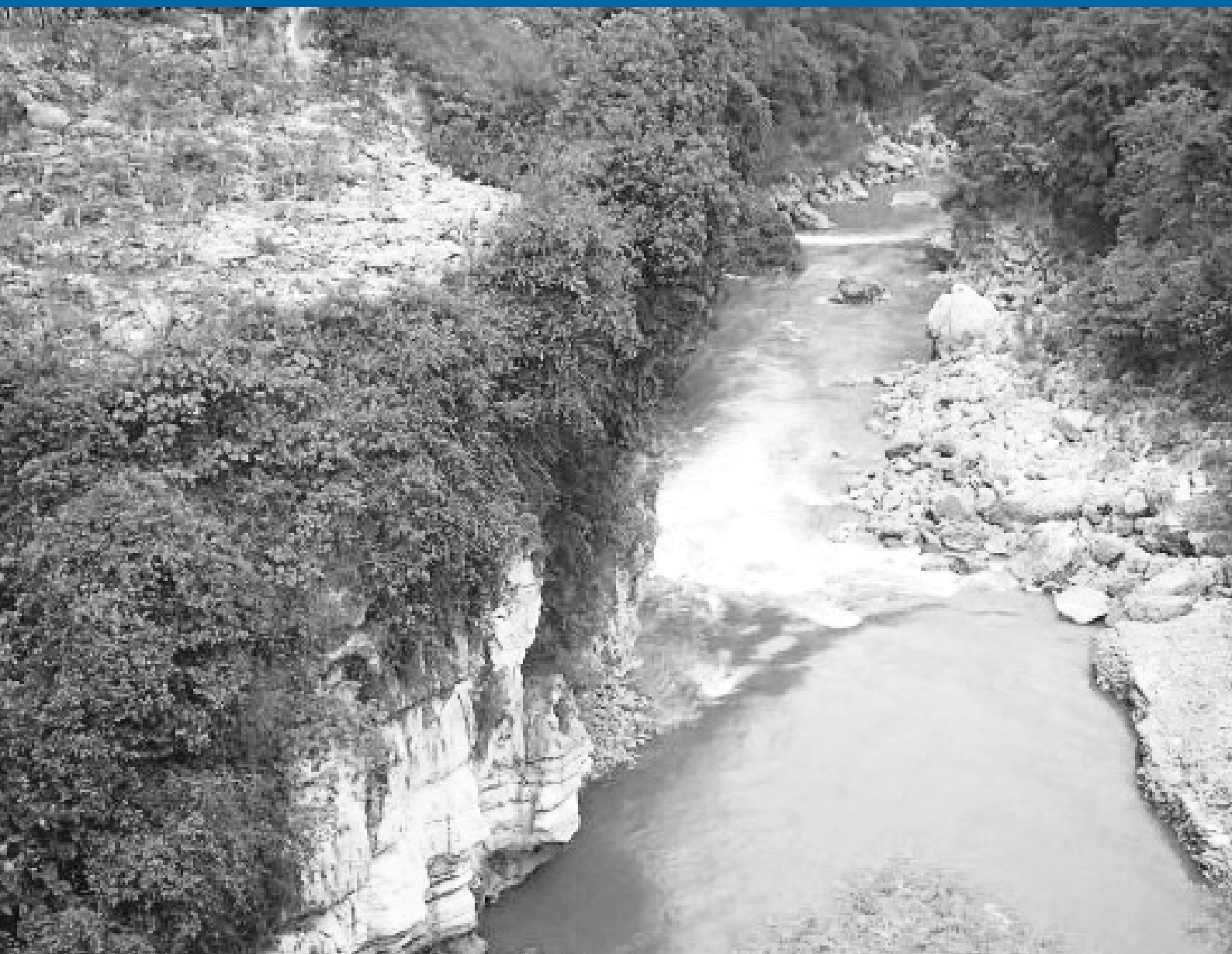


Scoping Assessment on Climate Change Adaptation in the Philippines

Summary
June 2012



ADAPTATION
KNOWLEDGE
PLATFORM



REGIONAL CLIMATE CHANGE
ADAPTATION KNOWLEDGE PLATFORM for Asia

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Scoping Assessment on Climate Change Adaptation in the Philippines

Summary
June 2012

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ACRONYMS

ASOG	ATENEO SCHOOL OF GOVERNMENT
CC	CLIMATE CHANGE
CCA	CLIMATE CHANGE ADAPTATION
CCC	CLIMATE CHANGE COMMISSION
CHED	COMMISSION ON HIGHER EDUCATION
CRM	CLIMATE RISK MANAGEMENT
DA	DEPARTMENT OF AGRICULTURE
DAR	DEPARTMENT OF AGRARIAN REFORM
DEPED	DEPARTMENT OF EDUCATION
DENR	DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DILG	DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT
DOE	DEPARTMENT OF ENERGY
DOF	DEPARTMENT OF FINANCE
DOH	DEPARTMENT OF HEALTH
DOST	DEPARTMENT OF SCIENCE AND TECHNOLOGY
DPWH	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
DRR	DISASTER RISK REDUCTION
DRRM	DISASTER RISK REDUCTION AND MANAGEMENT
ECO-TOWN	ECOLOGICALLY-RESILIENT AND ECONOMICALLY SUSTAINABLE TOWN
EST	ENVIRONMENTALLY SOUND TECHNOLOGIES
GHG	GREENHOUSE GASES
IPCC	INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
LGU	LOCAL GOVERNMENT UNIT
NCCAP	NATIONAL CLIMATE CHANGE ACTION PLAN
NDRRMC	NATIONAL DISASTER RISK REDUCTION AND MANAGEMENT COUNCIL
NEDA	NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY
NFSCC	NATIONAL FRAMEWORK STRATEGY ON CLIMATE CHANGE
NG	NATIONAL GOVERNMENT
NGO	NON-GOVERNMENTAL ORGANIZATION
PAGASA	PHILIPPINE ATMOSPHERIC, GEOPHYSICAL, AND ASTRONOMICAL SERVICES ADMINISTRATION
PES	PAYMENT FOR ECOSYSTEM SERVICES
RA	REPUBLIC ACT
ULAP	UNION OF LOCAL AUTHORITIES OF THE PHILIPPINES
UNEP	UNITED NATIONS ENVIRONMENTAL PROGRAM
UNFCCC	UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

SUMMARY

Policy-wise, the Philippines has been responsive to the challenges of climate change with the government enacting a number of national policies underlining the necessity to undertake climate-related actions. Examples include the Climate Change Act of 2009 or RA 9729, the National Framework Strategy on Climate Change, and the National Climate Change Action Plan. The Philippines has also passed RA 10121 or the National Disaster Risk Reduction and Management Law, which affirms and creates an enabling environment to develop synergy between disaster risk reduction (DRR) and Climate Change Adaptation to reduce disaster and climate-related risks. To secure stable funds for adaptation initiatives by the local governments and communities, on June 6, 2012, the Philippine Congress approved the Bicameral Committee Report for a law to establish the “People’s Survival Fund to provide long-term finance streams to enable the government to effectively address the problem of climate change, amending for the purpose Republic Act 9729”. The legislation now awaits the signature of the President.

For local government units (LGUs), the Philippines’ Department of Interior and Local Government (DILG) has issued several Memorandum Circulars (MCs) that encourage and/or mandate local governments to take the lead in adaptation. As early as 2008, even before the CC law was passed, DILG had already issued MC 2008-69 that encouraged CCA and DRR mainstreaming in development plans, projects, policies and budgets at the local level. This was followed by a series of other MCs aimed at CCA capacity building and local government projects.

While there is no dearth of climate change adaptation programs and projects in the Philippines, much of the current interventions are still led by the national government, and driven by external funding. Further analysis of the current adaptation interventions shows that the government has made significant investments in adaptation planning and understanding extreme events besides generating socio-economic information. But the scoping study also reveals that LGUs need urgent research on specific elements of the Philippine ecosystems; context-specific and culturally-appropriate adaptation options; new sources of funds; and downscaled climate models. LGUs also need to invest more in the actual practice of adaptation, and technologies required for it.

To help LGUs build capacity on CCA, it will be advisable to set up a CCA committee comprising lead units of the LGU involved in sectoral development planning (in sectors such as social, economic, services and environment), and their community-based partners in government and non-government organizations, as well as in the private sector, State colleges and universities. This will enable synergy in the science, policy and practice work for evidence-based climate change adaptation work in LGUs. Furthermore, State colleges and universities can be encouraged to provide extension services on CCA for LGUs. A CCA Learning Consortium, which can serve as the Philippines’ Adaptation Knowledge Platform, can also promote an open-source and non-internet based learning platform across the country. Once organized, this CCA Learning Consortium can work toward ensuring sustained technical support for LGUs on matters related to CCA. And because RA 9729 requires LGUs, particularly the municipalities and cities, to prepare Local Climate Change Action Plans, the Planning and Development Units and other units of the LGUs involved in development planning should be given priority on CCA capacity building in the immediate future.

All capacity building efforts on CCA for LGUs must contribute to better synergy. The capacity development interventions must be eventually directed toward strengthening the capacity building mechanisms of Local Government Academy (LGA), which is mandated to provide capacity building support for LGUs. Furthermore, knowledge management platforms on CCA should also complement one another. Hence, it is suggested that the Department of Environment and Natural Resources (DENR) take the lead in facilitating the establishment of a knowledge management system as the law stipulates. Once established, DENR can provide technical support to the LGUs to initiate their own knowledge management systems given that environment and natural resources functions have also been devolved to the LGUs.

SCOPING ASSESSMENT ON CLIMATE CHANGE ADAPTATION IN THE PHILIPPINES



INTRODUCTION

The Intergovernmental Panel for Climate Change (IPCC) 2007 report on the The most recent publication of the World Economic Forum on Global Risks 2012 names global greenhouse gas emissions as one of the major hazards faced by humankind today. Devastating risks will be enhanced by the failure in climate change adaptation (Risk Response Network 2012). The Intergovernmental Panel on Climate Change (IPCC) produced an Assessment Report 4 (AR4), which says that the anthropogenic causes that have increased greenhouse gasses will impact the global climate. It reports that widespread changes have already been observed in extreme temperatures—the number of cold days and nights has fallen, while the number of hot days and nights has risen; there has also been an increase in the frequency of tropical cyclones since the 1970s (Core Writing Team, Pachauri, and Reisinger 2009).

Climate trends in the Philippines indicate that from 1951 to 2010, the country experienced an average increase of 0.0108°C per year with the maximum and minimum temperatures increasing by 0.36°C and 1.0°C, respectively, over the last 60 years. Changes in the incidence of extreme daily rainfall are not statistically significant across the Philippines, but scientists have observed extreme rain events in some parts of the country. Climate projections for the Philippines, on the other hand, indicate that the mean temperatures across all areas may rise by 0.9°C by 2020 and by 1.8°C by 2050. Experts foresee a reduction in rainfall during the summers in most parts of the country, and an increase in precipitation during the southwest monsoon. In the Southern Philippines, specifically in Mindanao, a reduction in rainfall is projected by 2050. Luzon and Visayas will be most likely to experience extreme rainfall events, but generally more dry days are projected across the country by 2020 and 2050 (PAGASA, 2011). Such changes are expected to have significant if not catastrophic impacts on seven key areas of concern for the Philippines—food security, water sufficiency, ecological and environmental security, human security, industries and services, energy, knowledge and capacity development (CCC, 2011d).

The World Risk Index 2011 has ranked the Philippines third as one of the countries most at risk to natural hazards. The index examines four major components, namely “exposure to natural hazards such as earthquakes, storms, floods, droughts and sea level rise; susceptibility as a function

of public infrastructure, housing conditions, nutrition and the general economic framework; coping capacities as a function of governance, disaster preparedness, early warning, medical services, social and economic security; and adaptive capacities to future natural events and climate change” (Birkmann et al, 2012). According to the United Nations Institute on Environment and Human Security (UN-EHS), the Philippines is at risk to natural hazards not only because of its exposure and relative vulnerability, but because it needs to enhance its coping capacities and further develop its adaptive capacities with the former needing more attention than the latter. These risks coupled with vulnerability and lack of adaptive capacities are of major concern to the country.

Year after year, the Philippines experiences disasters that forewarn Filipinos about what may accompany the changing climate conditions. This is one reason why adaptation and mitigation have become a priority for the Philippines. A Climate Change Law was passed in 2009, a National Framework Strategy on Climate Change (NFSCC) was developed in 2010, and a National Climate Change Action Plan (NCCAP) was prepared by various stakeholders in 2011. Furthermore, the need for climate-related actions was also highlighted in the Philippine Development Plan (PDP) 2011–2016.

