



RISKS, SHOCKS, BUILDING RESILIENCE

Proceedings of the
Second Annual Public Policy Conference 2016





RISK, SHOCKS, BUILDING RESILIENCE

Proceedings of the
Second Annual Public Policy Conference 2016



RISK, SHOCKS, BUILDING RESILIENCE

Proceedings of the
Second Annual Public Policy Conference 2016



Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas



Bangko Sentral ng Pilipinas

Copyright 2017

Published by
Philippine Institute for Development Studies
Bangko Sentral ng Pilipinas

Printed in the Philippines. Some rights reserved

The views expressed in these proceedings are those of the authors and do not necessarily reflect the views of any individual or organization.

Please address all inquiries to:

Philippine Institute for Development Studies
18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, 1100 Quezon City
Telephone: (63-2) 8774000; 3721291 to 92
Fax: (63-2) 8774099
E-mail: publications@mail.pids.gov.ph
Website: <http://www.pids.gov.ph>

This volume is published annually and is under the Creative Commons Attribution Noncommercial License. It shall not be used for commercial purposes. Anyone can use, reuse, distribute, and build upon this material as long as proper attribution is made.

ISSN 2546-1761
RP 09-17-600

Editorial and production team: Sheila V. Siar, Mark Vincent P. Aranas, Jane C. Alcantara, Carla P. San Diego, and Rejinel G. Valencia

Syntheses writers: Sheila V. Siar and Gizelle G. Manuel (About the conference), Sheila V. Siar (Agricultural resilience), Mark Vincent P. Aranas (Health resilience), Misha M. Borbon (Macroeconomic resilience), and Rejinel G. Valencia and David Feliks M. Bunao (Urban environment)

Table of Contents

List of Tables, Figures, Appendixes, and Boxes	x
Foreword	xv
Preface	xvii
List of Acronyms	xix
About the Conference	xxiii

CONFERENCE FRAMEWORK PAPER	1
----------------------------------	---

Risks, Shocks, Building Resilience: Philippines

Gilberto M. Llanto

The evolving global risk landscape	1
Building resilient systems	4
Vulnerability and building economic resilience	4
Resilient systems in the Philippines	7
Developing resilience thinking: The way to go	8
References	8



SESSION 1: AGRICULTURAL RESILIENCE

1 Climate Change Adaptation and Mitigation for the Agriculture Sector	13
--	-----------

Marites M. Tiongco

Abstract	13
Introduction	14
Climate change and Philippine agriculture	17
The current government framework in support of adaptation and mitigation	19
Mainstreaming adaptation and mitigation strategies	22
The effectiveness of agricultural adaptation and mitigation initiatives	26
Agricultural finance to build resilience to climate change	32
Summary and policy implications	34
References	41

2 Improving Irrigation Water Governance for a Resilient Agriculture	45
--	-----------

Agnes C. Rola

Abstract	45
Introduction	45
Threats to water in agriculture	46
Framework of analysis	48
Analysis of irrigation sector performance	49
Analysis of irrigation water governance structure	50
Conclusions and policy recommendations	59
References	61

3 | Review of Design and Implementation of the Agricultural Insurance Programs of the Philippine Crop Insurance Corporation 65

Celia M. Reyes, Christian D. Mina, and Reneli Ann B. Gloria

Abstract.....	65
Introduction.....	65
Overview of the agricultural insurance programs in the Philippines	66
Assessment of the design of the program	69
Assessment of the implementation of the program.....	74
Concluding remarks	78
References	79

Session Synthesis..... 81

⊕ SESSION 2: HEALTH RESILIENCE

4 | The Challenge of Reaching the Poor with a Continuum of Care: 85 **A 25-Year Assessment of Health Sector Performance**

Orville Jose C. Solon and Alejandro N. Herrin

Introduction	85
Despite rising health expenditures and health reforms, progress in improving health outcomes	85
Devolution fragmented the delivery and financing of public health services	86
DOH identified major problems in the delivery and financing of health services	86
Reform initiatives attempted to address fragmentation	87
Fundamental weaknesses of the health system	87
Strategies to address the fundamental weaknesses	88
References	88

5 | Shake, Rattle, and Roll: Emotional Resilience toward a Resilient Health System 89

Madeleine de Rosas-Valera

Introduction.....	89
Emotional resilience: The missing link in disaster management strategy.....	90
Recommendations.....	90
References.....	92

6 | Promoting Cross-Sectoral Collaboration for Building Disaster Resilience..... 93 **in the Philippine Health Sector**

Ronald P. Law

Abstract.....	93
Background.....	93
Role of health.....	95
Challenges.....	96
Collaboration	96
Case study: The cluster approach	98
Conclusion.....	98

Policy recommendations.....	99
References.....	99
Session Synthesis	101
Better management	101
Cross-sectoral collaboration	102
Welfare of health workers	102
 ₱ SESSION 3: MACROECONOMIC RESILIENCE	
 7 Financial Market Resilience Through Financial Stability.....	105
(Even Though We Do Not Know Much of It Yet)	
<i>Johnny Noe E. Ravalo</i>	
Abstract.....	105
Introduction.....	106
Recent crises and why they matter for financial market resilience	109
The pursuit of financial stability.....	111
The Philippine experience.....	115
Moving forward: It has to be more than resilience	118
Final thoughts.....	122
References.....	123
 8 Can Cheap Oil Hurt Net Importers? Evidence from the Philippines	125
<i>Arlan Z.I. Brucal and Michael R.M. Abrigo</i>	
Abstract.....	125
Introduction.....	125
Empirical strategy	127
Results and discussion.....	130
Conclusion.....	131
References.....	133
 9 Extreme Flooding in Metro Manila Cities: Its Impact on Local Economies.....	135
Using a Multiweek CGE Analysis	
<i>Ramon L. Clarete, Philip Arnold P. Tuaño, and Marjorie S. Muyrong</i>	
Abstract.....	135
Introduction.....	135
Measuring the cost of natural disasters.....	136
An overview of the analytical framework.....	137
Data and empirical implementation.....	145
Observations from the model simulations.....	150
Conclusion and recommendations	154
References.....	155

Session Synthesis	157
Lessons from the crises	158
Other contemporary issues	158



SESSION 4: URBAN ENVIRONMENT RESILIENCE

10 Location Strategies in Building Resilient Settlements:.....	163
---	------------

Technical and Political Considerations

Arturo G. Corpuz

Abstract.....	163
Introduction.....	163
Location strategies and resilient settlements	164
Technical objectives.....	165
Political objectives.....	168
Resilient settlements network as a growth strategy.....	170
Conclusion.....	172
References.....	172

11 The Quest for Coherence: Energy/Water Efficiency and Metro Manila	175
---	------------

Sustainability Standards

Alvaro P. Artigas

Introduction.....	175
Infrastructure development program: A conceptual framework for new emerging markets.....	176
The management of environmental resources in the new emerging markets.....	180
Green growth in Metro Manila: The relation between water and energy development	182
Conclusion.....	188
References.....	189

12 Research on Urban Resilience to Natural Disasters of Households, Firms,	193
---	------------

and Communities in the Philippines

Danilo C. Israel and David Feliks M. Bunao

Abstract.....	193
Introduction.....	193
Definitions.....	194
Relative resilience of the Philippines	195
Philippine research on resilience.....	198
Urban resilience studies in the Philippines.....	199
Research gaps.....	203
Summary and recommendations.....	204
References.....	205

13 Risk and Resilience: Interrogating Prosperity, Inequality, and Climate Disasters	207
in Metro Manila	
<i>Emma E. Porio</i>	
Economic growth, urban development, and disaster risk	208
Socioeconomic performance, poverty, and inequality	209
Metro Manila: Growth, governance, and disaster risk	210
Sociopolitical reforms in urban governance, civil society, and social housing	210
Democratization—decentralization of urban governance and the financing of local development	211
Reflections and concluding comments	214
References	215
Session Synthesis	217
Building resilient infrastructure and settlements	217
Intersecting climate impacts and governance	217
Ensuring sustainability in the Metro	218
Promoting disaster resilience, mitigation, and adaptation in the Philippines	218
Ways forward	218
The Authors	219

List of Tables, Figures, Appendixes, and Boxes

TABLE

Conference Framework Paper | Risks, Shocks, Building Resilience: Philippines

1	Top five global risks in terms of livelihood	3
2	Top five global risks in terms of impact.....	3
3	Resilience and vulnerability of selected Asian economies.....	7

Chapter 1 | Climate Change Adaptation and Mitigation for the Agriculture Sector

1	Examples of projected climate change impacts on Philippine agriculture, forestry,.....	15
	and fisheries	
2	Government policies and strategies in response to climate change, 1991–2013	21
3	ODA initiatives with climate change adaptation, mitigation,	33
	and disaster risk reduction components	

Chapter 2 | Improving Irrigation Water Governance for a Resilient Agriculture

1	Irrigable and firm-ed-up service areas in the Philippines, by region, December 2014.....	50
2	Comparison between NIS and CIS	50
3	Cumulative total of all IAs as of December 2015	55
4	Status of irrigation management transfer of NIS as of October 2014.....	57
5	Status of CIS turnover, as of October 2014.....	57

Chapter 3 | Review of Design and Implementation of the Agricultural Insurance Programs of the Philippine Crop Insurance Corporation

1	Number of rice insurance policies, by amount of cover and by program type, 2013	70
2	Number of rice insurance policies, by amount of cover and by program type, 2014	70
3	Average production cost per hectare of rice and corn (PHP), Philippines, 2012.....	71
4	Number of corn insurance policies, by amount of cover and by program type, 2013.....	71
5	Average production costs per hectare (PHP) and premium rate (%)	72
	of selected crops, Philippines, 2012	
6	Total amount of cover less total indemnity amount (PHP) of rice farmers	75
	who experienced total damage, 2013	

Chapter 6 | Promoting Cross-Sectoral Collaboration for Building Disaster Resilience in the Philippine Health Sector

1	Summary of disasters that affected the Philippines in 2013, their health impacts,	94
	and health actions provided	
2	The cluster approach in the Philippines	98

Chapter 9 | Extreme Flooding in Metro Manila Cities: Its Impact on Local Economies Using a Multiweek CGE Analysis

1	Social accounting matrix basic structure.....	144
2	Capital availability in the cities of Marikina and Pasig.....	147

3	Labor availability in the cities of Marikina and Pasig	150
4	Raw materials availability in the cities of Marikina and Pasig	151

Chapter 10 | Location Strategies in Building Resilient Settlements: Technical and Political Considerations

1	Population, density, GDP/capita, and rail-BRT indicators, selected metro areas.....	167
---	---	-----

Chapter 12 | Research on Urban Resilience to Natural Disasters of Households, Firms, and Communities in the Philippines

1	Global Resilience Index, top 10 countries, 2016	195
2	Global Resilience Index, bottom 10 countries, 2016.....	196
3	Natural disaster resilience-related studies on urban households in the Philippines.....	202
4	Natural disaster resilience-related studies on urban firms in the Philippines	202
5	Natural disaster resilience-related studies on urban communities in the Philippines.....	203

FIGURE

Conference Framework Paper | Risks, Shocks, Building Resilience: Philippines

1	Global risk landscape and interconnection of risks	2
2	Framework for building resilient systems	5
3	Risks, vulnerability, resilience	6

Chapter 1 | Climate Change Adaptation and Mitigation for the Agriculture Sector

1	Trends in rice production (mt) and area harvested (ha), Philippines, 1961–2013.....	18
2	Operating structure of the NFSCC 2010–2022.....	22
3	Strategic actions on food security under the NCCAP 2011–2028.....	23
4	Provinces with the highest incidence of poverty, number of poor households, and risk of climate hazards	30
5	Adaptation cost and climate change-related damage to agriculture..... as percentage of GDP	34

Chapter 2 | Improving Irrigation Water Governance for a Resilient Agriculture

1	Projected regional supply and demand situation in thousand cubic meter, 2005–2025	46
2	Irrigation investment trends for NIS and CIS.....	51
3	Trends in irrigation investments by purpose, 1965–2012	51
4	Irrigated area trends for NIS and CIS.....	52
5	Cropping intensity trends for NIS and CIS	52
6	Fragmented and overlapping range of functions of key Philippine water-related agencies	53
7	Philippine irrigation water governance administration.....	54
8	Irrigation water delivery decisionmaking process at the local level, AMRIS	58

Chapter 3 | Review of Design and Implementation of the Agricultural Insurance Programs of the Philippine Crop Insurance Corporation

1	Share of insurance product to total amount of insurance cover (%), 1981–2013	73
2	Total amount of cover less total indemnity amount (PHP) of a specific group..... of rice farmers under the same set of conditions, 2013	76

3	Penetration rates for rice and corn insurance (%), 1981–2013	76
4	Penetration rates for rice, corn, and HVCC insurance (%), January–June 2014.....	77

Chapter 4 | The Challenge of Reaching the Poor with a Continuum of Care:

A 25-year Assessment of Health Sector Performance

1	Per capita health expenditures by financing agent, 1991–2014 (constant 2000 prices).....	85
2	MMR from the survey, civil registry, and the Department of Health	86

Chapter 5 | Shake, Rattle, and Roll: Emotional Resilience toward a Resilient Health System

1	Psychological preparedness for disaster situations: Proposed model	91
---	--	----

Chapter 8 | Can Cheap Oil Hurt Net Importers? Evidence from the Philippines

1	Personal remittance, 1976–2015	127
2	The historical evolution of the structural shocks, 1976–2015.....	129
3	Historical decomposition of oil price changes, 1976–2015.....	131
4	Cumulative responses of Philippine macroeconomic aggregates to each structural shock point estimates with one- and two-standard error bands	132

Chapter 9 | Extreme Flooding in Metro Manila Cities: Its Impact on Local Economies Using a Multiweek CGE Analysis

1	Illustrative flow of transactions in a general equilibrium model.....	138
2	Effects on weekly outputs of the industries in Pasig City, by week	152
3	Effects on producer and consumer prices, Pasig City, by weeks (% change in prices)	152
4	Effects on the city's GDP, household final consumption, and national and local public spending, Pasig City (PHP million)	153
5	Overall well-being of city residents, Pasig City (PHP million).....	154
6	Effects on weekly outputs of the industries in Marikina City.....	154
7	Effects on producer and consumer prices, Marikina City	155
8	Effects on the gross domestic product of Marikina City	155

Chapter 12 | Research on Urban Resilience to Natural Disasters of Households, Firms, and Communities in the Philippines

1	Resilience ranking of selected world cities, 2014	197
2	Overall climate disaster resilience score of Metro Manila, 2010	198
3	System dynamics diagram of a low-income (LI) household resilience model	199
4	Conceptual framework for resilience of firms	200
5	Community governance and resilience framework.....	201

APPENDIX

Chapter 1 | Climate Change Adaptation and Mitigation for the Agriculture Sector

1	Palay production losses due to climate-related natural hazards and disasters, 2007–2011	38
2	Typhoons causing the most economic damage, 1990–2013.....	39

3	Major DA programs, activities, and projects on productivity and climate40
	change resilience, 2013–2016

BOX

Chapter 13 | Risk and Resilience: Interrogating Prosperity, Inequality, and Climate Disasters in Metro Manila

1	Urban renewal and gentrification of the Pansol Social Housing Site213
	in Quezon City, Metro Manila
2	A local government’s highly successful in-city relocation eroded by flood disasters.....214
	and increased commercial development

Foreword

With our rapid economic growth and large and youthful workforce, the Philippines is considered one of the key emerging Asian economies today. The spike in our inward investments can reflect this fact, with a number of multinational companies starting to appreciate the benefits of investing in our local markets.

These hard-earned economic gains, however, will only be fleeting if we will not be able to build resilience that can withstand shocks. Unfortunately, we can witness the rise of many types of interconnected and varied risks that can potentially hamper the flow of investments and make resilience building more difficult and challenging in the country.

Indeed, we must first build resilience before we can achieve sustainable and inclusive progress. To this end, the Philippine Institute for Development Studies dedicated the 14th Development Policy Research Month in promoting a deeper understanding of the complex risk landscape confronting the Philippines and in developing a comprehensive approach to building the country's resilience.

The celebration's highlight, the Second Annual Public Policy Conference (APPC), specifically tackled various issues affecting resilience on the Philippine macroeconomic, agriculture, urban environment, and health sectors. Its format recognizes the need to push for a systems approach in analyzing the impacts of risks and devising solutions to address them.

These conference proceedings provide a review of the evidence-based policy studies presented during the APPC. Each paper is rich with analytical insights as well as courses of action that we should consider to address the risks and shocks that threaten our economic growth.

The Institute hopes that the recommendations raised in these proceedings may stimulate further researches and discussions on this issue.

GILBERTO M. LLANTO
President

Preface

The 2016 Annual Public Policy Conference (APPC) theme of “Risks, Shocks, Building Resilience” is a timely topic given the significant changes that are occurring in both the domestic and global fronts. These developments create challenges to our institutions and systems that require them to continually evolve and build their strength to withstand shocks and risks.

The *Bangko Sentral ng Pilipinas* (BSP), for its part, has been building its resilience against domestic and external shocks through the adoption of proactive policies and reforms. In the post-global financial crisis years, the Philippines experienced substantial capital flows. A market-determined exchange rate helped absorb some of the speculative pressures from these flows. The BSP participates in the foreign exchange market with a view to safeguard price stability and is limited to mitigating large volatilities in the exchange rate. In June 2016, the BSP launched the Interest Rate Corridor (IRC) system as an initiative to preemptively put in place forward-looking policies. The IRC was envisioned to help guide short-term market rates toward the BSP policy interest rate, thus strengthening the effectiveness of transmission of monetary policy adjustments. It is also seen to aid the development of Philippine capital markets by fostering money market transactions and active liquidity management by Philippine banks. The increased activity in the money market will help promote the normalization of the yield curve in the country.

Macroprudential policies have also become an important part of the BSP’s policy toolkit, particularly in addressing the consequences of global financial cycles. Global financial cycles can intensify the risk-taking incentives in the economy, particularly for financial intermediaries. The BSP’s wide range of targeted and preemptive macroprudential instruments has enhanced its policy toolkit to contain the risk-taking behavior of financial intermediaries during the financial cycle upswing. Targeted macroprudential tools are tailored to address specific vulnerabilities in the financial system. The BSP’s use of macroprudential policy has allowed it to keep monetary policy focused on its primary objective of maintaining price stability.

Building the resilience not only of our financial system but also of the other sectors of our economy—e.g., infrastructure, health, agriculture, environment—is a key ingredient toward attaining inclusive and sustained economic growth. Initiatives like the 2016 APPC highlight the importance of this goal by providing a venue for the different stakeholders to exchange views, deepen their understanding, and design action plans to address this developmental issue. The BSP is privileged to have been a part of this undertaking.

NESTOR A. ESPENILLA JR.

