives of the LGU given the details presented in Section 2 above*	Objectives linked to climate change ○ *Adaptation objectives* ○ *Mitigation Objectives (low-emission strategy statement would suffice if no specific mitigation objectives can be set given the absence of a GHG accounting)*	*Key Content:* Development Goal (review and or re-statement of the LGU development goals) Objectives of the LCCAP (these are objectives of CC actions that would support or are crucial elements for the achievement of the LGU Development Goal/s and objectives) A description of any stakeholder involvement.
Section 4: Programmes, Projects, & Activities (PPAs) and Policy Requirements *This section would present and explain the Programmes, Projects and Activities of the LGU given the LCCAP Objectives. The PPA's should explain all the details (e.g. Title of the action, Target sector & no. beneficiaries, Where the action would take place, Timeframe of implementation, Indicative Cost, Potential partners) of every PPA.*	Programs projects and activities The PAPs shall respond to technical findings and implications when LGU adopts business as usual stance in dealing with challenges on climate change. PAPs shall also reflect opportunities to sustain positive adaptation and mitigation actions.	*Key Content:* *Project Brief of Each Adaptation PPA* *Project Brief/Explanation of Each Mitigation PPA or LEDS strategy and the key areas of focus* *Policy requirements for the actions* *Medium-Term LDIP with Adaptation and Mitigation Options reflected in the CCET* *AIP with Adaptation and Mitigation Options reflected in the CCET*

Section 5: Monitoring and Evaluation *This section should provide details of M&E plan of the LGU given the PPA detailing how results and accomplishment will be monitored, evaluated, and reported to appropriate government agencies. It should also present who shall be responsible in monitoring, when, and the budget it would entail.*	Monitoring and Evaluation *Guides LGUs in monitoring the LCCAP workplan and evaluating implementation of adaptation and mitigation options.*	*Key Content:* *Filled up M&E template* *Recommendations how CDRA results will enhance the Ecological Profile of CDP and sectoral studies of CLUP and other thematic plans- e.g. GAD, LPRAP, other plans* *Goals and objectives linked to climate change*
		Appendices

Table 53. Review Mechanism for the LCCAP

Step 9 - Adjust and Modify

The LGU's LCCAP is not an endpoint. It is a living document that requires regular updating and adjustments in order to improve the effectiveness of its climate change adaptation and mitigation efforts.

Consistent with the mainstreaming process, Step 9 will direct users in using the outputs of LCCAP to the Ecological Profile and/or the Sectoral Studies. Further, it will also ensure that the LDIP will contain climate change-responsive programs and projects. And therefore, will strengthen the process of CC expenditure tagging.

This guidebook does not offer specific tool. Current processes organizing the EP and the Sectoral Studies as provided for in DILG's Guide on CDP preparation and HLURB's guide on Volume 3-CLUP preparation, respectively, shall be followed.

The LCCAP Core team must ensure that the results of the LCCAP process are integrated into the current local development plans. Below are suggestions for integration:

- CDRA outputs, particularly the exposure database and sectoral sensitivity should enhance the Ecological Profile for CDP Preparation. The new climate data and projections (e.g. rapid sea level rise, revised precipitation or temperature trends) should influence the updating of the Ecological Profile.

- The enhanced goals and objectives of the LCCAP must also be made reference in the updating of the CDP to ensure consistency, coherence and harmony in determining subsequent programs and projects and relevant policies for climate-responsive planning.

- The programs and projects in the LCCAP must also be made reference in the updating of the LDIP and AIP to be consistent with climate expenditure tagging processes.

Integration and Summing Up of the Enhanced LCCAP Process

The enhancement of the LCCAP takes off from the learning and advocacies of LCCAP Book 1 and LCCAP Book 2. Enhancement of the LCCAP Guidebooks is illustrated below:

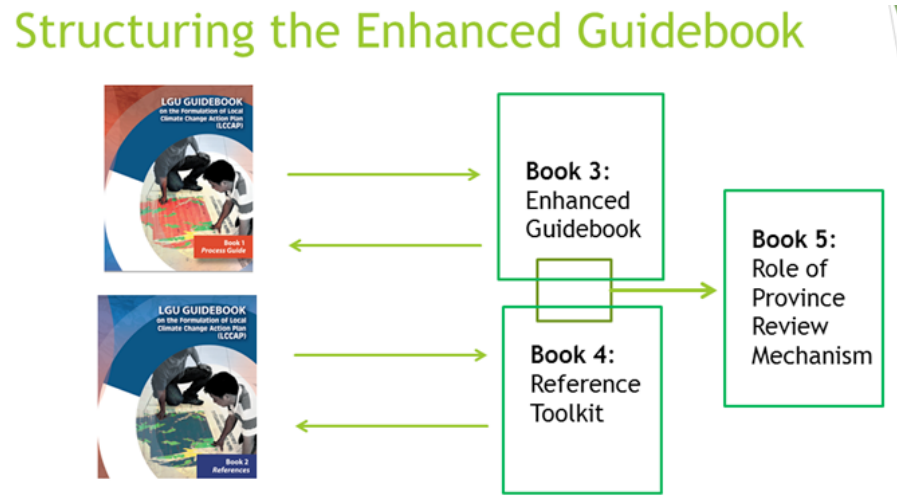


Figure 20. Structuring the Enhanced Guide

Book 3 builds on the vulnerability and adaptation (VAA) process in Book 1, but with enhancement of the methodology using the CDRA, with some modifications on the steps, the multi-sectoral coverage and definition of risks. Book 3 also integrates the SGHG inventory for low emission development strategies (LEDS) towards mitigation actions.

Book 4 provides the toolkits, matrices and worksheets for LCCAP formulation.

Further, the role of the province in LCCAP formulation is emphasized in the updated version (Book 5), given that addressing climate change is a governance issue and vertical integration of processes and decision-making are important parts of planning for climate change.