The Regional Climate Change Adaptation Knowledge Platform for Asia, also known as the Adaptation Knowledge Platform (AKP), seeks to facilitate CCA at local, national and regional levels, and to strengthen adaptive capacity of countries in South and Southeast Asia, while facilitating existing and emerging networks of practitioners and researchers and knowledge on adaptation. AKP is supported by the Swedish International Development Cooperation Agency (Sida), and other partners in this initiative include the Stockholm Environment Institute (SEI), the Swedish Environmental Secretariat for Asia (SENSA), the United Nations Environment Programme (UNEP), and the Regional Resource Centre for Asia and the Pacific (RRC.AP).

The Ateneo School of Government (ASoG) has been identified as the national implementation partner of AKP in the Philippines to support the process of CCA knowledge building and sharing, particularly among the local government units (LGUs) which have been given the primary task of taking action on climate change. ASoG, as part of its initial tasks, conducted the scoping assessment of CCA in the Philippines. The scoping assessment aims to:

- review existing policies, institutional mechanisms, mandates and specific programs for, and the state of knowledge and initiatives toward adaptation (Chapters 1-5);
- define a process for the development of an institutional mechanism for the potential operationalization of the a Local Government Unit Adaptation Knowledge Platform in the Philippines (Chapter 6);
- lay down a Local Government Unit CCA and Knowledge Management Capacity Development Strategy (Chapter 7); and
- present a potential Adaptation Platform Development Strategy based on the initial review (Chapter 8).

The discussion will thus be divided into four major sections described above.

CHAPTER 1

EXISTING POLICIES AND INSTITUTIONAL MECHANISMS ON CLIMATE CHANGE ADAPTATION IN THE PHILIPPINES



EXISTING POLICIES ON CLIMATE CHANGE ADAPTATION

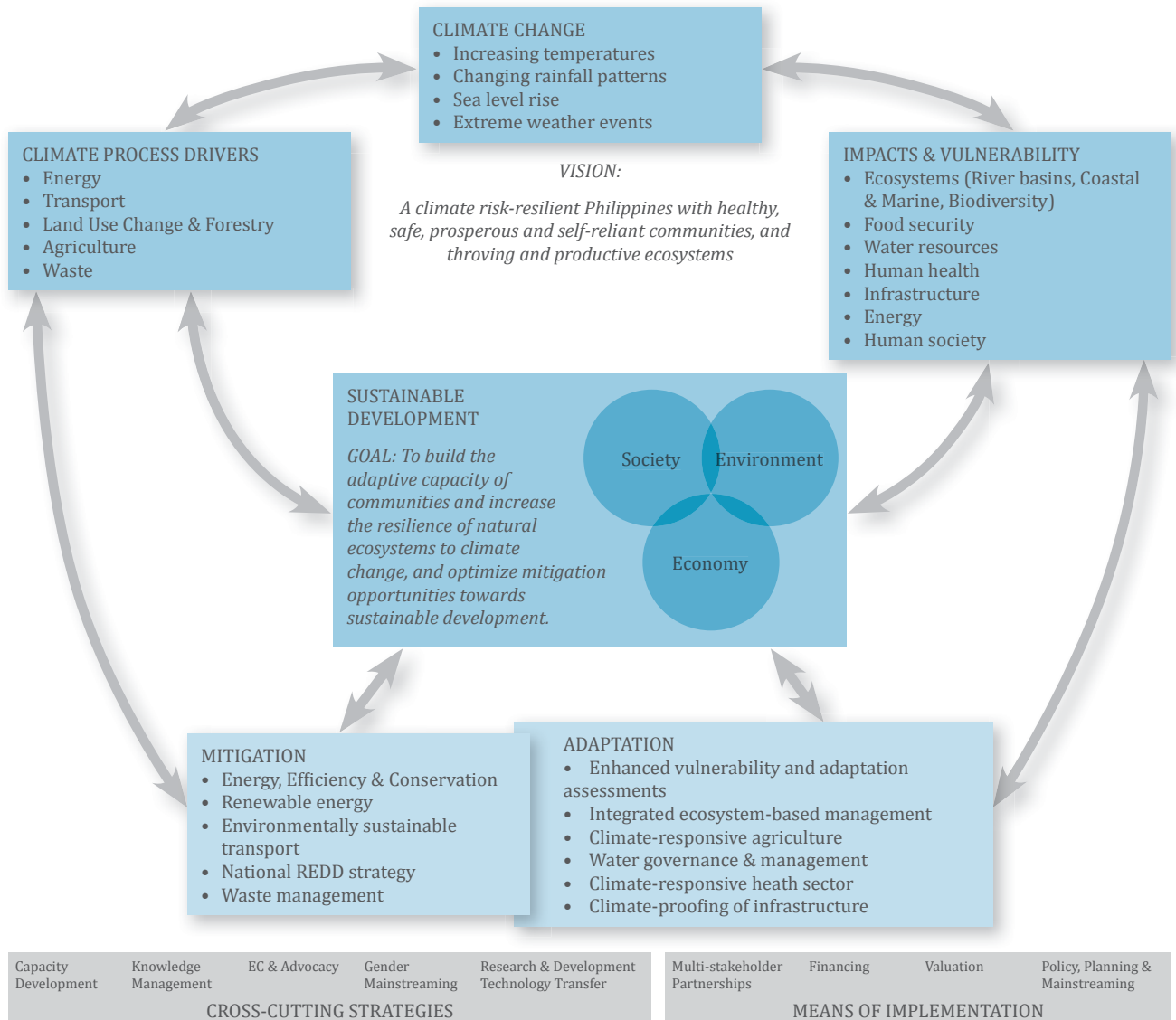
The Philippines has been responsive to the challenges of climate change in its various policies. Its national policies on the necessity to undertake climate actions include Climate Change Law, the National Framework Strategy on Climate Change, and the National Climate Change Action Plan. The Philippines has also passed RA 10121 or the National Disaster Risk Reduction and Management Law, which affirms and creates an enabling environment to develop synergy between DRR and climate change adaptation to ensure that the disaster and climate-related risks faced by the country are significantly reduced.

Republic Act 9729 or the Climate Change Law

Republic Action 9729, also known as “An Act Mainstreaming Climate Change into Government Policy Formulations, Establishing the Framework Strategy and Program on Climate Change, Creating for this Purpose the Climate Change Commission, and for Other Purposes”, was approved by the legislature of the Philippines in 2009. RA 9729 primarily aims to strengthen the mechanisms for climate change governance in the Philippines in light of international and national developments.

When RA 9729 was being formulated in the Philippines, the concept of climate change and its impacts was alien to many. This is reflected in the content of the Climate Change Law, which underlines the importance of understanding the impacts of, and vulnerabilities to climate change besides the need to develop synergy between disaster risk reduction and mainstreaming of climate change adaptation in development plans and programs. The document focused on the following adaptation-related concepts, actions, and interventions: adaptation planning; support for research and development programs; dissemination of information on CCA; enhancement of adaptive capacities of vulnerable human settlements; identification of options and prioritization of adaptation measures; and integration of climate change mitigation and adaptation work. It decreed that all these must be pursued with multi-stakeholder participation, and supported by a climate change information management system and network along with key investments in climate-sensitive sectors in order to contribute to the broader goal of sustainable development.

FIGURE_1 National Framework Strategy on Climate Change



Source: Climate Change Commission

If we, however, examine the content of the law vis-à-vis the Nairobi Work Program (NWP), RA 9729 does not explicitly cover all necessary actions for adaptation. Concerns have been raised over lack of provisions for the role of climate science, climate scenarios, models, and economic diversification for adaptation. The CC Law, nonetheless, recognizes the following needs:

- climate-proofing the socio-economic dimensions of the Philippine society;
- understanding the impacts of climate change on the socio-economic capacities of the country (i.e. development of key climate-sensitive sectors, multi-stakeholder participation);
- guidelines for preparing impacts and vulnerability assessments, technical assistance, adaptation planning;
- support for research and development programs;
- information dissemination on CCA;
- enhancement of adaptive capacities of vulnerable human settlements;
- identification of options and prioritization of adaptation measures; and
- climate change information management system and network.

National Framework Strategy on Climate Change 2010-2022

Recognizing the challenges posed by climatic forces, the National Framework Strategy on Climate Change (NFSCC) 2010-2011 underscores the need for the country's natural ecosystems and communities to adapt to climate change as it charts its way toward a cleaner path to development. The NFSCC lays emphasis on an integrated ecosystem-based management that will enable various sectors of the Philippine society to become more climate-resilient while pursuing sustainable development (Figure 1). The adaptation thrust of the NFSCC prioritizes the enhancement of vulnerability and adaptation assessments, with a focus on integrated ecosystem-based management, climate-responsive agriculture, water governance and management, climate-responsive health sector, disaster risk reduction and management, and climate-proofing of infrastructure (OP & CCC, 2010).

National Climate Change Action Plan 2011-2028

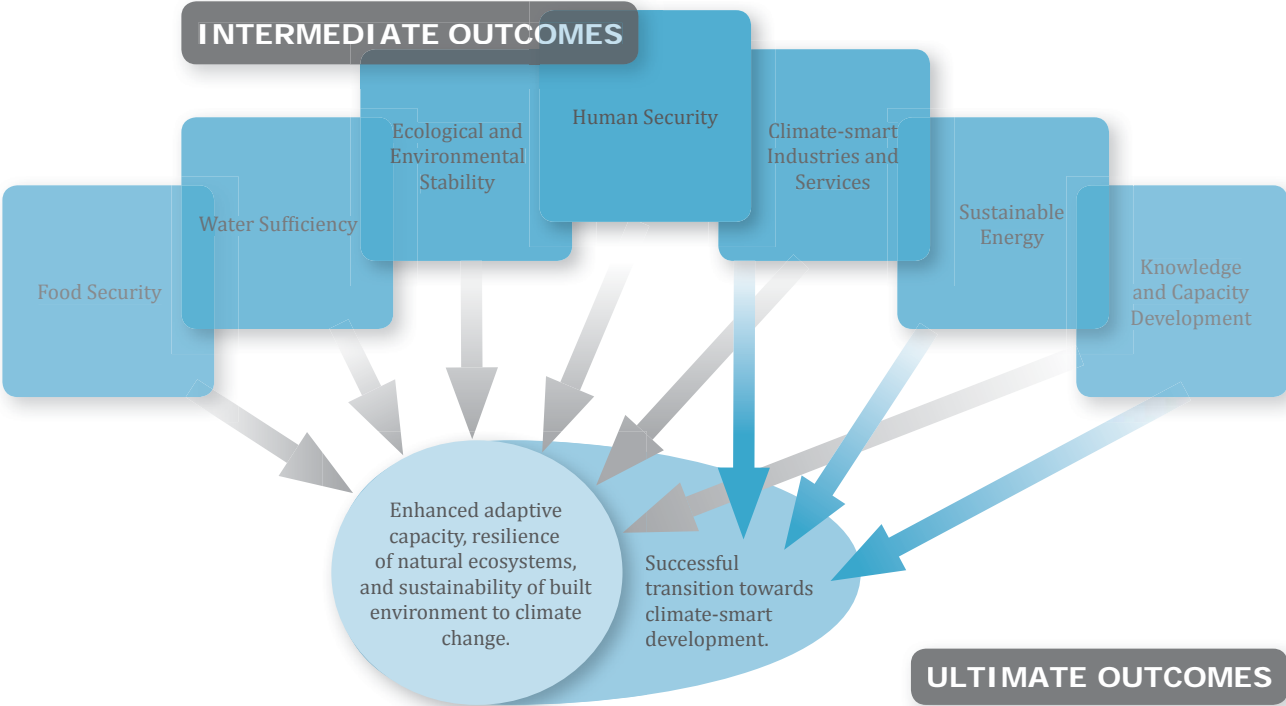
Following the completion of the NFSCC, Climate Change Commission (CCC) led the formulation of the National Climate Change Action Plan (NCCAP) 2011–2028 in 2010 covering three presidential terms in the Philippines' governance timeline. The NCCAP was prepared after comprehensive consultations to identify adaptation gaps, needs, and initial strategies in the Philippines, which were facilitated by the Adaptation to Climate Change and Conservation of Biodiversity (AccBio) of GIZ and the Department of Environment and Natural Resources (DENR), supported by the Federal Ministry for Environment, Nature Conservation and Nuclear Safety of the German Government. The series of consultations resulted in what is now known as the Philippine Strategy on CCA 2010–2022, the precursor to National Climate Change Action Plan 2011–2028. The gaps and needs stated in the Sectoral Working Group Reports of the Philippine Strategy on CCA 2010–2022 are summarised in Annex 1 (CCC, 2011d).

The NCCAP calls for paying due attention to the concerns of vulnerable sectors, considering the “need to enhance the adaptive capacity of communities, resilience of natural ecosystems and the sustainability of built environment to climate change.” It identifies seven key areas—food security, water sufficiency, ecological and environmental stability, human security, and knowledge and capacity development—for intervention. According to the plan, climate-smart industries and services, sustainable energy, CCA knowledge and capacity development will together contribute to climate-smart development and mitigation efforts. The NCCAP, thus, provides guidance for both adaptation and mitigation.

The NCCAP outlines key goals for each intermediate outcome with accompanying strategies for implementation (Figure 2).