Governor

Bangko Sentral ng Pilipinas

List of Acronyms

ABIF	– ASEAN Banking Integration Framework
ADB	– Asian Development Bank
ADS ²	– Accident and Dismemberment Security Scheme
AFC	– Asian financial crisis
AFMA	– Agriculture and Fisheries Modernization Act
AIM	– Asian Institute of Management
ALR	– ABIF Learning Roadmap
AMRIS	– Angat-Maasim River Irrigation Systems
AP ³	– Agricultural Producers Protection Plan
APCP	– Agrarian Production Credit Program
ARBs	– agrarian reform beneficiaries
ARMM	– Autonomous Region in Muslim Mindanao
ASEAN	– Association of Southeast Asian Nations
BCBS	– Basel Committee on Banking Supervision
BCLMV	– Brunei, Cambodia, Lao PDR, Myanmar, and Viet Nam
BERDE	– Building for Ecologically Responsive Design Excellence
BIS	– Bank for International Settlements
BPO	– business process outsourcing
BRT	– bus rapid transit
BSP	– <i>Bangko Sentral ng Pilipinas</i>
BSWM	– Bureau of Soils and Water Management
CAR	– Cordillera Administrative Region
CBMS	– community-based monitoring system
CCA/M	– climate change adaptation and mitigation
CCC	– Climate Change Commission
CDRI	– Climate Disaster Resilience Index
CFR	– Council of Financial Regulators
CGE	– computable general equilibrium
CIP	– communal or small irrigation project
CIS	– communal irrigation system
CL-2	– credit concentration, contagion, liquidity, and leverage
CMP	– Community Mortgage Program
CRED	– Centre for Research in the Epidemiology of Disasters
CSO	– civil society organization
DA	– Department of Agriculture
DAR	– Department of Agrarian Reform
DBM	– Department of Budget and Management
DENR	– Department of Environment and Natural Resources

DepEd	– Department of Education
DILG	– Department of the Interior and Local Government
DOE	– Department of Energy
DOF	– Department of Finance
DOH	– Department of Health
DOST	– Department of Science and Technology
DOT	– Department of Tourism
DPWH	– Department of Public Works and Highways
DRRM	– disaster risk reduction and management
DSWD	– Department of Social Welfare and Development
DTI	– Department of Trade and Industry
EIA	– Energy Information Administration
ESRB	– European Systemic Risk Board
EU	– European Union
FAO	– Food and Agriculture Organization
FGD	– focus group discussion
FISC	– Financial Inclusion Steering Committee
FMI	– financial market infrastructures
FSCC	– Financial Stability Coordination Council
FSComm	– Financial Stability Committee
FSOC	– Financial Stability Oversight Council
FUSA	– firmed-up service area
GDP	– gross domestic product
GFC	– global financial crisis
GHG	– greenhouse gases
GIIPS	– Greece, Italy, Ireland, Portugal, and Spain
GRI	– Global Resilience Index
ha	– hectares
HVC	– high-value crop
HVCC	– high-value commercial crop
IA	– irrigators' association
IDR	– irrigation delivery requirements
IMO	– Irrigation Management Office
IMT	– Irrigation Management Transfer
IO	– input-output
IRWM	– integrated regional water management
ISF	– irrigation service fee
ISFs	– informal settler families
Lao PDR	– Lao People's Democratic Republic
LBP	– Land Bank of the Philippines
LGU	– local government unit

LLDA	– Laguna Lake Development Authority
LRP ²	– Loan Repayment Protection Plan
LWUA	– Local Water Utilities Administration
m ³	– cubic meters
MAO	– municipal agricultural officer
MARIIS	– Magat River Integrated Irrigation System
MDG	– Millennium Development Goal
MHPSS	– mental health and psychosocial support
MMDA	– Metropolitan Manila Development Authority
mt	– metric ton
MSME	– mirco, small, and medium enterprises
MWSS	– Metropolitan Waterworks and Sewerage System
M&E	– monitoring and evaluation
NAPOCOR	– National Power Corporation
NCAA	– noncrop agricultural asset
NCCAP	– National Climate Change Action Plan
NCR	– National Capital Region
NDRRMC	– National Disaster Risk Reduction and Management Council
NEDA	– National Economic and Development Authority
NFSCC	– National Framework Strategy for Climate Change
NGO	– nongovernmental organization
NIA	– National Irrigation Administration
NIP	– new irrigation project
NIS	– national irrigation system
NSFI	– National Strategy for Financial Inclusion
NWRB	– National Water Resources Board
O&M	– operation and maintenance
OCD	– Office of Civil Defense
ODA	– official development assistance
OECD	– Organisation for Economic Co-operation and Development
OFR	– Office of Financial Research
OTC	– over the counter
PAGASA	– Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAP	– programs, activities, and projects
PAO	– Provincial Agricultural Office
PCIC	– Philippine Crop Insurance Corporation
PD	– Presidential Decree
PDP	– Philippine Development Plan
PhilGBC	– Philippine Green Building Council
PHP	– Philippine peso

PIDS	– Philippine Institute for Development Studies
PLMSC	– Philippine Livestock Management Services Corporation
PPP	– public-private partnership
PRHA	– Pansol Residents and Housing Association
QAB	– qualified ASEAN bank
R&D	– research and development
RA	– Republic Act
RIO	– Regional Irrigation Office
RO	– regional office
ROW	– rest of the world
RSBSA	– Registry System for Basic Sectors in Agriculture
RTGS	– Real Time Gross Settlement
SAM	– social accounting matrix
SDD	– small diversion dam
SDH/HiAP	– Social Determinants of Health/Health in All Policies
SFR	– small farm reservoir
SLR	– sea level rise
SME	– small and medium enterprise
sqkm	– square kilometer
SSIP	– Small-Scale Irrigation Project
STW	– shallow tube well
SWIP	– Small Water Impounding Project
SWISA	– Small Water Impounding System Association
TA	– team of adjusters
UN	– United Nations
UNEP	– United Nations Environmental Programme
UNICEF	– United Nations Children’s Fund
UPRIIS	– Upper Pampanga River Integrated Irrigation System
US	– United States
USD	– United States dollar
VAR	– vector autoregressive
WARA	– Weather-Adverse Rice Areas
WASH	– water, sanitation, and hygiene
WEF	– World Economic Forum
WFP	– World Food Programme

About the Conference

A strong country springs from a prepared, equipped, vigilant, and united people. Only when it is resilient to multiple risks can economic growth be truly sustained and enjoyed by all segments of the population. This is a critical challenge for the Philippines. How can the country sustain its rapid economic growth and make it more inclusive amid increasing vulnerability and exposure to climate change and natural hazards, and other types of risk factors?

This fundamental question confronting the country was the focus of discussions at various events held during the 14th Development Policy Research Month (DPRM) in September 2016, which centered on the theme “*Angkop na Kabandaan: Matatag na Ekonomiya at Lipunan*” or Investing in Risk Reduction for a Resilient Philippines. Its culminating activity was the Second Annual Public Policy Conference (APPC) held on September 22 at the Marco Polo Hotel in Pasig City.

During the conference, the concept of resilience was discussed at length, as well as the different risks the country confronts and the mechanisms and structures needed to reduce risks. This year’s conference on “Risks, Shocks, and Building Resilience” was aimed at providing policymakers with evidence-based information that could assist them in formulating appropriate and timely policy interventions to build resilience.

Dr. Ernesto Pernia, socioeconomic planning secretary and director-general of the National Economic and Development Authority (NEDA), emphasized the importance of building multiple resilience systems in sustaining the country’s economic gains. In his keynote address read by NEDA Deputy Director-General Rolando Tungpalan, Pernia stressed the need for the country to acquire the right tools and the right capacities to mitigate risks and prevent calamities from turning into disasters.

As an example, he cited how Typhoon *Yolanda* left thousands of people homeless and jobless, which held back economic growth in the region. Based on data from the Department of Agriculture, the total damage on agriculture caused by typhoons from 2000 to 2013 amounted to as much as PHP 195 billion. This amount keeps adding up every year due to the increasing frequency and intensity of weather disturbances.

Pernia pointed out that disasters and natural hazards entail not only economic costs but also social and health costs. Thus, he encouraged everyone to stay vigilant, knowing full well that another big disaster might just be around the corner.

“With every threat, we face the real risk of losing human lives, and we should work harder and faster toward a more vigilant and resilient society. Indeed, we must never underestimate the effects of climate change on society, because proper preparation or lack thereof can spell the difference between survival and disaster,” he stated.

However, Pernia acknowledged that disruptive weather events and natural calamities are just among the risks and threats that we must watch out for.

“The risk landscape has evolved into a web of various threat sources encompassing economic, environmental, societal, geopolitical, and technological risks. These risks are intricately linked to one another—and their effects can easily spread across economies and nations,” he cautioned.

According to Pernia, rising food and fuel prices and structural unemployment and underemployment are some examples of macroeconomic risks that threaten the country’s pursuit of sustained and inclusive

development. In addition, increased regional integration has also made the Philippines more vulnerable to market disturbances related to exchange rates, capital flows, and stock prices.

“In the area of health, risks from epidemics and pandemics have been intensified by greater mobility of people across national borders, increased trade flows, and more accessible transportation networks. Likewise, greater concentration of people and large-scale economic activities and infrastructure development have made urban communities more vulnerable to natural hazards, especially typhoons, floods, and landslides,” he added.

Thus, Pernia emphasized the need for a multidisciplinary approach in building resilient systems given their complex and multifaceted nature. This was also accentuated by Dr. Gilberto Llanto, president of the Philippine Institute for Development Studies (PIDS), in his presentation of the conference theme paper (p. 1, this volume).

Developing a multidisciplinary and holistic approach requires a clear understanding of the nature of risks at the sectoral level and how these impact the whole system. Thus, the APPC devoted four sessions to discuss the issues affecting the resilience of the macroeconomic, agriculture, urban environment, and health sectors. Top researchers presented the critical policy issues in these sectors, which, together, affect the country’s capacity to mitigate adverse shocks brought about not only by natural hazards but also by risks from financial crises, energy price volatility, food crises, pandemics, and failure of climate change mitigation and adaptation measures.

For example, on the aspect of agricultural resilience, discussions revolved around the effectiveness of support services to farmers, such as crop insurance and irrigation facilities. In the session on health, the structural problems that contribute to the vulnerability of the sector were tackled. Conversations in the urban environment session centered, among others, on building resilient infrastructure and settlement, and the multiple dimensions of disaster risk and resilience in coastal megacities like Metro Manila. In the macroeconomy session, discussions were rife on how to address financial market stability and on the effects of oil price shocks on the Philippine economy. The usefulness of economic modeling to determine the probable cost of disasters as a guide to more effective policy formulation on disaster risk reduction was also acknowledged.

At the end of the sessions, it became clear that while individual sectors are confronted with risks that may be unique to them, their effects are interrelated. The health of an entire system—be it a community, a country, or a region—also depends on the proper functioning of its component parts and their capacity to effectively absorb shocks, adapt to changes, and transform into more resilient entities. Governance is a key element that cuts across sectors. Policies should emanate from a multidisciplinary analysis of issues. Resilience building, however, is not the sole ambit of government. It should be a shared responsibility among all sectors of society.

“An all-of-government approach is necessary to put forward relevant policies. However, these policies will be more effective if the academic and research communities continue to engage and assist policymakers in crafting these policies. Everyone—the business and private sectors, civil society organizations, the media, and the public—has an important role to play in resilience building,” Pernia concluded.

Llanto, in his welcome remarks, underscored that building the country’s capacity to mitigate expected adverse shocks requires Philippine society and policymakers to be proactive in anticipating these shocks and crafting policy measures to cushion their potential impact.

“A resilient system has a capacity to quickly rebuild after a shock and build back better, and to recognize interdependencies of components of ecosystem and formulate holistic approach or measures,” he said.

Dr. William Padolina, PIDS Board of Trustees member and former science and technology secretary, also highlighted the importance of looking at risks and shocks in holistic terms to better understand their impacts on society and economy.

“The risks that we are exposed to are all very complex, and their impacts must be understood. Thus, we must look at these risks in terms of systems. I hope that we are all training our present and future researchers in using systems approach,” he emphasized in his closing remarks.

According to Padolina, the use of modern tools and information infrastructure that are now readily available allows researchers to have a broader and interactive view of these risks. He cited the availability of satellite data and maps, as well as research outputs from institutions like PIDS, that researchers could put together to get a better picture of these risks and problems.

“At the end of the day, what we want is an early warning system, a kind of forecast so that we can prepare ourselves. At the same time, our leaders and policymakers can be provided with good information. It cannot just be a one-size-fits-all approach in managing risks,” Padolina maintained. He also stressed the importance of communicating research results to policymakers, whom he said have the capacity to translate these research findings into good policies and provide resources to implement all of the recommendations.

“It is very clear that even if we are able to provide an initial understanding of the risks, some possible solutions, and ways to cope with them, at the end of the day, our policymakers are the ones who will eventually adopt, listen to what we are saying, and translate our recommendations into good policies,” he explained.

He concluded by encouraging the audience to do more research. He reminded the audience that it is their responsibility to make sure of three things: (1) that there are succession plans in terms of pursuing these kinds of studies, (2) that talent base will continue to expand, and (3) that institutions will be strengthened to be able to respond to the growing need to analyze risks and to make the necessary adjustments.

The 2016 APPC, which was attended by over 200 participants, was jointly organized by PIDS and *Bangko Sentral ng Pilipinas*. In 2015, the inaugural conference was launched with the theme “Harnessing Our Human Capital and Institutions for Inclusive Growth”. The APPC aims to convene experts and researchers in the social sciences to flag to policymakers critical issues that must be addressed in the immediate term. It is envisioned to serve as a platform to further bridge research and policymaking, and enhance evidence-informed planning and policy formulation in the Philippines.

Risks, Shocks, Building Resilience: Philippines

Gilberto M. Llanto

Risks are interconnected and constantly evolving. Globally, the rise of new and unexpected risks and shocks has impacted stable and poor societies alike, and some, especially the latter, have become increasingly dysfunctional.

In particular, the Philippines is peculiarly challenged to build economic resilience as indicated by its high-risk exposure and vulnerability. While people are more familiar with disaster risks and extreme weather events, and most discussions gravitate around building resilience against these types of risks, we can witness the rise of many different types of risks that are interconnected, making resilience building more difficult and challenging in the country.

As such, the Philippines needs to build economic resilience that goes beyond disaster risk reduction and management. After all, it is impossible to insulate the economy from interconnected risks and shocks.

The evolving global risk landscape

Before one can meaningfully discuss resilience, one must first understand the risk landscape. The world is a global village where economic activities

are significantly interconnected, interlinked, and interdependent. Under this setting, a changing and complex risk landscape and the relatively fast transmission of shocks that can easily cascade on a wide scale accentuate the vulnerability of individual and regional economies, and the global economy, in general. Pandemics, energy price volatility, rising food prices, financial crises, interstate conflicts, and failure of climate change mitigation and adaptation measures, among others, figure prominently in present-day conversations of the policy community.

The *2016 Global Risks Report* describes the evolving risk landscape perceived to significantly affect the global economy and individual economies in the coming years (WEF 2016). It defines global risk as “an uncertain event or condition that, if it occurs, can cause significant negative impact for several countries or industries within the next 10 years” (WEF 2016, p. 11).

The said report includes a map that shows that risks are not isolated but are linked to several other risks that magnify the impact or shocks on economies when they occur (Figure 1). Those risks also evolve, meaning they are not static but change

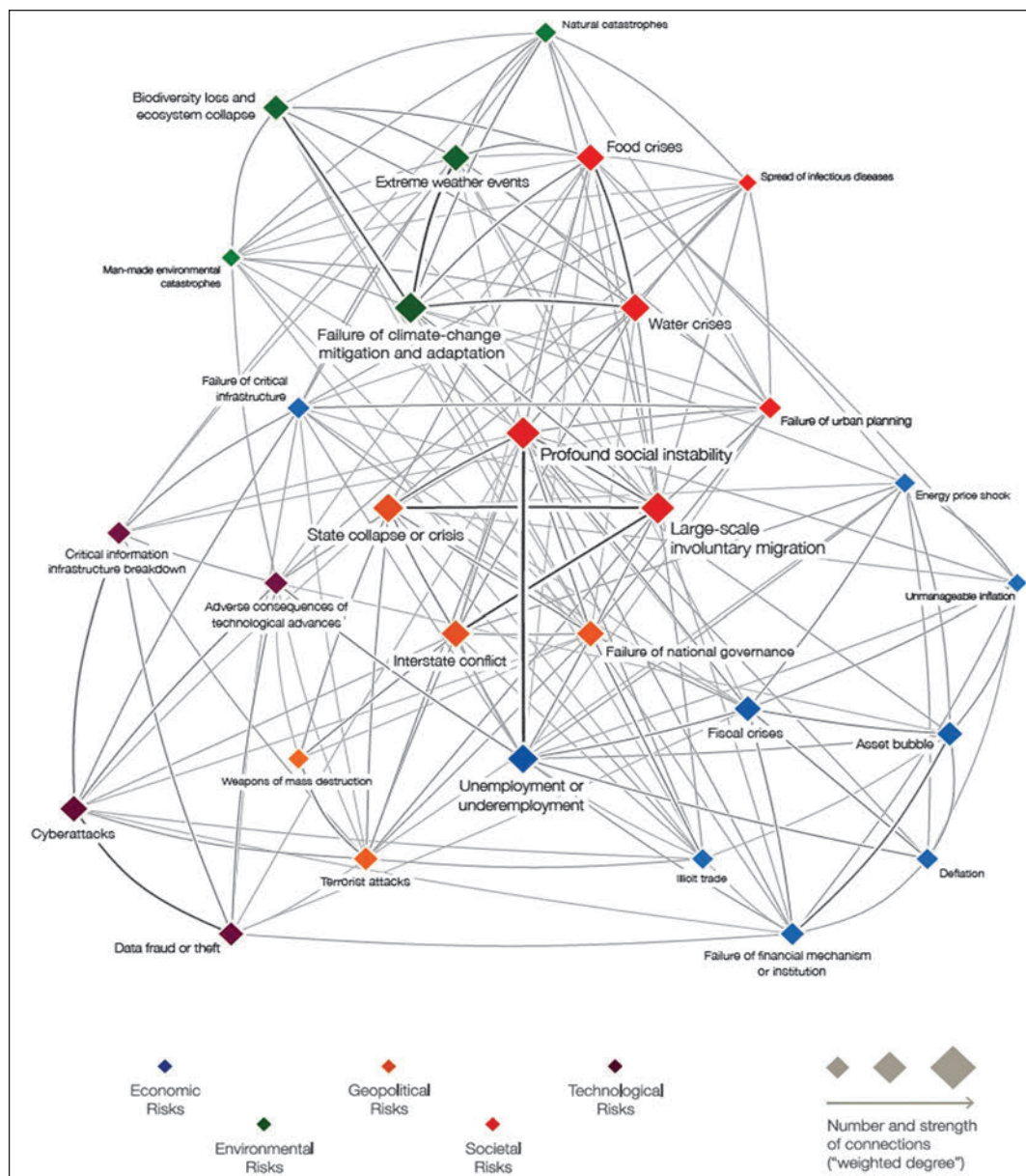
over time. A major difficulty is defining how best to manage or respond to those risks.

For instance, extreme weather events, failure of climate change mitigation and adaptation measures, and water risks are intricately linked to food crises. In particular, rapidly rising food prices drive poor people deeper into poverty because they often spend upward of 60–80 percent of their income on food (Clapp and Cohen 2009).

The report also provides a comprehensive overview of the evolving risks landscape in terms of likelihood of occurring (Table 1) and of the greatest impact (Table 2).

In 2016, the top five global risks in terms of likelihood are mostly related to the environment (extreme weather events, failure of climate change mitigation and adaptation, major natural catastrophes). Meanwhile, in terms of impact, the

Figure 1. Global risk landscape and interconnection of risks



Source: World Economic Forum [WEF] (2016)

top five global risks are societal (water crisis, large-scale involuntary migration), geopolitical (weapons of mass destruction), environmental (failure of climate change mitigation and adaptation), and economic (severe energy price shock).