In summary, the substantive enhancement is illustrated below:

Formulating the Local Climate Change Action Plan (LCCAP)		
Modular Framework	**Planning Steps**	**TOOLS**
Module A **Getting ready for LCCAP preparation** *What is happening?*	1. Getting Started	TOOL 1-A. Setting the Mood and Drawing Commi ments - WORKSHOP 1-Aa - WORKSHOP 1-Ab - WORKSHOP 1-Ac TOOL 1-B. Situating the LCCAP in the LGU Plans: Checklist (absence/ presence of plans and if CCA/DRRM are mainstreamed) TOOL 1-C. Session Guide. Re-visiting the LGU Vision - WORKSHEET 1-Ca. Example of Vision-Descriptors and Indicators
	2. Stakeholders and Participation	TOOL 2-A. Session Guide for Stakeholders Analysis and Mapping - WORKSHOP 2-Aa. Stakeholders Analysis - WORKSHOP 2-Ab. Stakeholders Map and Diagram TOOL 2-B. Training Plan. Organization and Training of Core Team

MODULE B: **Data Gathering, Assessment and Analysis** *What matters most*	3. 3.1a Risks and Vulnerability Assessments	<u>Task 2:</u> TOOL 3A-2- Impact Chain Diagram: Impacts of Hazard to Multi-Sectors within the Ecosystem <u>Task 3:</u> TOOL 3A.3 - Exposure Database 1. TOOL 3A.3a- Exposure Analysis 2. TOOL 3A.3b. Sensitivity Analysis 3. TOOL 3A-3c. Determination of Degree of Impact or Threat Level 4. TOOL 3A.3e. Determining Elements and Scores of Adaptive Capacity <u>Task 4:</u> TOOL 3A.4a. Summarize findings and Determine Climate Change Vunerability of the Sector per Hazard (CCVA) TOOL 3A.4b. Disaster Risk Assessment (DRA) <u>TASK 5:</u> TOOL 3A.5a. Determining Decision Areas and Summary of Findings TOOL 3A.5b. Mapping Decision Areas <u>TASK 6:</u> TOOL 3A.6a - Determining development implications, key challenges, issues and/or Opportunities
	3.2b Local GHG emissions	"Community-Level GHG Inventory for LGUs in the Philippines-User's Manual" (www.climate.gov.ph) Global Protocol for Community-Scale Greenhouse Gas inventories (www.iclei.org > low carbon-city >gpc)

Table 54. The LCCAP Outline

The tools are offered in the guide to help LGUs formulate the LCCAP. But LGUs may also opt to adopt other tools that are more appropriate to their condition.

ANNEXES

Annex A

The definitions are established by PAGASA below to arrive at a common understanding of key concepts and terminologies related to climate change action planning.

This provides relevance of the historical, near-term (i.e. climate and weather forecasts), and long-term climate information (i.e. climate projections) as bases for climate change policy and planning, such as the Local Climate Change Action Plans (LCCAP) of the Local Government Units (LGUs). It also contains a tool for end-users and experts of various sectors to perform sector-based impact assessments using future climate information to generate adaptation options.

Definition

I. Weather and climate

a. Weather

- The condition of the atmosphere at a specific time and place; or
- A specific meteorological event or condition (of parameters such as temperature, rainfall, and pressure) that happens over a period of hours or days.

b. Climate

- The average weather conditions for a particular area over a period of time ranging from months, to decades or centuries. The classical period is 30 years, as defined by the World Meteorological Organization (WMO), termed as the Climate Normal.
- Refers to the state of the climate system as a whole, including a statistical description of its variations.

c. Climate system

- A complex system consisting of various components, including the dynamics and composition of the atmosphere, the ocean, the ice and snow cover, the land surface and its features, the many mutual interactions between them, and the large variety of physical, chemical and biological processes taking place in and among these components.

II. Climate Change

a. What is climate change?

- It refers to "any change in climate over time, whether due to natural variability or as a result of human activity" (Intergovernmental Panel on Climate Change or IPCC),

- "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere" (United Nations Framework Convention on Climate Change (UNFCCC).

b. What is natural variability?

- The climate changes, or varies, naturally in a period of months, years, and even decades. This variability is attributed to atmospheric patterns/phenomena such as the Northeast Monsoon (Amihan), Southwest Monsoon (Habagat), El Niño and La Niña. However, the recent changes in the climate surpasses natural variability, which scientists attribute to the enhanced concentration of greenhouse gases in the atmosphere.

c. What are Greenhouse Gases?

- Greenhouse gases (GHGs) refer to the gases that serve as the driving factors in the greenhouse effect – the term used to describe the natural warming of the atmosphere. The GHGs absorb infrared radiation, keeping the earth from cooling down to a temperature unsuitable for life.

d. Where do GHGs come from?

- GHGs come from both natural sources (e.g. biological processes in land and oceans) and anthropogenic, or human-induced, sources (e.g. fossil fuel combustion, industrial emissions, livestock production, land-use changes).

- Carbon dioxide (CO2) is the most prominent GHG in the atmosphere in terms of concentration and atmospheric lifespan (the time it takes for CO2 to dissipate). Data reaching back to the prehistoric era show that CO2 concentration has, for the first time, increased beyond the natural limit by as much as a quarter since the 1950s.

- The rising concentration of GHGs has led to the enhanced warming of the atmosphere known as Global Warming.

III. Weather and Climate Information at Different Timescales

Integrating weather and climate information into decision making for all timescales provides opportunities for enhancing risk management by encouraging decisions that minimize exposure and maximize benefits to improbable outcomes. Some the most common sources of climate and weather information provided by PAGASA are listed and discussed in Appendix A.

