



Philippine Institutions and Complex Institutional Arrangements for Climate Change Adaptation in Agriculture

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Abstract

Addressing climate change necessitates creating new, or building the capacity of old, institutions. Institutions are vital tools that determine the intensity by which climate change considerations are incorporated into the decision-making process, designs, and plans. This article aims to illustrate that it is necessary to understand the institutional environment where the climate change adaptation (CCA) endeavors will be implemented such that local CCA policies, plans, and programs can be implemented effectively. The paper also intends to demonstrate that, along with the scientific and technological discussions, institutional conversations should be among the initial vital steps in CCA planning, and that the institutional dimension should be the foundation of broader reforms toward an effective CCA implementation. The paper accomplished this by investigating the conditions in the local agriculture and CCA in the Philippines. The paper applied the Institutional Environment Matrix as the main analytical framework.

The analysis showed that the existing institutional dynamics in the Philippines have impacted the effectiveness of the introduced CCA policies and efforts. The Local Government Code of the Philippines had counterproductive interplays with other institutional rules; first in agriculture, and afterwards, in CCA. The Code has devolved tasks to the local governments, provided local government units with extensive authority over their jurisdictions, and improved autonomy in local governance. However, it lacks the arrangements that would create (dis)incentives for individual and collective actions (i.e., rewards and penalties, payoffs on actions). Likewise, institutional mechanisms to support the devolution of government services are wanting. Such institutional environment in local governance has curtailed the effectiveness of local agricultural policies and the efficient implementation of new CCA policies.

This article advocates that analyzing the institutional environment where the CCA endeavors will be implemented will enable policy makers and CCA planners to understand better and to have deeper perception of the interlinkages between and among institutional arrangements. In the case of the Philippines, if the local agricultural institutional environment was considered in the design and implementation of the CCA policies, institutional support mechanisms that can address the existing issues and concerns in local agriculture may have been incorporated into these policies. Such action may have helped implementers to avoid the same difficulties in operationalizing CCA initiatives. Accordingly, the paper analyzed how CCA is operationalized through an institutional lens, and presented how institutional analysis is important in policy making. It further demonstrated the complexity of institutional linkages and raised the conversation on the institutional dimension of CCA.

Keywords: Institutional environment; local climate change adaptation; institutional dimension of climate change adaptation; institutional interplays; Philippine local agricultural adaptation

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Introduction

Institutions are central in the transformation and development of long-term adaptive capacity and resilience to climate change of systems. Specifically, policy and regulatory tools are the “enabling factors” that determine the intensity by which climate change considerations are mainstreamed into the decision-making process, designs, and plans for sustainable development (Berman, Quinn, & Paavola 2012; Boyle, Cunningham, & Dekens, 2013). Addressing climate change necessitates creating new, updating the old, or building the capacity of existing institutions. Although actual institutional responses to climate change are being realized, the adjustment in the institutional landscape and the operationalization of institutional actions toward the endeavor have been slow and limited. Most institutions have been established to address the problems of the past, and they need to be upgraded to confront the complexity of future climate scenarios effectively (United Nations Development Programme, 2011).

However, the existing legal and institutional frameworks are inadequate to facilitate an effective institutional response to climate change (Cruz et al., 2007; Tan & Pereira, 2010). The poor institutional capacity, weak institutions, and the need for institutional reforms have contributed to the vulnerability and lack of resilience in most, if not all, developing countries (Wilbanks et al., 2007; Rydge, Jacobs, & Granoff, 2015). These conditions validate the significance of synergized institutional, scientific, and technological approaches in building climate resilience in systems. The task, therefore, needs a multidimensional perspective.

Adaptation endeavors should encompass generating scientific and technological plans and designs and the means by which these sets of information and outputs will be integrated into the institutional environment (IE) where the adaptation measure will operate (Jentoft & Chuenpagdee, 2009; FitzGibbon & Mensah, 2012; Cuevas, Peterson, Robinson, & Morrison, 2016; Cuevas, 2018). Accordingly, this paper aims to show that in order to be effective in implementing local climate change adaptation (CCA) policies, plans, and programs, planners and policy and decision makers need to understand the IE where their respective CCA initiatives will be implemented.

IE is defined as the array of institutions that influence the behaviors and decisions of the actors within the domain of interest; in this case, agriculture and CCA. Along with the scientific and technological discussions, institutional conversations should be among the initial vital steps in CCA planning; the institutional dimension should be the foundation of the reforms toward an effective CCA implementation. Understanding the IEs enables stakeholders to analyze better the existing and potential problems in the IE, and to have a deeper and broader

perception of the interlinkages between and among institutional arrangements. Through an IE analysis, the present paper provides a good overview of the institutional interplays; that is, determining what arrangement and from which institution is complementary, contradicting, overlapping, or in conflict with another.

The paper is structured as follows. Section 2 presents a brief introduction of the agriculture and climate change conditions in the Philippines, thereby justifying the choice of study area. This is followed by the discussion of the methodology and limitations of the paper in Section 3. Section 4 details the first part of the analysis—the composition of the IEs of agriculture and CCA at the local scale. Section 5 illustrates the institutional interplays in the IEs, and Section 6 provides the concluding remarks of the paper. Fundamentally, the paper aims to stimulate the discussion on the institutional dimension of CCA. In doing so, it bridges the gap between planning and operationalization of CCA endeavors through an institutional lens.

Overview of Agriculture and Climate Change Adaptation in the Philippines

The contribution of agriculture to the Philippine economy has dwindled over the last 70 years. Its share of the country’s GDP has been sliced from 30% in 1946, to 20%, 14%, and 7% in 1970, 2000, and 2018, respectively. Nevertheless, the sector remains a significant source of employment, securing around a quarter of all jobs in the country in 2018. Its share was even greater than that of the manufacturing sector (19%) during the same year (PSA, 2020a, 2020b).

Through the years, the declining performance of agriculture has been attributed to a combination of factors. The central causes of the sector’s deterioration are the weaknesses in institutions and in governance within the agricultural bureaucracy, i.e., overcentralization, politicization of the bureaucracy, lack of clear organizational framework and organizational cohesion, weak technical and managerial capability, unclear communication lines, unstable budget, and corruption (David, 1995; Habito & Briones, 2005; David et al., 2012; OECD, 2017).

Another significant factor that directly impacts Philippine agricultural productivity is the inefficient provision of agricultural extension services. These services include the activities concerned with delivering information and services to agricultural stakeholders for capacity development (i.e., technical, organizational, management skills) and for improving the livelihood and well-being of agricultural stakeholders, particularly those in the rural areas (Ani & Correa, 2016). Essentially, agricultural extension is characterized by low levels of financing; fragmented institutions; lack of institutional coordination; disharmony of programs; overlapping

functions and activities of institutions; human resource issues; partisan politics and political interference, among others (Cidro & Radhakrishna 2003; Ocenar, Brillantes, Curthbertson, & Tumanut, 2004; Ani & Correa 2016; OECD, 2017).

The meager agricultural production in the Philippines is now further threatened by climate change. Agriculture highly depends on climatic conditions, and hence is extremely sensitive to its variations. Through the changing rainfall patterns, rising temperatures, increasing occurrence of intensified typhoons, and the like, climate change has been, and will continue to threaten the sector's productivity and overall performance (e.g., climate change-induced productivity shocks) (Chen, et al., 2016; Cruz et al., 2017; Lewis, Monem, & Impiglia, 2018).

Meanwhile, the Philippines is one of the countries highly vulnerable to climate change. In 2018, it ranked 5th in the world in terms of the most at-risk to climate change (i.e., Long-Term Climate Risk Index), and 4th with regard to countries most affected by extreme weather events in the years 1998–2017 (Eckstein, et al., 2019). With bleak climate projections, future conditions are likely to worsen in the country. Under the representative concentration pathway (RCP) 8.5 (high-emission scenario), temperatures can rise as high as 2.3 °C and 4.1 °C, by mid- and end of the 21st century, respectively. Likewise, under the same RCP 8.5 scenario, rainfall might decrease up to 40% by mid-21st century, whereas sea level is expected to rise by 20 CM by end of the century. Similarly, tropical cyclones are anticipated to intensify further (Philippine Atmospheric, Geophysical, and Astronomical Services Administration [PAGASA], 2018).