The NCCAP further determines the priority areas for adaptation actions. Out of the seven priority areas, only five are seen to contribute to adaptation goals—food security, water sufficiency, environmental and ecological stability, human security and knowledge and capacity development. Table 1 indicates key outcomes and outputs addressed under each priority area for adaptation action.

FIGURE_2 The National Climate Change Action Plan



Source: Climate Change Commission

The Climate Change Commission (CCC) recently called a national meeting of scientists and other stakeholders titled “Climate Change Research and Development Agenda Consultation: Analysis of the Research and Development Gaps and Priorities under the NCCAP” to ascertain research gaps in climate change in the Philippines (CCC, 2012). The table below lists the key research gaps identified on the basis of different thematic areas.

Table 1. Priority Research and Development Gaps Identified under the NCCAP

Objective as Expressed in the Outcomes under NCCAP	Outputs under NCCAP	Research & Development Gaps and Priorities under the NCCAP
<p>Food Security</p> <p>Ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change</p>	<p>Enhanced knowledge on vulnerability of agriculture and fisheries to the impacts of climate change;</p> <p>Climate-sensitive agriculture and fisheries policies, and programs;</p> <p>Enhanced capacity for CCA and DRR of government, farming and fishing communities and industry;</p> <p>Enhanced social protection for farming and fishing.</p>	<p>Enhance the capacity to establish and maintain observation facilities to collect data to be used for climate change protection and modeling</p> <p>Lack of data on cost-effectiveness of mitigation and adaptation practices</p> <p>Focus on other commodities (high-value vegetables, other staples)</p> <p>Lack of site-specific studies</p> <p>Inability to harmonize VA tools with high precision</p> <p>Lack of hatchery and breeding techniques for marine species</p> <p>Lack of interface with industry/community-based enterprises to upscale research results</p> <p>Lack of enabling mechanisms to translate scientific findings into policies</p>

Water Security		
Water resources are sustainably managed and equitable access ensured	Enabling policies for IWRM and CCA created; CC adaptation and vulnerability reduction measures implemented; Water supply and demand management of water improved; Quality of surface and ground water improved; Equitable access of men and women to sustainable water and supply improved; Knowledge and capacity for IWRM and adaptation planning improved	Irrigation sector for food security Municipal and domestic water supply sector for household water security and human health security Commercial and industrial sectors for growth and development Energy sector for hydropower
Environmental and Ecological Security		
Enhanced resilience and stability of natural systems and communities	CC mitigation and adaptation strategies for key ecosystems developed and implemented; Management and conservation of protected areas and key biodiversity areas improved; Environmental laws strictly implemented; Capacity for integrated ecosystem-based management approach in protected areas and key biodiversity areas enhanced	Ecosystems and their link to human security and vice-versa Social researches related to ecosystems and ecological security
Human Security		
Reduced risks of men and women and other vulnerable groups to climate change and disasters	CCA and disaster risk reduction practiced by communities and sectors at all local levels; Health and social protection delivery systems made responsive to climate change risks; CC-adaptive human settlements and services developed, promoted and adopted	Availability of high-resolution maps Impact modeling per sector Data (existence, acquisition, accessibility, priority)
Knowledge and Capacity		
Enhanced knowledge and capacity of women and men to address climate change	Improved capacity for CC scenario modeling and forecasting Government capacity for CC adaptation and mitigation planning improved CC resource centers identified and established Formal and non-formal capacity development program for climate change science, adaptation and mitigation developed Gendered CC knowledge management established and made accessible to all sectors at all levels	Translating scenarios into impacts Free and prior informed consent and intellectual property rights in CC researches Modes of climate financing Access to CC research Barriers and enablers to CC data sharing, setting up of CC research centers and clearing house Ensemble of CC projections Rapid research methods for CC assessments Responsiveness of CC research to needs of LGUs CC research utilization Applied CC research approaches Modes of engagement in CCA work Communicating CC to LGUs and vulnerable sectors Modes of popularizing CC Level of awareness and knowledge on CC

Source: Philippine Development Plan 2011–2016

The Philippine Development Plan (PDP) 2011–2016 constitutes the integrated and coordinated programs and policies for national development scripted by the Philippine Government. It targets inclusive growth by focusing on the competitiveness of productive sectors and employment generation; improving access to financing; investing in infrastructure;

promoting transparent and responsive governance; and developing human resources by enhancing social services and protection.

The PDP recognizes the vulnerability of the Philippines to climate-related hazards. The document focuses on developing coping capacities to counter immediate climate threats, and emphasizes CCA in the areas of agriculture, infrastructure, water governance, flood management and housing. It plans to employ ecosystem--based management, climate-sensitive technologies, and climate-resilient systems to reduce the risks posed by the changing climate. It also pays special attention to the role of LGUs in the fields of water governance, agriculture, and Comprehensive Land Use Plans (CLUPs).

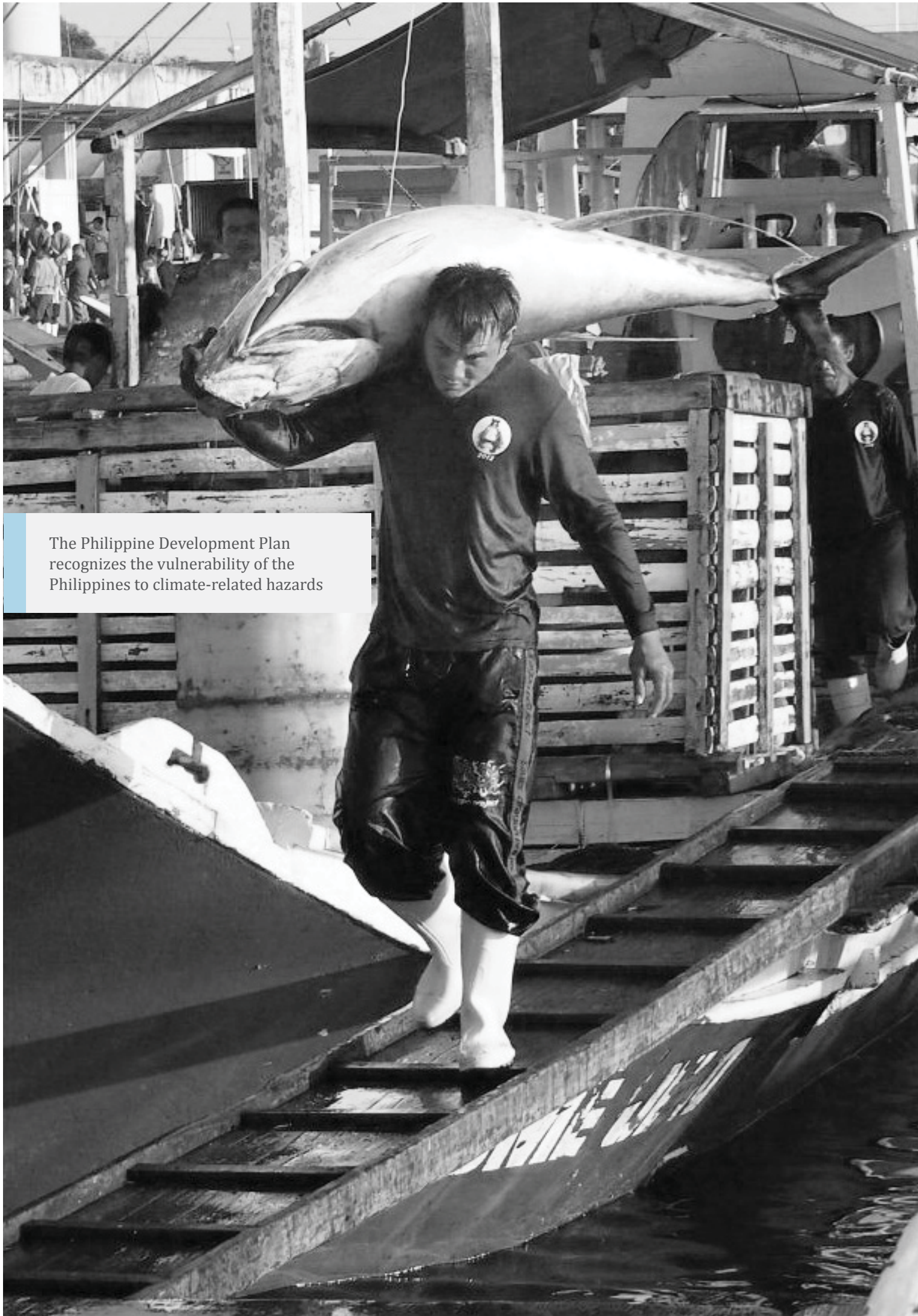
Republic Act 10121 or the Disaster Risk Reduction and Management Law

Almost immediately, and even before the Climate Change Law came into effect in 2009, its limitations were immediately recognized by risk reduction advocates. Owing to what was understood as the DRR and CCA nexus, proponents of risk reduction within the policy-making process, incorporated key provisions that allowed for CCA in the Philippines to be further strengthened by RA 10121:

- The National Disaster Risk Reduction and Management Council (NDRRMC) shall work with the Climate Change Commission (CCC) to formulate and implement a framework for CCA and DRRM.
- The Executive Director of the Climate Change Office of the Climate Change Commission shall be part of the NDRRMC.
- The CCC shall work with the NDRRMC in co-developing assessment tools on existing and potential hazards and risks.
- The NDRRMC will ensure the integration of DRR and CCA into local development plans, programs, and budgets as a strategy in sustainable development and poverty reduction.
- Not less than five percent (5%) of the estimated revenue from the regular sources shall be set aside as the Local Disaster Risk Reduction and Management Fund (LDRRMF) to support disaster risk management activities. (Note that this provision becomes valuable to CCA work in the Philippines because the CC Law does not specify allocations for CCA work. Using the DRR and CCA nexus as a justification, CCA can now be funded by the LDRRMF).
- Both DRR and CCA work aim at the reduction of vulnerabilities to prevent loss of lives and assets due to climate and weather-related hazards. The DRRM Law specifies that dereliction of duties, which lead to destruction of property, loss of lives, critical damage of facilities and misuse of funds, can be penalized under RA 10121, and the offender can be disqualified from public office if he/she is a public officer.

People's Survival Fund and Amendments to RA 9729

On 6 June 2012, the Bicameral Committee of the Philippine Congress approved the proposed bill that establishes the People's Survival Fund and amends RA 9729. The bill aims to address the gaps in RA 9729, mainly by specifying the funds and fund sources for climate change adaptation in local governments and communities. For instance, CCA funds may now come from 10 percent of the cash dividends declared by all government-owned and controlled corporations; 5 percent of proceeds from the sale of certified or verified



The Philippine Development Plan recognizes the vulnerability of the Philippines to climate-related hazards

emissions; and 10 percent from collections of motor vehicle user charges. Apart from a seed fund of PhP 50,000,000 from the President's Contingency Fund, the People's Survival Fund can also receive private donations.

Climate Change Law and Other Policies in Support of Climate Change Adaptation in LGUs

RA 9729 mandates LGUs to formulate, plan, and implement the climate change action plan consistent with the provisions of the Local Government Code, NFSCC and NCCAP.

- CCA is a regular function of the municipal and city governments. Provincial governments are to provide technical assistance, enforcement and information management to the municipal and city climate change action plans;
- The LGUs will provide a copy of their respective action plans to the CCC within a month of the adoption of the said plans;
- LGUs are authorized to appropriate and use part of their respective internal revenue allotment (IRA) to implement the local climate change action plans; and
- The Local Chief Executive (LCE) shall appoint a person, who has training in and knowledge of CC or related projects for the formulation and implementation of the local action plan.

There are several national laws and policies that set forth actions for CCA. For example, while RA 9729 enables climate change adaptation at the local level and RA 10121 mandates actions on adaptation by risk reduction, RA 7160 or the Local Government Code of 1991 stipulates that LGUs must prevent any form of loss of lives and damage to property by any hazards. Section 16 of RA 7160, the general welfare provision, mandates LGUs to ensure general welfare, accelerate economic development, and upgrade the quality of life of its people. It also specifically mentions that LGUs are not exempted from liability of death or injury to persons or damage to property.

Although under RA 9729, LGUs are at the forefront of local climate change adaptation action, and are required to facilitate adaptation by scripting and implementing climate change action plans, they lack the capacity to do so.

The DILG is not only tasked with ensuring that the LGUs comply with the relevant policies, it is also responsible for providing them technical assistance and guidance. Below is the list of DILG Memorandum Circulars relevant to CCA.

DILG Memorandum Circular 2008–69

Even in the absence of an enabling law on climate change in 2008, line agencies already heeded warnings about the possible impacts of climate change and weather extremes on the Philippines. In 2008, DILG issued a memorandum circular exhorting all local chief executives and policy-making councils to implement CCA and DRR measures, using the powers given by RA 7160 to LGUs to secure general welfare. Among the specific tasks they were encouraged to implement were the following:

- Mainstream CCA and DRR in local policies, plans, budgets and investment programs;

- Promote research and extension work on CCA through local research institutions, academe and other relevant stakeholders;
- Encourage multi-stakeholder participation in disseminating information about CCA among others;
- Work with the Provincial and Regional Development Councils to expedite the implementation of adaptation programs, projects and activities; and
- Promote dialogues that will facilitate the transition to environmentally sustainable patterns of production and consumption.