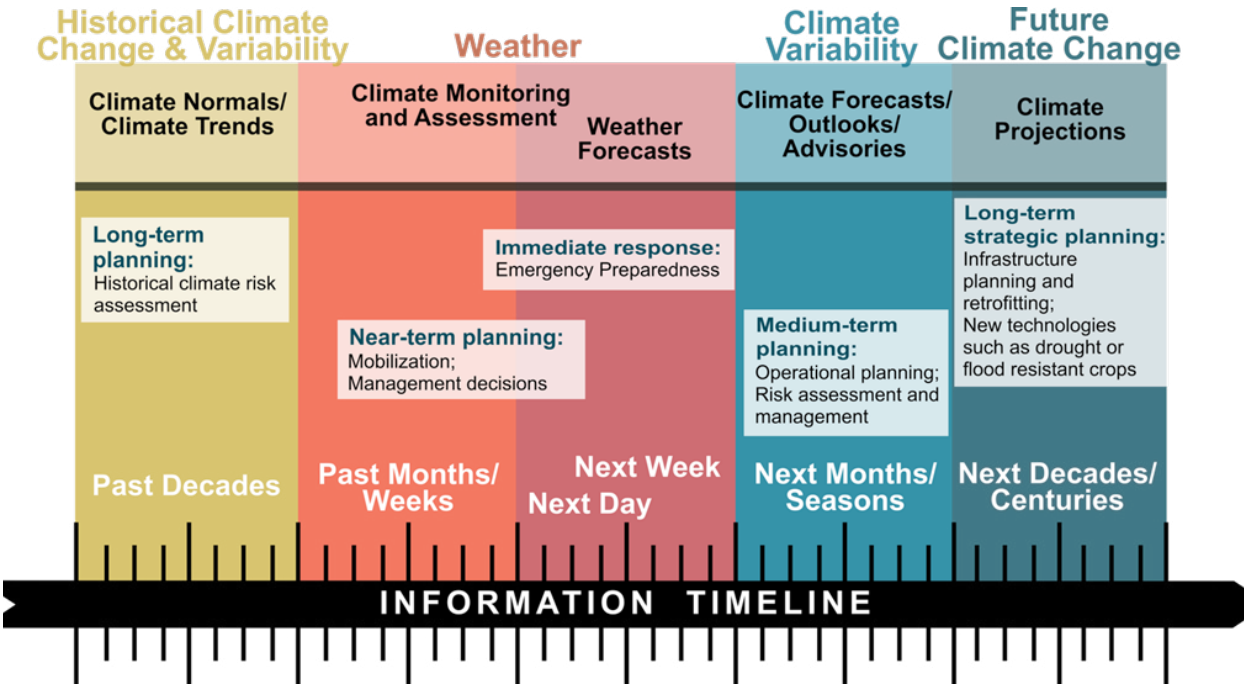


Figure 21. Examples of PAGASA's Climate Products and Services Across Different Timescales and Corresponding Decision-making Guides (in white boxes)

As seen in Figure 1, each time scale corresponds with different weather and climate information, which shows that not all types of information are needed for each decision making process.

The following are descriptions of the weather and climate products relevant to different time frames of the planning process and decision making:

- ***Climate Normals/Climate Trends***
  These information are essential for long-term planning, especially on relating past conditions to observed impacts.

- ***Climate Monitoring and Assessment***
  These are formulated through the comparison of the present climate with the normal of the month or season. This product is essential for near-term planning on mobilization and management decision of different sectors.

- ***Weather forecasts***
  These are necessary to inform decisions that involve immediate response for emergency preparedness.

- ***Climate Forecasts/Outlooks/Advisories***
  These are inputs for decisions on medium-term operational planning. These information are especially useful for climate risk assessment and management in anticipation of extreme climate events (e.g. El Niño and La Niña).

- ***Climate Projections***
  These are information of a range of possible climate future that serve as bases for sector-based impact assessment. These information are vital for the development of long-term climate change policy and planning such as the LCCAP.

IV. Formulation and Utilization of Climate Projections in the Philippines

Trajectories of future greenhouse gas concentrations, known as the Representative Concentration Pathways (RCPs) served as the bases in formulating the Fifth Assessment Report (AR5) of the IPCC, which was released in 2013. The RCP-based projections supersede the former SRES scenarios. Similarly, PAGASA updated its climate projections provided in the previous climate change report released in 2011. Currently, two RCP-based climate projections (i.e., RCP4.5 and RCP8.5) are being provided by PAGASA.

Figure 22. illustrates how the climate projections were derived. Initially, the global climate models (GCMs) project the possible future climate conditions given a particular greenhouse gases concentration (i.e., the RCPs). Different physical and dynamical processes of the climate system are represented in the GCMs. The GCM-derived climate projections are then used by the regional climate models (RCMs) to provide a more realistic and spatially detailed quantities (e.g., rainfall, temperature, pressure, etc.) at local scales (i.e., downscaled)

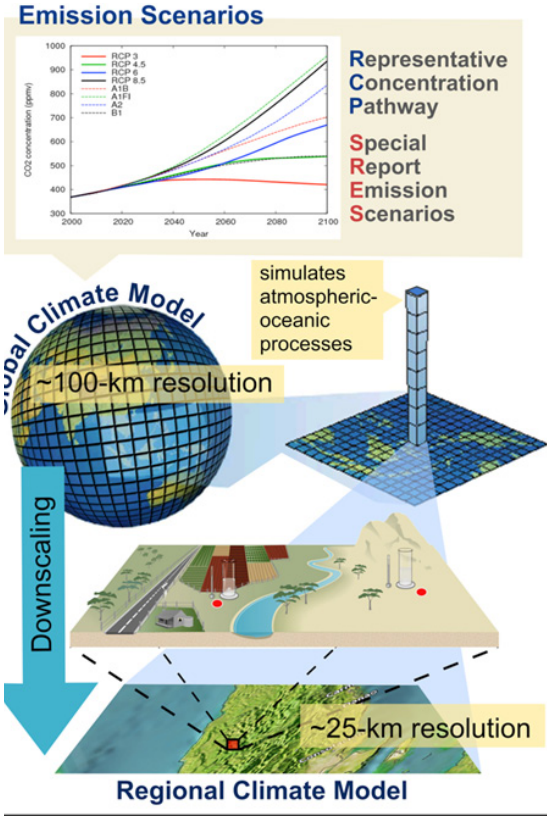


Figure 23. Brief illustration of how downscaled climate projections are derived using regional climate models

Given that future climate conditions are highly uncertain, PAGASA utilizes climate projections from a number of downscaled Global Climate Models (GCMs) using different RCMs (i.e. PRECIS, CCAM, RegCM4, and HadGEM3-RA) at 25-km horizontal resolution. This allows users to quantify user-specific associated risks based on a range of possible future climate conditions, and formulate their possible adaptation options.

The RCMs-derived climate projections are then presented in the form of maps (see Figure 3 for an example of this). The projected changes in seasonal rainfall and mean temperature were taken relative to the baseline climate (1971–2000). Two future periods, mid-21st Century (2036–2065) and end-of-21st century (2070–2099), could be used for future climate change adaptation planning. The range of possible future climate conditions is expressed in terms of lower bound (10th percentile), median (50th percentile), and upper bound (90th percentile), which were computed from the ensemble of RCMs' projections and could be obtained from PAGASA at the national, regional, provincial, and major river basins.