Because of its geographical location, the Philippines is naturally exposed to extreme weather

events and natural catastrophes linked to failure in climate change mitigation and adaptation in large economies that use fossil-based fuels. Moreover, while it has not been adversely affected by those top global risks in terms of impact, the impact of natural hazards and extreme weather events in terms of loss of lives, property, and infrastructure is

Table 1. Top five global risks in terms of likelihood

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1st	Breakdown of critical transformation	Asset price collapse	Asset price collapse	Asset price collapse	Storms and cyclones	Severe income disparity	Severe income disparity	Income disparity	Interstate conflict with regional consequences	Large scale involuntary migration
2nd	Chronic disease in developed countries	Middle East instability	Slowing Chinese economy (<6%)	Slowing Chinese economy (<6%)	Flooding	Chronic fiscal imbalances	Chronic fiscal imbalances	Extreme weather events	Extreme weather events	Extreme weather events
3rd	Oil price shock	Failed and failing states	Chronic disease	Chronic disease	Corruption	Rising greenhouse emission	Rising greenhouse emission	Unemployment and underemployment	Failure of national governance	Failure of climate change mitigation
4th	China economic hard landing	Oil and gas price spike	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber attacks	Water supply crises	Climate change	State collapse or crisis	Interstate conflict with regional consequences
5th	Asset price collapse	Chronic disease in developed world	Retrenchment from globalization (emerging)	Global governance gaps	Climate change	Water supply crises	Mismanagement of population ageing	Cyber attacks	High structural unemployment or underemployment	Major natural catastrophes

■ Economic
 ■ Environmental
 ■ Geopolitical
 ■ Societal
 ■ Technological

Source: WEF (2016)

Table 2. Top five global risks in terms of impact

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1st	Asset price collapse	Asset price collapse	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises	Water crises	Failure of climate change mitigation and adaptation
2nd	Retrenchment from globalization	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change	Rapid and massive spread of infectious diseases	Weapons of mass destruction
3rd	Interstate and civil wars	Slowing Chinese economy (<6%)	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises	Weapons of mass destruction	Water crises
4th	Pandemics	Oil and gas price spike	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment	Interstate conflict with regional consequences	Large scale involuntary migration
5th	Oil price shock	Pandemics	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agricultural prices	Failure of climate mitigation and adaptation	Critical information infrastructure breakdown	Failure of climate change mitigation and adaptation	Severe energy price shock

■ Economic
 ■ Environmental
 ■ Geopolitical
 ■ Societal
 ■ Technological

Source: WEF (2016)

huge and sets back growth in affected communities and the economy in general.

Building resilient systems

Present discourse on resilience points to the key characteristics of a resilient system, which include (1) capacity of a system to absorb change and still remain within the same state or domain of attraction, (2) capacity of a system to self-organize, and (3) capacity of a system to build and increase its capacity for learning and adaptation (Carpenter et al. 2001). Based on these definitions, resilience is about building the capacity of a system or systems to absorb change or any disturbance to its existing state, to adapt, and to learn from the change experience.

The Organisation for Economic Co-operation and Development (2014) explains that a system could be many things, including a unit of society, part of the natural environment, or a physical entity. A system's resilience, broadly defined, is "the ability of households, communities, and nations to absorb and recover from shocks, whilst positively adapting and transforming their structures and means for living in the face of long-term stresses, change, and uncertainty" (OECD 2014, p. 37; Van der Vegt et al. 2015). The common factor in various definitions of resilience is the stress laid on capacity or ability of a body to absorb and adjust to any change or perturbation (Norris et al. 2008; ADRRN 2010). However, beyond absorption and adjustment to change through some coping mechanisms, the idea of transforming structures to build resilience has to be emphasized.

A disruptive external shock tests the response and capacity of economic agents to deal with the shock. It is important to understand this behavior not merely in the context of being able to cope with a disruptive event but more so in terms of the following threefold responses: (1) absorption and recovery from exogenous shocks and stresses, (2) adaptation, and (3) transformation of society's structures and mechanisms (Mitchell 2013) that will enable different layers of society to withstand

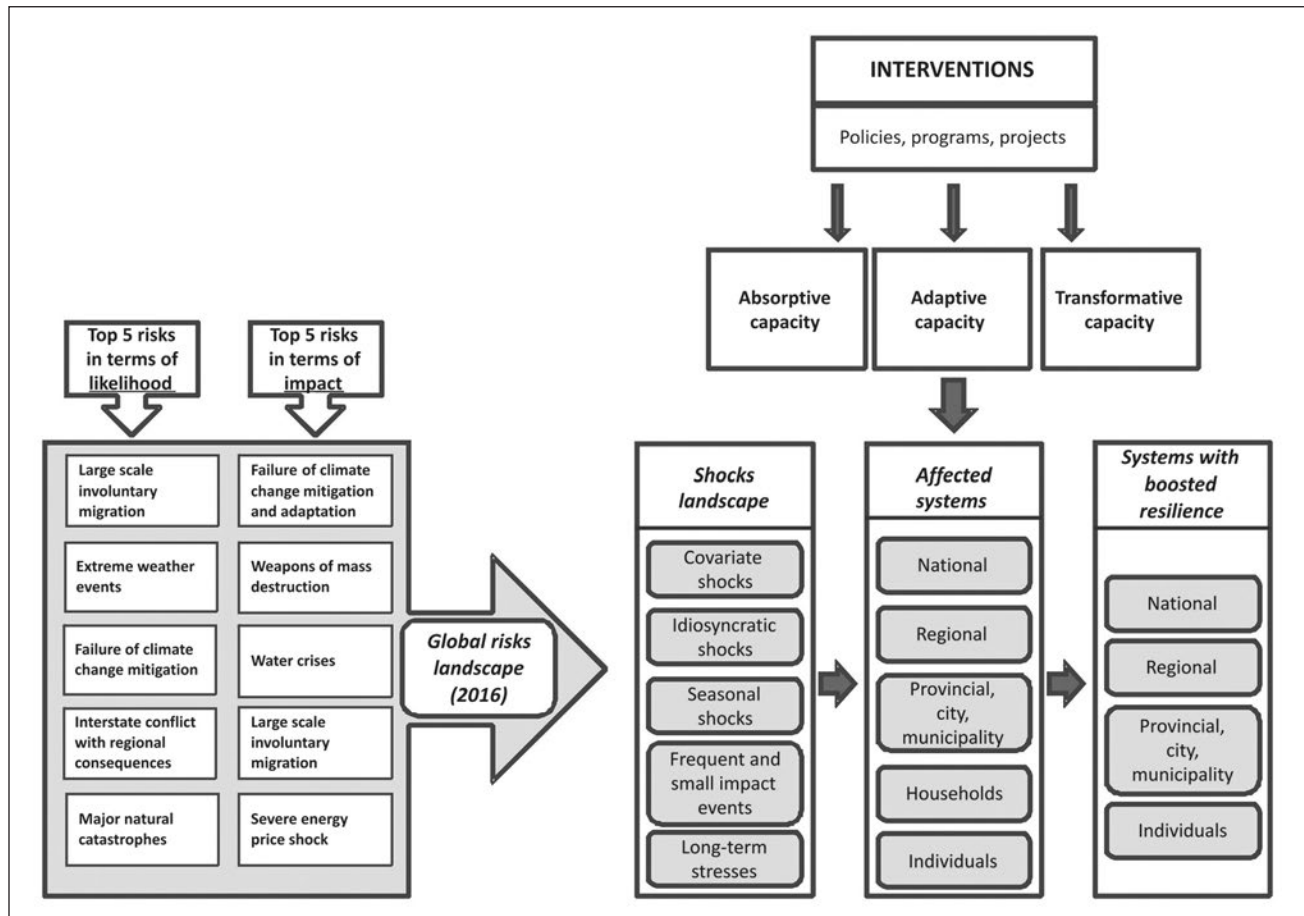
future shocks and stresses (e.g., climatic, natural, economic, and geopolitical).

The transformative phase in different systems is critical because the improvement or changes in structures and mechanisms presumably empower economic agents (different layers of society) to respond better to future shocks and stresses. The transformation of a system (e.g., the transformation of an agrarian economy to a modern, industrial economy) defines its resilience to future shocks. However, according to Walker and Salt (2006), social-economic-political-ecological systems are complex, adaptive systems that do not change in a predictable, linear, or incremental fashion. It will not be easy to define a pathway toward transformation. In other words, such systems are dynamic, opportunistic, and capable of responding to change in a variety of ways, sometimes totally unpredictable, and policymakers must be totally aware of this reality so that they may structure policies driven by evidence, experience, and their best prognosis of the future. The challenge laid at the door of policymakers is to determine appropriate policy interventions that will enhance the social-economic-political-ecological systems' ability to absorb and withstand shocks, adapt, and transform structures and mechanism (Figure 2).

Vulnerability and building economic resilience

Briguglio et al. (2008, p. 1) defines vulnerability as the "exposure of an economy to exogenous shocks arising out of economic openness, while economic resilience is defined as the policy-induced ability of an economy to withstand or recover from the effects of such shocks." Seth and Ragab (2012) pointed to two different approaches in studies of macroeconomic vulnerability of developing countries. The first approach looks at macroeconomic vulnerability from the standpoint of financial or banking crises wherein vulnerability is seen as a result of macroeconomic imbalances in the financial sector. The second approach examines vulnerability from the perspective of specific

Figure 2. Framework for building resilient systems



Source: Modified by the author from Figure 1 in Organisation for Economic Co-operation and Development (2014) and Figure 1 in WEF (2016)

structural conditions that expose economies to economic or financial risks and shocks.

There is yet no comprehensive framework for assessing macroeconomic vulnerability (Seth and Ragab 2012). Baritto (2008) and Seth and Ragab (2012) mentioned the set of indicators proposed by the International Monetary Fund in 1998 called the Macroeconomic Vulnerability Index, the World Bank's 1999 Index of Macroeconomic Vulnerability, and the United Nations' Economic Vulnerability Index. However, the seminal studies of Briguglio (1995, 1997), Briguglio and Galea (2003), and Briguglio et al. (2008) are instructive.

According to Briguglio et al. (2008), economic vulnerability arises basically from three factors: economic openness, export concentration,

and dependence on strategic imports. Economic openness is measured as the ratio of international trade to gross domestic product (GDP). A highly open economy is subject to the vagaries of external economic conditions over which it has no control.

Participation of an economy in international trade confers benefits in terms of greater domestic output and employment and foreign exchange earnings, but it also exposes the economy to external shocks. Export concentration is measured using the United Nations Conference on Trade and Development index of merchandise trade. Dependence on strategic imports is measured as the ratio of the imports of energy, food, or industrial supplies to GDP. In constructing a vulnerability index for each economy, Briguglio

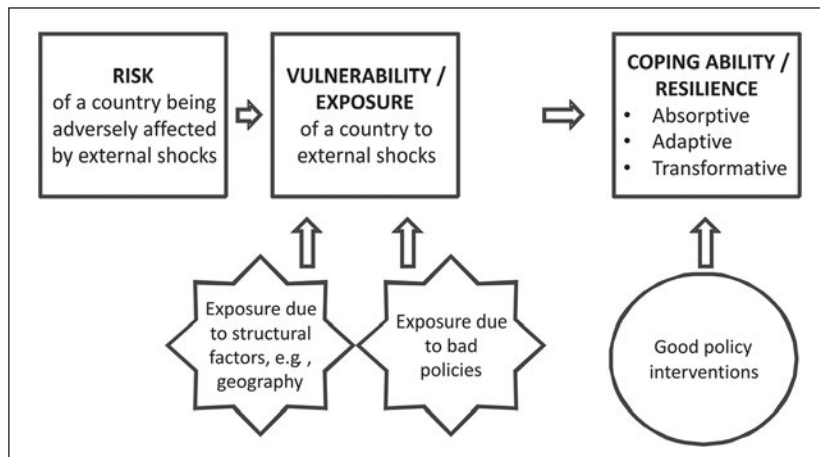
et al. (2008, p. 2) argue that vulnerability is due to “permanent or quasi-permanent features over which a country practically exercises no control and therefore cannot be attributed to inadequate policies.” However, as reflected in Figure 3, bad policies are contributory to the exposure or vulnerability of the economy because such policies prevent efficient structural transformation that builds economic resilience. Meanwhile, in the absence of any other estimation of the country’s vulnerability, the computation of Briguglio et al. (2008) is presented here to illustrate the extent of the country’s exposure or vulnerability relative to other countries. As depicted in Table 3, the Philippines is one of the most vulnerable countries in Asia.

Briguglio et al. (2008) hypothesized that resilience is captured by the following factors: (1) macroeconomic stability, (2) microeconomic market efficiency, (3) good governance, and (4) social development. Macroeconomic stability subindex is the simple average of three variables: (1) the fiscal deficit to GDP ratio, (2) the sum of the unemployment and inflation rates, and (3) the external-debt-to-GDP ratio. Microeconomic efficiency subindex is derived from a component of the Economic Freedom of the World index, sourced from Gwartney et al. (2005), namely, regulation of credit, labor, and business. Good

governance subindex consists of (1) judicial independence and impartiality of courts, (2) protection of property rights, (3) military interference in the rule of law, and (4) political system and the integrity of the legal system. The social development subindex is the sum of the education and health indices of the Human Development Index of the United Nations Development Programme. The resilience index is a simple average of the four subindices (Briguglio et al. 2008). It is interesting to know if there is a strong correlation between GDP per capita, on one hand, and vulnerability and resilience, on the other.

The authors drew some interesting implications, namely, that economic performance is “more dependent on man-made policies than on inherent vulnerabilities” (p. 13) and that good policies can lead to better coping ability and resilience. This explains what Briguglio et al. (2008) called as the “Singaporean paradox”, which is the seeming contradiction that a country can be very vulnerable and yet manages to register high GDP growth. Note that in Table 3, Singapore appears to be the most vulnerable economy among the lot but, at the same time, it is the most resilient. What explains this? The authors’ hypothesis is that it is good man-made policies that offset significantly whatever vulnerability an economy

Figure 3. Risks, vulnerability, resilience



Source: Briguglio et al. (2008)

Table 3. Resilience and vulnerability of selected Asian economies

Economy	Resilience Index	Vulnerability Index
Singapore	0.974	0.971
Hong Kong, China	0.877	0.713
Japan	0.674	0.106
Malaysia	0.624	0.587
Thailand	0.467	0.363
Philippines	0.353	0.485
Sri Lanka	0.328	0.415
India	0.301	0.201
Nepal	0.208	0.327
Indonesia	0.161	0.174
Bangladesh	0.136	0.313
Pakistan	0.069	0.349

Source: Briguglio et al. (2008)

faces. In the case of Singapore, the constraints are obvious: it is a small city-state with a small (but extremely smart) population totally dependent on global trade for sustenance and investments. However, an excellent performance in terms of the subindices of macroeconomic stability, microeconomic efficiency, good governance, and social development is more than enough to override inherent and permanent factors that create vulnerability.

In finding ways to deal with a complex risk landscape and varying shocks, policy conversations have shifted from reducing vulnerability to exogenous shocks to building resilient systems that will enable economies to absorb shocks, adapt, and transform into modern, diversified industrial or postindustrial economies (in the case of the most-advanced economies). Building resilient systems means having good, forward-looking policy options for dealing with the vulnerability of the economy to various shocks. Berkes (2007) points to a pathway: build resilience into human–environment systems, an effective way to deal with change characterized by uncertainty, surprises, and unknowable risks. This line of thinking is illustrated in Figure 3, a revised version of Briguglio et al. (2008).

Resilient systems in the Philippines

In the Philippines, the concept of building resilience commonly relates to the occurrence of natural catastrophes, such as severe flooding, typhoons, earthquakes, and landslides. The *Philippine Development Plan (PDP) 2011–2016* has included disaster resiliency as an important element in its integrated strategies, programs, and projects for inclusive growth. Disaster resiliency is likewise included in the *PDP 2011–2016 Midterm Update* and in the Revalidated Public Investment Program and Results Matrices. This is in line with the government's policy to incorporate disaster risk reduction in development planning at various levels of government, as stated in the Philippine Disaster Risk Reduction and Management Act of 2010 (Republic Act No. 10121) and its implementing rules and regulations (NDRRMC 2010).

However, while disaster resilience remains as a major objective, the country should also be concerned with the evolving interconnected risk landscape and shocks earlier described. The Philippine economy has become more open and integrated to the global market, thus, exposure and vulnerability to external risks and shocks have likewise risen. Because of this phenomenon, there is a need to establish a deeper understanding of

the dynamics of resilient systems and to develop a more comprehensive approach to building the country's economic resilience.

Developing resilience thinking: The way to go

We should adopt resilience thinking that understands how interacting systems, say of communities and the ecology, or social-ecological systems, can be managed in order to make them resilient (SRC 2014). Boosting resilience involves: (1) understanding the risk landscape and how shocks impact systems, including how society functions in each context; (2) determining at which layer of society those risks are best managed; and (3) applying a set of resilience principles to strengthen the system's capacity to absorb shocks, adapt, and transform so that the system will be less exposed to shocks (OECD 2014). It is important to find out which layer of society can best deal with and manage the identified risks and, more importantly, handle those risks (Mitchell 2013).

The global risk landscape and the experience with past crises and shocks provide information as to what risks affect economic agents and the impact of exogenous shocks. There are numerous risk analysis tools, showing where and when conflict is likely and which areas are exposed to natural hazards, and modelling how economic shocks and pandemics might spread or how climate change will affect different communities and regions (OECD 2014). Policymakers should be aware and conversant about risk analysis, risk management, and what policies can best respond to exogenous shocks. Such policies should be underpinned by policy analysis and research on resilience systems. It is obvious that policymakers, especially the budget department, should give a premium to evidence-based policy research.

There is also a need for a shared vision in the communities and in the larger polity on what to do about those risks, what priorities for action are there, and, more importantly, how to boost the resilience of various entities to the risks they face every day.

The crucial questions facing policymakers are: where and when should a household, community, or nation-state invest time, skills, and money, and what form of investments should be taken in order to empower at-risk communities, help them to better absorb shocks, and adapt or transform so that they become less exposed to shocks.

Building economic resilience requires finding effective instruments (i.e., policies and interventions) to deal with different risks and shocks (e.g., natural hazards, pandemics, financial crisis) and their traumatic effects. This is the present day's biggest challenge facing policymakers because catastrophic shocks can quickly unravel hard-earned economic gains. Finding effective policy responses to risks, shocks, and postdisaster trauma, and efficiently implementing them, are not easy tasks. An immediate issue is identifying policies or instruments that could effectively "deal with an increasingly complex, interconnected, and evolving risk landscape, while retaining the (economy's) ability to seize opportunities to increase overall well-being" (OECD 2014, p. 1). Assuming that those policies or instruments could be identified, the next issue is effective policy design and implementation.

References

- Asian Disaster Reduction and Response Network (ADRRN). 2010. *Terminolohiya sa Disaster Risk Reduction*. Bangkok, Thailand: United Nations International Strategy for Disaster Reduction and Quezon City, Philippines: Center for Disaster Preparedness.
- Baritto, F. 2008. Disasters, vulnerability, and resilience from a macroeconomic perspective: Lessons from the empirical evidence. Background paper for the 2009 ISDR Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: International Strategy for Disaster Reduction.
- Berkes, F. 2007. Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Nat Hazards* 41:283–295.
- Briguglio, L. 1995. Small island states and their economic vulnerabilities. *World Development* 23:1615–1632.