DILG Memorandum Circular 2008–123

Following the earlier DILG issuances on climate change, the Vice-Mayors League of the Philippines, the Provincial Board Members League of the Philippines, the Philippine Councillors League, the Lady Local Legislators League of the Philippines, the League of Local Planning and Development Coordinators of the Philippines, and the Bureau of Local Government Supervision entered into a Memorandum of Understanding aimed at mobilizing actions to address the challenges posed by the changing climate. The implementation of the interventions is to be done in the following four phases: awareness building; legislative and executive actions; assessment of actions; and sustaining strategies. As a strategy for the first phase of awareness-raising, DILG MC 2008-123 made specific mention of two-day regional conferences on climate change that were conducted from September 2008 to March 2009.

DILG Memorandum Circular 2008-161

Pursuant to the earlier MC on the mobilization of local actions to address climate change impacts, a trainers' training was planned. Local chief executives were encouraged to allow the participation of local government officials and personnel who could be part of the trainers' pool for LGUs. The same document also specified the source of funds for the participation of LGU officials and personnel.

DILG Memorandum Circular 2009-73

Local chief executives were also advised to support capacity building efforts for climate change. For example, when DENR and the Department of Transportation and Communications (DOTC) initiated a review of the Clean Air Act implementation and explored possible partnerships on climate change actions, the local chief executives were encouraged to participate in the undertaking.

DILG Memorandum 2009-164

In 2009, the Province of Albay, in partnership with DENR and the GTZ ACCBio project, convened the Second National Conference on Climate Change. In support of this effort, the Department of Interior and Local Government (DILG) directed all its Regional Directors to disseminate information about climate change to all the local authorities within their areas of responsibility.

DILG Memorandum Circular 2011-27

The DILG, through the Local Government Academy (LGA), encouraged chapter presidents of the League of Municipalities to join the Executive Dialogue on CCA for Local Economic Development on the theme of "Creating Synergy of Actions between Local and National Governments toward a Common Development Agenda."

DILG Memorandum Circular 2011-166

To help increase awareness about CCA and mitigation actions relevant to the Philippines, and pursuant to Presidential Proclamation No. 1776 series of 2008—the declaration of the “Global Warming and Climate Change Consciousness Week”—the DILG issued a memorandum circular exhorting all LGU chief executives to take part in the event scheduled for 21–22 November 2011.

DILG Memorandum Circular 2012-02

In compliance with RA 6716 of 1989—the Rainwater Collector and Spring Development Law—and in response to the impacts of the changing climatic conditions, all provincial governors, city and municipal mayors and barangay captains have been advised to include the promotion of rainwater collection system (RWCS) technologies at the community level, and the construction of rainwater collectors in their development and/or climate change action plans.

DILG Memorandum Circular 2012- 73

The DILG has issued guidance on the use of the Local Disaster Risk Reduction and Management Fund (LDRRMF). The fund also allows for investments in the following climate adaptation-related actions:

- Conduct of risk assessment, vulnerability analysis, and other science-based technology and methodologies to enhance LGU ecological profiles, sectoral studies, and mainstream DRR-CCA in Comprehensive Land Use Plan (CLUP) and the Comprehensive Development Plan (CDP);
- Capacity building (train, equip, organize, provide funding, sustain) of representatives of NGAs, LGUs and sectoral representatives in mainstreaming DRR/CCA into development planning, investment programming/financing, and project evaluation and development;
- Capacity building for application of science and evidence-based scenarios in mainstreaming DRR/CCA into plans, policies, programs;
- Conduct of activities to review and integrate DRR/CCA into various environmental policies, plans, programs and projects;
- Conduct vulnerability analysis and risk assessment for critical facilities and infrastructure;
- Conduct hazards mapping and assessment at town/city and barangay levels;
- Conduct studies on disaster prevention for armed conflict situation and climate change effects; and
- Develop training programs, and integrate DRR/CCA school curricula at all levels (include DRR/CCA in textbooks, teachers’ guides and manuals).



CLIMATE CHANGE IMPLEMENTATION MECHANISM

In addition to the above-mentioned policies that seek to ensure that LGUs implement CCA, an implementation mechanism has been put in place with clear definitions of the roles of key stakeholders, including LGUs. Under RA 9729, the Climate Change Commission (CCC) will create an enabling environment that will make adaptation possible. Apart from coordinating policy and defining the strategy and program on climate change, CCC shall also recommend legislations, policies, strategies, programs and appropriation on CCA.

The Commission formulated the Framework Strategy on Climate Change based on CC vulnerabilities and adaptation needs. It also took the lead in crafting the NCCAP in accordance with the Framework Strategy. Apart from identifying vulnerabilities and impacts, the NCCAP pinpoints appropriate adaptation measures for joint projects of national and local governments.

RA 9729 specifies LGUs as the lead units in the formulation, planning and implementation of Local Climate Change Action Plans (LCCAP). The barangays will identify issues, best practices and implement solutions, while the municipal and city governments are now mandated to consider CCA as one of their regular functions. The provincial governments shall provide technical assistance, enforcement, and information management support to municipalities and cities.

It is, however, to be noted that national line agencies, as part of their regular government functions, are also tasked with providing technical support to LGUs. RA 9729 highlights the functions for certain agencies. For instance, the Department of Education (DepEd) is supposed to integrate CC in primary and secondary education; the DILG and LGA will facilitate CC training for LGUs; the DENR will establish and maintain a CC information management system and network in collaboration with other national government agencies, institutions and LGUs; while the Philippine Information Agency (PIA) will disseminate information on CC, including adaptation.

President of the Republic of the Philippines is the chairperson of the Climate Change Commission (CCC), which comprises three other Commissioners appointed by the President. The CCC also has an Advisory Board comprising representatives of 15 line agencies of the national government, including Department of Agriculture, Environment and Natural Resources, Education, Foreign Affairs, Health, Interior and Local Government, National Defence, Public Work and Highways, Science and Technology, Social Welfare and Development, Trade and Industry, Transportation and Communications, National Economic and Development Authority, National Security Council, National Commission on the Role of Filipino Women; presidents of various Leagues (Provinces, cities, municipalities and barangays) and representatives of the academe, business sector and non-governmental organization. It can, therefore, be said that the Philippines has a policy that enables a nationwide CCA mechanism.

CURRENT POLICY CHALLENGES AND RECOMMENDED POLICY DIRECTIONS FOR CLIMATE CHANGE ADAPTATION IN LGUs

Absence of clear funding sources for local climate action from national or local funds

Despite these national policy interventions that lay priority on enhancing implementation of adaptation actions at the local level by LGUs, there are still policy gaps that hinder LGUs from taking immediate steps in this direction.

RA 9729 is a clear and urgent response to the threat of climate hazards. It was also meant to contribute to the country's efforts to achieve sustainable development. Yet there were vital aspects such as funding for adaptation that were left out during the legislative debates. Despite the strengths of the NFSCC and the NCCAP, the pursuit of adaptation and mitigation in the Philippines will remain highly dependent on external funding if the

Government does not make specific allocations from the national and local budgets. NEDA outlines the following sources of funds for CC-related work in the Philippines:

- United Nations Framework Convention on Climate Change (UNFCCC): Adaptation Fund; Green Climate Fund; The Special Climate Change Fund; Clean Development Mechanism; Least Countries Fund; Fast Start Financing; Cool Earth Partnership; Initiative for Climate and Environment; International Climate Initiative; East Asia Climate Partnership; Millennium Development Goal Achievement Fund (Energy and Climate Change); and the Global Environment Facility;
- Multilateral Financing Facility: Climate Investment Funds administered by the World Bank;
- Financing Facilities for Local Climate Change Work
 - Clean Technology Fund (under the Climate Investment Fund); and
 - Credit Line for Energy Efficiency and Climate Protection in the Philippines. (NEDA 2012)

Though mandated to implement local climate change action plans, the LGUs have a hard time accessing funds. Creative planning and budgeting has been encouraged, such as by integrating CCA into development planning. The following local government funds have been identified for CCA work, using RA 7160, RA 10121 and RA 9729:

- The Personnel Services Fund for the salaries and wages of DRR and CCA staff;
- The MOOE Fund for the supplies and materials for DRR and CCA offices;
- The Capital Outlay Fund for infrastructure, buildings, equipment;
- The 20% Local Development Fund for development, resilience and adaptation;
- The DRRM Fund, which can be used for DRR and CCA work;
- The unspecified local CCA fund from the IRA;
- The 10% Sangguniang Kabataan Fund to engage the youth in CCA work through youth development programs and projects; and
- The New Fees and Charges that can be allocated for DRR and CCA initiatives. (Magalang, 2012)

Climate change is not an easy concept to understand, more so when CCA is often used interchangeably with DRR. While capacity building for the conceptual understanding of CCA has been pursued, the more critical need is its operationalization in development planning.

Insufficient guidance and directives on how to integrate climate change adaptation into local development planning

There is a new planning mandate that provides guidelines for rationalizing and harmonizing the planning and budgeting process. From over 26 plans that LGUs have to prepare each year, the Joint Memorandum Circular 2007-1 provides for “Guidelines on the Harmonization of Local, Planning, Investment Programming, Revenue Administration, Budgeting and Expenditure Management.” This means that all sectoral plans must be incorporated into a single plan. This circular as well as the provision that all LGUs should prepare a CC action plan implies that CC plans can now be incorporated into the local development plans of each LGU.

Each LGU must come up with a Local Development and Investment Plan (LDIP) that embodies a strategy framework at provincial and municipality levels (i.e. the Provincial Development and Physical Framework Plan for provinces and the Comprehensive Land Use Plan and the Comprehensive Development Plan for municipalities and cities). Each year, this plan is transformed into an Annual Investment Plan (AIP). The LDIP and the AIPs incorporate priority programs, projects and activities (PPAs), which serve as the basis for the programming of funds. Hence, it is imperative that LGUs must know how to integrate CC plans into their existing development plans, thereby saving time and resources required for preparing separate plans.

Given the above-mentioned primary concerns, the following policy directions are recommended:

- The IRR (implementing rules and regulations) of RA 9729, which are being revised, must have clearer provisions about funding for CCA. Furthermore, guidance from the Department of Budget and Management (DBM) must follow any IRR revision.
- Harmonization of the DRR and CCA plans with the Rationalized Planning Process. The DILG, CCC, NDRRMC, NEDA, HLURB will have to provide due guidance to LGUs on how to integrate CCA in their development plans through a Joint Memorandum Circular.
- To encourage further compliance, the DILG can design a Seal of CCA awards scheme similar to the Seal of Disaster Preparedness and Seal of Good Housekeeping awards to encourage LGUs to ensure that CCA is implemented in and by their respective constituencies.


Lack of clarity about the role of other stakeholders in CCA in LGUs under the Climate Change Law

If one were to closely examine the CCA law, Section 16 only says that in the crafting and implementation of local climate change plans, CCC will coordinate with various stakeholders. The law does not explicitly mention the role of stakeholders in CCA.

The Philippines has one of the most active dynamic civil societies on climate change related issues with the likes of Aksyon Klima, Climate Change Conference of the Philippines, and Philippine Movement on Climate Justice. Apart from these, the country also has many community-based and people's organizations that have been contributing to CC work over the years. They are an asset, and can significantly contribute to the enhancement of adaptive capacities in LGUs.

In the current practice on CCA interventions in development planning, CSOs have opted to draw from the power of the Local Government Code of 1991 to uphold the role of CSOs in development planning. The Joint Memorandum Circular 2007-1 on the Rationalized Planning System further specifies how the CSOs can intervene in sectoral planning.

Should the national government agencies decide to issue guidelines for LGUs on the crafting of CCA plans or its integration in development plans, it is suggested that the guidelines cover and recognize the role that other stakeholders, particularly civil society organizations, can play in the development and implementation of local climate change action plans.



Climate change is not an easy concept to understand, more so when CCA is often used interchangeably with DRR.

CHAPTER 2

CURRENT CLIMATE CHANGE PROGRAMS AND PROJECTS: NATIONAL GOVERNMENT

The Philippines is at risk to multiple climate and weather-related hazards. It is apparent to the more informed government leaders and other stakeholders that if the country does not act on these risks, it will suffer from devastation year after year, and will be ill-prepared for the projected climate hazards of the future. As a result of this realization, the Philippine Government has initiated several programs in an attempt to develop and enhance the adaptive capacities of its institutions and people.