The Philippines recognizes the importance of addressing and adapting to climate change, and has enacted laws toward this goal. Two of the most influential legislation on the concern are the Climate Change Act of 2009 (hereafter referred to as the Act) and the Philippine Disaster Risk Reduction and Management Act of 2010. The Act institutionalized climate change and CCA mainstreaming into the national and local government policies, plans, and programs. It also created the primary policy-making body of the government on climate change concerns, the Climate Change Commission. Meanwhile, the Philippine Disaster Risk Reduction and Management Act established the CCA and disaster risk reduction management (DRRM) agenda in government processes such as policy formulation, socioeconomic development planning, budgeting, and governance.

In recent years, the Philippines has also established the institutional foundations linking climate change to agriculture. To illustrate, both the Republic Act (RA) No. 8435 (Agriculture and Fisheries Modernization Act [AFMA] of 1997) and the Climate Change Act, the main laws governing the rules in agriculture and climate

change, respectively, acknowledged this connection. Section 16 of the AFMA has provisions concerning “Global Climate Change”, whereas Section 9(f) of the Climate Change Act identifies agriculture among the climate-sensitive sectors. The Department of Agriculture (DA), the lead government agency in the sector, has also initiated efforts toward implementing CCA. In 2010, it created the Climate Change Program Office under the Office of the Undersecretary for Policy and Planning. In 2011, it issued a policy and implementation program to guide stakeholders in addressing climate change issues. In 2013, the DA issued a memorandum on “Mainstreaming Climate Change in the DA Programs, Plans and Budget”. This memorandum likewise led to the creation of the Adaptation and Mitigation Initiative in Agriculture.

The Philippines is an interesting case for an institutional environment analysis. For one, it is in a unique position to provide robust sets of information on the interactions and interplays among the existing institutions operating in agriculture and has introduced sets of institutional rules in CCA. Furthermore, it has an agricultural sector that is defined by problematic agricultural bureaucracy, weak institutions, and a challenging extension services system on one hand. On the other, the Philippines has been institutionalizing climate change-related laws and policies in the past decade; laws in which the effects can now be assessed and analyzed.

Methods and limitations

The author conducted a desk research; particularly, it examined around 40 relevant CCA and agriculture laws and policies, investigated the functions and mandates of 25 organizational institutions, and studied approximately 80 peer-reviewed papers, government reports, and grey literature on the topics.

Analytical Framework

This paper applied the Institutional Environment Matrix (IEM) framework, developed by Cuevas, Peterson, and Morrison (2014), in analyzing the IEs of agriculture and CCA and in examining the institutional interactions within these environments. Although there are other frameworks for analyzing institutions, they are not suitable to address the objectives of this research, which is to analyze all forms of institutions—rules, social structures (customs, norms, practices), and organizations.

To illustrate, the Adaptation, Institutions and Livelihoods (AIL) framework developed by Agrawal (2008) focuses only on organizational institutions; it examines relationships among public, private, and civil society institutions. It is a tool used primarily to analyze organizational partnerships for facilitating adaptation. Meanwhile, the Adaptive Capacity Wheel framework of Gupta et al. (2010) defines institutions as rules, customs,

and norms—factors that influence the individual and collective behaviors and actions, as well as the adaptive capacities of societies. Although the Advocacy Coalition Framework of Sabatier and Weible (2007) does define institutions as rules, social structures, and organizations, its main aim is to assess the political conflicts and technical disputes of multiple actors. It is not meant to study IEs, institutional arrangements, and the functional interdependencies of institutions, which are the elements needed for this research.

The IEM, on the other hand, considers rules, social structures, and organizations as components of the IE; it is also designed for examining complex IEs and for determining the institutional fit of CCA responses. The IEM framework has a dual layer design—IE and institutional matrix (IM). The first layer (i.e., IE)

inventories the institutions that interact within the system or setting. Meanwhile, the IM concerns itself with the arrangements: (1) linking the institutions, (2) determining institutional functions, (3) influencing institutional interactions, and (4) determining institutional interplays. The matrix depends on the institutions identified in the IE; these institutions comprise the vertical (column) section of the IM. On the other hand, the horizontal (row) section is composed of the various functions of institutions; they are the classifications by which the institutional arrangements are organized in the IM cells. Essentially, the matrix provides a structure for analyzing institutional interplays in relation to the general institutional functions: reducing uncertainty, connecting individuals to society, fostering adaptive capacity, and mobilizing resource utilization (Table 1).

Table 1. Institutional matrix structure: Institutional functions by type of institutions

INSTITUTIONAL FUNCTIONS	Description	TYPES OF INSTITUTIONS		
		Rules	Social Structures	Organizations
<i>Reduces uncertainty</i>				
Establishes systems of power and authority	Actors and actions involved in decision making; who has the authority and what kind of authority	●	●	●
Identifies inclusions and exclusions	Scope and jurisdiction of actors (who) and actions (what) allowed and constrained	●	●	●
Creates rights and entitlements	Claims, privileges, etc. to resources, i.e., access rights, management rights	●	●	
Provides structure in procedures and processes	Sets of rules or agreements that preside over how the activities are implemented.	●	●	●
<i>Connects individuals to society</i>				
Converts personal values into social norms and shared beliefs	Social principles, beliefs, and philosophies	●	●	●
Influences and transforms individual acts and expectations into collective actions	Plans and programs for collective efforts and actions	●	●	●
Creates (dis)incentives for individual and collective actions	Rewards and penalties; payoffs on actions	●	●	●
Coordinates individual or collective behaviors	Management of multiple efforts	●	●	●
<i>Fosters adaptive capacity</i>				
Defines information systems	Provision of information (who, what, when, where, how and for whom)	●	●	●
Mediates influence of external interventions	Access to and management of outside resources (how, what, when, where)	●	●	●
<i>Mobilizes resource utilization</i>				
Means of delivery of external resources	Actors facilitating access to outside resources (who and for whom)			●
Determines transaction costs of activities and decisions	Integration of multiple efforts; internal costs (financial or otherwise)	●	●	●
Allocates resources	Provision of resources (who, what, when, where, how and for whom)	●	●	●

Source: Cuevas et al. (2014)

Based on the design of the matrix, users can analyze the system of institutional arrangements—operational and collective-choice rules and governance arrangements—in the IE (Table 2). The vertical assessment of the matrix shows the different arrangements that enable an institution to perform its functions. It is possible for an institution to fulfill only one or all functions, depending on the arrangements it provides. Meanwhile, the horizontal assessment enables the users to examine the functional interdependencies of institutions, and/or the linkages across institutions. For example, by laying out the different arrangements that establish the system of power and authority provided by each institution, one can examine whether an institution contradicts or complements the authority established by another. Essentially, this design enables a structured analysis of institutional interplays—interactions and reactions

between and among institutions that build institutional linkages, relationships, and interdependencies (Cuevas et al., 2014).

Possible interactions among institutions include *complementary interactions*, which denotes institutions benefitting from one another and functioning better because of the creation or existence of the other. Conversely, *counterproductive interactions* imply institutions that destabilize and inhibit one another from carrying out their respective functions effectively. *Neutral interactions*, on the other hand, indicate that institutions neither improve nor worsen the functioning of others; they simply exist together in the same IE.

When institutions are incompatible or institutional arrangements are not attuned with each other,

Table 2. Institutional Environment Matrix framework for adaptation analysis

INSTITUTIONAL FUNCTIONS	TYPES OF INSTITUTIONS							
	Rules (R)			Social Structures (SS)		Organizations (O)		
	R1	R2	R3	SS1	SS2	O1	O2	O3
<i>Reduces uncertainty</i>								
Establishes systems of power and authority	IA	IA	IA	IA	IA	IA	IA	IA
Identifies inclusions and exclusions	IA	IA	IA	IA	IA	IA	IA	IA
Creates rights and entitlements	IA	IA	IA	IA	IA	IA	IA	IA
Provides structure in procedures and processes	IA	IA	IA	IA	IA	IA	IA	IA
<i>Connects individuals to society</i>								
Converts personal values into social norms and shared beliefs	IA	IA	IA	IA	IA	IA	IA	IA
Influences and transforms individual acts and expectations into collective actions	IA	IA	IA	IA	IA	IA	IA	IA
Creates (dis)incentives for individual and collective actions	IA	IA	IA	IA	IA	IA	IA	IA
Coordinates individual or collective behaviors	IA	IA	IA	IA	IA	IA	IA	IA
<i>Fosters adaptive capacity</i>								
Defines information systems	IA	IA	IA	IA	IA	IA	IA	IA
Mediates influence of external interventions	IA	IA	IA	IA	IA	IA	IA	IA
<i>Mobilizes resource utilization</i>								
Means of delivery of external resources						IA	IA	IA
Determines transaction costs of activities and decisions	IA	IA	IA	IA	IA	IA	IA	IA
Allocates resources	IA	IA	IA	IA	IA	IA	IA	IA

Note: IA = institutional arrangements

Source: Cuevas et al. (2014)

contradicting relationships form. These links result in conflicts among institutions and in clashes among their functionalities. In instances when institutions have similar mandates, the *overlapping interactions* among them generally lead to disagreements on jurisdictions. Conditions worsen when relationships are *redundant* due to the complete duplication of most or all institutional functions (Cuevas et al., 2014).