Taking for example the projected changes in rainfall over Metro Manila by the mid-21st century, based on RCP8.5, as shown in Fig. 3, the driest possible future rainfall conditions (i.e., the 10th percentile rainfall change) over the region could be in the March-April-May and June-July-August seasons. Note that the March-April-May season coincides with the region's dry and hot months, which could have adverse impacts on human health, water resources, and businesses, among others. The wettest possible (i.e., the 90th percentile) change in rainfall (exceeding 80% increase), on the other hand, could be felt in the December-January-February season, which could somewhat be beneficial to some sectors of community as this season corresponds to the dry months over the region. Nevertheless, the most likely future rainfall conditions (i.e., the median of the RCMs' projected changes in rainfall) could be a minimal increase in rainfall (less than 20% relative to the baseline climate) in all seasons except in June-July-August, which is expected to experience a slight rainfall reduction (not exceeding 20%) in the future. Such wide range of possible future rainfall conditions infers a number of climate change adaptation options that could be based upon the existing DRR-CCA frameworks.

Given that future climate conditions are highly uncertain, PAGASA utilizes climate projections from a number of downscaled Global Climate Models (GCMs) using different RCMs (i.e. PRECIS, CCAM, RegCM4, and HadGEM3-RA) at 25-km horizontal resolution. This allows users to quantify user-specific associated risks based on a range of possible future climate conditions, and formulate their possible adaptation options.

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Supplementary to the maps similar to that shown in Fig. 3, projected changes in rainfall and temperature are also provided by PAGASA in tabular forms known as the Climate Information Risk Analysis Matrix (CLIRAM). CLIRAM was co-developed by PAGASA and the UK Met Office, together with the participants from three cities in Metro Manila and the municipality of Salcedo, in a DFID-funded project1. This tool helps users to better understand the range of climate projections, which could then be used to identify the potential impacts and propose their possible adaptation options.

In general, PAGASA provides CLIRAM, which summarizes the projected changes in rainfall or temperature for each of the four seasons used similarly in the maps assuming RCP4.5 and RCP8.5 (see, Tables 1 and 2). Changes in rainfall are provided in percentage (3rd column), absolute values (4th column), and the projected seasonal rainfall amount (i.e., the baseline rainfall amount plus the projected change; 5th column of the CLIRAM). The users should assess the

potential impacts on their sector for each of the projected change following steps 1-4 in the CDRA process and list them in column 6 of the CLIRAM. Then, possible adaptation options should be identified following steps 5 & 6 in the CDRA process and be provided in column 7 of the CLIRAM. The CLIRAM for temperature changes are presented in almost similar way as rainfall, but changes are expressed in degree Celsius (°C).

The computations previously done by users (see Chapter 3 of the CDRA process) in the previous climate projections provided by PAGASA has been eliminated, and thus users of climate change information could focus on enumerating the possible climate change impacts on different sectors of their localities and proposing their possible adaptation options.

Figure 24. Projected changes in rainfall over Metro Manila by the mid-21st century assuming a high-range of future greenhouse gas concentrations (i.e., the RCP8.5)

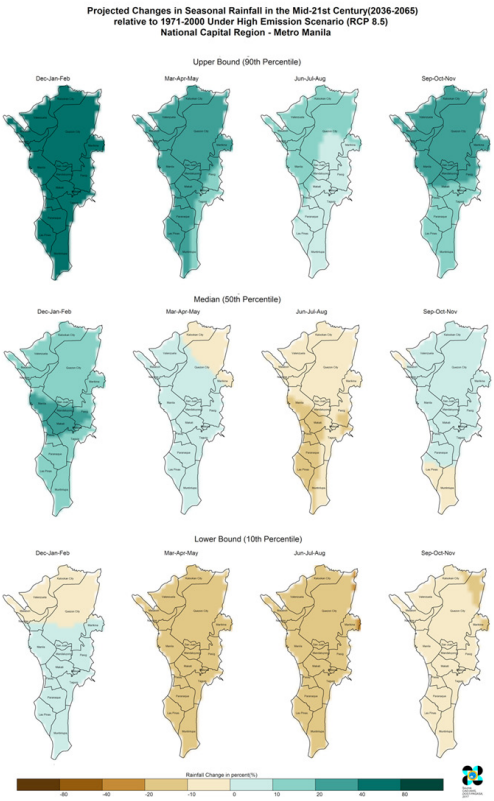


Table 55. CLIRAM of projected changes in rainfall for Metro Manila in the Mid-21st Century (2036-2065)

Projected Changes in Seasonal Rainfall in the Mid-21st Century (2036-2065) for Metro Manila relative to 1971-2000							
Season	Scenario	Range*	Projected Change		Projected Seasonal Rainfall Amount (mm)	Potential Impacts	Adaptation Option
			Percent (%)	Rainfall amount (mm)			
December-January-February (DJF)	Moderate Emission (RCP 4.5)	Lower Bound	-0.1	-0.2	107.3		
		Median	17.7	19.0	126.5		
Observed baseline = 107.5 mm		Upper Bound	55.5	59.6	167.1		
	High Emission (RCP 8.5)	Lower Bound	2.7	2.9	110.4		
		Median	27.8	29.9	137.4		
		Upper Bound	53.4	57.4	164.9		
March-April-May (MAM)	Moderate Emission (RCP 4.5)	Lower Bound	0.7	1.3	199.8		
		Median	6.9	13.7	212.2		
Observed baseline = 198.5 mm		Upper Bound	25.7	51.1	249.6		
	High Emission (RCP 8.5)	Lower Bound	-7.2	-14.3	184.2		
		Median	4.8	9.6	208.1		
		Upper Bound	19.8	39.4	237.9		
June-July-August (JJA)	Moderate Emission (RCP 4.5)	Lower Bound	-21.3	-249.4	920.8		
		Median	-10.1	-118.6	1051.6		
Observed baseline = 1170.2 mm		Upper Bound	-0.4	-5.0	1165.2		
	High Emission (RCP 8.5)	Lower Bound	-17.0	-199.3	970.9		
		Median	-6.1	-71.7	1098.5		
		Upper Bound	7.7	90.3	1260.5		
September-October-November (SON)	Moderate Emission (RCP 4.5)	Lower Bound	-10.8	-82.3	676.4		
		Median	-6.0	-45.2	713.5		
Observed baseline = 758.7 mm		Upper Bound	7.7	58.5	817.2		
	High Emission (RCP 8.5)	Lower Bound	-8.0	-60.6	698.1		
		Median	3.9	29.6	788.3		
		Upper Bound	19.9	150.7	909.4		