The MDG-F 1656 Joint Programme: Strengthening the Philippines' Institutional Capacity to Adapt to Climate Change

The Philippines and the Spanish Government share a General Treaty of Friendship and Cooperation. This evolved from Basic Cooperation on Technical Cooperation in 1974, developed into a Joint Commission in 2005–2008 and was enhanced by Spain's Law on Cooperation and Masterplan 2009–2012. The Spanish Government, through its development arm AECID or the Oficina Técnica de Cooperación, has entered into a cooperation mechanism ranging from technical and financial cooperation, which may be bilateral or multilateral, with other Spanish public administration units in a centralized or decentralized mode, and with NGOs (NEDA & MDGG Achievement Fund, 2012).

In the Philippines, the support of the Spanish Government was channelled through the United Nations System under the MDGF thematic window on Environment and Climate Change, and is implemented by nine government agencies—National Economic and Development Authority (NEDA), Department of Agriculture (DA), Department of Environment and Natural Resources (DENR), Department of Health (DOH), Department of Labor and Employment (DOLE), Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA), Department of Trade and Industry (DTI), Housing and Urban Development Council (HUDC) and the Province of Albay—and six partners of the United Nations, including United Nations Development Programme (UNDP), Food and Agriculture Organization (FAO), International Labour Organization (ILO), the United Nations Environment Programme (UNEP), United Nations Human Settlements Program (UNHSP) and World Health Organization (WHO). The initiative also brought support to Region V (the Bicol Region), Region XIII (CARAGA region), and other areas of Mindanao.

The MDGF support aimed at enhancing capacities for CCA, mainstreaming climate risk reduction in development plans and processes, and improving coping mechanisms. To achieve these, the following projects were implemented:

Capacity Assessment of CCA for Provinces

NEDA took the lead in capacity assessment work for LGUs in the provinces under the MDGF 1656 Joint Project. The initiative engaged 12 national government agencies, two CSOs, and two provincial LGUs in 2009 before going on to engage 10 more provinces and the CCC in 2011. The assessment implemented the following:

- Retrofitted UNDP's capacity development approach and capacity assessment methodology for CCA; and
- Prepared a capacity assessment toolkit for provinces, which included a step-wise procedure for capacity assessment and preparation of capacity development strategies.

Competency Development Programme

The Development Academy of the Philippines and NEDA worked to strengthen institutional adaptive capacity to address climate change and increase the stakeholders' competency to address evolving climate-related risks. Furthermore, the initiative developed adaptation competencies that will benefit local and national government units and agencies engaged in the crafting of plans, programs and projects. The intervention also engaged national government agencies and scientists with expertise in climate science, forestry, agriculture, coastal and marine resources, health, and water among others, to develop learning modules and engage LGUs in a learning process. The modules developed were initially rolled out in Agusan del Norte. The work is said to have led to financial and social growth, knowledge gain, sustainable livelihood and farming activities, besides increasing the worth of environment in the households involved in the intervention (Development Academy of the Philippines, 2011).

Mainstreaming of CCA in the Philippine Development Plan 2011–2016

The description of this initiative is already reflected in Section 1.1.4 on the Philippine Development Plan. Here are a few of its goals:

- To promote the modernization of agriculture and fisheries; climate-sensitize rural infrastructure; conduct research on climate-resistant technologies; develop capacity building for vulnerability assessments; boost emergency support system, risk reduction mechanisms, and risk sharing strategies; encourage climate-smart budgeting, and promote climate data collection and assessment.
- Mainstream CCA in the updated Environment and Natural Resources Framework Plan.
- Ensure productivity and climate resilience through innovative risk transfer mechanisms.
- Strengthen the Philippines' institutional capacity to adapt to climate change.
- Water resources: The National Institute of Geological Sciences assessed the vulnerability of the Philippine's water sector and examined usable resource variables (including supply and pollution sources), distribution, and the extent of sectoral end users. The project yielded a Philippine Water GIS database (David, 2011).

- Complete the operational guidelines for the National Policy on CCA for the health sector

The work in this component was headed by the DOH. The National Framework for Action aimed at protecting the Filipinos' health from the direct and indirect effects of climate change. This goal will be achieved through an integrated CC and health systems development; mainstreaming of CC in the identification and improvement of health technologies; and partnership building. The areas for intervention will specifically be in service delivery, governance, human resources, policy, standard and regulation.

Currently, DOH has accomplished the following:

- the preparation of a strategic plan for the health sector;
- the creation of a Climate Change Unit in DOH;
- the preparation of an Event-based Surveillance and Response System in the Community (ESRC) and the Surveillance in Post-Extreme Emergencies and Disasters (SPEED) that have been implemented in several LGUs across the country;
- hospital assessment tools have to be retrofitted to include climate resiliency indicators;
- training of trainers for a country-wide capacity building on climate change and health for health workers has been completed;
- a communication plan and IEC materials on climate change impact on health for health promotion have been developed;
- the inclusion of the use of health vulnerability and capacity assessment tools in the operational guidelines of a DOH administrative order;
- The finalization of the Administrative Order and Operational Guidelines for CCA and Health
- Vulnerability Assessments under the MDGF 1656 Joint Program. The work in the health sector was conducted by the Institute of Health Policy and Development Studies, the National Institutes of Health, University of the Philippines-Manila. The project focused on climate change vulnerability and impact assessment tools, monitoring and evaluation framework, and a compendium of adaptation practices in the Philippine Health Sector. Vulnerabilities were examined according to the following categories: individual/family/community; socio-economic factors; pathogen factors; health system and infrastructure; national and local policy development and environmental policy.

Other major demonstration projects were implemented focusing on:

- Enhancing adaptive capacities of communities in contiguous fragile ecosystems in Northern Luzon;
- Developing a model climate friendly governance infrastructure in Southern Luzon;
- Climate-resilient human settlements and socio-economic infrastructure, also in Southern Luzon; and
- Using innovative risk transfer mechanisms to develop climate-resilient farming communities in the eastern seaboard of Mindanao. The initiative, led by ILO in partnership with DTI, focused on integrated Financial Packages and Weather Index-based Insurance. The project presented three models of innovative integrated financial package: credit delivery-cum-savings; social protection mechanisms; capacity building support for crop production and the development of alternative

livelihoods. The weather-index based insurance (WIBI) package for rice and corn was bundled with support services such as WIBI literacy, and techno training in the form of good agricultural practices and pest control (Villacorta, 2011).

Philippine Climate Change Adaptation Program

The Philippine Climate Change Adaptation Program (PhilCCAP) is a US\$ 4.974 million grant jointly supported by the Global Environment Facility, Special Climate Change Fund and World Bank (GEF/SCCF/WB) covering the period from 2011 to 2015. As a need reflected in the country's Initial National Communication, PhilCCAP primarily aims to enable rural communities to cope with the impact of climate change and variability by developing and demonstrating approaches for adaptation (World Bank, 2011).

Covering four major components, the PhilCCAP includes the following interventions:

- Strengthening the enabling environment for CCA includes strengthening CCC's role in policy oversight; implementing CCA framework; establishing a decision-making framework for adaptation and sector investments; formulating a project screening tool; capacity building; access, interpretation and dissemination of climate risk information; knowledge management; and awareness raising.
- Adaptation measures in agriculture and natural resources management will be a joint undertaking of the DA, DENR, National Irrigation Agency (NIA), Agricultural Training Institute (ATI), Bureau of Soil and Water Management (BSWM), and Philippine Crop Insurance Corporation (PCIC). Major interventions under this component include climate-proofing of agricultural infrastructure in areas like the Jalaur River System at Iloilo in Region 6, and the Pinacanawan River Irrigation systems at Cagayan in Region 2; improving the delivery and effectiveness of extension services specifically for climate risk management at the farm level; pilot testing a weather index-based insurance; and enhancing resilience through improved protected area management (i.e. Penablanca Protected Landscape and Seascape and the Siargao Islands Protected Landscape and Seascape) (World Bank, 2010).

Key outputs are retrofitted or redesigned irrigation systems, farm-to-market roads, trading posts and small water impounding projects, decision support systems and Climate Field Schools for farmers of rice and corn, and a weather index-based crop insurance.

- Enhancing the provision of scientific information for climate risk management requires reliable information from and improved capacity within PAGASA. Specific interventions include the preparation of a climate information guide and the design of adaptation actions, which include historical time series, downscaled forecasts, outlooks and climate scenarios. In addition, integrated risk maps must be produced under this project. Furthermore, institutional climate risk management capacity within PAGASA and other institutions will be enhanced.
- Project coordination will be provided by the DENR, but the work will also include monitoring and evaluation, adaptive management activities, organizing of seminars and workshops.

Adaptation to Climate Change and Conservation of Biodiversity in the Philippines

The Department of Environment and Natural Resources implemented a GTZ-supported project that aims to develop and implement relevant adaptation strategies to compensate the effects of climate change and loss of biodiversity in selected areas of the Philippines. A Biodiversity Fund has been established to support micro-projects that aim to contribute to the conservation of terrestrial and marine biodiversity, and contribute to carbon sinks and ecosystem climate resilience. To date, the project has:

- supported the formulation of the Philippine Strategy for CCA;
- established an information exchange platform and database management system;
- conducted trainings of trainers for CCA; and
- monitored the results of the small grants projects. (DENR 2011)

Mainstreaming DRR/CCA into local government processes

Through the support of the World Bank-Governance Facility for Disaster Reduction and Recovery (WB-GFDRR), DILG envisioned the “Climate Change-Proofing” of LGUs by integrating DRR and CCA in local physical and development plans, and enabling LGUs at risk to prepare for and address climate change-related phenomena that cause destruction and death. The project is piloted in seven provinces of Pampanga, Zambales, Laguna, Bohol, Leyte, Surigao del Norte and Surigao del Sur. The project has the following components:

- vulnerability assessment;
- vulnerability and adaptability assessment for ecological profiling, data integration and plan preparation for Olongapo City, Tuguegarao City, Cauayan and Isabela, Capiz, Lanao del Norte, Davao del Sur, Tarlac and Cagayan; and
- mainstreaming DRR and CCA into local plans and budgets. (DILG 2011)

Climate Science and the PAGASA

To facilitate better understanding of how the climate is changing in the Philippines, DOST-PAGASA, as part of the MDGF 1656 Initiative, conducted a study on climate change in the Philippines. The study presented climate scenarios and downscaled scenarios using PRECIS model simulations, and climate trends using observed climate data. It also presented regional climate projections in the Philippines. PAGASA proposes, however, that these projections and scenarios need to be translated into impacts so that appropriate adaptation actions can be designed and calibrated according to potential climate threats (PAGASA, 2011).

Apart from this intervention, PAGASA, under the READY project of the UNDP, also attempted to downscale the HadCM3 A1B scenario for 2020 and 2050 and the ECHAM4 A2 scenarios for 43 LGUs using PRECIS (Hilario, 2010).

Japan also granted support to the Bicol River Basin to reduce its vulnerability to flood hazards through effective forecasting and warning. The said program on the “Improvement of Capabilities to Cope with Natural Disasters caused by Climate Change” is implemented by DOST-PAGASA with funds administered by the Department of Finance (DOF).

In addition to these, the Japan International Cooperation Agency (JICA) also assisted DOST-PAGASA in the improvement of the meteorological radar system of the Philippines to help communities adapt to challenges resulting from flooding and rainfall-induced landslides. The five-year project that runs until 2014 aims at upgrading the observational capabilities of PAGASA radars used for monitoring weather-related disturbances; and achieving accuracy of forecasts and timeliness of warnings.

Integrating DRR/CCA in the Local Development Planning and Decision-Making Processes

National Economic and Development Authority (NEDA), in cooperation with UNDP and the Australian Agency for International Development (AusAID), embarked on a partnership to integrate DRR and CCA in land use and development planning and to facilitate a multi-stakeholder cooperation in addressing climate change. For LGUs, it envisioned raising awareness about climate change among communities, developing competencies, incorporating DRR and CCA in land use and development plans, and developing practical strategies on CCA and DRR.