Limitations

The primary step in determining how the introduction of CCA institutions impact the agriculture sector is to understand each individual IE. Examining the IEs of

the agriculture sector and CCA separately enables one to comprehend the core issues affecting CCA efforts in agriculture. Hence, the need to identify the different institutions in both environments (Tables 3 and 4).

The agriculture sector has numerous institutional issues; each issue is complicated and would need intensive analysis. To achieve the objective of illustrating the need to understand the institutional environment where CCA endeavors will be implemented, the paper focuses on selected issues. The different aspects of agriculture were examined to determine which areas are relevant to CCA efforts.

Table 3. Selected institutional rules in agriculture and climate change adaptation

Agriculture	Climate Change Adaption
Presidential Decree No. 717 of 1975 - Provided credit and financing system for agrarian reform beneficiaries through banking institutions	RA No. 9729 Climate Change Act
Executive Order No. 116, s. 1987 - Reorganization Act of the Ministry of Agriculture and Food	RA No. 10121 Philippine Disaster Risk Reduction and Management Act of 2010
RA No. 6657, Comprehensive Agrarian Reform Law of 1988	2010 –2022 National Framework Strategy on Climate Change
RA No. 7607, Magna Carta for Small Farmers of 1992	RA No. 10174 - People's Survival Fund of 2011
RA No. 8435, Agriculture and Fisheries Modernization Act of 1997	National Climate Change Action Plan 2011–2028
RA 8532, Strengthening the Comprehensive Agrarian Reform Law of 1998	Executive Order No. 43, s. 2011 - Pursuing Our Social Contract with the Filipino People Through the Reorganization of the Cabinet Clusters
RA No. 8550, Philippine Fisheries Code of 1998	RA No. 10639 Free Mobile Disaster Alert Act of 2014
RA No. 9168, Philippine Plant Variety Protection Act of 2002	RA No. 10692 PAGASA Modernization Act of 2015
RA No. 9700, CARP Extension with Reform of 2009	DBM National Budget Memorandum No.118 - Adoption of the Budget Priorities Framework in the Preparation of the FY 2014 Agency Budget Proposals
RA No. 10000, Agri-Agra Reform Credit Act of 2009	DBM-CCC JMC No. 2013-01 Guidelines in Tagging/Tracking Government Expenditures for Climate Change in the Budget Process
RA No. 10068, Organic Agriculture Act of 2010	DBM Local Budget Memorandum No. 2014-68 FY 2015 Internal Revenue Allotment Level and Other Local Budget Preparation Matters
Rice Mechanization Program, 2011	DBM-CCC-DILG JMC No. 2014-01 Tagging/Tracking Climate Change Expenditures in Local Budget
Food Staples Sufficiency Program, 2011	DBM-CCC-DILG JMC No. 2015-01 - Revised Guidelines for Tagging/Tracking Climate Change Expenditures in the Local Budget (Amending JMC-2014-01, Dated August 7, 2014)
RA No. 10601, Agricultural and Fisheries Mechanization Law of 2013	DBM-CCC Joint Memorandum Circular No. 2015-01 - Revised Guidelines for Climate Change Expenditure Tagging amending JMC No. 2013-01
RA No. 10654, Amendment to the Philippine Fisheries Code, 2014	DBM Local Budget Memorandum No. 70 issued June 2015 FY 2016 Internal Revenue Allotment Level and Other Local Budget Preparation Matters
Agro-industry Modernization Credit and Financing Program	DILG MC No. 2008-69 - Encouraging All Local Chief Executives and Sanggunians to Implement Climate Change Adaptation and Disaster Risk Reduction Measures
Comprehensive Agriculture Loan Fund	DILG MC No. 2008-123 - Mobilizing Local Actions to Address the Impacts of Climate Change

Table 3 (continued)

Agriculture	Climate Change Adaption
Strategic Agriculture and Fishery Development Zones	DILG MC No. 2008-161 Trainor's Training on Mobilizing Local Actions to Address the Impacts of Climate Change
DA Administrative Order No. 6 s.1998	DILG MC No. 2012-73 – Utilization of Local Disaster Risk Reduction and Management Fund DILG MC No. 2014-135 Guidelines on the Formulation of Local Climate Change Action Plan DILG MC No. 2015-77 Guidelines on Mainstreaming Climate Change Adaptation and Disaster Risk Reduction in Local Development Planning Presidential Decree No. 78 Presidential Decree No. 1149 Executive Order No. 128 DENR Administrative Order No. 97-11 DBM Memorandum March 15, 2012

Table 3 (continued)

<i>Note:</i>	CARP = Comprehensive Agrarian Reform Program	DBM = Department of Budget and Management
	JMC = joint memorandum circular	DENR = Department of Environment and Natural Resources
	CCC = Climate Change Commission	DILG = Department of Interior and Local Government
	MC = memorandum circular	FY = Fiscal year
	DA = Department of Agriculture	RA = Republic Act
	PAGASA = Philippine Atmospheric, Geophysical and Astronomical Services Administration is the National Meteorological and Hydrological Services	

Table 4. Selected institutions in agriculture and climate change adaptation

Agriculture	Climate Change Adaption
Department of Agriculture	Climate Change Commission
Bureau of Soils and Water Management	Office of Civil Defense
Bureau of Fisheries and Aquatic Resources	National Disaster Risk Reduction and Management Council
Bureau of Animal Industry	Department of Interior and Local Government
Bureau of Plant Industry	Department of Budget and Management
Philippine Center for Postharvest Development and Mechanization	Philippine Atmospheric Geophysical and Astronomical Service Administration
Bureau of Agricultural Research	University of the Philippines Nationwide Operational Assessment of Hazards
Bureau of Agricultural and Fisheries Engineering	Manila Observatory
Bureau of Agriculture and Fisheries Standards	Mines and Geoscience Bureau
Philippine Rice Research Institute	
National Irrigation Administration	
Philippine Council for Agriculture and Fisheries	
Philippine Crop Insurance Corporation	
Agricultural Credit Policy Council	
Agricultural Training Institute	
National Food Authority	

Initial analysis revealed the relevant linkages among the institutions within the agriculture and CCA IEs in relation to extension services, funding and finance, and research and development and technology (R&D and technology). The IEs and the existing network of institutions related to these concerns (i.e., extension services, funding and finance, and R&D and technology) proved to be complex and extensive (Figure 1).