Table 56. CLIRAM of projected changes in mean temperature for Metro Manila in the Mid-21st Century (2036-2065)

Projected Changes in Seasonal Temperature in the Mid-21st Century (2036-2065) for Metro Manila relative to 1971-2000						
Season	Scenario	Range*	Projected Change		Potential Impacts	Adaptation Option
			Change in ℃	Projected Seasonal Mean Temperature		
December-January-February (DJF)	Moderate Emission (RCP 4.5)	Lower Bound	1.0	27.1		
		Median	1.2	27.3		
Observed baseline = 26.1 ℃		Upper Bound	1.6	27.7		
	High Emission (RCP 8.5)	Lower Bound	1.2	27.3		
		Median	1.6	27.7		
		Upper Bound	1.9	28.0		
March-April-May (MAM)	Moderate Emission (RCP 4.5)	Lower Bound	0.9	29.7		
		Median	1.2	30.0		
Observed baseline = 28.8 ℃		Upper Bound	1.7	30.5		
	High Emission (RCP 8.5)	Lower Bound	1.3	30.1		
		Median	1.6	30.4		
		Upper Bound	2.2	31.0		
June-July-August (JJA)	Moderate Emission (RCP 4.5)	Lower Bound	1.0	29.0		
		Median	1.3	29.3		
Observed baseline = 28 ℃		Upper Bound	1.8	29.8		
	High Emission (RCP 8.5)	Lower Bound	1.3	29.3		
		Median	1.5	29.5		
		Upper Bound	2.3	30.3		
September-October-November (SON)	Moderate Emission (RCP 4.5)	Lower Bound	1.0	28.4		
		Median	1.1	28.5		
Observed baseline = 27.4 ℃		Upper Bound	1.8	29.2		
	High Emission (RCP 8.5)	Lower Bound	1.3	28.7		
		Median	1.5	28.9		
		Upper Bound	2.2	29.6		

* upper: 90th percentile; median: 50th percentile; lower: 10th percentile

Annex B (Credit to PAGASA)

Summary of weather and climate information produced by PAGASA. Adapted from [1]

PAGASA Products	Type of information	Time	Description
	Climate Types	1951-2010	Modified Corona's Climate Classification (Type I to Type IV) based on distribution of rainfall over certain regions of the country
	Climatological normals for rainfall, temperature, wind, etc.	1981-2010	Average of Climatological data computed for the following consecutive periods of 30 years (WMO)
Weather and Climate Monitories and Advisories	Forecasts	Daily	24-hour public weather forecast (released at 5:00 am and 5:00 pm)
	Monthly Anomalies	Monthly	Monthly analysis of precipitation and temperature difference relative to climatological normal (1980-2010)
	Extremes	Monthly, Annual	Monthly and annual highest and lowest observed temperature; greatest one day rainfall amount observed within a day based on all PAGASA synoptic stations
	El Niño/ La Niña Advisories, El Niño/ La Niña Watch	Monthly	El Niño Southern Oscillation (ENSO) status; "Advisories" speak of the current ENSO phase whereas "watch" refers to the forecast of ENSO phase based on ENSO alert system
	Agri-weather Forecast	2 days	Forecast and advisories related to agriculture (Farming advisories)

	10 Day Forecast	10 days	10 day weather outlook for farm operations (Temperature, Rainfall, Total Cloud Cover, Rel. Humidity, Wind)
Weather & Climate Outlooks	Monthly Forecast	Monthly	Monthly issuance of expected weather systems that will affect the country for the next 6-months
	Monthly Tropical Cyclone Forecast	Monthly	Forecast number of Tropical Cyclone that will enter PAR
	Seasonal Forecast	Every 6-months	Closely monitoring of climate conditions and other weather systems that likely to influence the country
Climate Projections	Climate projections for the Philippines	Mid-21st Century (2036-2065), Late 21st Century (2070-2099)	Climate projections for the Philippines by province for temperature and precipitation based from all available downscaled climate change data that were simulated under three scenarios; A1B (Socioeconomic driven scenarios), RCP 4.5 and RCP 8.5 (Emission-driven scenarios)

Annex C. Sample Worksheet on Exposure Database (Exposure data, sensitivity, threat level, Adaptive Capacity, Relative Vulnerability, Risk Estimates- Tasks 1, 2, 3, 4, 5 & 6)

Sample MATRIX/WORKSHEET FOR CDRA Database
Sector: Economic Sub-sector: Agriculture
Hazard: Flooding

Ecosystem	**BARANGAY** (List down barangays by ecosystem)	**Exposure**			
		Total # of farming dependent families affected by the hazard	**Total Production Area Allocation (hectare)**	**Dominant Crop Types**	**Average Output Per hectare (Php)**

SENSITIVITY (AGRICULTURE & FISHERIES/ECONOMIC SECTOR)									DEGREE OF IMPACT SCORE/ THREAT LEVEL
% of affected farmers, fisherfolks without access to early warning system	% of farmers not employing sustainable production techniques	% of affected farmers dependent to loan for farm input	Production areas not covered by hazard control measures (flood control dikes, sea walls, etc)	% of HH without awareness about CCA/DRR information	% of farmers without access to irrigation (for drought or dry spell)	% of farmers without access to water impoundment infrastructures	% of production areas (in hectares) not covered by insurance	% of farmers/ fisherfolk without access to alternative livelihood	*Refer to Threat Level Parameters in Page 64*

ADAPTIVE CAPACITY (LGU)						ADAPTIVE CAPACITY SCORE (average)
Dimensions of Adaptive Capacity (AC). Refer to Pages 55-61						
Wealth 1	**Information 2**	**Infrastructure 3**	**Technology 4**	**Institution and Governance 5**	**Social Capital 6**	Total Score of AC Dimensions/6
SCORE	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	

VULNERABILITY		ESTIMATION OF RISKS	Summary of VULNERABILITIES AND RISKS	DECISION AREAS	TECHNICAL FINDINGS	IMPLICATIONS	KEY ISSUES CHALLENGES, OPPORTUNITIES
Threat Level/Adaptive Capacity. Page 64		**LOO X SOC (Pages 66-67)**					
RELATIVE VULNERABILITY (Score)	Vulnerability CATEGORY (VH, H, MH, M, ML, L)						

Note: Elements and indicators reflected in this matrix are examples only and LGUs may organize their indicators according to data needs.