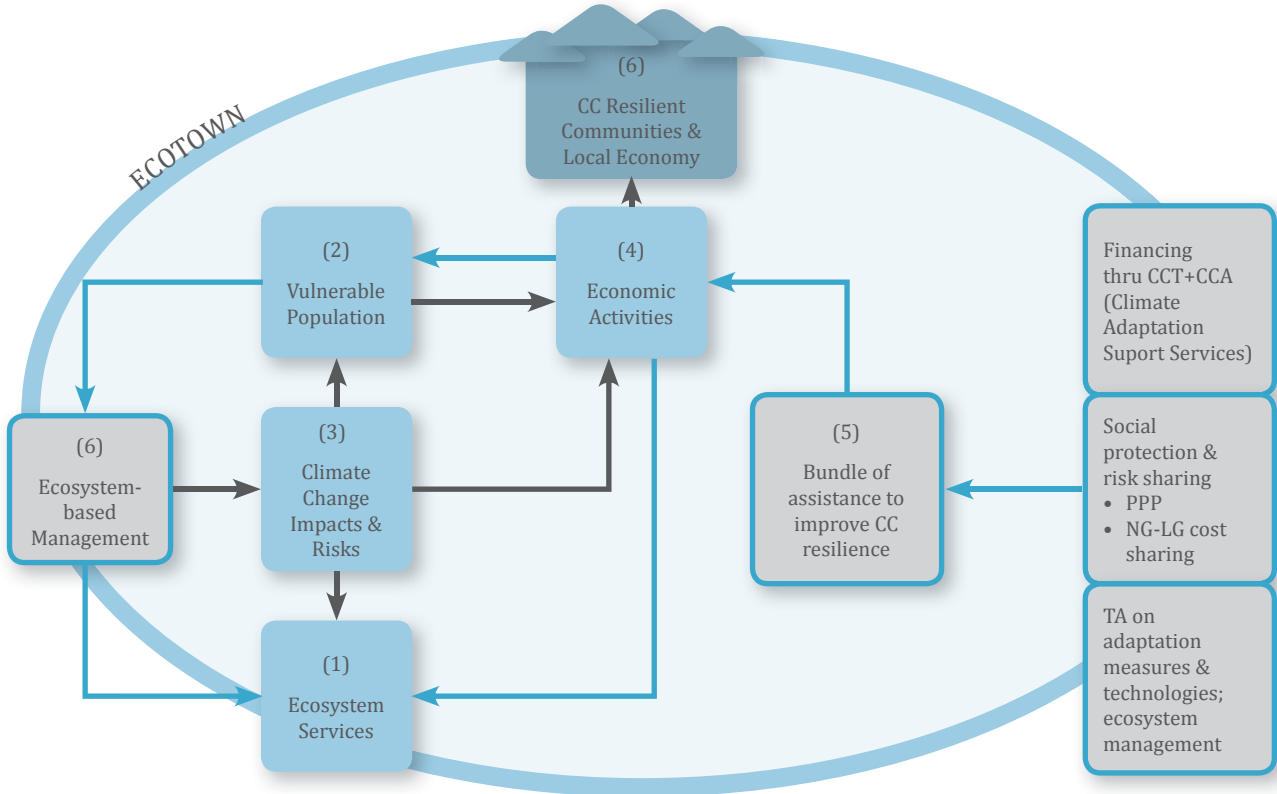
The said initiative aimed to:

- develop a handbook on establishing, managing and maintaining disaster reduction and climate reduction data;
- provide supplemental guidelines on mainstreaming integrated DRR/CCA in land use and physical framework planning;
- develop a reference manual on mainstreaming DRR/CCA in local land use planning;
- produce ten vulnerability assessment reports;
- produce ten DRR/CCA-enhanced sub-national land use/physical framework plans;
- contribute to a National Action Plan on Climate Change;
- encourage and implement a multi-stakeholder mechanism on climate change at the local level;
- demonstrate 10 CCA projects; and
- document the best practices in community-level CCA projects (NEDA 2011).

Implementing the NCCAP at the Local Level (Eco-Towns)

The Climate Change Commission, in pursuit of climate change-resilient communities and local economy, is currently pursuing development interventions using ecosystem-based management or an eco-town framework. The eco-town approach will be piloted in the eastern seaboard of the Philippines, in the top ten poorest provinces, in the top eco-tourism sites, and in key biodiversity areas of the country. The initiative is essentially

FIGURE_3 Eco-town Framework (CCC, 2011c)



bundled assistance designed to improve climate resilience with the following major components:

- financing through climate change technical and CCA support services;
- social protection and risk sharing implemented through public-private partnerships and through national government and local government cost-sharing; and
- technical assistance for adaptation measures, technologies, and ecosystems management. (CCC, 2011b)

Project Climate Twin Phoenix

In December 2011, several cities in Mindanao, particularly Cagayan de Oro and Iligan, suffered heavily from the devastating impact of the tropical storm Washi and its accompanying precipitation. The UNDP and Australian Government are now supporting the Climate Change Commission in implementing the Project Climate Twin Phoenix. The said project is aimed at mainstreaming CCA and disaster risk reduction into the planning and budgeting processes.

The project includes the following components:

- vulnerability and risk assessment;
- crafting of priority climate adaptation and disaster risk mitigation actions;
- information and education campaign; and
- concrete local actions on DRR and CCA to facilitate better competencies. (CCC, 2011a)

Supporting the Climate Change Commission (CCC) in the implementation of National Climate Change Action Plan

GIZ supported CCC and Department of Energy (DOE) to improve adaptation capacities and enhance the mitigation of GHGs. The project sought to:

- increase institutional capacities within the CCC for policy development, coordination, development of financing options, monitoring and reporting on CC and climate protection;
- strengthen capacities of local governments to develop and implement climate strategies and action plans; and
- enable the DOE to design a framework for the generation of renewable energy, awareness raising, and facilitation of knowledge exchange. (NEDA, 2012)



CHAPTER 3

CURRENT PRIORITY AREAS FOR CLIMATE CHANGE ADAPTATION

The previous sections have identified existing policies, institutional mechanisms, mandates and programs for CCA. This section will further analyze these policies and initiatives to investigate which areas have been prioritized and targeted within the scope of CCA intervention. For this analysis, nine work areas defined in the Nairobi Work Program (NWP) will be used as the NWP is the pathway to adaptation proposed under the UNFCCC. The nine work areas are (1) methods and tools; (2) data and observation, (3) climate modeling, scenarios and downscaling; (4) climate-related risks and extreme events; (5) socio-economic information; (6) adaptation planning and practices; (7) research; (8) technologies for adaptation; and (9) economic diversification (UNFCCC, 2010). Brief descriptions of the nine work areas are given below. This approach is chosen with the view that adaptation initiatives, such as those identified in the NWP and specified in the Table 2, will help reduce vulnerabilities and establish a new critical threshold of vulnerabilities to the changing climate (Carter et al. 2007). Below is a brief description of the Nine Areas of Work described under the NWP:

- Methods and tools include “developing and disseminating methodologies and tools for impact and vulnerability assessments and adaptation planning.”
- Data and observations include “improving collection, management, exchange, access to and use of observational data and other relevant information on current and historical climate variability and change.”
- Climate modeling, scenarios, and downscaling promotes “the development of, access to, and use of information and data on projected climate change.”
- Climate-related risks and extreme events will include activities leading toward the “understanding of impacts and vulnerability, emphasizing current and future climate variability, and extreme events, and the implications for sustainable development.”
- Socio-economic work will enhance “knowledge of the socio-economic aspects of climate change” and promote “the integration of socio-economic information into impact and vulnerability assessments.”
- Adaptation planning and practices work will include the collection, analysis and dissemination of “information on past and current practical adaptation actions and measures, including projects, short- and long-term strategies, and local and indigenous knowledge. This will be done through facilitating communication and cooperation between stakeholders.”
- Research work will promote “research on adaptation options.”
- Technologies for adaptation will work toward the promotion and “development and diffusion of technologies, know-how, and practices

- for adaptation, addressing identified adaptation priorities and building on lessons learned from current adaptation projects and strategies.”
- Economic diversification work will focus on “promoting understanding and the development and dissemination of ways to increase economic resilience, and decrease reliance on vulnerable economic sectors.” (UNFCCC 2007)

Very briefly, it can be gleaned from the Table 2 below that there is significant investment in adaptation planning, understanding extreme events and generating socio-economic information in the Philippines. However, there is a need for further research and actual practice of adaptation, economic diversification, and new technologies for adaptation. There is also a need for key investments in generating climate data and observations and downscaling climate models for LGUs.

Table 2. Summary of NWP priorities covered by CC policies, programs and projects in the Philippines

Philippine Policies, Programs and Projects on CC	Work Areas Covered by the NWP								
	Methods and tools	Data and observation	Climate modelling, scenarios and downscaling	Extreme events and climate risks	Socio-economic Information	Adaptation planning and practice	Research	Tech for adaptation	Economic diversification
RA 9729	X			X	X	X	X	X	
NFSCC									
NCCAP	X	X	X	X	X	X	X	X	X
PDP 2011-2016									
DILG issuances		X		X		X			
RA 10121						X			
RA 7160				X	X	X			X
MDGF 1656	X	X	X	X	X	X	X	X	X
PhilCCAP	X	X	X	X	X	X	X	X	
ACCBio	X	X			X	X			
Mainstreaming CCA (DILG)					X	X			
PAGASA programs	X	X	X				X		
Integration of CCA (NEDA)				X	X	X			
Eco-town				X	X	X			
Twin Phoenix				X	X	X			
Implementation of the NCCAP						X			

CHAPTER 4

STATE OF CLIMATE CHANGE ADAPTATION KNOWLEDGE IN THE PHILIPPINES

This section presents a brief description of the state of CC knowledge in the Philippines that the researchers were able to capture in a limited time. These are knowledge made available to practitioners by national government agencies. It is to be noted that there are limited attempts to capture spontaneous adaptation strategies developed by local government units and communities that can contribute to knowledge building in CCA in the Philippines.

Climate Science

DOST-PAGASA produced a document on climate change that includes data on:

- Observed climate data or climate trends in the Philippines;
- Climate projections in 2020 and 2050: seasonal temperature change, seasonal rainfall change, extreme temperature events, extreme rainfall events using the PRECIS (providing regional climates for impact studies) model;
- Regional and provincial projections in 2020 and 2050 in 17 regions of the Philippines; and
- Likely impacts of climate change on the water resources, forestry, agriculture, coastal resources, and health (from a review of related literature).

There is, however, recognition that to craft effective adaptation options, the climate projections have to be downscaled further, and that public and private scientific research institutions can collaborate to come up with an ensemble of climate projections based on several climate models. For instance, MO used a “regional climate model that downscaled the ECHAM 5 global climate model to a resolution of 20km (MO and ICRAF 2012).” Furthermore, there are other similar institutions and climate scientists in the country that are looking into the role of other essential climate variables (i.e. surface-based, upper air atmospheric, ocean, water column, terrestrial essential climate variables) for understanding how the changing climate will affect various sectors in society, and elements in the ecosystem. An evidence of such attempts can be reviewed from the publication “Patterns of Vulnerability in Four Sectors of Silago, Southern Leyte, Philippines (MO and ICRAF, 2012).”

Vulnerability

In discussions on CCA, vulnerability as a concept is most challenging for many stakeholders. Some define it as a form of inherent weakness or extent of damage. The latter definition can be attributed to the disaster management practice in the Philippines. However, scientists in the Philippines are beginning to provide a clearer understanding of vulnerability from a CCA perspective by defining it in accordance with the definition suggested by the IPPC, which describes it as a function of exposure to the hazard, sensitivity of elements and adaptive capacities.

Different research institutions have assessed vulnerabilities in various ways. For instance, in the study of vulnerability of water resources, the National Institute of Geological Sciences at the University of the Philippines said institutional vulnerability-readiness ratio was equal to the ratio between the institutional capacity index and stress index. The University of the Philippines and Marine Science Institute examine vulnerability as the sum between the potential impact (exposure and sensitivity) and the adaptive capacity (or the ability of the system to cope with changes). The Resilient Seas Project headed by DOST examined vulnerability as a function of potential impact (composed of exposure to rates of sea level change, waves and tides and geomorphological, lithology and coastal slope sensitivity) and long-term shoreline adaptive capacity. These multiple ways of assessing vulnerabilities led CCC to facilitate a leveling off process among academic and research institutions through a Community of Practice project supported by GIZ.

Adaptation Metrics and Options

The Philippines has produced a Philippine Strategy on CCA 2010–2022 (DENR, 2010) which contains a wealth of information on adaptation metrics (i.e. scalability, policy relevance, transferable, context-specific, comparable, captures the multi-dimensional nature of adaptation) in adaptation assessment (i.e. identification of adaptation options, prioritizing options, building adaptive capacity, implementation options and monitoring and evaluation); and adaptation gaps and options in the areas of agriculture, fisheries, biodiversity, coastal and marine resources, energy, forestry, health and infrastructure.

CHAPTER 5

ADAPTATION RESEARCH PRIORITIES AND ADAPTATION KNOWLEDGE PRIORITIES FOR LOCAL GOVERNMENT UNITS

As discussed previously, RA 9729 stipulates that LGUs are responsible for implementing CCA at the local level. However, many local government officials and offices in the Philippines do not have the technical capacities required by the NCCAP to undertake CCA interventions. In the Capacity Assessment done by NEDA in 10 pilot provincial LGUs in the Philippines under the MDGF 1656 project for CCA, the lowest ratings of the LGUs for functional capacities examined were in three areas: (1) assessing a situation and creating a vision and mandate; (2) formulating policy and strategy; and (3) monitoring and evaluation (NEDA, 2012). These functional capacities are vital if LGUs are to integrate CCA in development plans and budgets.