- . 1997. Alternative economic vulnerability indices for developing countries. Report prepared for the United Nations Department of Economic and Social Affairs.
- Briguglio, L. and W. Galea. 2003. Updating and augmenting the economic vulnerability index. Occasional Reports on Islands and Small States No. 2004/4. Msida, Malta: Islands and Small States Institute of the University of Malta.
- Briguglio, L., G. Cordina, N. Farrugia, and S. Vella. 2008. Economic vulnerability and resilience: Concepts and measurements. Research Paper No. 2008/55. Helsinki, Finland: United Nations University-World Institute for Development Economics Research.
- Carpenter, S., B. Walker, J. Andreis, and N. Abel. 2001. From metaphor to measurement: Resilience of what to what? *Ecosystems* 4:765–781.
- Clapp, J. and M. Cohen. 2009. The food crisis and global governance. In *The global food crisis: Governance challenges and opportunities*, edited by J. Clapp and M. Cohen. Ontario, Canada: The Centre for International Governance Innovation Wilfrid Laurier University Press.
- Gwartney, J. and R. Lawson, with E. Gartzke. 2005. Economic freedom of the world: 2005 Annual Report. British Columbia, Canada: The Fraser Institute. www.freetheworld.com (accessed on March 16, 2016).
- Mitchell, A. 2013. Risk and resilience: From good idea to good practice. OECD Development Assistance Committee Working Paper 13/2013. Paris, France: OECD Publishing.
- National Disaster Risk Reduction and Management Council (NDRRMC). 2010. Implementing rules and regulations of Republic Act No. 10121, “Philippine Disaster Risk Reduction and Management Act of 2010”. Quezon City, Philippines: NDRRMC. http://www.ndrrmc.gov.ph/attachments/article/95/Implementing_Rules_and_Regulation_RA_10121.pdf (accessed on March 8, 2016).
- Norris, F., S. Steven, B. Pfefferbaum, K. Wyche, and R. Pfefferbaum. 2008. Community resilience as a metaphor, theory, set of capacities and strategies for disaster readiness. *American Journal of Psychology* 41:127–150.
- Organisation for Economic Co-operation and Development (OECD). 2014. Guidelines for resilience systems analysis. Paris, France: OECD Publishing.
- Seth, A. and A. Ragab. 2012. Macroeconomic vulnerability in developing countries: Approaches and issues. International Policy Centre for Inclusive Growth Working Paper Number 94. Brasilia, Brazil: United Nations Development Programme. <http://www.ipc-undp.org/pub/IPCWorkingPaper94.pdf> (accessed on March 9, 2016).
- Stockholm Resilience Centre (SRC). 2014. Applying resilience thinking: Seven principles for building resilience in social-ecological systems. Stockholm, Sweden: Stockholm University. <http://www.stockholmresilience.org/download/18.10119fc11455d3c557d6928/1459560241272/SRC+Applying+Resilience+final.pdf> (accessed on January 13, 2016).
- Van der Vegt, G., P. Essens, M. Wahlstrom, and G. George. 2015. Managing risks and resilience. *Academy of Management Journal* 58(4):971–980.
- Walker, B. and D. Salt. 2006. *Resilience thinking: Sustaining ecosystems and people in a changing world*. Washington, D.C.: Island Press.
- World Economic Forum (WEF). 2016. *The Global Risks Report 2016*. 11th edition. Geneva, Switzerland: WEF. <http://www3.weforum.org/docs/Media/TheGlobalRisksReport2016.pdf> (accessed on March 15, 2016).



SESSION 1

AGRICULTURAL RESILIENCE

Climate Change Adaptation and Mitigation for the Agriculture Sector

Marites M. Tiongco

Abstract

With rational and adequately financed adaptation and mitigation strategies to forestall disasters and migrations at unprecedented scales, the most dangerous impacts of climate change could still be averted, according to the United Nations Environmental Programme. These strategies, however, must be applied immediately and aggressively. In the agriculture sector, adaptation and mitigation strategies primarily involve responses to higher temperatures, excessive precipitation, extreme weather events, rising sea levels, and the evolution of minor diseases and pest infestations into major ones. Resulting challenges include landslides, severe soil erosion, flooding, and drought, which, in turn, cause losses of crops, livestock, and fisheries; reductions in yields; shortages of water; and destruction of infrastructure. Available strategies, technologies, and tools need to be applied through coordinated and targeted approaches that respond to a complexity of locally specific conditions. More importantly, mainstreaming adaptation and mitigation strategies in agricultural development planning requires (1) increased information and understanding about

climate change and its implications, (2) greater advocacy in the use of climate-smart practices, and (3) intensified development and dissemination of risk-resilient technologies.

On this basis, this paper examines the Philippines' level of resilience to the adverse impacts of climate change by reviewing available literature, road maps, action plans, agricultural policies, programs, and activities related to climate change adaptation and mitigation (CCA/M) in the agriculture sector. More specifically, it assesses the alignment of climate change policies and priorities with the intended outcomes of the National Climate Change Action Plan (NCCAP) and the Philippine Development Plan. The paper also presents evidence of the effectiveness of the country's agricultural adaptation and mitigation policies and initiatives, including recent trends in government budget allocations, and identifies constraints and challenges, proposing recommendations to overcome them.

This study finds that the projects and programs on CCA/M and disaster risk reduction management have focused on building capacity, understanding the impacts of climate change,

and setting priorities for adaptation policy. At the level of local government unit, vulnerability assessments were found useful in prioritizing programs, activities, and projects (PAPs) and in identifying coping strategies within the context of comprehensive development and land use plans.

With the alignment of the programs and projects' outputs and NCCAP outcomes, reforms on budget allocation for agricultural CCA/M become output/results based. With this setup, the implementation of PAPs is strengthened, and targets are monitored. As programs on CCA/M are relatively at their initial and medium-term stages, monitoring and evaluation are warranted to ensure the effectiveness of policies and programs in reducing the impacts of climate change and climate-related risks in agriculture.

Introduction

The occurrence of climate change is clear, and the evidence of its negative impact on ecosystems and human systems is now widely documented and published. In the Philippines, climate change and climate variability based on analysis of available time-series data on temperature (including sea surface temperature), precipitation, sea level rise, and sequences of wet and dry days have been presented and discussed in various studies; the most recent of which is done by Gracilla and Lansigan (2010), PAGASA and DOST (2011), David et al. (2013), Cinco et al. (2013), Villafuerte et al. (2014), and Lansigan (forthcoming). Climate projections by the Department of Science and Technology's (DOST) Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for 2020–2050 do not indicate improvements in weather changes and their variability of distribution, but rather exacerbation that ranges from the occurrence of super typhoons and periodic inundation to droughts—all of which are detrimental primarily to agriculture. Cost estimates of damages on the sector in the past have increased more than six-fold from a yearly average of PHP 3.8 billion in 2000–2005 to PHP 19.3 billion in 2004–2014 (2000–2010 values

from the Department of Agriculture [DA], as cited by Israel and Briones 2012; 2011–2013 values from NDRRMC 2013).

The United Nations Environmental Programme (UNEP) has indicated that the most dangerous impacts of climate change could still be averted if rational and adequately financed adaptation and mitigation strategies are initiated to forestall disasters and migrations at unprecedented scales; but these must be applied immediately and aggressively. In the agriculture sector, adaptation and mitigation strategies primarily involve responses to higher temperatures, excessive precipitation, extreme weather events, rising sea levels, and the evolution of minor diseases and pest infestations into major ones. Resulting challenges include landslides, severe soil erosion, flooding, and drought, which, in turn, cause losses of crops, livestock, and fisheries; reductions in yields; shortages of water; and destruction of infrastructure (Table 1).

Available strategies, technologies, and tools need to be applied through coordinated and targeted approaches that respond to a complexity of locally specific conditions. More importantly, mainstreaming adaptation and mitigation strategies in agricultural development planning requires increased information and understanding about climate change and its implications, greater advocacy in the use of climate-smart practices, and intensified development and dissemination of risk-resilient technologies.

The focus on the agriculture sector is grounded on the need to safeguard and further improve the country's food security situation, reduce poverty, and enhance employment opportunities—all of which are key elements to achieve a more sustainable and inclusive growth.

On this basis, this paper¹ examines the Philippines' level of resilience to the adverse

¹ This paper is heavily drawn from Chapter 7 on Adaptation and mitigation strategies in *The future of Philippine agriculture: Scenarios, policies, and investments under climate change*. This book is part of the International Food Policy Research Institute-National Economic and Development Authority project titled "Addressing the Impacts of Climate Change in the Philippine Agriculture Sector".

Table 1. Examples of projected climate change impacts on Philippine agriculture, forestry, and fisheries

Risk	Possible Impacts on Agriculture	Direction and Likelihood of Future Trends	Adaptation and Mitigation Strategies	Further Action
Changing weather patterns	Failure to establish crops	Highly likely based on warm spells and heat waves, with increased frequency over most land areas ^a	<i>Adaptation strategies:</i> Making available and adopting resilient crops <i>Mitigation strategies:</i> Reducing methane and nitrous oxide production in agriculture	Breeding and screening crops resilient to changing weather patterns
	Poor crop yields	Virtually certain based on warmer days and nights, fewer cold days and nights, and warmer and more frequent hot days and nights over most land areas (and on warming of the most extreme days and nights each year)	<i>Adaptation strategies:</i> Ensuring efficient weather forecasting and cultural management strategies, making adjustments to cropping calendars, and modifying crop establishment practices <i>Mitigation strategies:</i> Using organic fertilizers and pesticides, pesticides derived from nonfossil fuels, and plant-incorporated pesticides; and using mulching and zero-to-minimal tillage	Breeding and screening crops resilient to changing weather patterns; conducting on-farm testing; providing information, education, and communication (IEC); and making nonfossil fuel-based pesticides and plant-incorporated pesticides available
	Increased energy costs and reduced poultry and hog harvests		<i>Adaptation strategies:</i> Adopting energy-efficient poultry- and hog-raising systems, adopting feed formulation and a feeding strategy for ruminants, and constructing energy-efficient buildings <i>Mitigation strategies:</i> Harvesting methane from animal manure; adopting energy-efficient or green machinery; delivering timely, location-specific weather information to farmers; and harvesting methane for self-contained energy use	Making energy-efficient or green machines available; conducting energy audits of postharvest facilities and constructing energy-efficient infrastructure; delivering timely, reliable, location-specific weather information; making appropriate technologies available for harvesting; and using methane from livestock wastes
Landslide	Destruction of upland agricultural systems	Highly likely based on increased frequency over most areas of heavy precipitation events	<i>Adaptation strategies:</i> Adopting soil and water conservation practices and agroforestation of denuded landscapes, providing IEC and early warning to downstream inhabitants <i>Mitigation strategies:</i> Sequestering carbon dioxide through agroforestation	Providing reliable and accurate weather forecasting; using backyard seed nurseries for indigenous agroforestry species; implementing community-based, integrated watershed management; and supporting community-based organizing
	Collateral damage to lowland agriculture, aquaculture, coastal fishery resources, settlements, and infrastructure	Likely based on increased incidence of extremely high sea level (excluding tsunamis) ^b		
Severe soil erosion	Soil-nutrient depletion; siltation of irrigation systems, rivers, and streams; increased occurrence of dust storms, especially during El Niño events	Highly likely based on increased frequency of heavy precipitation events over most areas	<i>Adaptation strategies:</i> Stabilizing slopes using engineering solutions and vegetative strip technology, and covering crop using legumes in denuded landscapes <i>Mitigation strategies:</i> Sequestering carbon dioxide through agroforestation	Providing planting materials for agroforestation and cover crops, and screening crop species that could minimize soil erosion
Floods	Destruction of crops and fisheries in flood-prone areas; destruction of postharvest facilities and farm-to-market roads; destruction of livestock houses in flood-prone areas; destruction of farms; loss of livestock; loss of farm inputs,	Likely based on increased incidence of extremely high sea levels (excluding tsunamis) ^b	<i>Adaptation strategies:</i> Submerging and using flood-tolerant rice and corn varieties, using early maturing varieties to avoid floods during the first cropping, using weather-resilient infrastructure, situating livestock housing appropriately, using appropriate feed formulations, establishing evacuation protocols and locating centers above flood levels, locating storage sheds above flood	Ensuring planting materials are made available on time, coupled with providing IEC; establishing early warning systems to harvest fish earlier; making capital available to replace destroyed properties; facilitating timely delivery of reliable and location-specific weather information to farmers; establishing early warning systems; making

Table 1. (continued)

Risk	Possible Impacts on Agriculture	Direction and Likelihood of Future Trends	Adaptation and Mitigation Strategies	Further Action
	machinery, and implements; and loss of farm capital		levels, and establishing savings and seed banks in flood-free areas <i>Mitigation strategies:</i> Converting areas that are not economically viable for fish production to wetlands or other uses, ensuring conversion strategies have mitigation potential, capturing methane, and reducing methane output	information available on flood-prone areas; making advisories available on emergency procedures during floods; and providing subsistence subsidies ^c
Drought	Significant reduction in yields and loss of crops, water shortages, heat stress on farm animals, increased energy costs to poultry and hog raisers, and loss of capital among farmers	Likely based on increased areas affected by drought	<i>Adaptation strategies:</i> Use of drought-tolerant crops, efficient water use in irrigation systems (drip irrigation), use of early maturing varieties to escape drought, use of crop establishment technology to shorten turnaround time between crops, construction of well-ventilated buildings and dwellings, choice of poultry and hogs that are tolerant to higher temperatures, construction of energy-efficient buildings, and use of water conservation practices <i>Mitigation strategies:</i> Use of integrated sustainable practices (e.g., no tillage) that reduce/capture greenhouse gas emissions, use of organic fertilizers to increase soil capacity to capture carbon dioxide, and use of special planting programs in drought-prone areas	Making water available at the right time, or when crops need it, using efficient irrigation and drainage systems, providing planting materials, making water use efficient/drought-tolerant crops available, using watershed management approaches to agriculture and fishery establishment, making water conservation practices available, providing advisories in drought-prone areas, facilitating timely delivery of reliable and location-specific weather information to farmers, making poultry and livestock breeds that are tolerant to higher temperatures available, and providing subsistence subsidies ^d
Increased pest pressure	Loss of crops, livestock, and aquaculture	Virtually certain based on warmer days and nights, fewer cold days and nights, and warmer and more frequent hot days and nights over most land areas (and on warming of the most extreme days and nights each year)	<i>Adaptation strategies:</i> Use of pest-resistant crops, livestock, and fish; use of environmentally friendly pest control strategies; and biocontrol of pests and diseases <i>Mitigation strategies:</i> Establishing biopesticides to serve as carbon sinks (e.g., neem trees)	Making pest-resistant crops and environmentally friendly, nonfossil fuel-based pesticides available
Strong winds	Lodging of rice and corn, fruit trees, plantation crops, and others; destruction of poultry and pig pens; and destruction of residences and fishing vessels	Likely based on increased incidence of intense tropical cyclone activity	<i>Adaptation strategies:</i> Use of short and early-maturing rice and corn varieties and other food crops; use of early-maturing, shorter, and sturdy bananas, fruit trees, and coconuts; designing and situating poultry and pig housing to resist gale-force winds; building wind-resistant infrastructure; planting windbreaks; ensuring reliable and localized weather forecasting; and establishing evacuation protocols and centers in the event of strong typhoons <i>Mitigation strategies:</i> Shifting crops from irrigated rice to dry/wet seeded varieties that minimize carbon dioxide, ammonium, and nitrogen dioxide generation; using fruit trees and windbreaks as carbon sinks	Making planting materials available; providing early warning systems and advisories; providing risk maps; making early-maturing, shorter, sturdy bananas, fruit trees, and coconuts available; ensuring the availability of high-quality construction materials; screening plant materials resistant to strong winds; making advisories on emergency procedures available during typhoons; making capital available to replace fishing boats; making information on typhoon paths available; and providing subsistence subsidies

Notes: (a) Extremely high sea levels are based on average sea levels and regional weather systems, and are defined as the highest 1 percent of hourly values of observed sea levels at a station for a given reference period.

(b) In all scenarios, the projected global average sea level in 2001 is higher than in the reference period; the effect of changes in all regional weather systems on sea level extremes has not been assessed.

(c) Damages to agriculture and property between 1975 and 2002 were estimated to be around USD 55 million and USD 83 million, respectively (Amadore 2005, cited in ADB 2009).

(d) The sharpest fall in gross value added and in volume of production was recorded during the El Niño years of 1982–1983 and 1997–1998 (Amadore 2005, cited in ADB 2009).

Sources: Author's compilation based on Intergovernmental Panel on Climate Change (2000, 2007) and Department of Agriculture [DA] (2013a)

impacts of climate change, focusing on agricultural policies, programs, and activities currently in place. More specifically, it assesses the alignment of climate change policies and priorities with the intended outcomes of the National Climate Change Action Plan (NCCAP) and the Philippine Development Plan (PDP). The paper also presents evidence of the effectiveness of the country's agricultural adaptation and mitigation policies and initiatives, including recent trends in government budget allocations, and identifies constraints and challenges, proposing recommendations to overcome them. The primary methodology used is a review of available literature, road maps, action plans, and project reports. Supporting information was also gathered through key informant interviews and consultations with key officials from DA and local government agencies in Albay, Camarines Sur, Northern Samar, Davao City, and Benguet, among others. Additional case study information was also collected for illustrative purposes.

More specifically, this paper aims to: (1) examine the consistency and alignment of climate change policies and priorities with the agriculture sector outcomes outlined in the PDP, and identify overlaps or complementation among these policies; (2) present evidence of effectiveness of the climate change adaptation and mitigation (CCA/M) policies and initiatives in the agriculture sector; and (3) investigate recent trends in government budget allocation for CCA/M in agriculture, identify constraints and challenges, and propose recommendations to overcome those constraints.

The effectiveness of CCA/M policies is measured in terms of the extent of contribution of activities that can be attributed to achieving project objectives and outcomes (i.e., intended and unintended short- to medium-term outcomes, and long-term impacts, if any).

Climate change and Philippine agriculture

Despite its diminishing share to the country's gross domestic product (GDP), the agriculture sector still employs about 30 percent of the country's labor

force, not to mention its continuing critical role in ensuring greater availability and accessibility of food, especially to the more marginal segment of the population who are most food insecure and impoverished. Unfortunately, labor productivity in the sector is lowest, only a sixth that of the industry sector and a third that of the services sector. Its growth rate is also slowest at 1.9 percent in 2014, as compared to the 3.9- and 4.2-percent growth rate in the industry and services sectors, respectively.

In terms of food security, latest statistics on food threshold (i.e., the minimum income deemed sufficient to meet the basic food requirements of a family of five) show a 9.5-percent increase between the first half of 2013 and the first half of 2014 (PSA 2013, 2014).² During these periods, the increase in the needed income to meet the basic food requirement came primarily from food price increases, particularly in rice. This resulted in food price inflation, which averaged at 6.5 percent during the first semester of 2014 as compared to 2.5 percent during the same period in 2013.³ Subsequently, poverty incidence in 2014 was reported at 25.8 percent, as compared to 24.6 percent in 2013. High food prices are deemed a major contributor to the difficulty of the country to achieve its Millennium Development Goal (MDG) on poverty reduction.

Enhancing agricultural production and increasing its productivity level mean overcoming huge challenges; one of which is climate change, which accounted for extreme weather events like super typhoons and prolonged and more frequent El Niños. A study conducted on the production and productivity of Philippine agriculture over the past three decades showed that the sector's growth had slowed down and has been erratic since the 1990s, especially with the periodic occurrence of El Niño that had appreciable impact on weather

² First semester 2013 and first semester 2014 computations of food threshold are based on the *2013 and 2014 Annual Poverty Indicators Survey* of the Philippine Statistics Authority, respectively. The computations excluded Leyte (due to Typhoon Yolanda devastation) and Batanes (due to small sample size).