1. Columns A-B. Identify the barangays affected and location of barangays per ecosystem (upland, lowland, agriculture, coastal, urban, etc.)

2. Column C. Exposure. Using the gathered data and maps, indicate information and values for each indicator.

3. Column D. Summarize the findings and observation about EXPOSURE of all the barangays included in the analysis for this particular hazard. Take note of important quantitative and qualitative data and indicators.

4. Column E. input the required information that corresponds to each of the sensitivity indicator.

5. Column E. Summarize the findings and observation on the SENSITIVITY of population. Take note of the important and significant information and qualities of the most affected barangay or elements.

6. Column G. Based on the estimated exposure, the degree of sensitivities of the exposed units, and identifed potential impacts, qualitatively determine the Level of Threat/Degree of Impact using the suggested rating scale introduced in PAGE 64 of guide.

7. Column H. Determine the ADAPTIVE CAPACITY of the affected communities/sector by supplying the information based on the given indicators in Pages 55-61.

8. Column I. Determine the level of adaptive capacity of the LGU by getting the average score (total score divided by 6 dimensions) and the corresponding adaptive category (VH,

9. Column J. Summarize the findings and information on the adaptive capacity of the affected communities and the LGU.

10. Column K. Determine the Relative Vulnerability of the affected sector by dividing the level of threat/degree of impact score in Page 64.

11. Column L. Determine the summary of findings of threat level and adaptive capacity.

12. Column M. Estimate the level of risks in vulnerable barangay/s or ecosytem/s by by multiplying the likelihood of occurrence (LOO) with the severity of consequence (SOC). Refer to pages 66 and 67 for the scoring. LGUs may review the summary of findings for exposure, sensitivity and adaptive capacity of the sector, to determine the severity of consequence (SOC).

Note: For purposes of the LCCAP, the estimation of risks is undertaken to know the return period of hazards (expressed through likelihood of occurrence) and severity of consequence) that may affect the vulnerable barangay/s or ecosystem/s. For full-scale disaster risk assessment (DRA), LGUs may refer to relevant processes introduced in CLUP/CDP guides.

13. Column N. Determine summary of findings/observations of vulnerabilities and risks.

14. Column O, Determine the Decision Areas. Decision areas can be a specific location- barangays and/or ecosystems which are found to be most vulnerable and high risks to hazards/climate change as analyzed in previous tasks. It is at this stage where the Technical Working Groups may analyze cross-sectorally the results of previous tasks.

15. Column P. Determine Technical Findings. These can be summaries of findings, observations which built on previous tasks and analyzed cross-sectorally (social, economic, environment, infrastructure/physical land use, institutional).

16. Column Q. Determine the Implications when the LGU is not introducing anything reduce or avoid the identiied vulnerabilities and risks. Implications are usually regarded as "business-as usual" in climate change planning.

17. Column R, Analyze the key issues, challenges and opportunities per decision area.

Sample MATRIX/WORKSHEET FOR CDRA Database
Sector: Social. Sub-sector: Population
Hazard: Flooding

ECOSYSTEM	BARANGAY (List down barangays by ecosys-tem)	EXPOSURE (POPULATION; SOCIAL SECTOR)					SUMMARY OF TECHNICAL FINDINGS FOR EXPOSURE
		Total Residential Area (hectares)	Total Population	total # of families	Population Density	% of affected population/ families (over total population of the brgy)	

RELATIIVE VULNERABILITY		SUMMARY OF FINDINGS	ESTIMATION OF RISKS	Summary of VULNERABILITIES AND RISKS	DECISION AREAS	TECHNICAL FINDINGS	IMPLICATIONS	KEY ISSUES CHALLENGES, OPPORTUNITIES
(Threat Level /Adaptive Capacity)			LOO x SOC. (Refer to Pages 66-67					
Refer to Page 64 for parameters	Vulnerability category (VH, H, M, L, VL)							

Note: Elements and indicators reflected in this matrix are examples only and LGUs may organize their indicators according to data needs.

1. Columns A-B. Identify the barangays affected and location of barangays per ecosystem (upland, lowland, agriculture, coastal, urban, etc.)

2. Column C. Exposure. Using the gathered data and maps, indicate information and values for each indicator.

3. Column D. Summarize the findings and observation about EXPOSURE of all the barangays included in the analysis for this particular hazard. Take note of important quantitative and qualitative data and indicators.

4. Column E. input the required information that corresponds to each of the sensitivity indicator.

5. Column E. Summarize the findings and observation on the SENSITIVITY of population. Take note of the important and significant information and qualities of the most affected barangay or elements.

6. Column G. Based on the estimated exposure, the degree of sensitivities of the exposed units, and identifed potential impacts, qualitatively determine the Level of Threat/Degree of Impact using the suggested rating scale introduced in PAGE 64 of guide.

7. Column H. Determine the ADAPTIVE CAPACITY of the affected communities/sector by supplying the information based on the given indicators in Pages 55-61.

WEALTH (all available financial resources and funds that the LGU allots or provide to respond or assist the affected sectors, etc.)

INFORMATION (ex: information and early warning systems; level of awareness of the sectors on the impacts of climate change and other hazards)

INFRASTRUCTURE (ex: strong, climate resilient, safe and enough infrastructure and space that the affected sector could use)

TECHNOLOGY (ex: equipment, innovations and research outputs relevant to the hazard which the affected sector could use to address or respond to the impact of the hazard)

INSTITUTION/GOVERNANCE (ex: government or LGU plans, programs, policies and offices/staff available to address the impact of the hazard)

SOCIAL CAPITAL (ex: organized groups, volunteers and capable and skill people who can help the LGU in addressing the impacts of the hazard)

SENSITIVITY (POPULATION/SOCIAL SECTOR)											
% of informal settler households/ families	% of families living below poverty line	% of families with no permanent source of income	% of households living in dwelling units with walls made from predominantly light, salvaged and makeshift type materials	% of young (<5 yrs old)	% of old (> 60 Yrs old)	% of population with no access to safe water supply	% of HH with no ac- cess to sanitary toilet	% of HH without access to early warning system	% of HH without awareness about CCA/DRR information	% of household with no access to infrastructure mitigation measures related to hazard	% of HH without access to health services & philhealth