Based on Figure 1, the R&D and technology concern will even encompass those institutions involved in agrometeorological stations, information generation and dissemination, R&D networks, etc. Thus, the investigation was further narrowed to those concerns that directly affect local agriculture and CCA, and hence the focus on the extension services. Although local units are likewise affected by R&D and technology concerns,

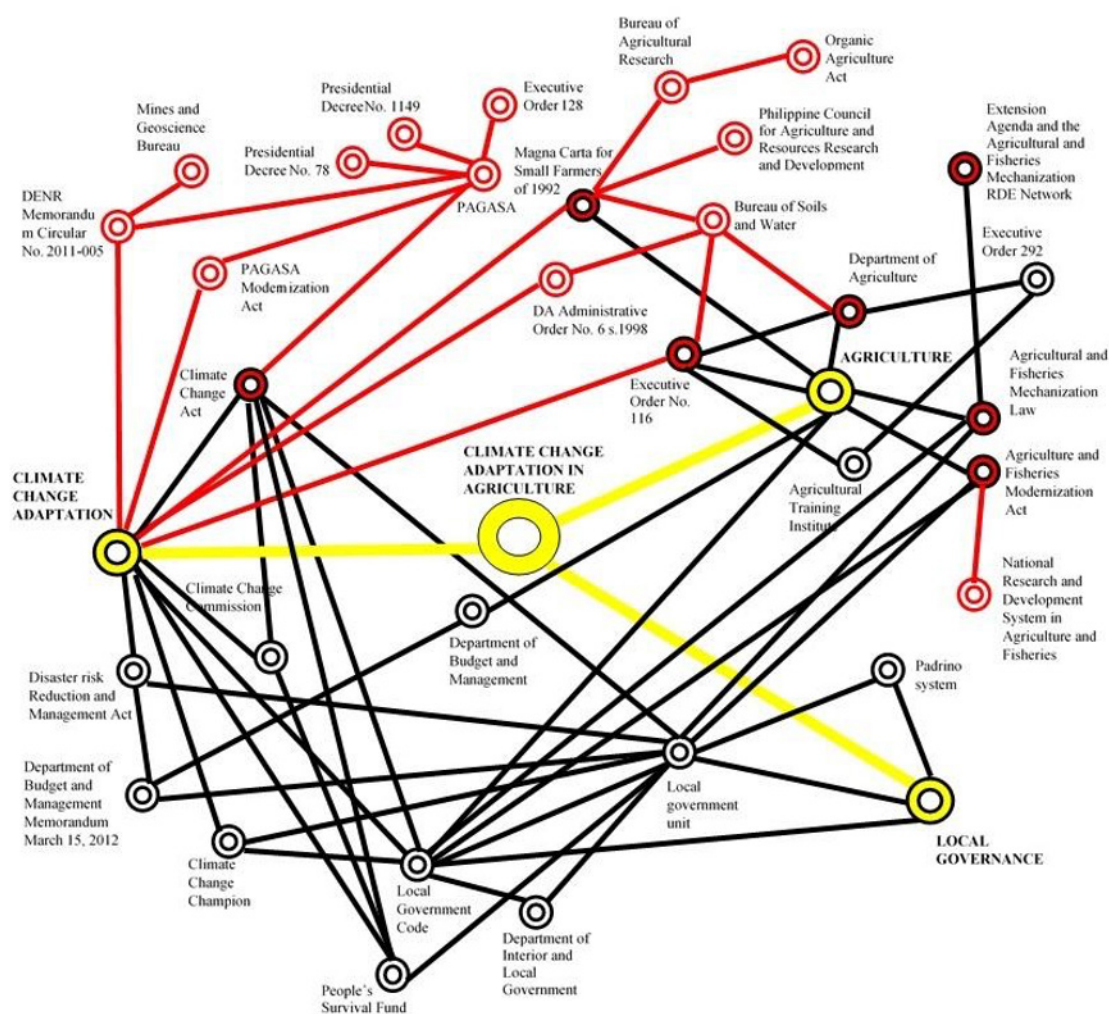


Figure 1. A framework for the disaster-climate relation

- Notes:*
- (1) The yellow circles and lines represent the IEs and linkages that comprise the local agricultural CCA in the Philippines. The red and black lines and circles indicate the institutions and linkages involved in R&D and technology and extension services, respectively. The circles with red fill represent the institutions involved in both concerns. Notice that although local units are likewise affected by R&D and technology concerns, most of the institutional interactions in this area do not involve the local governance institutional environment.
 - (2) The figure is only a partial and not a complete illustration of the network of all institutions. The design of the figure was borrowed from Cuevas (2018).
 - (3)

DA	=	Department of Agriculture
DENR	=	Department of Environment and Natural Resources
PAGASA	=	Philippine Atmospheric, Geophysical and Astronomical Services Administration is the National Meteorological and Hydrological Services
RDE	=	research, development, and extension

most of the institutional interactions in this area are at the national scale.

Meanwhile, the issues on extension services also touch on some funding and financial concerns. Still, the number of institutions involved in extension services is extensive. Thus, due to time and other constraints, analysis was not exhaustive. That is, only those selected few that will give sufficient information to achieve the objective of the research were featured; not all institutions and arrangements were analyzed. Lastly, provided that the Philippine agriculture sector comprises both agriculture and fisheries, the analysis was limited to the former to simplify the already complex nature of the analysis.

Results: Institutional Environments in Agriculture and Climate Change Adaptation

IE: Local Agriculture

Considering the limitations of the research, the IE of the local agriculture in the Philippines comprises the rules pertaining to agriculture, such as the Agriculture and Fisheries Modernization Act of 1997 (AFMA), Agricultural and Fisheries Mechanization Law of 2013 (AFMech), and the Executive Order (EO) 116 s. 1987 (Table 5). The AFMA is the key law on agriculture and fisheries production in the Philippines. Specifically, it stipulates the policy framework and support measures that reinforce a technology-based and market-driven agricultural production in the country. The AFMech,

on the other hand, was enacted to modernize Philippine agriculture through mechanization. It intends to develop partnerships for research and development between and among the government, academic institutions, farmer organizations, civil society, and other private units.

EO No. 116, also known as the “Reorganization Act of the Ministry of Agriculture and Food”, is the chief law that mandates the DA to promote agricultural development; provide the policy framework, public investments, and support services needed by the sector; and oversee and direct the planning, regulation, execution, and monitoring of programs and activities concerning agriculture and food production in the country. As part of the government system, the DA is also ruled by EO No. 292 or the Administrative Code of 1987. In particular, this is the rule that provides the key structures, procedures, functions, and rules of governance in the Philippines. The policy is also part of the agricultural IE, as it oversees how government agencies are organized, including the arrangements between the central and field offices of departments.

The IE for local agriculture is, likewise, composed of rules and organizations concerned with local government activities, specifically, the Local Government Code of 1991 (hereafter referred to as the Code). This law created a system of decentralization and gave local government units (LGUs) in the Philippines more powers, authority, responsibilities, and resources, and thereby greater autonomy.

Table 5. Institutional environment: Philippine agriculture and CCA at the local scale

INSTITUTIONAL SYSTEM: LOCAL AGRICULTURE- Agricultural Extension Services			
	Formal Rules	Social Structures	Formal Organizations
AGRICULTURE	Agriculture and Fisheries Modernization Act of 1997 Agricultural and Fisheries Mechanization Law of 2013 Executive Order 116, s. 1987 Executive Order 292 / Administrative Code of 1987 Local Government Code of 1991	<i>Padrino</i> system	Department of Agriculture Local government unit
CLIMATE CHANGE ADAPTATION	Climate Change Act of 2009 Philippine Disaster Risk Reduction and Management Act of 2010 Local Government Code of 1991 Department of Budget and Management Memorandum March 15, 2012	Climate change champion <i>Padrino</i> system	Climate Change Commission Local government unit Department of Interior and Local Government Department of Budget and Management

Note: *Padrino* system refers to “the norm or value system of political patronage where a person gives or gains favor, promotion, or political appointment through social (friendship) or familial affiliation, instead of merit and qualifications” (Cuevas et al., 2016 p. 53)

Lastly, this environment is also comprised of the social norm that is prevalent in local governance in the Philippines, the *padrino* (patronage) system, which is defined as “the norm or value system of political patronage where a person gives or gains favor, promotion, or political appointment through social (friendship) or familial affiliation, instead of merit and qualifications” (Cuevas et al., 2016 p. 53).

IE: Local Climate Change Adaptation

The IE of CCA encompasses the rules pertaining to climate change and the CCA-DRRM agenda in the Philippines. Hence, it involves the Act, the Philippine Disaster Risk Reduction and Management Act, and the People’s Survival Fund of 2011. The People’s Survival Fund is an amendment to the Act, and is primarily concerned with providing funding support or financial streams for CCA programs and projects at the local level. Through the Act, the Climate Change Commission is included in the IE.

Similar to the agricultural IE, the Code is involved in the local implementation of both CCA and DRRM. Accordingly, the LGU and the Department of Interior and Local Government are included in the local CCA IE,

given the latter’s mandate to supervise local governments and promote local autonomy in accordance with the Code. Also, the CCA IE covers the Department of Budget and Management, due to its role in the financial concerns of government units. In this particular case, it issued the department memorandum dated 15 March 2012 with the subject “Local Disaster Risk Reduction and Management Offices in Local Government Units”. This IE is also comprised of the climate change champion, which is “the identifiable political/administrative champion for climate change issues who symbolizes a social structure-based institution that can 1) form individual and social expectations, and 2) influence relations, interactions, behaviors, and the conduct of people” (Cuevas et al. 2016, p. 2054).