Given that the LGUs are at the forefront of CCA work in the Philippines, they will have to assess their own climate risks, formulate appropriate adaptation options that can be integrated into their development plans and budgets, and develop the capacities to implement their adaptation plans. Based on consultations with LGUs, the following are the gaps in research that they need to plug:

- PAGASA has prepared climate projections for each province of the country. However, given that the Philippines is an archipelago with diverse ecosystems, downscaled climate projections at the municipal level that can be applied in climate change risk assessments will be a necessary requirement for them to adapt. At the very least, LGUs must have access to climate trends covering 30 years for their respective areas of responsibility.
- The Philippines is a hazard-prone country. LGUs will need to know their other multi-temporal and multi-spatial hazards (i.e. geo-physical, ecological, human-induced) that may possibly interact with their climate and weather-related hazards and cause potential harm to their people and assets.

- Many LGUs have yet to identify their biophysical and social vulnerabilities as well as capacities. This information will be essential in determining an LGU's level of risk to climate change.
- Studies are needed to examine how projected changes in climate parameters can impact farming, fishing, marine resources, crops, products, local biodiversity, water resources, soil composition, forestry, infrastructure, human health, and key economic sectors and ecosystems. Context-specific research data on these will enable LGUs to craft programs, projects and activities that they can include in their development plans. These can also serve as a basis for public investments in CCA.
- CCA is context-specific. If LGUs are to adapt, they also need to know the most appropriate adaptation options for them, using a more ecosystem-based approach that recognizes the provisioning, regulating, supporting and cultural value of each ecosystem. Many LGUs face the challenge of balancing economic needs with environmental management and protection.
- Innovations research on lifestyle-based, culturally appropriate adaptation options will be essential for the development of context-specific adaptation options.
- Most LGUs also need adequate funds for CCA at the local level. Policy reform analysis will have to be conducted to inform LGUs about the funding mechanisms that can be developed to create an enabling environment for local CCA without depending on foreign funding.

CHAPTER 6

INSTITUTIONAL MECHANISM FOR THE POTENTIAL OPERATIONALIZATION OF AN LGU ADAPTATION KNOWLEDGE PLATFORM IN THE PHILIPPINES

As of 30 June 2010, the Philippines comprised 80 provinces, 122 cities, 1,512 municipalities, and 42,025 barangays. Set apart by diverse ecosystems, the LGUs need specialized knowledge about climate change in order to adapt successfully. Under the current Philippine laws, however, there is no singular knowledge platform for LGUs in the Philippines. They may have access to multiple platforms, but not necessarily specified under a law.

The Local Government Code of 1991 provides that each LGU can facilitate human resource development. In fact, each year, every LGU must make allocations for human resource development and capacity building needs as part of its development planning process. CCA capacity building can, therefore, be facilitated within each LGU through this mechanism. A specific administrative order or executive order can lead to a CC committee headed by the Planning and Development Office of each LGU, but involving all offices within each LGU besides other stakeholders. A more effective approach is to make it mandatory by having DILG issue a memorandum circular requiring the setting up of such a committee that can serve as an Adaptation Knowledge Platform within each LGU.

Regardless of the approach, LGUs will need the help of other institutions. For instance, LGUs can partner with state colleges and universities, which can treat this collaboration as part of their extension service programs. These state colleges and universities can automatically become part of the CC committee. Civil society organizations or community-based organizations and private institutions concerned with CCA can also come aboard the CC committee. This approach will facilitate a trans-disciplinary learning process in the local Adaptation Knowledge Platforms of the Philippines.

CHAPTER 7

LGU CLIMATE CHANGE ADAPTATION CAPACITY DEVELOPMENT STRATEGY

While RA 9729 requires CCA integration into local development plans, it does not specify the source of funds for CCA. In order to implement the law, it is essential to boost the CCA knowledge, capacity and resources among LGUs. In order to integrate CCA into development plans and budgets, the LGUs must be creative in terms of finding ways to (1) understand the climatic hazards faced by them; (2) determine which adaptation options are most appropriate for them; and (3) identify sources that can be used to implement these adaptation options. Given their limited resources to pursue adaptation actions, LGUs need better access to scientific data. They should work with local scientists and practitioners so that their adaptation options are well-informed by both science and practice.



INSTITUTIONAL CAPACITY DEVELOPMENT THROUGH SCIENCE-POLICY-PRACTICE NEXUS

There are several suggested pathways for CCA capacity development in LGUs, in which science and practitioners can contribute. For example, science can explain the hazards, while people can reflect on ways to cope with them, and the academic/scientific community can help LGUs take context-specific actions leading to adaptation since coping and adaptive capacities depend on the context. In addition, local practitioners can inform LGUs about existing attempts at CCA. Community-based civil society organizations and private institutions, which have already been developing and implementing CCA interventions, can also help LGUs decide about their adaptation options. What will be most helpful for LGUs are evidence-based CCA approaches that were developed and perfected by practitioners over time, and reflect years of learning and action.

Scientific knowledge about the hazards, vulnerabilities, coping, and adaptive capacities will lead to better policies, practical actions and interventions. As such, a science-policy-practice nexus is proposed between scientific and academic institutions, governance institutions (public and private) and their community-based partners. This section describes how science can inform policy and practice as well as how practice can inform the direction of scientific research and policy development. The concept of a science-policy-practice nexus aims to harness the strength of each to come up with a CCA action with significant outcomes. This proposal is not entirely alien to the planning process in the Philippines where stakeholders from scientific institutions, academia, CSOs and local communities are supposed to be involved in local development planning.

Enabling Synergy in Science-Policy-Practice Work for Evidence-Based Climate Change Adaptation Work in LGUs

To enable LGU ownership of the CCA work and enhance the institutional capacities in DRR and CCA, LGUs can organize a CCA core team comprising lead units of the LGU involved in sectoral development planning (i.e. social, economic, services, institutional, environmental) and their community-based partners, people’s organizations, private sector, and State colleges and universities in their respective areas. This team can develop a strategy paper on CCA capacity building for LGUs; and lead in the identification of appropriate adaptation measures that can be transformed into Programs, Projects and Activities (PPA) which can serve as the basis for public investments in LGUs. They can also organize sectoral clusters for initiating further learning on CCA, and seek potential partnerships with other stakeholders who can help the LGUs in determining appropriate adaptation measures.

CCA practice can be fostered by encouraging LGUs to pilot science-based CCA interventions and innovations in partnership with national agencies, the legislature offices endowed with development funds, Union of Local Authorities in the Philippines, donor agencies, international humanitarian organizations, and community-based organizations. Lastly, LGUs should set up CCA field schools to facilitate cross-learning among the units.

Bringing Science-Policy-Practice to the Service of Nation-Building through LGUs

The Philippines has several State colleges and universities that are supposed to provide extension services to their immediate communities. This is, in fact, part of their mandate. Consistent with the visions of nation-building, the academic and scientific community’s key role as a catalyst for risk reduction and climate change adaptation is to communicate their scientific studies on CCA to communities of practice, especially LGUs. These institutes can develop learning modules that facilitate the understanding of climate and disaster risk science. Applied climate science work can be used to further encourage sharper analysis and research in the fields of agriculture, water, energy, health, transportation, infrastructure development and gender.

These learning institutions can also develop a course on CCA for LGUs with specialized and focused discussions on adaptation options in the various fields mentioned above. The training can target Local Chief Executives, Planning and Development Office and the heads of offices of the LGUs and line agencies assigned to review LGU programs and projects (e.g. agriculture, agrarian reform, environment and natural resources, trade and industry, tourism, and public works among others). A short CCA course can also be offered for the Sangguniang Kabataan and National Service Training Program (NSTP) coordinators in cooperation with CCC, NDRRMC, National Youth Commission (NYC), and the Commission on Higher Education (CHED). Furthermore, LGUs can work with academic and scientific institutions, which can initiate a program for Climate Change Innovation. Study options can include a CCA executive program (for local government officials), a diploma course (for members of the research and academic community) and a certificate course (for national government and non-government personnel), co-offered by the Ateneo School of Government, Manila Observatory, and Climate Change Academy of the Province of Albay.



Scientific knowledge about the hazards, vulnerabilities, coping, and adaptive capacities will lead to better policies, practical actions and interventions.

The above-mentioned stakeholders, whose capacities have been developed, can mentor members of a proposed capacity building consortium involving state and private colleges and universities across the country with the specific aim of providing CCA technical and capacity building support to LGUs across the Philippines.

The Capacity Building Consortium on CCA, when convened, shall work toward joining the umbrella of capacity building institutions under the Local Government Academy's PhilNetwork. The Local Government Academy is the institution tasked with building LGU capacities. Through the CCA learning consortium, it seeks to address the problem of lack of internal and institutional capacity in the LGA to pursue CCA capacity building. To ensure compliance, all capacity building initiatives related to CCA, when initiated by the LGA, must be supported by a memorandum circular specifically from the DILG. The country can use the expertise of scientific, academic and civil society institutions for CCA in LGU. To avoid conflict with government agencies and to harmonize and develop synergy among various stakeholders on CCA, capacity building for LGUs by scientific, academic and civil society institutions can go through an accreditation process by the LGA.

At this juncture of CC development in the Philippines, LGUs are required to prepare their local climate change action plans (LCCAP). However, many LGUs find this a challenge. So, it is recommended that the capacity building work on adaptation should target the Planning and Development Units of the LGUs. Furthermore, the CCA training for LGUs can focus on how to integrate CC in development planning; how to identify appropriate adaptation options that can be transformed into programs, projects, activities in LGUs; and how to network and link with research and academic institutions working on CCA. Another way forward is to set up a Science-Policy-Practice Learning Network/Circle between CCA local government champions, community-based practitioners, private-sector DRR and CCA practitioners, international humanitarian organizations and donor agencies as well as academic and research institutions. A monthly science and policy review and briefs on CCA can be targeted as a product of this Learning Network/Circle. Furthermore, it is suggested that local government officials should pursue regular science-policy dialogues on CCA concerns, needs, actions and innovations with Philippine legislators, and agencies concerned.



KNOWLEDGE MANAGEMENT CAPACITY DEVELOPMENT

It is evident that there are multiple interventions on CCA in the Philippines. Though commendable for their intentions, they lead to a state of incoherence from the governance perspective, particularly in the area of knowledge management and capacity development given the multiple agencies providing various interventions without a common framework or a set of standard tools. In order to avoid further confusion, it is proposed that the CCA knowledge management capacity building for LGUs be done through several platforms that have already been institutionalized by law or administrative policies.

First, knowledge management (database on adaptation information) via a climate change information management system and network, as stipulated in the RA 9729, must be facilitated by DENR, which has an institutional structure that allows for direct engagement with the LGUs. DENR also has a Climate Change Office that can provide technical support for the creation of a knowledge management service on CCA in LGUs.

Consistent with the capacity development strategy proposed above, the local Environment and Natural Resources Office can also facilitate data management for the outputs of the local CCA team or committee; initiate local research on context-specific and culturally appropriate adaptation measures; and facilitate the knowledge building process through the proposed Learning Circles.

These proposals are, however, applicable to LGUs that have local environment and natural resources offices (ENRO). Some LGUs have not yet established their local ENRO due to lack of funds. Where the local ENRO has not been established, it is suggested that the knowledge management capacity be developed through the local planning and development offices in the case of provinces, cities and municipalities. In barangays, the knowledge management capacity can be a function of the barangay development councils (BDCs).

CHAPTER 8

ADAPTATION KNOWLEDGE PLATFORM DEVELOPMENT STRATEGY FOR THE PHILIPPINE

Currently, CCC, in partnership with GIZ, has initiated the formation of a Community of Practice (CoP). However, the CoP is a community of researchers from academic institutions and line agencies, a rather exclusive circle at the time of writing this report. It is suggested that the Adaptation Knowledge Platform for the Philippines begin with the creation of a CCA Learning Consortium, which includes LGUs and their champions as proposed earlier. The Learning Consortium will eventually link with the CoP, but will work toward its institutionalization as a partner of the LGA.

While an internet-based open source knowledge sharing platform is recognized as the way forward, it is suggested that the Adaptation Knowledge Platform be open source, yet also non-internet based. Thus, it is advisable to set up CCA resource centers within the local Environment and Natural Resources Offices or the local Planning and Development Offices of LGUs.

LGUs are mandated with securing the general welfare of their people. By making knowledge and information on CCA available to the most vulnerable communities and other constituents, they can meet this obligation.

CONCLUSION

Philippines has a law, RA 9729, that enables climate change adaptation at the local level. Actions on adaptation are further mandated by a related risk reduction law, RA 10121, while prevention of any form of loss of lives and damage to property by any source of hazard is a mandate given to LGUs by RA 7160.

Under RA 9729, the LGUs are at the forefront of local climate change adaptation action. However, there is a widespread lack of capacity among LGUs required to facilitate adaptation at the local level through the preparation and implementation of climate change action plans.

Owing perhaps to the fact that the Climate Change Commission (CCC) is still in its infancy, the CC governance system appears to be in a state of transition. Nonetheless, there are several different attempts that aim to enable national government institutions and some LGUs to develop adaptive capacities.