SUMMARY OF TECHNICAL FINDINGS (SENSITIVITY)	THREAT LEVEL (DEGREE OF IMPACT SCORE)
	Refer to Page 64 for parameters

ADAPTIVE CAPACITY (LGU)						AVERAGE ADAPTIVE CAPACITY	SUMMARY OF FINDINGS (ADAPTIVE CAPACITY)
Six Dimensions. Refer to Pages 55-61						Total Score / 6 Dimensions	
Wealth	Information	Infrastructure	Technology	Institution and Governance	Social Capital		
Score	Score	Score	Score	Score	Score		

8. Column I. Determine the level of adaptive capacity of the LGU by getting the average score (total score divided by 6 dimensions) and the corresponding adaptive category (VH,

9. Column J. Summarize the findings and information on the adaptive capacity of the affected communities and the LGU.

10. Column K. Determine the Relative Vulnerability of the affected sector by dividing the level of threat/degree of impact score in Page 64.

11. Column L. Determine the summary of findings of threat level and adaptive capacity.

12. Column M. Estimate the level of risks in vulnerable barangay/s or ecosytem/s by by multiplying the likelihood of occurrence (LOO) with the severity of consequence (SOC). Refer to pages 66 and 67 for the scoring. LGUs may review the summary of findings for exposure, sensitivity and adaptive capacity of the sector, to determine the severity of consequence (SOC).

Note: For purposes of the LCCAP, the estimation of risks is undertaken to know the return period of hazards (expressed through likelihood of occurrence) and severity of consequence) that may affect the vulnerable barangay/s or ecosystem/s. For full-scale disaster risk assessment (DRA), LGUs may refer to relevant processes introduced in CLUP/CDP guides.

13. Column N. Determine summary of findings/observations of vulnerabilities and risks.

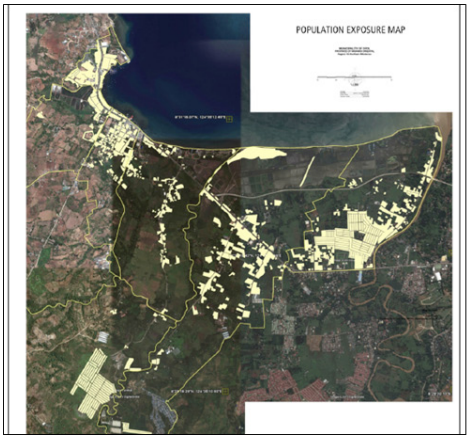
14. Column O, Determine the Decision Areas. Decision areas can be a specific location- barangays and/or ecosystems which are found to be most vulnerable and high risks to hazards/climate change as analyzed in previous tasks. It is at this stage where the Technical Working Groups may analyze cross-sectorally the results of previous tasks.

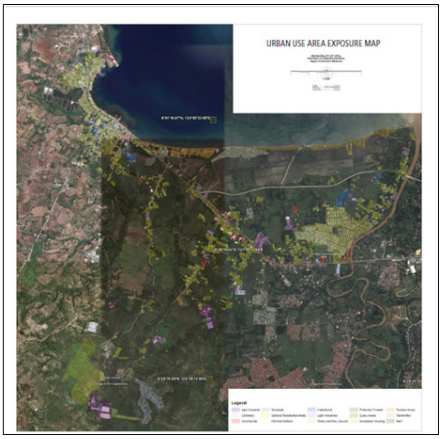
15. Column P. Determine Technical Findings. These can be summaries of findings, observations which built on previous tasks and analyzed cross-sectorally (social, economic, environment, infrastructure/physical land use, institutional).

16. Column Q. Determine the Implications when the LGU is not introducing anything reduce or avoid the identiied vulnerabilities and risks. Implications are usually regarded as "business-as usual" in climate change planning.

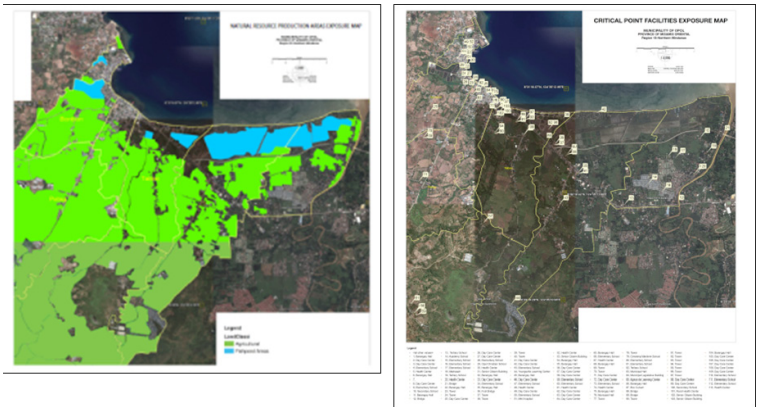
17. Column R, Analyze the key issues, challenges and opportunities per decision area.

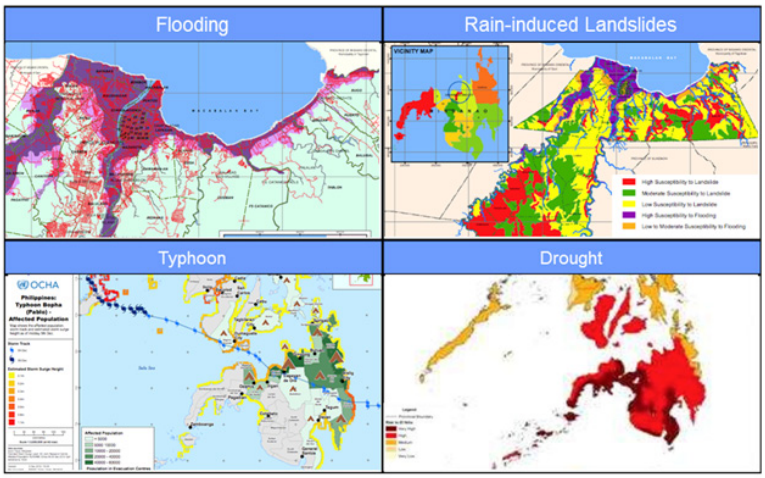
Annex D. Sample Exposure Maps (Sectoral and Spatial) of Opol, Misamis Oriental (Supplemental Guideline, CDRA. HLURB, 2016)