These institutions likewise interact with an IE of local governance, as can be seen by the identified institutions in both local agriculture and CCA IEs. In fact, local governance institutions and arrangements have vital roles and influences in the operationalization of local agricultural CCA. If institutional linkages will be plotted, then both the LGU and the Code would have the most links to other institutions in agriculture and CCA IEs (Figure 2). The relationships and interactions among

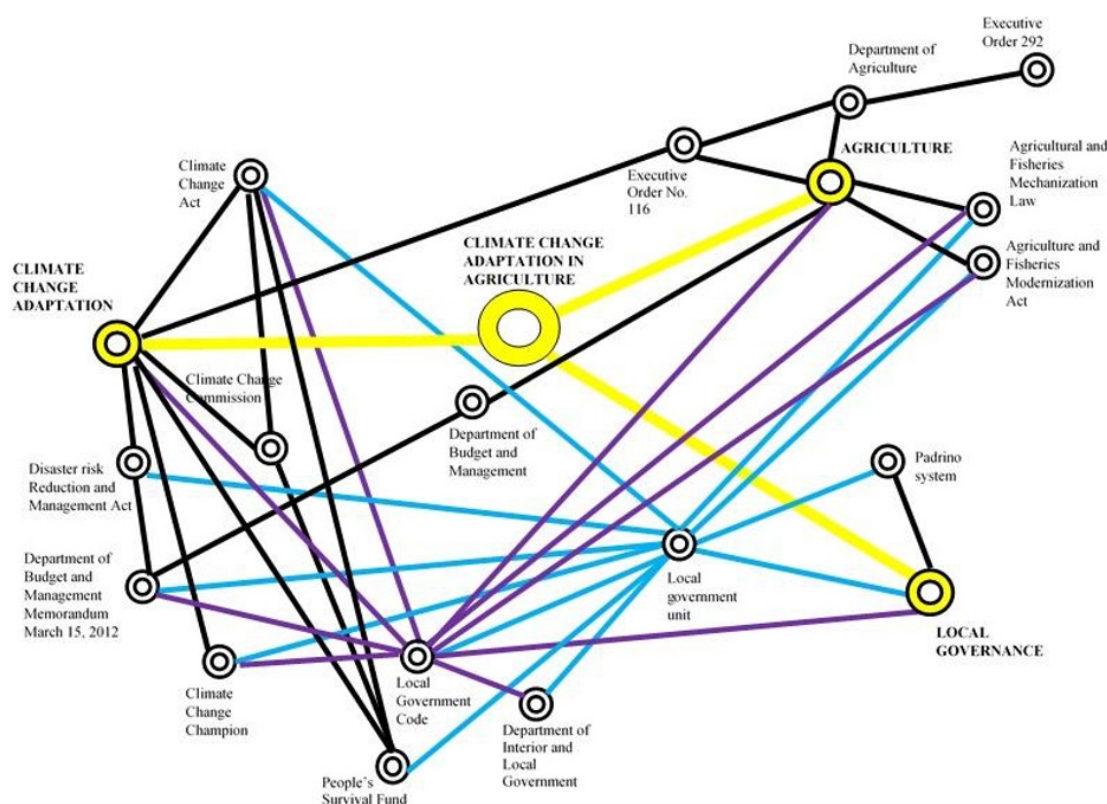


Figure 2. Climate change adaptation in agriculture: Network of institutions and IEs involved in extension services

Notes: (1) The yellow circles and lines represent the institutional environments and linkages that comprise the local agricultural climate change adaptation in the Philippines. The blue lines indicate the linkages with the local government unit, whereas the violet lines signify the linkages with the Local Government Code. The black lines represent all the other linkages among institutions.

(2) The figure illustrates the institutions and linkages included in the analysis. It does not represent the network of all institutions involved in extension services. The design of the figure was borrowed from Cuevas (2018).

the network of institutions are intensively discussed in the next section.

Discussion: Institutional interplays in local agricultural climate change adaptation

Climate change adaptation is a relatively new endeavor that is being integrated into the existing agricultural institutional system. Although CCA has its own IE, its incorporation into the agricultural system indicates that it will also face the existing conditions affecting the agricultural IE. Thus, this section discusses first the agricultural IE, as it is imperative to understand the institutional interplays in this environment. Afterward, CCA will be included into the mix.

Interplays among National and Local Institutions in Agriculture: Devolution of Agricultural Extension Services

EO No. 116 has provided the DA with the power and authority over agricultural concerns in the Philippines, including providing extension services and training to farmers; it established the DA as an integral component in agriculture's IE. However, the extension services function of the DA has been completely affected when the Code was enacted. The Code is the legislation that has devolved the power, authority, resources, and responsibilities over local concerns from the national government to the LGUs (provincial, city, and municipal governments). Particularly, Section 17(b) of the Code decrees the agricultural support services function to the *barangays* (i.e., smallest administrative unit in the Philippines), and agricultural extension and onsite research services and facilities to municipalities and provinces.

The AFMA reestablished the authority of LGUs in local agriculture, such that LGUs "shall be responsible for delivering direct agriculture and fisheries extension services" (Section 90 AFMA, 1997). Meanwhile, Article 7 of the AFMech outlines applied research, extension, dispersal, management, and regulation, along with agricultural engineering endeavors, to be among the LGUs' responsibilities (Sections 28 and 29).

When agricultural extension services were devolved to the LGUs, it resulted in a number of difficulties, which made the Code counterproductive with the other institutions in the agricultural IE. First, with two institutions leading the initiatives, the system of authority over agricultural concerns was compromised. The DA is the central authority on agricultural concerns in the country and has its own key result areas that guide its goals and activities. These key result areas are set by the DA, which are independent from the goals and objectives of other institutions. These key result areas are the basis of the department's policies, programs, and projects (Cuevas, Peterson, Robinson, & Morrison,

2015). Although the DA has field offices, per EO No. 292, they are only authorized to implement laws, policies, plans, rules, and regulations of the department at the regional level. These field offices are then mandated to coordinate with the LGUs who have the authority over the local governance, as provided by the Code (OECD, 2017; Cuevas, et al., 2018).

Since the DA's authority is limited to its regional offices, it cannot direct the devolved agricultural field personnel to undertake the department's projects, programs, and activities without the consent and approval of the LGU. However, LGUs have different sets of priorities; the DA's key result areas do not directly translate to those of the LGUs'. Agriculture, in general, and agricultural extension services, in particular, have to compete with the other key programs of the LGUs (e.g., welfare, health, education, environment, tourism, infrastructure, etc.). Often, local chief executives do not prioritize agricultural programs and activities in their jurisdiction (Ocenar et al., 2004; Cidro, 2015).

Moreover, LGUs also function within a different set of rules from those that govern the DA. One of these rules is the social-structure rule that prevails in Philippine local governance—the *Padrino* system. In LGUs where agriculture is not a priority, projects and programs are impacted by political patronage. For example, local politicians can interfere by altering the intended recipients of certain programs to benefit favored groups. Such cases result in additional project costs, corruption in the system, and inefficiency in operation. These conditions then risk the effective local execution of national programs in agriculture (Magno 2001; Ocenar et al., 2004; Cidro, 2015; Ani & Correa, 2016). "The devolution resulted in the decrease in the DA's control over the actual implementation of national programs in the field level" (Magno 2015, p. 139).

Meanwhile, although the devolution has mandated the agricultural extension services responsibilities to the LGUs, the local officials tasked to implement the programs and projects on-ground are not involved in the planning and policy-making processes. The authority over these agricultural concerns remains with the DA (Magno, 2001; Siamwalla, 2001). The AFMA and the AFMech have reenforced this authority. Yet, these rules do not specify arrangements for the LGUs to have an operational relationship with the DA. Consequently, a situation exists, in which the "national government agencies maintain the power to control, supervise, and review many of the supposed devolved services, even as LGUs are held responsible for them, resulting in confusion, overlaps, and duplication of functions" (Magno, 2015, p. 128). The Code has therefore weakened the extension services institutions in agriculture, impeding their (institutions') ability to perform their functions effectively. There is a gap between national and local implementation of activities, or between the planning and operationalization processes of

agriculture programs. However, the institutional support mechanisms to bridge this gap are lacking.