³ Rice price inflation rate is at 11.9 percent during the first semester of 2014, as compared to 1.7 percent during the same period in 2013. Meanwhile, vegetable price inflation rate is at 10.3 and 2.4 percent in the first semester of 2014 and 2013, respectively.

patterns and, consequently, the performance of the agriculture sector (Habito and Briones 2005).

In addition, the severe droughts that occurred in 1972–1973, 1982–1983, 1997–1998, 2004–2005, and 2009–2010 contributed to the significant reduction in the production of rice and other major crops, with the most significant decline in 1998 when a La Niña was followed immediately by an El Niño (Figure 1). Appendix 1 shows the production losses in *palay* due to climate-related disasters that increased from PHP 2.5 billion in 2007 to PHP 17.6 billion in 2011, which is equivalent to 3–4 percent of total agricultural production (WB 2013). Appendix 2 further shows the total damages and losses brought about by the major typhoons that struck the country from 1990 to 2013; one of which is Super Typhoon Yolanda (internationally known as Haiyan), which wrought havoc in Leyte and other Visayan islands.

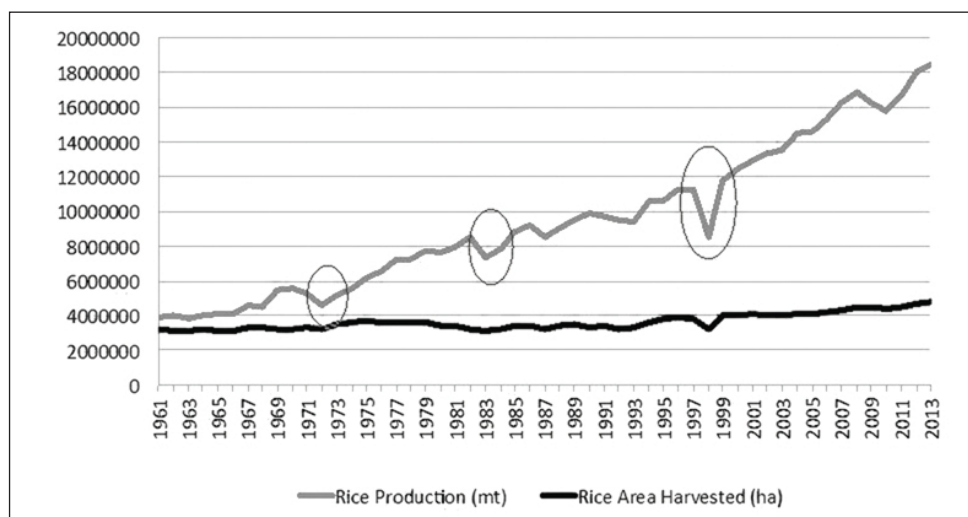
With increasing intensity and frequency, extreme weather events not only devastate and threaten land and water resources but also impede improvements in food security. In fact, the areas affected by extreme weather events grew from 683,440 hectares in 2000 to 977,208 hectares in 2010 (Israel and Briones 2012). Notably, about 27.3 percent of the total land area in the country

(or 8.34 million hectares) is considered to be vulnerable to drought, alternating with floods and typhoons on an annual basis (NEDA 2011b).

Climate change is projected to continue and worsen in the Philippines. The DOST-PAGASA projected a widespread warming in most parts of the country for 2020 and 2050. The number of days with maximum temperature of more than 35°C is expected to increase in all parts of the country, with the largest increase in temperatures in the summer months of March, April, and May. Likewise, projected seasonal mean temperatures in the Philippines are expected to rise by about 0.9–1.1°C for 2020 and 1.8–2.2°C by 2050.

Changes in temperature are likely to destabilize the food production environment and disrupt commodity production forecasts, both affecting the level of food supply. Turrall et al. (2008) reported that high-latitude crop yields are more likely to increase when temperature rises to 1–3°C and fall as the temperature exceeds 3°C. Lower-latitude crop yields, in contrast, are expected to decline when temperature rises to as little as 1–2°C. Changes in rain regimes and patterns of extreme events, such as floods or droughts that happen more often, may lead to shorter production seasons that translate to

Figure 1. Trends in rice production (mt) and area harvested (ha), Philippines, 1961–2013



mt = metric tons; ha = hectares

Source: Bureau of Agricultural Statistics (2014)

reduction in agricultural production (IPCC 2012). Accordingly, climate change increases the risk for rainfed farming systems and the possibility of risk hedging among small farmers. Table 1 summarizes further the possible changes in agricultural output due to climate change impact (IPCC 2007). Climate change, hence, will spell a difference in terms of cropping calendars, unpredictability of yields, pest pressures, crop losses, livestock and fisheries production, and damage to existing infrastructure.

These projections stress the need to assert greater pressure to adapt to climate change impact and risks. For the agriculture sector, adaptation has to primarily respond to high temperatures or too much precipitation, extreme weather events, sea level rise, and evolution of minor pest and diseases into major ones, among others. The challenge is to maintain, if not totally enhance, the characteristics of the elements for agricultural production amid the pressure caused by the changing climate. Adapting efficient cropping systems is deemed essential to provide measures that are well targeted and site specific. Moreover, the variability in temperature requires efficient water management in irrigation systems to adapt well to changes in cropping patterns.

In consonance with the optimism of UNEP on the possibility of averting climate change and forestalling its negative impact, the Philippine government affirms that the current measures and interventions being implemented are geared toward enhancing resiliency against climate change and, hence, to minimize or even eliminate exposure to potential risks. Mainstreaming CCA/M in the sectoral development plan involves (1) greater advocacy to use climate-smart agricultural practices, (2) enhanced understanding and knowledge about climate change and its possible negative consequences, and (3) strengthened development and dissemination of risk-resilient technologies.

Funding assistance from development partners on projects that respond to the different challenges posed by climate change—either on a bilateral or multilateral scheme—has been

expanding. Similarly, national budget allocation to climate change programs and projects is now given due consideration. Whether or not the current level of such investment is sufficient needs to be ascertained based on the successful delivery of their target/s. In the absence of output level indicator to measure the country's climate resiliency, an evaluation of the effectiveness of CCA/M initiatives would be good enough proxy to guide the government in its decisionmaking process.

The current government framework in support of adaptation and mitigation

Recognizing the importance of managing greenhouse gases (GHGs), the Philippines has been proactive in responding to the negative impacts of climate change, including reducing atmospheric GHG emissions. As early as 1991, and even prior to the 1994 signing of the United Nations Framework Convention on Climate Change, the Philippine government created the Inter-Agency Committee on Climate Change to coordinate and monitor the country's climate change-related challenges and initiatives. The government signed the Kyoto Protocol in 2003, after which various laws and government issuances were enacted (Table 2). A detailed discussion of key legislations is presented below.

Enactment of Climate Change Act (Republic Act or RA 9729)

Signed in October 2009, the Climate Change Act calls for the state to integrate the concept of climate change into various phases of policy formulation, development plans, poverty reduction strategies, and other government development initiatives. The act encourages a collective approach to climate change by all stakeholders, including national and local government, private enterprise, nongovernmental organizations, local communities, and the public. The act's implementing body is the Climate Change Commission (CCC), which spearheaded the formulation of the National Framework

Strategy for Climate Change (NFSCC) and the aforementioned NCCAP (CCC 2009, 2010).

The NFSCC 2010–2022 is the government's national road map for ensuring the country becomes more resilient to climate risks. The main goals of the NFSCC are to build the adaptive capacity of communities, increase the resilience of natural ecosystems, and optimize sustainable mitigation opportunities. It comprises seven key results areas: (1) enhanced vulnerability and adaptation assessments, (2) integrated ecosystem-based management, (3) water governance and management, (4) a climate-responsive agriculture sector, (5) a climate-responsive health sector, (6) climate-proof infrastructure, and (8) disaster risk reduction (Figure 2). The pursuit of a climate-responsive agriculture sector is primarily intended to protect and enhance ecosystems and ecosystem services to ensure greater food security and increase livelihood opportunities. Priority strategies include the following:

1. Reducing climate change risks and the vulnerability of natural ecosystems and biodiversity through ecosystem-based management approaches, conservation efforts, and sustainable environmental and natural resources-based economic endeavors, such as ecotourism
2. Increasing the resilience of agricultural communities by developing climate change-sensitive technologies, establishing climate-proof agricultural infrastructure and climate-responsive food production systems, and providing support services to the most vulnerable communities
3. Strengthening the resilience of fisheries by restoring fishing grounds, stocks, and habitats and investing in sustainable and climate change-responsive fishing technologies and products
4. Expanding investments in aquaculture and other food-production areas
5. Strengthening the crop insurance system as an important risk-sharing mechanism to

introduce innovative risk transfer mechanism, such as a weather-based insurance system

6. Strengthening sustainable, multisectoral, and community-based resource management mechanisms

The NFSCC was put into effect through the NCCAP, which, in turn, focuses on seven thematic areas: (1) food security, (2) water sufficiency, (3) ecosystems and environmental stability, (4) human security, (5) climate-smart industries and services, (6) sustainable energy, and (7) knowledge and capacity development.

The NCCAP also identifies actions to ensure greater food security and resilience in agriculture (Figure 3). Specific agricultural policy reforms include the land use bill and regulations to shift commodities and convert agricultural land to nonagricultural uses.⁴

The Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121)

The government's climate change agenda also emphasizes the convergence of adaption and disaster risk reduction and management (DRRM). Consequently, the Disaster Risk Reduction and Management Act of 2010 defines the country's National Disaster Risk Reduction and Management Framework, under which initiatives are institutionalized and funds are appropriated for training, supplies and equipment, postdisaster activities, insurance, and other purposes.

The act specifies that at least 5 percent of the estimated total standard revenues of local government agencies be set aside as the Local Disaster Risk Reduction and Management Fund to support both climate change adaptation and disaster risk reduction activities. Of the allocated funds, 70 percent can be used for DRRM activities, such as (but not limited to) predisaster

⁴ The National Land Use Act is intended to guide the optimum allocation of land among competing uses within the framework of sustainable development. It also provides a mechanism for resolving land use policy conflicts, taking into consideration the principles of social equity and economic efficiency.

Table 2. Government policies and strategies in response to climate change, 1991–2013

Legislation/Policy/Plan	Year of Implementation
Creation of the Inter-Agency Committee on Climate Change	1991
Signing of the United Nations Framework Convention on Climate Change	1994
Ratification of the United Nations Framework Convention on Climate Change	2003
Signing of the Kyoto Protocol	2003
Creation of the Presidential Task Force on Climate Change	2007
Enactment of the Climate Change Act (RA 9729)	2009
Creation of the Climate Change Commission	2009
Formulation of the National Framework Strategy on Climate Change, 2010–2022	2010
Mainstreaming climate change in the <i>Philippine Development Plan 2011–2016</i>	2010
Enactment of the Philippine Strategy on Climate Change Adaptation and the Disaster Risk Reduction and Management Act (RA 10121)	2010
Formulation of the National Climate Change Action Plan, 2011–2028	2011
Creation of Cabinet Cluster on Climate Change Adaptation and Mitigation	2012
Enactment of the People's Survival Fund Act (RA 10174)	2012
Mainstreaming guidelines on integrating disaster risk reduction and climate change adaptation concerns into the Environmental Impact Statement systems	2013
Mainstreaming climate change in the Department of Agriculture programs, plans, and budgets	2013
Development and implementation of guidelines in tagging/tracking government expenditures on climate change in the budget process	2013

RA = Republic Act

Sources: Senate Economic Planning Office (2012) and DA (2013a)

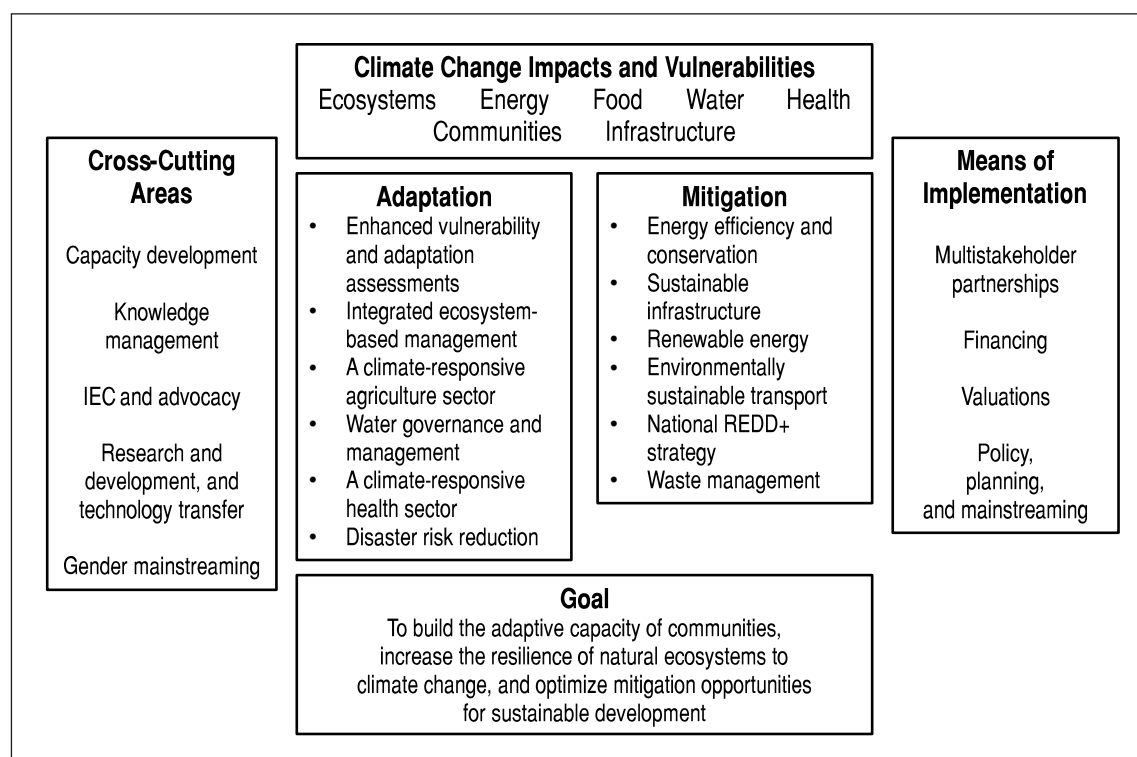
preparedness program training, life-saving rescue equipment, supplies, and medicines; postdisaster activities; and disaster insurance premiums. The remaining 30 percent is allocated as Quick Response Fund, which is a standby fund for immediate use by implementing agencies—namely, DA, Department of National Defense, Department of Social Welfare and Development (DSWD), Department of Education (DepEd), and Department of Public Works and Highways (DPWH)—for disaster response activities, such as relief and recovery programs.

In 2013 and 2014, PHP 500 million was allocated to DA for the provision of seed and planting materials to households and communities affected by natural hazards and disasters, including fingerlings/fries, livestock, fishing nets, and small boats, as well as the repair of irrigation systems (DA 2014).

The act is founded on the principle of proactivity and facilitated action. However, the Quick Response Fund, which is limited to postdisaster relief and rehabilitation, would indicate that this principle is not being instituted (Domingo 2014). Restricting access to the funds for predisaster expenses puts unnecessary pressure on relief and rehabilitation operations in the event of disasters; the timing and magnitude of which are always uncertain.

People's Survival Fund Act of 2012 (RA 10174)

The need to have a sustained source of funding for climate change-related projects prompted an amendment of the Climate Change Act to establish the People's Survival Fund, which is a special fund within the national treasury to finance adaptation initiatives based on the NFSCC. The fund had an opening balance of PHP 1 billion under the General

Figure 2. Operating structure of the NFSCC 2010–2022

NFSCC = National Framework Strategy for Climate Change; IEC = information, education, and communication; REDD+ = reducing emissions from deforestation and forest degradation plus
 Source: Climate Change Commission [CCC] (2009)

Appropriations Act, which can be augmented by donations, endowments, grants, and other contributions. The fund is managed by a board that is chaired by the CCC and comprises representatives from government agencies, academia, private enterprise, and nongovernmental organizations.

The fund is intended to support the adaptation activities of local governments and communities. It is allocated to projects based on, but not limited to, the following criteria: (1) the community having a relatively high level of vulnerability to climate change, (2) the participation of the community in the design of the project, (3) the potential of the project for reducing poverty, (4) the potential of the project to be cost effective and sustainable, (5) the potential of the project to respond to gender-differentiated vulnerabilities, and (6) the participation in the project by local government agencies with a climate change action plan in place.

Mainstreaming adaptation and mitigation strategies

The PDP 2011–2016

The PDP 2011–2016 is the primary document outlining national development programs and strategies to guide the current leadership (NEDA 2011a). The plan focuses on developing capacities for coping with and countering immediate climate threats, emphasizing climate change adaptation in the areas of agriculture, infrastructure, water governance, flood management, and housing. The plan emphasizes ecosystem-based management, climate-sensitive technologies, and climate-resilient systems to reduce the risks posed by the changing climate. For agriculture, the target for the end of 2016 is to achieve higher incomes and improved food security, especially for farm households, by increasing agricultural and fisheries production through more prudent use of resources; building greater linkages with manufacturing and industry,

including increasing the production of raw materials; and enhancing the sector's resilience to the risks of climate change.

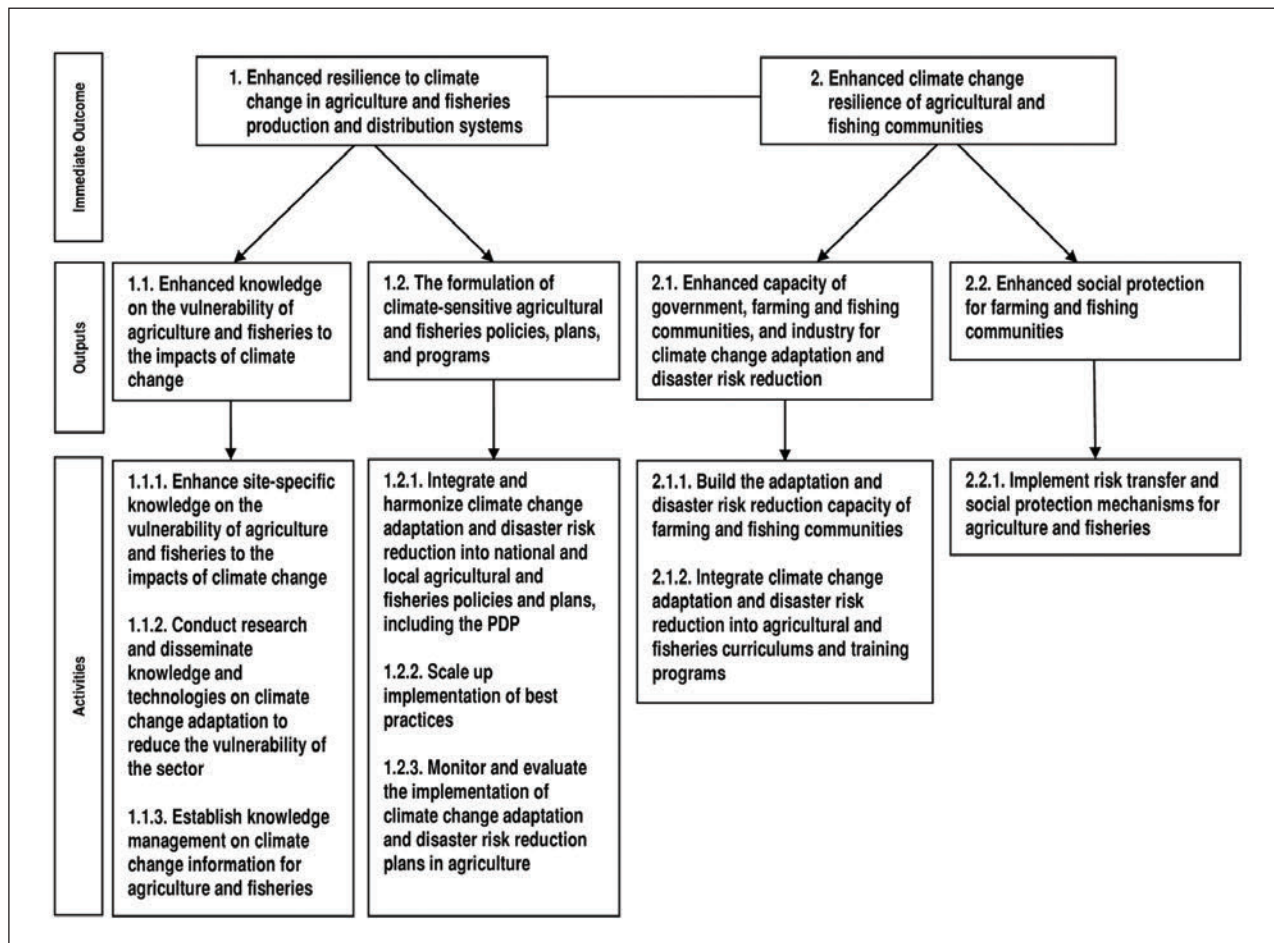
Recognizing that effective DRRM will enhance adaptive capacities to climate change, climate variability, and extreme climate events, the PDP was updated to integrate policies and measures that address climate change in agricultural development planning and decisionmaking. Strategies in the area of “Competitive and Sustainable Agriculture and Fisheries” include: (1) encouraging the diversification of production and livelihood options, (2) reducing the degradation of and improving the quality of environmental resources, and (3) increasing the resilience of agricultural communities and their capacity to

respond effectively to climate change risks and natural hazards.