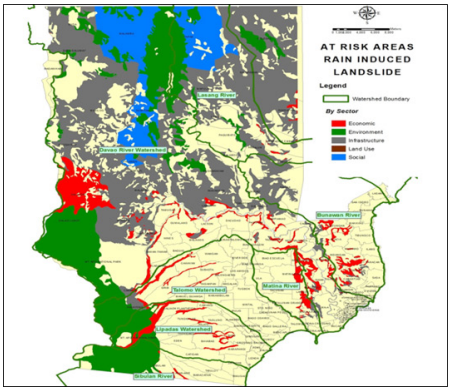
Annex E. **Sample Sectoral Exposure Maps** (Davao City. Joint UN-Habitat/World Food Programme Philippine Cities Climate Change Project. 2012-2013)

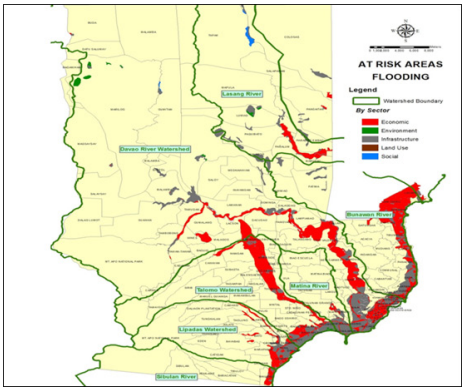




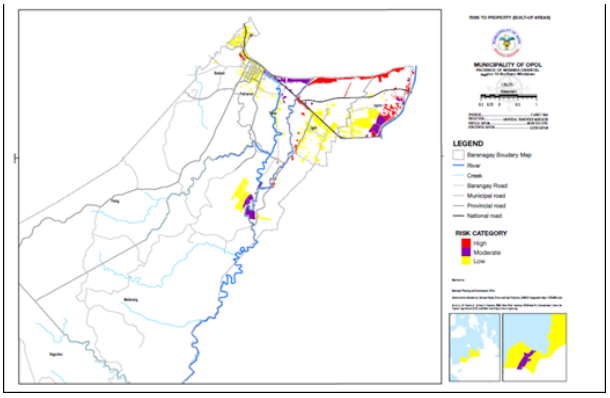
Sample Exposure Maps (Sectoral). Joint UN-Habitat/ World Food Programme Philippine Cities Climate Change Project. 2012-2013)

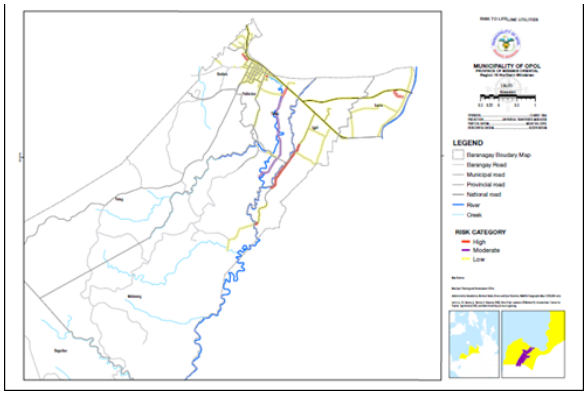
Annex F. Sample Risk Maps. Davao City. Joint UN-Habitat/World Food Programme Philippine Cities Climate Change Project. 2012-2013)





Sample Exposure Maps (Sectoral and Spatial) of Opol, Misamis Orienta3. (Supplemental Guideline, CDRA HLURB, 2016)





References

1. Bureau of Local Government Development-Department of the Interior and Local Government. (2016). Local Planning Illustrative Guide – Preparing and Updating the Comprehensive Development Plan (CDP) [PDF]. Retrieved from http://www.dilg.gov.ph/PDF_File/reports_resources/dilg-reports-resources-2017110_298b91787e.pdf.

2. Bureau of Local Government Development-Department of the Interior and Local Government. (2005). Rationalized Local Planning System.

3. Canada-Nova Scotia. (2011). Municipal Climate Change Action Plan Guidebook.

4. Climate Change Commission. (2017). Community-Level GHG Inventory for Local Government Units in the Philippines – User's Manual [PDF]. Retrieved from http://climate.gov.ph/index.php/documents/category/27-nfscc#core-modules.

5 Housing and Land Use Regulatory Board. Supported by United Nations Development Program and Australian Aid. (2014). Comprehensive Land Use Plan (CLUP) Guidebook – Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the Comprehensive Land Use Plan [PDF]. Retrieved from http://projectclimatetwinphoenix.com/wp-content/uploads/2015/06/Supplemental-Guidelines.pdf.

6. ICLEI. (n.d.). Global Protocol for Community-Scare Greenhouse Gas Emission Inventories [PDF]. Retrieved from https://www.wri.org/sites/default/files/global_protocol_for_community_scale_greenhouse_gas_emissions_inventory_executive_summary.pdf.

7. ICLEI. (n.d.). The Mitigation-Adaptation Connection: Milestones, Synergies and Contradictions. Retrieved from http://itepsrv1.itep.nau.edu/itep_course_downloads/~GeneralAQInfo/Climate%20Change/ICLEIMitigationAdaptationConnection.pdf.

8. Local Government Academy-Department of the Interior and Local Government. (2014). LGU Guidebook on the Formulation of Local Climate Change Action Planning (LCCAP) Book 1. Manila, Philippines.

9. Scannel, C. and et.al. (2016). Building Resilience to Climate Extremes following Typhoon Haiyan in the Philippines. Retrieved from http://precisrcm.com/DFID_Philippines_Reporting/DFID_Philippines_WP4%20Pilots_final.pdf.

10. United Nations Human Settlements Programme. (2015). Guiding Principles for City Climate Action Planning [PDF]. Retrieved from https://unhabitat.org/books/guiding-principles-for-climate-city-planning-action/.

11. United Nations Human Settlements Programme. (2014). Planning for Climate Change: Guide-A Strategic, Values-based Approach for Urban Planners. Retrieved from https://unhabitat.org/books/planning-for-climate-change-a-strategic-values-based-approach-for-urban-planners-cities-and-climate-change-initiative/.

12. United Nations Human Settlements Programme. (2013). Planning for Climate Change Adaptation (PCCA) Project. Vulnerability and Adaptation Assessment Reports: Davao City.