The successful provision of agricultural extension services highly depends on the coordination and cooperation between the DA and the LGUs. Yet, both the DA and the LGUs operate as two completely separate institutions, and their IEs lack arrangements that would foster a unified collective effort toward the development of local agriculture (Saliot, 2006; Ani & Correa 2016). Thus, the weak link and lack of coordination between the DA and the LGUs have been one of the key challenges for the effective on-ground implementation of agricultural programs (Cidro, 2015; OECD, 2017).

Effects of Institutional Interplays in Agriculture: Financial Resources for Agricultural Extension Services

The lack of funding has been among the primary barriers in implementing the devolved agricultural services (Magno, 2015; Ani & Correa, 2016; OECD, 2017). Along with the functions and services, the devolution has mandated the financial responsibility over local concerns to the LGUs. In line with this, Section 129 of the Code provides the LGUs the power to create their own revenue sources, may these be in the form of local taxes, fees, or other charges. However, in practice, effectiveness of this autonomy is dependent on the character (to rise above the influence of partisan politics, corruption, and rent seeking) of local government leaders and on their ability to generate income for the LGUs (Ocenar, et al., 2004; Cidro, 2015). The Code also provides the LGUs with a share in the proceeds of national taxes in the form of the internal revenue allotment. Title 3 of the Code details the arrangements for this allotment. Specifically, the LGUs' shares from the national coffers amount to 23% for provinces; 23%, cities; 34%, municipalities; and 20% for barangays. These shares are determined through a formula comprising of population (50%), land area (25%) and equal sharing (25%) (Section 285).

In general, majority of LGUs have become dependent on the internal revenue allotment as a fund source. For example, from a 38% contribution of internal revenue allotment to the total LGU income net of borrowings in 1985–1991, this figure rose to 65% in 1992–2003. Specifically, this percentage climbed from 39% (pre-Code) to 81% (post-Code) for provinces; from 38% to 74% for municipalities; and from 33% to 47% for cities. In 1999 alone, LGUs relied on the internal revenue allotment for more than two-thirds of their income (Magno, 2001; Manasan, 2005). However, based on the internal revenue allotment formula, the poor LGUs, which typically have a fewer tax base and less ability to create their own revenue sources, also receive a relatively smaller allocation. As such, poorer LGUs—which are often agriculture-based—have more limited funds to allocate to its numerous devolved responsibilities. Accordingly, LGUs are reluctant to use

funds for agriculture from their own coffers; agriculture competes with the other LGU priorities (Manasan, 2005; Ani & Correa, 2016). Through the years, LGUs have prioritized social services in their budgets; the sector's spending grew by 22% annually, on average, during the 1991–2003 period. The general public services sector spending expanded at a slower pace (16%) during the same period. Still, economic services spending, where agriculture spending belongs, increased the least at 13% (Cidro, 2015). Funds for local agriculture often fall under external sources, securing of which depended on local leadership (Ocenar et al., 2004).

Meanwhile, despite the devolved personnel, the DA central office has maintained most of the funds; in 1997, only 6% of the budget were allocated to the regional offices who were expected to lead the coordination and provision of technical and support tasks under the devolution. The DA do provide funding for national agricultural programs; however, access to it is under the condition that LGUs modify their local plans to suit the national agenda, which sometimes do not match the LGUs' priority goals (Magno, 2001; 2015).

Effects of Institutional Interplays in Agriculture: Human Resources and Agricultural Extension Workers

The enactment of the Code led to the devolution of the DA agricultural personnel—exceeding 17,000 extension workers and administrative staff—to the more than 78 provinces and 1,000 cities and municipalities. This number dwindled to around 12,000 in 2001, and further fell to about 10,000 in 2015 (Librero, 2003; Cidro, 2015; OECD, 2017). Thus, from being the responsibility of the DA, the salaries of these agricultural extension workers (AEWs) has been transferred to the LGUs, and are now governed by the arrangements provided by the Code.

One particular arrangement pertains to the personal services allocation—payments of salaries, wages, and compensations of LGU employees. That is, it should not exceed about 45%–55% of the LGU funds (Section 325 of the Code). This provision poses several difficulties to the LGUs, and they have adjusted (to these challenges) by forming arrangements that later produced cascading problems for LGU personnel.

To illustrate, the personal services spending allocation is generally not sufficient to cover the needs of the LGUs. Hence, LGUs have resorted to the practice of employing personnel on a contractual basis, hired under job orders or service contracts, because these items can be charged against the maintenance and operating expenses (for development projects). This practice has resulted in LGU employees, including extension workers, not having security of tenure and other benefits enjoyed by permanent staff. High employment turnover also followed due to the temporary basis of positions (Ocenar et al., 2004; Manasan, 2005).

The resulting contractual hiring practice of AEWs is also influenced by the *padrino* system or other forms of political influences. First, the municipal or city mayor can appoint an agriculturist in his/her locality as provided by Section 443(b) and Section 454(b) of the Code, respectively. Likewise, due to the nature of the contractual hiring system, the position typically does not undergo the usual government hiring process. Consequently, local chief executives can appoint favored, but not necessarily qualified, people to the job. At times, contracts are not renewed due to the change in administration, and thereby political affiliations, affecting the effectiveness of extension services delivery (Ocenar et al., 2004; Ani & Correa, 2016). The relatively more objective hiring process of the DA has been replaced by a practice highly influenced by partisan politics (Cidro, 2015).

There is also disparity in compensations between AEWs from high- and low-income LGUs since salaries are now based on LGU funds. This situation is aggravated by the position's stagnant salary rates as compared to their counterparts at the national government agencies. In some cases, some experienced demotion in salary when the devolution was initiated. Furthermore, unlike the conditions in the national agency, there is little room for professional development and capacity development in LGUs, resulting in demoralized, unmotivated, and low-morale AEWs. These employment conditions exist in most areas, especially in the economically challenged LGUs (Cidro & Radhakrishna, 2003; Librero, 2003; Cidro, 2015; Ani & Correa, 2016).

Interplays among National and Local Institutions in Climate Change Adaptation: Mainstreaming of Climate Change Adaptation

The Act is a vital component of the IE for CCA. Section 4 of the Act created the Climate Change Commission to be the primary authority in coordinating, monitoring, and evaluating government programs and action plans on climate change. The Climate Change Commission is an independent and autonomous body, with the same status as that of a national government agency. As a national agency, the Climate Change Commission has its own sets of key result areas. However, Section 2 of the Act "declared the policy of the State to systematically integrate the concept of climate change in various phases of policy formulation, development plans, poverty reduction strategies and other development tools and techniques by all agencies and instrumentalities of the government". As such, all agencies in the government, including the DA, have their own programs on climate change in line with their respective key result areas. The development of key result areas is typically independent from one agency to another; thus, even with a common CCA agenda, the programs, projects, tasks, and efforts of varying government agencies are typically not in synergy. Consequently, organizational cohesion is lacking among government agencies concerning climate

change, especially at the national scale (Cuevas et al., 2015).

The lack of organizational cohesion is manifested in the unclear delineation of roles and responsibilities among institutions on the issue of CCA (Dator-Bercilla, Roxas, Holtsberg, & Inagaki, 2012; Cuevas et al., 2014). This situation is often accompanied with the absence of organizational cooperation and collaboration arrangements for effective planning. To illustrate, with the implementation of the Act, the Philippines developed its National Climate Change Action Plan. The plan outlines the agenda and priority strategies of the government for CCA (CCC 2010). However, the National Climate Change Adaptation Plan, which was designed by the Climate Change Commission, and the Philippine Development Plan 2011–2016, which was developed by another, were not fully aligned in what they regarded to constitute "adaptation". As the plans at the highest policy level, their lack of alignment can possibly result in discrepancies among departmental and local development plans, and programs, activities, and projects (OECD, 2017).