One item is crop or agricultural insurance protection. The development plan targets over 2 million farmer-beneficiaries by 2016—a 60-percent increase per year since 2012. This target is to be achieved by providing insurance to farmers, including training in crop diversification and the impact of weather on crops; promoting the adoption of climate-responsive technologies and innovations in crop production; and processing and distributing agricultural products.⁵ Farmers are to be provided with credit assistance and appropriate incentive mechanisms to undertake climate change

⁵ For more information, see strategies 14–16 in Chapter 4 of the *Midterm Update of the PDP 2011–2016* (NEDA 2011a).

Figure 3. Strategic actions on food security under the NCCAP 2011–2028



adaptation measures. These strategies are to be implemented so that farmers simultaneously increase their resilience to the risks of climate change and their agricultural productivity.

In addition to the guidelines for mainstreaming climate change adaptation, the public investment program and results matrix outline the goals, outcomes, and outputs to be achieved, along with the corresponding indicators, baseline information, end-of-plan targets, and responsible agencies.

Agriculture and Fisheries Modernization Plan 2011–2017

The road map for developing the agriculture sector is laid out in the Agriculture and Fisheries Modernization Plan 2011–2017. This plan recognizes climate change as the “new normal” environment that adds greater pressure to the goal of increasing agricultural productivity. The plan includes an entire chapter on medium- and long-term responses to climate change in agriculture. In particular, the plan states that policies and programs that aim to build the adaptive capacity of farming and fishing communities will be further reinforced through seven strategic areas: (1) development of a climate information system; (2) conduct of research and development for adaptive tools, technologies, and practices; (3) repair and improvement of irrigation systems and the establishment of small water-impounding projects and small farm reservoirs; (4) development of climate change-adaptive infrastructure; (5) introduction of financing mechanisms and instruments for transferring risk; (6) the institution of regulations to ensure effectiveness and safety; and (7) the development of a fully engaged extension system. The required funding for climate change initiatives during the period of the plan is PHP 7.6 billion.

Synergies between national and local action plans and adaptation policies

The Climate Change Act directs local government agencies to prioritize climate change issues and set

local climate change action plans using the NCCAP as a guide. Being on the frontline in responding to the impacts of climate change, local government agencies are intended to take the initiative in climate proofing vulnerable provinces and municipalities via their respective comprehensive development and land use plans. For example, users’ manuals have been formulated to guide provincial governments in incorporating climate change adaptation and disaster risk reduction concerns into their development and land use plans. The manuals are based on comprehensive and scientifically sound vulnerability assessments of the respective municipalities. They provide their municipalities with the necessary technical guidance to formulate risk-resilient land use and development action plans, while also providing guidance on possible sources of financial assistance to implement the plans. The vulnerability assessment of municipalities is done by the local community in collaboration with scientists and researchers. As of 2011, this exercise had been undertaken in Caraga, Mindanao (Region 13), which has produced, completed, and pilot tested its users’ manual.

Another example of successful synergies between national and local climate change action plans is the climate change adaptation and disaster risk reduction strategy pioneered in the province of Albay, Luzon, which focuses on preemptive evacuation to achieve zero casualties. In mainstreaming climate change adaptation into the province’s local development planning processes, this strategy involved building a climate change adaptation road map around the MDG target of achieving greater environmental sustainability (Espinosa 2012). Policies were formulated, programs are developed, and budgets are allocated for the purpose of achieving greater environmental sustainability within the province. Additionally, the capacity of select institutions was strengthened either in implementing or guiding the implementation of programs and projects that would ensure the successful achievement of specific goals. This strategy is considered one of

the best practices for climate change initiatives and replication in provinces with similar geographic and climatic characteristics.

Institutional capacity to address climate change risks in agriculture

The institutions directly involved in addressing and coordinating climate change actions are the Cabinet Cluster on Climate Change, Climate Change Council, People's Survival Fund Board, National Disaster Risk Reduction and Management Council, National Economic and Development Authority (NEDA), Department of Budget and Management, Department of Finance, local government agencies, House of Representatives Ecological Committee, and National Council on Sustainable Development. The Climate Change Council is the lead policymaking body tasked with coordinating, monitoring, and evaluating the climate change agenda.⁶ The council has effectively formulated the national climate change strategy and action plan, and led the preparation of the People's Survival Fund.

The council has a broad mandate to be carried out with counterpart departments and agencies. Responsibilities include implementing regional and local actions; building local adaptation capacity with the Department of the Interior and Local Government (DILG); mainstreaming climate issues into development and planning processes with NEDA; aligning climate change adaptation and DRRM actions with the National Disaster Risk Reduction and Management Framework; and putting the People's Survival Fund into operation in cooperation with the Fund's Board, whose role is mobilizing resources. The Climate Change Council's role also includes setting strategic directions for local government agencies to improve their integration of climate-related objectives into their local climate change adaptation and DRRM programs.

Most local government agencies have limited technical capacity, so developing such

capacity is among the key areas prioritized in the NFSCC. Among the strategic priorities for capacity development is strengthening institutional arrangements for adaptation and mitigation (CCC 2009). Consequently, World Bank (2013, p. 13) notes that the key challenges in responding to climate change issues include “lack of institutional capacity, knowledge generation and management, and monitoring and evaluation (M&E)” across government levels and departments involved. This is where cooperative efforts are required among the Climate Change Council, NEDA, and DILG to deliver this much-needed support to local government agencies. Similarly, capacity for mainstreaming climate change in local development plans needs to be built through training and incentives for knowledge generation, facilitation, and sharing—particularly to overcome the significant capacity gap in oversight agencies, departments, and local government agencies—and to enhance public awareness of the integration of climate change adaptation and DRRM (WB 2013).

Building on the recommendation of World Bank (2013), DA developed a comprehensive climate change action plan that has been mainstreamed across all units, and also embarked on a national initiative and communication strategy called “Adaptation and Mitigation Initiatives in Agriculture”. The strategy aims to provide efficient and resilient support services to effectively address climate challenges in agriculture. It also addresses the importance of integrated agricultural development planning by focusing on the “strategic agricultural development zone” as the primary domain for climate change planning. In 2013, DA began mainstreaming climate change in its programs, plans, and budget (DA 2013b). Its goals include: (1) building the knowledge, attitudes, and skills of its staff; (2) developing a culture with a deep consideration of climate change and sustainable development issues; and (3) mainstreaming climate change system wide, such that all agencies be wholly climate responsive in their decisionmaking processes from the

⁶ The Climate Change Council also acts as secretariat to the Cabinet Cluster on Climate Change.

establishment of priorities, to the setting of policy, to the execution of M&E (DA 2013b).

The initiatives of DA's System-Wide Climate Change Office include mainstreaming climate change, the climate information system, the Philippine adaptation and mitigation in agriculture knowledge toolbox, climate-resilient agricultural infrastructure, financing and risk transfer instruments on climate change, climate-resilient agriculture and fisheries regulations, and the climate-resilient agricultural extension system. Aside from financial resources, implementing CCA/M measures requires investment, technologies, and know-how. Considering the country's limited resources, it is important that they be invested in highly targeted and integrated ways to maximize results.

The effectiveness of agricultural adaptation and mitigation initiatives

The alignment of ongoing initiatives with NCCAP and PDP's target outputs

To date, DA has aligned some of its climate change programs, activities, and projects with strategies defined by the NCCAP on climate-smart industry and services, sustainable energy, and outcomes relating to food security. Establishing systematically consistent targets and outputs between the NCCAP and the DA will determine the extent to which activities can be carried out effectively.

The alignment of strategies and outcomes between the NCCAP and the PDP (NEDA 2011a), meanwhile, has been improved through the updated development plan. A commonly specified outcome—supported by outputs, indicators, and targets—is increasing climate change resilience in agriculture, fisheries, and environmental and natural resources.⁷

⁷ In the updated PDP, the chapters on competitive and innovative industry and services, competitive and sustainable agriculture and fisheries, social development, good governance and the rule of law, sustainable and climate-resilient environment and natural resources, and accelerating infrastructure development all include extensive discussions on climate change, particularly in relation to adaptation and DRRM (Chapters 3, 4, 6, 7, 9, and 10, respectively).

Knowledge on the vulnerability of agriculture and fisheries to the impacts of climate change

Climate change is a global issue that requires local solutions. To respond appropriately, it is extremely important that decisionmakers and farmers understand the types and levels of vulnerability they face in different locations. While global projections and scenarios have been provided by international organizations and institutions, the challenge for the Philippines is to interpret this body of information within the local context, so that farmers can put appropriate adaptation measures into practice. Some of the outputs produced include the following:

Flood hazard maps

The project “Climate Twin Phoenix” included the generation of flood hazard maps for different rainfall scenarios for integration into the country's rain monitoring system under the “Nationwide Operational Assessment of Hazards” project (CCC 2013). This work is intended to serve as the basis for early warning systems in the identified locations. The maps will also be used as a foundation for local government contingency plans and development programs (CCC 2013).

The work is also intended to enhance the competencies of the local government agencies concerned in mainstreaming adaptation and DRRM into their comprehensive land use plans. The Climate Twin Phoenix project also uses knowledge and education to: (1) raise awareness about disasters, (2) educate the community, and (3) assist local governments in integrating climate change adaptation and disaster risk reduction in planning their cities and municipalities and in advancing policies that support strategies and actions toward sustainable development (UNDP 2013a). The project was implemented in Cagayan de Oro, Iligan City, Davao Oriental, and Compostela Valley Province.

Provincial agricultural models

A provincial agricultural model was developed from the assessment of the impacts of climate

change on the agriculture sector through the project “Assessments of Climate Change Impacts and Mapping of Vulnerability to Food Insecurity under Climate Change to Strengthen Household Food Security with Livelihoods’ Adaptation Approaches”, which was led by the NEDA. In order to generate projections, the provincial agricultural model depends on output data from partner agencies derived from climate, crop, and hydrological models (DA 2013a).

Climate-sensitive agriculture and fisheries policies, plans, and programs

Consistent with the agenda of mainstreaming CCA/M into the country’s development, local, and sectoral plans, certain programs and projects, which are discussed below, produced necessary outputs for climate-proofing development plans relating to agriculture and fisheries.

System-wide climate change program

Instigated in early 2013, this program was a strategic move on the part of DA to more directly address climate change considerations, including vulnerabilities and risks in agriculture. The program cuts across the department’s policy instruments and agencies, focusing on seven key components: (1) mainstreaming CCA/M initiatives in agriculture, (2) a climate information system, (3) the Philippine adaptation and mitigation in agriculture knowledge toolbox, (4) climate-smart agricultural infrastructure, (5) financing and risk transfer instruments on climate change, (6) climate-smart agriculture and fisheries regulation, and (7) a climate-smart agricultural extension system. A comprehensive M&E system is needed to facilitate a better assessment of the program.

Low-emission capacity building

With a focus on agriculture, this project was designed to produce: (1) a robust national system for preparing inventories of GHG emissions; (2) the formulation of nationally appropriate mitigation action road maps within the context of national

development priorities; and (3) the design of the monitoring, reporting, and verification systems to support the implementation and evaluation of the road maps (UNDP 2013b). The project also focused on increasing awareness of CCA/M within industry, and encouraging the private sector to develop climate-resilient, low-carbon initiatives.

The capacity for climate change adaptation and DRRM

The following actions have been undertaken to enhance the capacity of government, industry, and the farming and fishing communities in the areas of climate change adaptation and DRRM.

Capacity needs assessments

The capacity development needs of institutions were initially assessed in 2011 under an MDG initiative on climate change and the environment implemented by NEDA. The assessments looked at institutions’ functional and technical capacities in relation to CCA/M, particularly in terms of their ability to: (1) engage in multistakeholder dialogues; (2) develop mandates and vision statements based on assessment results; (3) formulate policy and strategy; (4) budget, manage, and implement strategies; and (5) monitor and evaluate progress. The assessments were only conducted on a limited number of institutions, including the Climate Change Council and local government agencies in 10 municipalities (i.e., Cavite, Ifugao, Pangasinan, Sorsogon, Antique, Biliran, Bohol, Agusan del Norte, Bukidnon, and Surigao del Norte).

Based on the project’s capacity assessment results (NEDA 2012a), the participating agencies had high capacity in areas 1, 2, and 3, but low capacity in areas 4 and 5. The findings also indicated high capacity among the participating agencies’ leadership and personnel, which could be attributed to the government’s efforts in prioritizing climate change adaptation and DRRM. Moreover, by enacting the 2009 Climate Change Act and 2010 DRRM Act, the government has established the necessary policy environment within which

climate and disaster risks can be addressed. In turn, these actions have increased the country's access to international funding for climate change adaptation and created active partnerships between funding agencies and institutions to strengthen the latter's adaptive capacities. The assessment did, however, determine that the institutions' M&E capacity was low, which could be because the country's system of M&E for climate change adaptation is relatively new, as are the policies to mainstream climate change adaptation into the planning and budgeting processes of local government agencies. A customized M&E system targeting climate change adaptation may be needed.

In contrast, a bottom-up approach seemed to work in the project "Enhanced Climate Change Adaptation Capacity of Communities in Contiguous Fragile Ecosystems in the Cordilleras". The thematic approaches used to enhance local stakeholder capacity involved enhancing: (1) knowledge about climate change, (2) planning capacity in local government agencies, (3) data management for climate change planning and monitoring, and (4) capacities for implementing climate change adaptation options at the farm level (Sandoval and Baas 2013).

Conservation farming villages

In 2011, conservation farming villages were established in the upland communities of La Libertad, Negros Oriental, and Ligao, Albay, as a means of introducing CCA/M technologies to farmers. Under this type of scheme, farmers are encouraged to adopt conservation farming from a wide range of technologies to combat the effects of climate change, loss of biodiversity, land degradation, and drought, while, at the same time, increasing land productivity and promoting land conservation and rehabilitation (NEDA 2012a; Utzurum and Ablan 2013). These technologies include sloping landscapes, contour farming, rapid composting, mulching, multispecies cropping, conservation tillage, water-saving technologies and water management, sowing hedgerow seeds,

constructing physical barriers/rock walls to prevent erosion, and shifting crops and cropping patterns.

One of the lessons learned through this program is the benefit of strong partnership developed between the institutions involved (e.g., Philippine Council for Agriculture, Forestry and Natural Resources Research and Development; Silliman University; La Libertad, Negros Oriental) and the conservation farming village community. This has contributed to the accomplishment of the expected outputs; one of which was to empower the community to solve current and future issues.

Smart agricultural approaches

The project "Smarter Approaches to Reinvigorate Agriculture as an Industry" was initiated to develop and implement science-based crop and cropping system technologies and protocols, as well as long-term strategies geared toward maximizing crop yields while minimizing any adverse environmental or climate impacts on six priority crops (i.e., rice, corn, bananas, coconuts, coffee, and cacao). The project adopted the strategy of "smart agriculture" by employing a combination of technological innovations on information, cropping systems modeling, geographic information systems, and field sensors to develop decision-support models and an early warning system to help farmers and policymakers make sound, science-based judgments relating to climate change. Orientation seminars and training on farming the six priority crops were also conducted to build capacity among the different stakeholders in the provinces of Isabela and Panay Island, and the municipality of Catarman in Northern Samar.

The project comprised five integrated components: (1) developing and evaluating crop models with a view to launching a nationwide crop-forecasting platform capable of producing crop advisories and forecasts for the six priority crops; (2) developing environmentally targeted integrated crop management protocols for the purpose of establishing an automatic weather station and ground-sensor network and updating

soil, land suitability, and environmental information for an integrated crop management database; (3) establishing an online knowledge portal for climate-resilient and sustainable crop production in the Philippines that includes the program's crop advisories and forecasting tools; (4) building the knowledge and capacity to diagnose learning needs, developing a learning framework for stakeholder communities, developing training modules, and conducting capacity-building workshops and technical training on the use of the online platform; and (5) mainstreaming the results of the project by crafting policy recommendations, publishing research outputs in peer-reviewed journals, and establishing a crop-climate forecasting and modeling laboratory within the University of the Philippines Los Baños.

The project was launched in November 2013, and assessments have yet to be conducted. An important contribution of this initiative is the evidence-based planning and identification of management mechanisms that could help local government agencies address climate risks and disasters.

Institutionalizing best practices in farming

Another project in the Bicol region, "Strengthening Capacities for Climate Risk Management and Disaster Preparedness in Selected Provinces of the Philippines", initiated institutionalized, community-based adaptation practices. Agricultural universities and extension services facilitated the selection and field testing of a set of best practices in cropping, livestock, and fisheries management. Enhanced climate information products were jointly produced by PAGASA and DA to meet the needs of farmers and inform the seasonal selection of crop varieties for field demonstrations (Baas and Ricoy 2013).

Information dissemination

DA has developed techniques and strategies to make crops more tolerant to the adverse impacts of climate change and has disseminated them to

farmers through a variety of projects. Improvements in agricultural extension and support services have made farmers aware of climate change adaptation technologies, enabling them to make better decisions in the areas of adaptation, mitigation, and preparedness. Nevertheless, financial and technical support to local government agencies involved in disseminating information and providing extension services needs to be strengthened, particularly in provinces categorized as having low adaptation and mitigation capacity, a high incidence of poverty, and a high risk of exposure to climate hazards like flooding and landslides (Figure 4).