Given the breadth, extent, and scope of CCA work in the Philippines among its many LGUs, the national government needs to recognize the significant contribution of scientific, academic and civil society institutions in building capacities of LGUs on CCA. Furthermore, various institutions working toward CCA must learn how to develop synergy to save on resources; contribute to coherence in CCA action; and work at not confusing LGUs on the various pathways to CCA. Where there are existing government mechanisms that can facilitate capacity building on CCA (for instance, Local Government Academy) or more efficient CCA knowledge management (for instance, through DENR as RA 9729 stipulates), it is suggested that other institutions with CCA programs and projects work with these institutions or specifically contribute to strengthening the capacities of these institutions further.

Lastly, it is suggested that an Adaptation Knowledge Platform for LGUs can be facilitated by the creation of a CCA Learning Consortium, composed of various stakeholders, including LGUs, who can work with the Community of Practice being established by the CCC in coordination with the LGA.

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ANNEX 1

ADAPTATION GAPS AND NEEDS IDENTIFIED PER SECTOR IN THE PHILIPPINES STRATEGY ON CCA 2010–2022

Agriculture	<p>Inadequate focus of national research agenda on climate change; and lack of scientific guidelines, benchmarks and indicators for monitoring and assessing climate change impacts;</p> <p>Lack of a clear picture about the limits of adaptation as effective adaptation measures are highly dependent on specific, geographical factors;</p> <p>Global knowledge was not translated into local information about climate risks and adaptation strategies;</p> <p>Inadequate effort to establish a well-organized national and local climate risk information system and ways to communicate this information;</p> <p>Uncertainty in the continuity of support and dedication to climate change due to uneven tenure conditions in the local government leadership;</p> <p>Lack of geographical balance in the data and literature on observed changes, with marked scarcity of such data in developing countries;</p> <p>Absence of a National Land Use Policy to rationalize land use change and define the best economic and environmental use of prime lands in the country;</p> <p>Lack of institutional capacity to locally replicate global research information and knowledge;</p> <p>Lack of historical field data about trends in production, disease manifestations and effects on yield by climate types, season and landscapes;</p> <p>Lack of benchmark landscape and crop-specific data and information for monitoring changes in the levels and quality of organic matter, which provides vital signs of ecological health, productivity, water generation capacity, soil productivity and carrying capacity;</p> <p>The current limitation of scientific institutions, which for want of modern laboratory and computer-assisted facilities, are unable to conduct quantitative translation of climate change impacts on specific agro-ecosystems, as well as measured/calibrated response of plants and animals to every change and permutation in temperature and rainfall.</p> <p>The need to explore the integration of science and anecdotal knowledge of farmers with the monitoring of climate change and in downscaling of knowledge and information tools for communicating climate change strategies to a wide range of users and stakeholders at the local and national level.</p> <p>The country’s scientists and researchers have a clear understanding of the impacts of climate change on agriculture and food security, but the local farmers have an even better understanding of the responses of indigenous crops, livestock and fish to various micro-changes in climate stressors.</p>
Biodiversity	<p>Policy and institutional issues and gaps</p> <p>Information, data and knowledge gaps on the impacts of climate change on Philippine biodiversity;</p> <p>No cross-sectoral strategies for addressing climate change impacts;</p> <p>Need to formulate a research and monitoring plan to study the impacts of climate change on various species and ecosystems; and</p> <p>Weak institutional capacities to plan and implement programs on biodiversity adaptation to climate change.</p> <p>Technical issues and gaps</p> <p>Establishment of the Philippine climate change scenarios to prepare impact and vulnerability assessments;</p> <p>Inventory and vulnerability assessment of critically endangered species and fragile ecosystems; and</p> <p>Integration of biodiversity conservation in development planning, particularly in the development of towns and cities, which has shrunk or obliterated ecosystem diversity.</p>

Coastal and Marine	<p>Technology Develop a methodology to determine vulnerabilities in different parts of the Philippines, using appropriate technologies as guides to actions; and Adopt ecosystem approaches (e.g. coordinated management of coastal and adjacent land ecosystems) that make use of remote sensing technological tools such as satellite imageries</p>
	<p>Governance Set up marine reserve networks with identified refugia serving as sources of coral/fish larvae to replenish degraded reefs due to human-induced factors and high temperatures; refugia in deeper, cooler waters near upwellings can avert serious threats to fisheries; Implement a program that physically protects coastal areas from strong wave action, storm surges, tsunamis, etc.; Prioritize protection/management of mangroves, sea grasses, coral reefs and beaches as a unit to derive maximum benefits resulting from synergistic interactions of these four ecosystems that result in enhanced marine productivity; Select priority seascapes far from sources of non-climate related stress (e.g. degraded catchments, poor land practices, urbanized developed areas).</p>
	<p>Education Develop IEC programs on links between ecosystems and biophysical stresses to enable affected communities to better understand climate change; and Mainstream climate change in the curriculums of schools, colleges and universities.</p>
	<p>Research Use various parameters of marine biodiversity (e.g. fish biomass, species' richness, fish abundance, fish biomass export from marine reserves, catch-per-unit effort) as indicators to measure the progress of conservation and management of coastal ecosystems through regular monitoring. It is necessary to determine the new baselines for these indicators; and Determine the optimal clustering and locations for marine reserves according to the "source and sink" concept of distribution of marine propagules, taking into consideration oceanographic factors such as upwellings, downwellings, horizontal movements of ocean currents, wave action, etc.</p>
	<p>Capacities Enhance the resilience of coastal and marine ecosystems and coastal communities by reducing human-related stressors such as over-fishing, use of destructive methods of fishing, and pollution;</p>
	Energy

Fishery	<p>A national plan that integrates CC mitigation/adaptation strategies for fisheries and aquaculture, coastal and marine environments and biodiversity into the economic and social development processes and policy frameworks.</p> <p>Addressing potential complexities of CC changes and responses at different scales of impact would require a highly efficient coordination among various sectors within the governance framework. It is essential therefore that CC considerations be part of the normal processes of development, engaging people and various stakeholders at all levels.</p> <p>Build the adaptive capacity of people and institutions involved in fisheries and ecosystem. Implement novel ways of training and engaging people at all levels to prepare for environmental / fisheries disaster mitigation, rescue and rehabilitation.</p> <p>Develop the knowledge base by scenario modelling and impact analysis to enable resource managers and scientist to better understand the impacts of climate change on fisheries and aquaculture at different scales. This will help them develop appropriate and cost-effective adaptive measures.</p> <p>Taking into consideration the different ecosystem and biological groupings such as the demersal, reef-related and pelagic fisheries.</p> <p>Learn and innovate from happenings in other areas. WWF for instance has a program called “climate change witness” that encourages everyone to report anomalies, abnormalities they experience. Fishers for instance report unusual appearance of fish species in their locality, or the disappearance of an organism or a bleaching event. Such information is relayed to scientist who then study these “incidents”.</p> <p>Encourage information and knowledge sharing to increase awareness about CC among people and policy makers.</p> <p>Enhance cooperation in the implementation of mitigation and adaptation measures. There is a need to engage the private sector as a partner in CC mitigation and adaptation schemes; identify and invest in business opportunities arising from climate change.</p> <p>Create a pool of multi-sectoral experts with representatives from the fisheries and aquaculture sector, to advise governments and businesses on ways to minimize negative impacts, and maximize opportunities. This would include cost-benefit analysis of a wide range of creative adaptation strategies for both public and private sectors.</p> <p>Strengthen existing regional structures and processes with special focus on CC change, given the transboundary nature of some of the fishery resources. Policy and legal mechanisms at the regional level need to be developed or harmonized, given that the country is signatory to many global, regional and sub-regional treaties. In the event of resumption (if ever) of WTO negotiations, Philippine’s positions on issues such as subsidies, CC impact considerations must be taken into full account.</p> <p>Strengthen the regional trading mechanisms to buffer supply variability and protect the investments in the fisheries sector. This is highly important because the Philippines is a net exporter of seafood products.</p> <p>Improve the utilization of marine and fisheries products through value addition, thus reducing losses arising from poor handling and preservation and increasing the income of the fishers.</p>
Forestry	<p>Identification and demarcation of high-value forests for conservation, based on the definitions of the Forest Stewardship Council, for both biodiversity conservation and for regulating climate, water, and soil erosion.</p> <p>Development of payment for ecosystem services (PES) schemes to generate financing for conservation.</p> <p>Adaptation and coping mechanisms of the upland poor to stresses and shocks associated with climate change.</p> <p>Geo-hazard mapping of all forestry areas in the Philippines. Policy and implementation measures limiting human settlements in the uplands and coastal areas.</p>

Health	<p>Governance Establishment of cross-sector activities and coordinative mechanisms (forestry, water, energy, agriculture) for integrated adaptation responses Policy cover for governance plans and activities. Integrating CC in the monitoring and evaluation systems Development of specific strategies for community participation to improve resilience in anticipation of projected impacts Forging of private-public partnerships for climate change and health activities</p> <p>Regulation Climate Change and Health Development National and local assessment to determine health vulnerabilities and impacts Addressing the need for additional regulatory parameters to ensure safety of infrastructure and quality of health goods and services Mainstreaming indigenous knowledge in adaptation mechanisms for health Review of the CC Act vis-à-vis related legislation (i.e., Clean Air Act, Solid Waste Management, etc.) Institutionalizing DRR and CCA into health regulatory system development and policies</p> <p>Capacities Training health personnel and acquiring equipment for adaptation Developing behavioral change communication on CC and health Addressing the need for additional research and studies integrating CC in the monitoring and evaluation systems Integration of infectious disease programs with environmental health program (WATSAN) Establishment of integrated disease surveillance systems with an emphasis on climate-sensitive diseases</p> <p>Financing Ensuring a financing mechanism for CC adaptation, which is measurable, reliable and sustainable Inclusion of CC programs and initiatives in the development of provincial/city investments</p> <p>Plans for Health Sector-wide approach (pooling of resources) Strengthening PhilHealth benefit package to address CC-related diseases</p>	
	Infrastructure	<p>Sustainable baseline data collection by the Bureau of Research and Standards for climate-proofing infrastructure projects; Develop unified climate change localized projections for all the 16 regions in the form of hazards maps, vulnerability maps, precipitation data, sedimentation, etc.; Review of existing building codes, specifications and standards and draft protection levels to guide the design of new infrastructure; More thorough evaluation of existing adaptive measures and their relative ability to reduce operational costs, and maintain or improve mobility and safety; Develop a set of sector tools to identify infrastructure at risk, and develop customized adaptation strategies; Conduct an inventory of existing infrastructure that may be at risk from the effects of climate change based on the vulnerability maps specific to localized climate change projections; Updating of studies and plans, especially those in the implementation pipeline, to include climate change considerations; Develop coordinated adaptation plans with other sectors such as health, energy, water and biodiversity; Collaboration with scientific organizations and academe for new tools and approaches to climate-proof design and implementation of infrastructure projects; Draft design guidelines for new infrastructure that take into account anticipated climate change impacts; Integrate climate change concerns into planning, right from project conceptualization to operation and maintenance; Conduct comprehensive studies that focus on key issues for shipping and navigation, including the impacts on climate change on the roll-on roll-off transportation strategies; Integrate climate change and adaptation concerns into engineering curriculum; Capacity-building of national government agencies, and LGUs; Creation of allocation funding support for CCA activities—mechanics to be prepared by an inter-agency technical working group to be led by the Department of Finance; Additional resource mobilization in the form of foreign funding; Review international best practices to adapt to local infrastructure planning, design and implementation; Conduct an inventory of the existing local CCA plans and practices to incorporate lessons learned in infrastructure planning, design and implementation; and Identify adaptation strategies from other sectors for further study. For instance, analyze how changes in factors external to climate such as technology, legislation/local ordinances, financing, risk transfer mechanisms (i.e. insurance policies), land use patterns and economics, affect societal vulnerability to climate change;</p>

Effective, climate change responsive, and participative water governance
Mainstreaming CC adaptation in water resources policies and development planning
Institutional and policy reforms
Reduced water sector vulnerability and resilient communities and natural ecosystems
Climate-proofing of water-related infrastructures, including water supply infrastructures, dams and impoundments for irrigation and energy generation;
Adopting “low cost” appropriate and advanced adaptation technologies; and
Enhancing institutional and community capacity for IWRM.
Improved knowledge on water sector adaptation to climate change
Strengthening of key government and academic institutions at the national and local levels to provide climate change projections and impacts on water supply and demand.
Generating and managing knowledge about adaptation technologies and impacts of climate change on water resources and its associated social and economic costs.
Developing and implementing comprehensive communications strategy to raise awareness about climate change impacts on water resources and the advantages of early attention to adaptation.
Integrating climate change and IWRM into education and training for key fields, including engineering, economics, architecture, planning, natural resources /environmental management, and local governance.
Sustainable and reliable water sector financing and investment for CCA.
Developing public-private sector partnership in IWRM and CC adaptation to encourage shared responsibilities in financing adaptation measures;
Designing and implementing appropriate incentive systems to mobilize diverse sources of financing; and
Designing and implementing full-cost water pricing and tariff structures that encourage conservation and efficient water consumption besides generating resources to assist in financing adaptation measures



Secretariat

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