The lack of organizational cohesion likewise risks the occurrence of overlapping interactions among institutions, which may result in duplicate or inconsistent CCA efforts. This is observed between the Climate Change Commission and the National Disaster Risk Reduction and Management Council, in which the two agencies are not coordinated vis-à-vis DRR and adaptation concerns (OECD, 2017). Similarly, the DA launched the Climate Change Systems-Wide Program as an effort to mainstream climate change into the country's agriculture and fisheries modernization programs (Department of Agriculture, 2018). The lack of organizational cohesion is again evident as:

... DA's Climate Change Systems-Wide Program does not make explicit reference to National Climate Change Adaptation Plan strategic priorities... it is unclear how different institutions at the national, sectoral and local levels co-ordinate in the design and implementation of existing and future climate programs, activities, and projects... In addition, overlaps and co-ordination issues may arise among different institutions in the implementation of programmes... (OECD 2017, p. 185).

At the local scale, the government field offices are unfamiliar with the function of their institution in local CCA-DRR activities, implying a lack of organizational cohesion. The field offices abide by their respective institution's key result areas and mandated functions. These key result areas are usually not coordinated with one another; thus, field offices are unable to partake in local CCA-DRR initiatives effectively (Cuevas et al., 2015).

As mentioned earlier, the authority of government agencies, like the DA, is restricted to the regional offices. The national government agency, which has a direct influence on local affairs, is the Department of Interior and Local Government by virtue of RA 6975 of 1990. In performing its mandate, the department establishes and prescribes rules, regulations, and issuances regarding laws affecting LGUs. The interior department also lays down plans, policies, programs and projects that promote and support the administrative, technical, and fiscal capabilities of local government offices and personnel.

According to Section 15(b) of the Act, the department is also tasked to “facilitate the development and provision of a training program for LGUs in climate change”. Hence, the various department memorandum circulars prescribe guidelines in some areas of local CCA mainstreaming (Table 3). However, even with the Department of Interior and Local Government’s efforts, there is still a gap on how to translate national CCA measures to local environments. This gap exacerbates the unclear delineation of responsibilities of the institutions in relation to CCA. Accordingly, this results in conflicts “between national and local governments over the functions and the definition of the LGUs role in the implementation of adaptation programs and projects” (OECD, 2017, p. 183).

Such conditions are due to the lack of institutional arrangements that support the emergence of climate change and CCA prioritization within the government. As mentioned earlier, the Code does not provide for processes or procedures to help LGUs to develop an operational relationship with the DA. Similarly, such arrangements are likewise not provided in the Act; thus, a gap between the national and local operationalization of CCA exists due to the counterproductive interplays that arise between the Code and the Act.

The lack of institutional support mechanisms is also most evident in the lack of guidance for mainstreaming CCA into local endeavors. LGUs are mandated to produce the Local Climate Change Adaptation Plan upon the enactment of the Act in 2009. However, the guidelines to support the mainstreaming efforts, such as the memorandum circulars of the Department of Interior and Local Government, specifically, the “Guidelines on the Formulation of Local Climate Change Action Plan” and “Guidelines on Mainstreaming Climate Change Adaptation and Disaster Risk Reduction in Local Development Planning”, were provided only in 2014 and 2015, respectively. Likewise, the *LGU Guidebook on the Formulation of Local Climate Change Action Plan* was released in 2014, while the *Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the Comprehensive Land Use Plan* was made available in 2015. During the years in between, LGUs found it difficult to comply with the Act and were uncertain on how to accomplish their responsibilities as mandated by the legislation. Moreover, LGUs are burdened with

the multiple requirements, particularly the approximate 30 sectoral plans, assigned by other laws and policies. These overlapping responsibilities hamper LGUs from focusing on mainstreaming CCA into local plans (Cuevas et al., 2016).

Meanwhile, as provided by the Code, local activities are under the control of the LGUs. Like agriculture, incorporating CCA into the local priorities depends on the LGUs’ needs and/or on the level of cooperation between the LGU and the central government (OECD 2017). Thus, this highlights the significance of local leadership support to the CCA endeavor. In the Philippines, local leadership has proved to be an effective catalyst for local CCA, in the form of a climate change champion. The champion is most influential if s/he is the local chief executive because the Code includes provisions that enable LGUs to create and execute their own decisions within their jurisdictions. Specifically, the local chief executive has the executive and legislative authority to promote and act on concerns s/he considers significant to the general welfare of the LGUs. Thus, as a climate change champion, s/he can advance local CCA implementation, such is the case in the province of Albay (Cuevas, Peterson, & Morrison, 2015; Cuevas, Peterson, Robinson, et al., 2016).

To illustrate, the Governor of Albay during the period 2007–2016 was able to institutionalize a number of endeavors to address climate change. Through the Provincial Executive Order 2007-12-A, the Center for Initiatives and Research for Climate Adaptation (CIRCA) was established in the province as a key institution on climate change. Furthermore, CCA was prioritized in the province by virtue of the Provincial Resolutions 2007-04 and 2007-24. The Provincial Council Resolution 2008-44 also encouraged the Provincial Government of Albay-CIRCA, the DA, the Department of Environment and Natural Resources, and the Department of Agrarian Reform to conduct training and workshops in order to incorporate climate change into local land use plans. Most importantly, the Provincial Government of Albay spearheaded the First National Conferences on Climate Change Adaptation, an output of which was the call for an early passage of the Act. Through these efforts, local leadership influenced the local government to prioritize CCA, encouraged the LGU to commit to CCA, and influence the mindset of the community toward CCA. The governor, as a climate change champion, represented a social-structure institution that was able to influence individual acts and expectations into a collective action, convert personal beliefs into social norms, and command collective behaviors (Cuevas, Peterson, & Morrison, 2015; Cuevas, Peterson, Robinson, et al., 2016). In this case, the Code complements the Act and other formal rules on CCA.

Effects of Institutional Interplays in Climate Change Adaptation: Finance and Human Resources

Given that the local governance IE is primarily governed by the Code, it is likely that the issues encountered in the agriculture extension services IE are experienced in the local CCA IE. LGU involvement is further reinforced by Section 14 of the Act, which provides for the LGUs to be the frontline agencies in formulating, planning, and implementing climate change action plans in their respective jurisdictions.

Section 18 of the Act authorizes the LGUs to utilize portions of their internal revenue allotment to CCA-related activities. However, as presented earlier, LGU funds are not sufficient to cover the already-existing LGU responsibilities. Hence, there is little room for CCA programs from these funds. The amendment of the Act—Republic Act (RA) 10174 of 2011 that created the People's Survival Fund—intends to address this financial concern. The People's Survival Fund is a special fund in the national treasury aimed to finance local adaptation programs and projects. However, it took years after the enactment of the People's Survival Fund for the implementing rules and regulations of the policy to come out (through the Climate Change Commission Resolution No. 3 dated 13 November 2015). Thus, during the intervening years, LGUs were unable to access the fund; but LGUs were already required to implement the Act.

When the implementing rules and regulations of the People's Survival Fund were released, LGUs began submitting funding proposals. However, it soon became evident that there were gaps in the process to access the funds in terms of technical requirements of the proposals. As of mid-2017, there were only two proposals approved; most were approved in concept, awaiting submissions of more technical particulars, or were returned to LGUs for revisions (Supnet, 2017). The People's Survival Fund Secretariat and the Climate Change Commission assisted in making the People's Survival Fund more accessible by publishing the *Proponent's Handbook: A Guide on How to Access the People's Survival Fund* in 2016 and *Accessing the People's Survival Fund Training Manual* in 2017. Nonetheless, these were made available years after RA 10174 had been enacted; thus, the impacts of these efforts are yet to be realized as of this writing. Essentially, the funds for CCA activities were made available to the LGUs; however, the institutional support mechanisms to ensure that the available funds can be accessed by the intended beneficiaries are lacking, thereby creating barriers to local adaptation (Cuevas et al., 2015).

In 2010, the Philippines passed the Philippine Disaster Risk Reduction and Management Act, which institutionalized the synergy of climate change and DRRM in the government agenda. The law's implementing

rules and regulations specified the creation of the local disaster risk reduction and management (LDRRM) officer. Although the officer's primary responsibilities are on DRRM concerns, s/he is also tasked to collect information on natural hazards, local vulnerabilities, and climate change risks, and to maintain local climate risk maps (Rule 6, Section 4 of Implementing Rules and Regulations). Meanwhile, as per Department of Budget and Management Memorandum dated March 15, 2012, "the personal services requirement of position created for an LDRRM Office shall be funded from LGU funds and is subject to the personal services limitation of LGU budgets." Thus, as in the case of agriculture, the creation of the LDRRM officer's position is ruled by the limitations and constraints of the Code. Hiring permanent personnel is already difficult for LGUs as most have already reached their respective budgetary ceilings. This then translates to unavailable budget for a new LGU position. However, LGUs are mandated to comply with the law despite the prevailing difficulties surrounding local personnel.