Enhanced social protection for farming and fishing communities

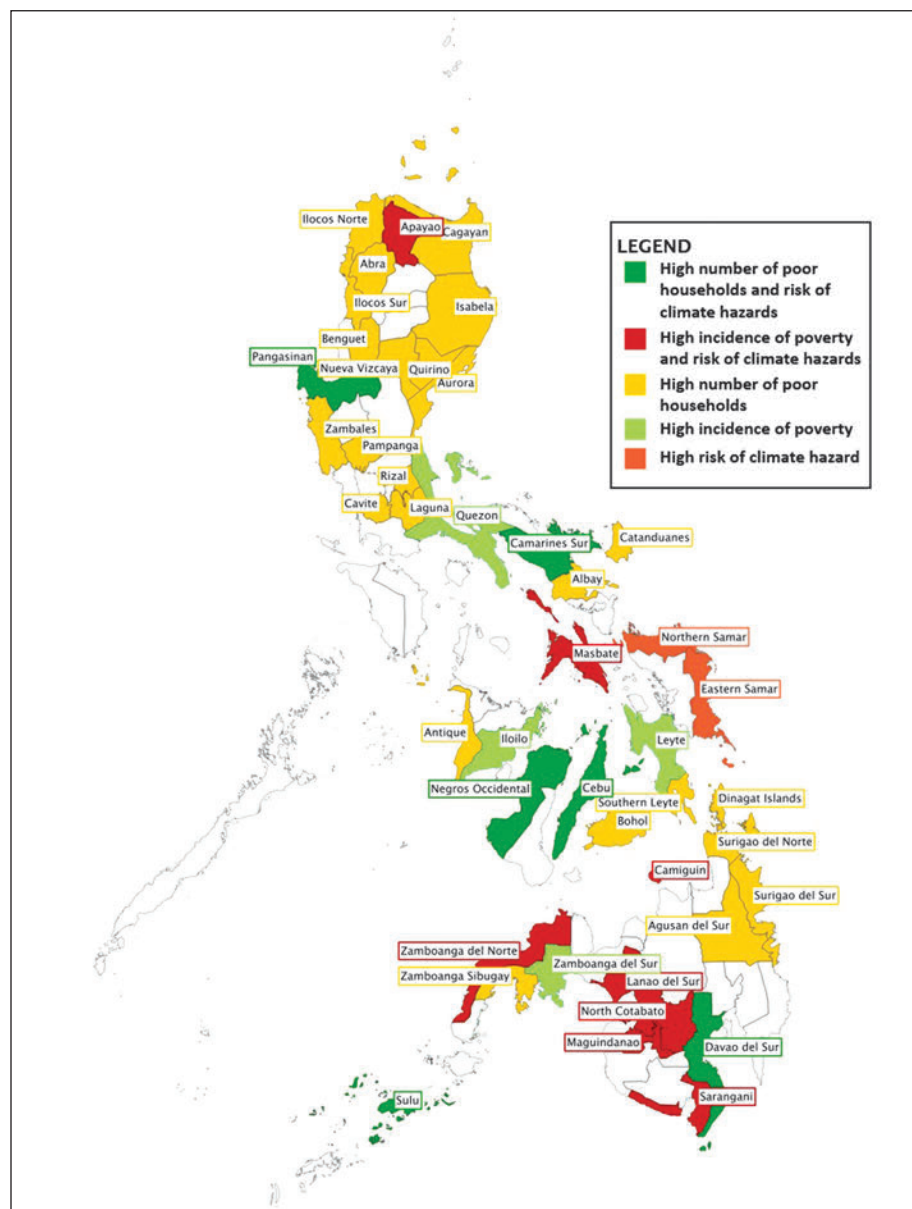
Climate change greatly affects individuals, particularly those whose livelihoods depend on natural resources. While climate change impacts are inevitable, governments seek to protect farmers and fisherfolk through initiatives, such as those described below.

Climate-proof livelihood options

Another project associated with the MDGs involved field testing indigenous or location-specific adaptation measures in contiguous fragile ecosystems.⁸ The information and data generated from field demonstration tests of adaptation options will enable the development of a climate change adaptation strategy for the Cordillera region, including effective and efficient coping mechanisms and possible alternative, climate-proof livelihoods. However, the dispersed location of the field plots made this project difficult to monitor. Additional tests were undertaken at a pilot site located in the province of Camarines Sur in attempts to climate proof the community's livelihood and develop a replicable template for use at similar sites in the Philippines. Lack of impact monitoring data meant that the effectiveness of the adaptation options and level of benefits could

⁸ In particular, the project focused on the two landlocked provinces of Benguet and Ifugao in the Cordilleras.

Figure 4. Provinces with the highest incidence of poverty, number of poor households, and risk of climate hazards



Source: National Economic and Development Authority [NEDA] (2014)

not be determined, once again highlighting the importance of impact evaluation.

Financial risk management schemes

Another project introduced financial risk management mechanisms to vulnerable farming populations in the province of Agusan del Norte to assist them in adapting to climate change by augmenting their productivity levels. In proposing

both financial and productive resources, such as innovative financial schemes and a revolving fund that is self-replenishing from the principal and interest payments of borrowers, it was expected that the affected populations would have greater opportunity to diversify their livelihoods and, hence, become more resilient to the impacts of climate change (ILO 2012). These financial schemes benefited around 837 farmers

through weather index-based insurance issued to members of a local cooperative by a rural bank in coordination with municipal governments. Three other schemes—rural bank, cooperative, and local government loan facility—served as forms of credit deliveries to 753 farmers. In addition, 41 early warning systems and weather monitoring devices were installed in priority areas, and five index-based weather insurance products were established in two priority municipalities for rice and corn. Knowledge-based products were also made available, together with the creation of a focal team and other partnerships, which were expected to maintain project gains and facilitate the duplication and upscaling of mechanisms.

In 2013, the Department of Trade and Industry (DTI) in the Caraga region renewed its partnership with the Beneficiaries Multipurpose Cooperative of the Bauag Comprehensive Agrarian Reform Program as part of the “Climate Change Adaptation Support Program”. The partnership aimed to extend the cooperative model to the towns of Buenavista, Jabonga, Kitcharao, and Cabadbaran City, and was expected to benefit at least 100 farmers in vulnerable sites in Agusan del Norte (PIA 2013).

The Land Bank of the Philippines also developed a credit window through which agricultural enterprises, particularly hog farms, could obtain credit for biogas facilities to capture methane from hog manure, convert the gas to electrical energy, channel the power to the local grid, and—at the same time—apply for credits in the carbon market through the World Bank’s Clean Development Mechanism program (Calado 2012). A similar credit window is needed for farmers who decide to shift from conventional to organic farming systems (NOAB 2011).⁹

The effectiveness of CCA/M initiatives

DA requires additional resources and skills in order to align its plans and programs with

NCCAP’s outcome on food security. Most initiatives fall under the area of strengthening local adaptive capacity (e.g., providing better climate information, conducting research and development, building early warning systems, ensuring efficient irrigation systems).

A few, however, focus on mitigation (e.g., developing farming practices that reduce GHG emissions or promoting sustainable land management to address land degradation). To measure the effectiveness of these programs and projects, these programs require M&E, including financial tracking. In the absence of official M&E systems, initiatives are assumed to have achieved their full potential.

Based on the target outcomes for climate-resilient agriculture defined by the NCCAP and PDP, the following gaps were identified:

1. Field officers employed by DA and local government agencies lack the technical skills needed to assist farmers in adopting organic farming practices or converting from conventional to organic farming systems.
2. Organic farming practices and systems are not integrated into the science and technology research agenda or government agricultural plans and programs.
3. Farmers lack both the capacity to take up innovative and “smart” technologies, as well as the necessary level of empowerment to access sustained sources of credit to meet production needs and to connect with markets.
4. The question of households’ willingness to pay for organic products has not been addressed.
5. The vulnerability of soil, water, and human and environmental resources in the context of climate change needs to be assessed.
6. Climate change preparedness and adaptation have not been mainstreamed at the local level, particularly in areas with varying vulnerability potentials.

⁹ Note that conversion to organic farming is not well planned under the Organic Agriculture Act of 2010 (RA 10068). No part of the act or its implementing rules and regulations tackles the process of converting from conventional to organic farming.

7. Comprehensive and systematic mapping is needed at all levels (i.e., *barangay*, town, and province) in order to determine which areas are highly vulnerable to specific climate change impacts.
8. Naturally suited adaptation measures need to be identified for specific areas (e.g., crop varieties and rotation plans).

Agricultural finance to build resilience to climate change

World Bank (2013) examined the climate expenditures of five Philippine departments, namely, DA, Department of Energy (DOE), Department of Environment and Natural Resources (DENR), DPWH, and PAGASA. The study showed that climate-related budget appropriations had increased steadily from PHP 12 billion in 2008 to PHP 35 billion in 2012. However, climate appropriations represent a small part of the national budget—0.9 to 1.9 percent between 2008 and 2012. During this period, nearly 72 percent of the appropriations were directed to adaptation-related initiatives, whereas 18 percent were allocated to mitigation-related initiatives.

In 2013, a total of 23 ongoing programs and projects addressed CCA/M at a cost of PHP 95.971 billion—almost three times higher than the 2012 figure of PHP 34.710 billion, which covered 37 projects (Table 3). The *Official Development Assistance (ODA) Portfolio Review* (NEDA 2012b, 2013) indicates that a total of PHP 56.363 billion in loans and grants was invested in mitigation-related initiatives in 2013, representing an increase of PHP 13.924 billion over the 2012 figure; PHP 17.56 billion was invested in adaptation-related initiatives. Some climate change investments were not included in the report, which explains why the 2012 figures are lower than those for 2013. Most of these ODA funds are still directed toward building capacity, strengthening institutions, enhancing national and local plans, and postdisaster efforts (i.e., response, recovery, and rehabilitation) rather than prevention.

Further analysis revealed that most of the climate expenditures and appropriations fall under the NCCAP priority on water sufficiency, ecosystem and environmental stability, and food security. World Bank (2013) concluded that the increased budget appropriation indicated enhanced leadership and growing awareness of CCA/M. It is also important to determine the efficiency of budget increases in terms of improving the resilience of each sector.

The Asian Development Bank (2009) study titled, “Economics of Climate Change in Southeast Asia”, determined that the avoided damage in agricultural and the coastal zones of Indonesia, the Philippines, Thailand, and Viet Nam could reach 1.9 percent of GDP by 2010, with investment in adaptation measures amounting to 0.2 percent of GDP. While almost all sectors have adaptation needs, the report noted that the water, agriculture, forestry, coastal and marine, and health sectors required detailed attention. Agriculture, in particular, required several priority actions, including: (1) strengthening local adaptive capacity through better climate information, (2) conducting research and development on heat-resistant crop varieties, (3) developing early warning systems, and (4) developing efficient irrigation systems. It was also suggested that innovative risk-sharing instruments, such as index-based insurance schemes, be explored (ADB 2009).

Trends in the share of the budget appropriated for adaptation activities as a share of GDP and climate change-related damage to agriculture indicate that the Philippines has allocated the required investment in adaptation to protect the sectors from the impacts of climate change (Figure 5). It is important to note that 75 percent of the appropriations allocated to climate adaptation were earmarked for flood control protection. Data on agricultural losses caused by climate-related events (e.g., natural hazards and disasters) also indicate an increasing trend, with damage amounting to 0.55 percent of GDP in 2012.

DA secured funding to support the development of mitigation and adaptation

Table 3. ODA initiatives with climate change adaptation, mitigation, and disaster risk reduction components

Component	2011		2012		2013	
	Number of Projects	Cost (PHP billion)	Number of Projects	Cost (PHP billion)	Number of Projects	Cost (PHP billion)
Adaptation	43	73.80	26	21.96	10	17.564
Mitigation	13	7.38	11	8.04	12	56.363
Adaptation and mitigation	22	7.51	12	4.72	–	–
Disaster risk reduction	–	–	12	18.21	1	0.001
Total	78	88.69	61	52.92	23	73.928

ODA = official development assistance

Note: Projects may contribute to more than one component. Cost refers to the total project cost, not the project component that specifically addresses climate change. Moreover, the total costs of some projects were not documented, so the total amount may also not reflect the total investment in climate change initiatives.

Sources: NEDA (2011b, 2012b, 2013)

projects by PhilRice, including the promotion of location-specific, rice-based technologies suitable for different conditions (Appendix 3). The following agricultural programs, activities, and projects correlate with investment targets of PHP 27.7 billion for the 2013–2016 period and PHP 5.4 billion for ongoing targets (NEDA 2014):

1. Mechanization of Philippine sugarcane farms
2. Philippine Rural Development Program
3. Balintongan Reservoir Multipurpose Project
4. Ilaguen Multipurpose Project
5. Chico River Pump Irrigation Project
6. Tumauni Reservoir Project
7. Fisheries, Coastal Resources, and Livelihood Project
8. Balog-Balog Multipurpose Irrigation Project Phase II
9. Public-Private Partnership Program: Logistics Support in the Agri-Fishery Products Supply Chain (Transportation of Agri-Fishery Products Utilizing the Southrail Main Line)

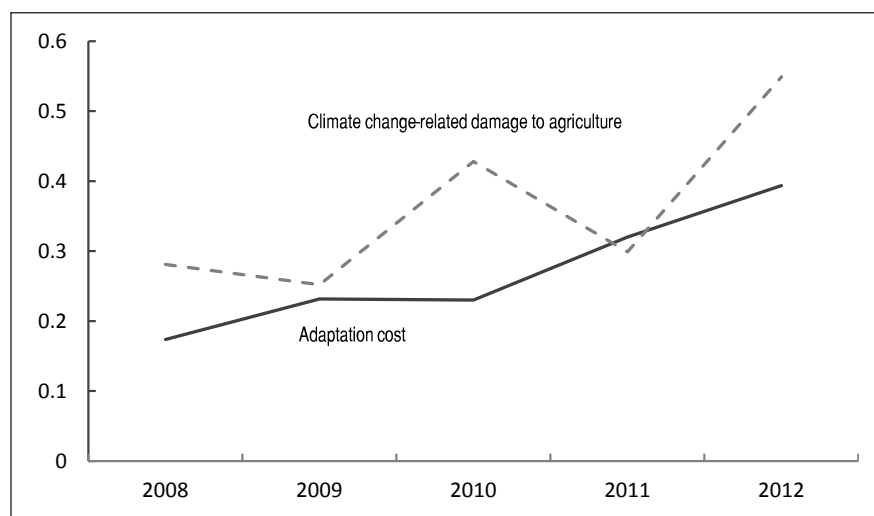
Data indicate that the increased budget for CCA/M activities cannot automatically be equated with greater agricultural resilience to the impacts

of climate change. Given the Philippines' level of vulnerability and the role that the agriculture sector plays in the national economy, it would seem important to assess the allocation of funding for climate change adaptation across and within government departments and agencies. The shift from a fragmented to a coordinated agenda for achieving resilience provided unique opportunities to enhance climate-related planning and prioritization. Issuances of more coherent policies call for the systematic integration of climate change in various phases of policy formulation, development planning, and prioritization across all agencies and departments. For instance, the government's public financial management reforms and new budgeting approach were adopted to support activities responding to climate change.

In the approved 2015 budget, 24 government agencies used the climate change expenditure tagging guidelines and procedures to report and track activities related to CCA/M (DBM et al. 2014).¹⁰ Data indicated that PHP 176.6 million or 20 percent of the total budget included components

¹⁰ The 24 agencies were the CCC, DA, DepEd, DOE, DENR, Department of Foreign Affairs, DILG, Department of Labor and Employment, DPWH, DOST, DSWD, Department of Tourism, DTI, Department of Transportation and Communications, Housing and Land Use Regulatory Board, Housing and Urban Development Coordinating Council, Metropolitan Manila Development Authority, Mindanao Development Authority, National Anti-Poverty Commission, National Commission on Indigenous Peoples, National Commission on Muslim Filipinos, NEDA, Pasig River Rehabilitation Commission, and Presidential Communications Operations Office.

Figure 5. Adaptation cost and climate change-related damage to agriculture as percentage of GDP



GDP = gross domestic product

Source: Author's compilation based on Government of the Philippines (n.d.)

addressing CCA/M (GOP n.d.). About 98 percent of the tagged expenditures were for adaptation measures, such as flood control, reforestation, sector-specific research and development on climate change, and disaster risk reduction. Of this, PHP 38.3 million or 21.7 percent were allocated to departments and agencies working directly for the agriculture sector and whose work program reflects an increased focus on outputs for market development services; extension support, education, and training services; research and development; and credit facilitation services.

Evidently, policies and measures to ensure that the goal of achieving national climate resilience have been effective in influencing the country's planning and investment processes. It should be noted, however, that the complete planning and budgeting cycle includes M&E processes in support of a more coherent set of programs and projects targeting climate resilience. These processes include a core list of indicators that defines performance. Currently, the Philippines maintains a results matrix that measures the country's overall performance against its development targets. As of 2013, two specific outcome indicators in the matrix gauged the country's resilience to climate change adaptation and DRRM: (1) a decrease in

yearly damage and losses due to natural disasters, environmental hazards, and human-induced and hydrometeorological events; and (2) an increased budget for climate change adaptation and DRRM. While these indicators measure the country's outcome targets, they cannot capture the direct impact of specific climate change-related initiatives. Consequently, it is suggested that a set of measurable indicators for climate actions needs to be defined, especially for the agriculture sector. Such indicators must be consistent and supported by measureable targets to monitor progress, in order to encourage the proposal and implementation of more focused and aligned activities within and across government agencies and sectors.

Summary and policy implications

In general, national strategies for adapting to and mitigating the impacts of climate change complement the international framework for effective action, as defined by the United Nations Framework Convention for Climate Change, including an enabling environment and mechanisms for the transfer of technologies.

In particular, the major outputs of agricultural agencies, such as the DA, are aligned with the NCCAP's food security goals and the PDP's target

on climate-resilient agriculture. Nevertheless, policy implementation in the country remains weak for numerous reasons, including limited institutional capacity and limited resources of the implementing agencies. The nature of the current adaptation and mitigation initiatives indicates that the preparedness of the agriculture sector is still in its early stages and is focused on building capacity and understanding the impacts of climate change in specific locations. As a result, the effectiveness of these projects cannot be measured yet in terms of improved food security or higher incomes. Some observations are discussed below:

1. *Different projects have been initiated in different regions, but their outputs have not been replicated in other parts of the country.* While relevant outputs have been produced to enhance agricultural resilience, they often only focus on the Bicol region. For example, vulnerability assessments were useful in prioritizing initiatives and identifying coping strategies within the context of comprehensive development and land use plans; however, the process of integrating climate risk in the prioritization of programs, activities, and projects was not practiced in most local government agencies because maps and risk assessments were not available. In the absence of records from national agencies, such as the Housing and Land Use Regulatory Board and DILG, and aside from pilot sites, the number of local government agencies that had mainstreamed CCA/M in their comprehensive land use plans and comprehensive development plans could not be determined. In particular—with the exception of areas covered by the MDG-Funds 1656 Joint Programme and related projects—community-based agricultural adaptation strategies have yet to be established.
2. *Downscaling vulnerability and risk assessment to the farm level remains a challenge.* Projecting climate change impacts could be one way of informing decisions, but the current

drawback is that many projections have coarse spatial resolutions and, hence, are not useful in informing decisions about smaller geographic areas.

3. *Measuring the impacts of programs and projects is often neglected.* Given that policies and programs on CCA/M are relatively new, evaluation studies and determinations of the costs and benefits of projects are lacking. A review of the design of programs and projects indicates that impact assessments were either not included in projects or were not funded. The importance of impact evaluation studies may be acknowledged, but this has yet to result in actual studies and data.
4. *Action on ensuring the transparency of the planning and implementation of programs and projects has been initiated but needs further enhancement.* Aside from the formulation of climate change policies and legislation, governance and accountability issues have also been addressed, including tagging government expenditures on climate change in the budget process. As a result, it is now easier to track the funding that goes to the agriculture sector, but the typologies and indicators used for climate change expenditures in the tagging system need to be refined.