LGUs operate without the sufficient financial resources to create a permanent position for the LDRRM officer. Thus, LGUs have resorted to designating the position, or its responsibilities, to existing regular LGU personnel. The designated LDRRM officers end up overworked, underpaid, and unmotivated; aside from the responsibilities they were originally hired for, they have been burdened with significant tasks on CCA and DRRM concerns without additional compensation, financial or otherwise (Cuevas et al., 2015). Like in the case of agriculture, hiring of LDRRM officers on a contractual basis became the norm in some LGUs in order to address the unavailable permanent local position. This again has resulted in LGU employees with no security of tenure, and without the benefits experienced by permanent personnel. Similarly, LGUs also rely on funding the LDRRM officer's salary from the development project funds. These efforts resulted in temporary employment of officers and high LGU staff turnovers. This employment problem is critical in CCA-DRRM because it disrupts the continuity in the management of CCA-DRRM work and causes low or no return on investments for CCA-DRRM training and education (of LDRRM officers) (Cuevas et al., 2016; Cuevas, 2018).

Since local CCA also operates within the local governance IE, the *padrino* system is also at work, in which the officers are appointed based on political considerations rather than on merit. Political appointments typically end with less qualified LDRRM officers in terms of knowledge, experience, and appreciation of climate change and/or DRRM concerns. Additional problems arise with the *padrino* system influencing local hiring.

As a political appointee, the LDRMM officer is co-terminus with the mayor. Thus, a change in local political power signifies losses in human resource investments, which in this case is the

CCA-DRR trained LDRRM officer (Cuevas et al., 2016, p. 2053).

Based on the discussions above, it is clear that the same issues and concerns that affect the local agriculture also affect local CCA because both operate within the local governance IE. As such, local agricultural CCA works within three IEs—agriculture, CCA, and local governance.

Conclusions

This article advocates that analyzing the institutional environment where CCA endeavors will be implemented can make policy and decision makers and planners better understand and have deeper perception of the interlinkages between and among institutional arrangements. It aims to show that for CCA policies, plans, and programs to be effectively implemented at the local level, it is necessary to understand the institutional environment where CCA initiatives are to be implemented. Further, the paper intends to demonstrate that, along with the scientific and technological discussions, institutional conversations should be among the initial vital steps in CCA planning. Lastly, the institutional dimension should be the foundation of broader reforms toward an effective CCA implementation.

This institutional analysis, through examining the institutional environments, has resulted in the following findings:

- Local agricultural CCA works within three IEs—agriculture, CCA, and local governance. Formal rules (e.g., AFMA, AFMech, EO No. 116, the Act, among etc.), govern primarily the IEs of agriculture and CCA at the national scale. However, both the formal rules and social structures (i.e., culture, norms, practices) have significant influence on the local governance IE.
- Local governance institutions and arrangements have vital roles and influences in the operationalization of local agricultural CCA. Both the LGU and the Code have the most links to other institutions in agriculture and CCA IEs.
- Agriculture in the Philippines was decentralized via the Local Government Code of 1991. The Code provides LGUs with extensive authority over their jurisdictions and autonomy in governance. The enactment of the Code is counterproductive with the mandates of the other institutions in the agricultural IE because the Code lacks the arrangements that can facilitate one of the vital functions of institutions (as per IEM framework): to create (dis)incentives for individual and collective actions (i.e., rewards and penalties; payoffs on actions). This situation helps to create

the existing personality-driven style of local governance in the Philippines; a style which encourages coordination arrangements among actors to be founded on personal relationships (i.e., *padrino* system) rather than institutional. The *padrino* system exhibits counterproductive interplays with other institutions in the agriculture IE, and later in the CCA IE. It has often (than not) affected the: 1) priorities of the LGUs; 2) implementation of national programs in the LGUs; and 3) selection of LGU personnel.

- On the other hand, the personality-driven style of local governance enables local CCA to be implemented effectively when a climate change champion exists, particularly when this champion is the local chief executive. The provisions in the Code affords a climate change champion to influence local legislation, initiate programs, and support implementation of national initiatives at the local scale; these provisions complement the other institutional rules on CCA. With the local chief executive as a champion for either agriculture or CCA or both, s/he can function as the institution that connects individuals to society toward the agenda. In this case, the Code establishes a system of power and authority that complements the Act although it is under a conditional setting—with the existence of a climate change champion.
- The Code is likewise counterproductive with other pieces of legislation in terms of funding. The burden of financing all local programs, projects, and activities are borne by the LGUs. Although the Code enables LGUs to have financial autonomy in practice, the ability of LGUs to acquire financial resources outside the national funds (i.e., internal revenue allotment) still depends on the personality and ability of the local chief executive.
- The successful provision of agricultural extension services highly depends on the coordination and cooperation between the DA and the LGUs. Yet, both entities operate as two completely separate institutions, and their IEs lack arrangements that would foster a unified collective effort toward the development of local agriculture. Similarly, CCA actors lack organizational cohesion, thereby compromising how they operate within the CCA context. This lack of cohesion typically manifests in the unclear delineation of roles and responsibilities among institutions regarding CCA issues. These conditions in agriculture and CCA highlight a significant function of institutions—reducing uncertainties. In particular, the institutional function of providing structure in procedures and processes (i.e., setting rules or agreements that preside over the how activities

are implemented) is lacking; hence, institutional support mechanisms that are necessary to bridge the gaps between and among institutions are wanting.

- The lack of institutional support mechanisms is most evident in the lack of guidance for mainstreaming CCA into local endeavors. LGUs are mandated by the Act to implement local CCA, but the guidelines and directives to support the mainstreaming efforts are wanting.

These findings suggest that the Code needs to be revisited and amended to address the concerns at the local level. For one, the Code already has existing counterproductive interplays with other institutions. For another, the Code does not have the needed arrangements for addressing a new phenomenon like climate change. Following the functions of institutions in the IEM framework, the amendments should include establishing arrangements that create (dis)incentives for individual and collective actions (i.e., rewards and penalties; payoffs on actions) promoting local agriculture and CCA in order to minimize the influence of personality-driven type of local governance. With these institutional arrangements, the existence of a local chief executive that champions these causes (agriculture and CCA) may no longer be needed as a condition for the personality-driven style of local governance to have positive effects.

Arrangements that improve the financial capacities of LGUs, especially in relation to human resources, should also be incorporated in the Code. The current personal services allocation in the Code is not working effectively to address the needs of the LGUs. Likewise, arrangements that provide better structure in procedures and processes are needed to address concerns on political appointments and human resources. Lastly, the Code needs to be updated and amended to include arrangements pertaining to climate change and CCA.

Meanwhile, the analysis of the CCA IE implies that new institutions (i.e., laws, policies, regulations) need institutional support mechanisms that are not reactive (those responding to issues already existing); these mechanisms should be anticipatory (those that are planned or prepared in advance before issues arise). For example, the People's Survival Fund could have been better implemented if the guidelines on how to access the fund were available upon the enactment of the law. Similarly, mainstreaming of CCA into local plans may have been less of a burden to LGUs if institutional arrangements (i.e., sets of rules or agreements) that preside over how local mainstreaming activities are to be implemented were provided in a timely manner. These institutional arrangements include the guidelines and guidance books on local mainstreaming. Thus, institutional support mechanisms should be designed simultaneous with the development of new laws and policies. Under current circumstances, anticipatory

institutional support mechanisms may no longer be possible; however, it needs to be noted that the arrangements to improve the current conditions should be based on the analysis of institutional environments and institutional interplays.

The results show that institutional analysis is not given its warranted attention in CCA efforts in the Philippines. This article presented the significance of institutional analysis and provided a concrete example on how to conduct it in the CCA discussion. It demonstrated the complexity of institutional linkages and illustrated that institutional analysis should be among the initial steps in CCA planning. There are still a wide range of issues affecting both agriculture and CCA at the local scale, such as capacity development, technology transfer, and research and development. These concerns involve other sets of institutions and arrangements, thereby creating various arrays of institutional interplays. Future research can look into these issues under institutional lens to further establish that the institutional dimension should be the foundation for reforms toward the effective CCA implementation.

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