In terms of policy implications, the observations discussed below are of particular note.

1. *Community-based adaptation strategies must be location specific.* While various projects suggest different tools for local implementation, greater understanding of the need for location-specific responses to climate change is needed. The provinces in Bicol and Cordillera have already produced notable results in the implementation of community-based adaptation strategies. A framework can be drawn from these results so that other regions can replicate the process and promote integration within relevant government

institutions. Such a framework would guide other local government agencies in designing locally appropriate adaptation strategies.

2. *Agricultural extension and support services need to be strengthened to increase farmers' awareness of climate risks and understanding of climate-sensitive farming technologies.* Local government capacity to conduct farmer training and extension and provide better communication networks needs to be enhanced so that farmers can make better decisions about climate change and adaptation strategies and disaster risk preparedness and mitigation. According to PDP 2011–2016, local government agencies should prioritize strategies focusing on disaster risk reduction and mitigation, income diversification, and social insurance and protection (NEDA 2011a). To support these strategies, local government agencies require financial and technical support, particularly in provinces categorized as having low capacity, a high incidence of poverty, and a high risk of exposure to natural hazards and disasters like flooding and landslides (see Figure 4). Calls have been made for additional funding, both for national and local government initiatives. It is important, however, that any additional funding be directed to activities relevant to the needs and gaps of the location involved. Considering the number of initiatives already in place, an inventory of the skills and resources available to accomplish specific targets should be conducted. Furthermore, the provinces with high levels of vulnerability and poverty incidence, as identified in the updated PDP 2011–2016, should be given priority.
3. *Data and information related to climate change should be made readily available and accessible.* State-of-the-art adaptation and mitigation tools will be of no use unless they are readily available and accessible to users, and accompanied by relevant information. An institutionalized

system of data gathering and management is needed to ensure the sustainability of practices promoting climate resilience. It is equally important that information and communication campaigns be targeted to poor farmers to increase their adaptive capacity. Information about the impacts of climate change and different adaptation measures must be made available in a timely manner. This means that all climate change data, information, and literature (including climate change projection studies) should be collected, compiled, and made available at the local level. Moreover, the government must increase its investments in methods of disseminating seasonal forecast information in terms of its agronomic and economic implications to enable farmers to understand the importance of adaptation and mitigation strategies in crop and livestock production, and their effectiveness in improving resource use efficiency.

4. *Research and development need to be strengthened so the Philippines can fully tap its potential in developing and using climate-friendly technologies.* Creative financial and economic mechanisms and instruments are needed to facilitate technology development and transfer (e.g., incentives for patents and protection of intellectual property rights).
5. *Private sector participation in financing and investing in adaptation and mitigation technologies needs to be promoted.* While the trend toward agricultural climate change initiatives is increasing, World Bank (2013) showed that in DA alone, some programs and projects are left unfunded. Assistance from bilateral and multilateral donor agencies has been insufficient to meet the increasing demand for funding to address climate change-related challenges. It is highly recommended that the government fast track the road map for climate action on agriculture, which aims to integrate the participation and support of the private sector in financing

and investing in adaptation and mitigation technologies. This initiative would not only complement funding from other sectors but also encourage ownership and accountability of private individuals and organizations.

6. *A monitoring and evaluation system for the country's climate change initiatives is needed, including but not limited to enhancing resilience in the agriculture sector.* Currently, indicators of adaptive capacity only include decreased damage and losses due to natural hazards and disasters, environmental hazards, and human-induced

and hydrometeorological events, which were used as a proxy to monitor improvements in adaptive capacity at the community level. A set of measurable indicators of climate-related actions in agriculture needs to be defined, and an M&E system must be institutionalized. Such indicators must be consistent and supported by measureable targets for monitoring progress and to encourage the proposal and implementation of more focused and aligned activities within government agencies and across sectors.

Appendix 1. Palay production losses due to climate-related natural hazards and disasters, 2007–2011

Region	2007			2008			2009			2010			2011		
	Affected Area*	Production Loss		Affected Area*	Production Loss		Affected Area*	Production Loss		Affected Area*	Production Loss		Affected Area*	Production Loss	
		Volume (thousand mt)	Value (PHP thousand)		Volume (thousand mt)	Value (PHP thousand)		Volume (thousand mt)	Value (PHP thousand)		Volume (thousand mt)	Value (PHP thousand)		Volume (thousand mt)	Value (PHP thousand)
ARMM	–	–	–	21.6	1.0	280,407.1	5.8	5.7	125,717.8	1.5	3.1	52,931.2	10.0	7.1	222,787.1
CAR	32.7	18.4	254,054.8	2.5	0.8	15,195.3	49.4	74.6	1,280,433.3	28.2	42.2	722,936.1	27.7	18.6	343,790.4
Region 1	21.0	7.8	144,754.1	18.9	10.3	197,301.5	136.2	432.7	7,369,726.6	27.5	20.1	340,901.0	62.8	31.6	603,089.2
Region 2	119.0	101.8	1,299,828.7	92.9	55.8	1,036,724.6	129.1	181.1	3,118,435.4	324.3	426.8	6,780,831.6	227.2	192.9	3,123,052.8
Region 3	87.6	9.4	617,354.7	25.4	10.1	238,467.2	265.9	508.2	8,403,868.0	132.3	153.2	2,619,259.6	380.7	673.9	9,730,560.8
Region 4a	–	–	–	7.8	1.0	22,271.2	18.0	52.7	919,497.8	9	29.9	515,162.2	5.7	10.2	136,494.3
Region 4b	18.7	9.3	135,181.2	9.7	6.6	131,800.7	33.3	8.0	413,313.8	35.6	69.3	1,211,069.2	32.9	39.2	696,328.1
Region 5	17.6	18.6	236,219.4	54.7	54.1	780,593.8	85.6	91.6	1,689,992.6	18.4	45.7	780,098.9	111.6	157.8	1,981,307.9
Region 6	10.0	15.0	157,256.7	89.8	60.8	1,288,694.1	17.0	13.1	85,986.9	62.2	91.3	1,580,504.8	5.0	4.1	57,546.3
Region 7	0.9	2.3	26,190.0	0.2	0	1,339.8	0	0	125.6	–	–	–	–	–	–
Region 8	8.5	–	56,851.0	27.4	12.3	285,045.7	2.9	0	8,746.8	–	–	–	23.8	11.3	198,887.2
Region 9	0.0	–	611.5	7.7	18.2	280,962.8	0	0	374.0	1.1	1.3	21,522.0	3.4	–	68,664.5
Region 10	0.1	0.1	2,721.9	0	–	292.1	0.6	0.3	9,057.4	4.4	12	203,609.0	2.8	1.4	43,396.4
Region 11	9.1	–	91,909.2	0.1	0.1	1,229.2	2.7	–	21,344.8	1.2	4.7	80,308.0	6.0	–	41,420.2
Region 12	8.3	3.1	53,772.7	13.9	9.7	212,947.6	7.5	12.0	239,152.3	13.6	37.4	636,463.0	7.7	14.3	318,225.2
Caraga	10.5	0.2	48,251.7	2.8	6.4	78,342.2	15.6	0.3	145,660.8	–	–	–	15.2	–	35,379.5
Philippines	258.0	160.4	2,486,162.1	375.3	247.4	4,851,614.8	769.8	1,380.4	23,831,434.1	365.9	396.4	6,357,630.4	922.5	1,162.5	17,600,929.9

ARMM = Autonomous Region in Muslim Mindanao; CAR = Cordillera Administrative Region; mt = metric tons

Note: * per thousand hectares

Sources: Author's compilation based on Israel and Briones (2012) and DA (various years)

Appendix 2. Typhoons causing the most economic damage, 1990–2013

Typhoon/Monsoon	Year	Areas Affected	Agriculture (PHP billion)	Total (PHP billion)
Ruping (Mike)	1990	NCR and Regions 3 to 12	8.512	10.846
Rosing (Angela)	1995	NCR, CAR, Regions 1 to 5, and Region 8	9.037	10.799
Kadiang (Flo)	1993	NCR, CAR, and Regions 1 to 4	7.193	8.756
Winnie	2004	Eastern Luzon	0.185	0.188
Loleng (Babs)	1998	CAR, Regions 1 to 6, and Region 8	3.695	6.787
Ondoy (Ketsana)	2009	NCR and Regions 3 and 4a	6.670	10.970
Peping (Parma)	2009	CAR and Regions 1 and 3	20.500	27.300
Sendong	2011	Region 10	0.309	2.070
Habagat (southeast monsoon)	2012	NCR and Regions 3 and 4a	2.400	3.060
Pablo (Bopha)	2012	Region 4b, Regions 6 to 12, and Caraga	26.530	36.950
Tropical Depression Crising	2013	Region 4b, Regions 6 to 12, and ARMM	0.011	0.011
Yolanda (Haiyan)	2013	Regions 4 to 8, Regions 10 and 11, and Caraga	10.480	12.450

ARMM = Autonomous Region in Muslim Mindanao; CAR = Cordillera Administrative Region; NCR = National Capital Region

Source: National Disaster Risk Reduction and Management Council (2013)

Appendix 3. Major DA programs, activities, and projects on productivity and climate change resilience, 2013–2016

Program, Activity, Project	Expected Outputs	PDP-RM Critical Indicators Addressed	Regions Covered	Investment Targets (PHP million)		
				Subtotal 2013–2016	Total for Continuing Investment Targets	Total
Mechanization of Philippine sugarcane farms	Provision of hauling trucks and high-powered tractors	Increase in yields of major commodities, decrease in yearly proportion of farm household income to total income	Regions 2, 3, 4a, 5, 6, 7, 8, 10, 11, and 12	1,100.0	600.0	1,700.0
Philippine Rural Development Program	Construction of rural infrastructure: 2,346 km of farm-to-market roads, 775 linear meters of bridges, 30,205 ha of irrigation, and 294 potable water supply	Increase in yields of major commodities, decrease in yearly proportion of farm household income to total income	Regions 1, 2, 3, 4a, 4b, 5, 6, 7, 8, 9, 10, 11, 12, 13, ARMM, and CAR	23,907.8	3,627.5	27,535.3
Balintongan Reservoir Multipurpose Project	Development of agricultural enterprises: generation of 14,900 ha	Increase in yield and volume of major commodities	Region 3			500.0 ^a
Chico River Pump Irrigation Project	Development of agricultural enterprises: generation of 8,700 ha	Increase in yield and volume of major commodities	Region 2			
Ilaguen Multipurpose Project	Development of agricultural enterprises: generation of 30,000 ha	Increase in yield and volume of major commodities	Region 2			
Tumauini Reservoir Project	Development of agricultural enterprises: generation of 2,385 ha, rehabilitation of 3,615 ha	Increase in yield and volume of major commodities	Region 2			
Balog-Balog Multipurpose Irrigation Project Phase 2	Development of agricultural enterprises: generation of 24,849 ha, restoration of 2,000 ha, rehabilitation of 14,301 ha	Increase in yield and volume of major commodities	Region 3			
Fisheries, Coastal Resources, and Livelihood Project	Protection and rehabilitation of coastal communities	Increase in volume of production	Regions 4b, 5, 8, 13, and ARMM	1,686.6	1,121.2	2,807.7
Public-Private Partnership Program: Logistics Support on the Agri-Fishery Products Supply Chain (Transportation of Agri-Fishery Products Utilizing the Southrail Main Line)	Logistics centers equipped with cold chain equipment and warehouses, establishment of other needed facilities	Reduction in level of postharvest losses	Regions 4a, 4b, and 5	1,000.0	–	1,000.0
Total				27,694.4	5,348.7	33,043.1

DA = Department of Agriculture; ARMM = Autonomous Region in Muslim Mindanao; CAR = Cordillera Administrative Region; ha = hectares; km = kilometers;

PDP = Philippine Development Plan

Note: ^a reflected in Chapter 10 of the PDP 2011–2016 (NEDA 2011a)

Source: NEDA (2014)

References

- Asian Development Bank (ADB). 2009. *The economics of climate change in Southeast Asia: A regional review*. Mandaluyong City, Philippines: ADB. www.adb.org/publications/economics-climate-change-southeast-asia-regional-review (accessed on October 2014).
- Amadore, L.A. 2005. *Crisis or opportunity: Climate change impacts and the Philippines*. Quezon City, Philippines: Greenpeace Southeast Asia.
- Baas, S. and A. Ricoy. 2013. Enhancing community-based adaptation through institutionalization of good practices in Bicol region, Philippines. In *How does climate change alter agricultural strategies to support food security?* Paper presented at the Food Security Futures: Research Priorities for the 21st Century, April 11–12, Dublin, Ireland. http://www.pim.cgiar.org/files/2013/03/ClimateChangeAndFoodSecurity_PrioritiesForPublicResearch.pdf (accessed on November 10, 2014).
- Bureau of Agricultural Statistics (BAS). 2014. Statistics on rice production, area harvested, and average rice yield in the Philippines from 1970–2012. Quezon City, Philippines: BAS.
- Calado, P. 2012. Carbon finance support facility for clean development mechanism projects. Paper presented at the Capacity Building Seminar on Post-2012: Carbon Market, July 18–20, ADB Headquarters, Manila, Philippines.
- Cinco, T.A., F.D. Hilario, R.G. de Guzman, and E.D. Ares. 2013. Climate change and projections in the Philippines. Paper presented at the 12th National Convention on Statistics, October 1–2, EDSA Shangri-La Hotel, Mandaluyong City, Philippines.
- Climate Change Commission (CCC). 2009. *National framework strategy on climate change 2010–2022*. Manila City, Philippines: CCC. www.climate.gov.ph/index.php/en/news/104-national-framework-strategy-on-climate-change (accessed on December 19, 2013).
- . 2010. *National Climate Change Action Plan: 2011–2028*. Manila City, Philippines: CCC.
- . 2011. *Philippines Climate Change Adaptation Policy Initiatives National Climate Change Action Plan*. Local Government Academy. Manila City, Philippines: CCC. www.lga.gov.ph/sites/default/files/knowledgeExchange-pdf/tagaytay/D1-CCC%20CCA-DRR%20Policies%20and%20Initiatives.pdf (accessed on December 29, 2013).
- . 2013. *Project Climate Twin Phoenix*. Manila City, Philippines: CCC. www.climate.gov.ph/project/project-climate-twin-phoenix (accessed on December 29, 2013).
- David, L.T. et al. 2013. *Seascape clusters according to the range of SST increase*. Quezon City, Philippines: University of the Philippines Marine Science Institute.
- Department of Agriculture (DA). 2013a. DA policy and implementation program on climate change. Attachment to the Memorandum: Mainstreaming climate change in the DA programs, plans, and budget. Quezon City, Philippines: DA. www.da.gov.ph/images/PDFFiles/otherspdf/approved_APolicyImplementationProgramClimateChange.pdf (accessed on April 19, 2014).
- . 2013b. *Memorandum: Mainstreaming climate change in the DA programs, plans, and budget*. Quezon City, Philippines: DA. www.da.gov.ph/index.php?option=com_content&view=article&id=1233:memorandum-urgent-implementation-of-the-da-climate-change-policy-thrusts-andprograms&catid=107:climate-change (accessed on April 19, 2014).
- . 2014. *General appropriations act*. Quezon City, Philippines: DA. www.dbm.gov.ph/wp-content/uploads/GAA/GAA2014%20ANNEXES/Vol%201/DA/DA.pdf (accessed on November 16, 2014).
- . Various years. *Reports on damages and losses due to climate-related natural disasters*. Quezon City, Philippines: DA.
- Department of Budget and Management (DBM), Climate Change Commission (CCC), and Department of the Interior and Local Government (DILG). 2014. *Tagging/Tracking climate change expenditures in the local budget*. Joint Memorandum Circular 2014-01. www.climate.gov.ph/images/docs/Joint_MemorandumCircular_2014-01.pdf (accessed on December 14, 2015).

- Domingo, S. 2014. DRRM and quick response funds. Presentation to the House of Representatives on ZBB study. <http://cpbrd.congress.gov.ph/index.php/events/123-2014-event-materials/425-knowledge-sharing-forum-july-2-2014> (accessed on November 15, 2014).
- Espinas, A. 2012. Geography and public planning: Albay and disaster risk management. HDN Discussion Paper Series No. 4. Quezon City, Philippines: Human Development Network. http://hdn.org.ph/wp-content/uploads/DP_04_Espinas.pdf (accessed on December 19, 2013).
- Government of the Philippines (GOP). n.d. National data portal. <http://data.gov.ph/catalogue/dataset> (accessed on December 19, 2013).
- Gracilla, M.F. and F.P. Lansigan, 2010. Analysis of changing climate in selected locations in the Philippines. Paper presented at the National Convention on Statistics, October 1–2, Mandaluyong City, Philippines.
- Habito, C. and R. Briones. 2005. Philippine agriculture over the years: Performance, policies, and pitfalls. Paper presented at the Policies to Strengthen Productivity in the Philippines Conference, June 27, Makati City, Philippines.
- Intergovernmental Panel on Climate Change (IPCC). 2000. Special report on emissions scenarios: A special report of Working Group III of the Intergovernmental Panel on Climate Change, edited by N. Nakicenović and R. Swart. Geneva, Switzerland: IPCC. www.ipcc.ch/pdf/special-reports/emissions_scenarios.pdf (accessed on December 29, 2013).
- . 2007. Climate change 2007: Synthesis report. Fourth Assessment Report of the Intergovernmental Panel of Climate Change. Geneva, Switzerland: IPCC. www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm (accessed on December 29, 2013).
- . 2012. Summary for policymakers. In *Managing the risks of extreme events and disasters to advance climate change adaptation*, edited by C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea et al. A Special Report of Working Groups I and II of the IPCC. Cambridge, United Kingdom and New York, NY: Cambridge University Press.
- International Labour Organization (ILO). 2012. MDG-F 1656 joint programme on climate change adaptation: Outcome 3.4 climate resilient farming communities in Agusan del Norte through innovative risk transfer mechanisms. Geneva, Switzerland: ILO. www.ilo.org/wcmsp5/groups/public/asia/---ro-bangkok/---ilo-manila/documents/publication/wcms_173262.pdf (accessed on March 16, 2014).
- Israel, D. and R. Briones. 2012. Impacts of natural disasters on agriculture: Food security, and natural resources and environment in the Philippines. PIDS Discussion Paper No. 2012-36. Makati City, Philippines: Philippine Institute for Development Studies.
- Lansigan, F. Forthcoming. The future of Philippine agriculture: Scenarios, policies, and investments under climate change. In *The future of Philippine agriculture: Scenarios, policies, and investments under climate change*. IFPRI-NEDA's project on Addressing the Impacts of Climate Change in the Philippine Agriculture Sector.
- National Disaster Risk Reduction and Management Council (NDRRMC). 2013. Effects of continuous rains due to tail-end of a cold front in Regions IV-A, IV-B, V, VI, VII, VIII, IX, X, XI, XII, Caraga, and ARMM. Situation Report No. 59. www.ndrrmc.gov.ph/attachments/article/1125/updsitrep59.pdf (accessed on December 11, 2013).
- National Economic and Development Authority (NEDA). 2011a. *Philippine Development Plan 2011–2016*. Pasig City, Philippines: NEDA.
- . 2011b. *2011 ODA portfolio review*. Pasig City, Philippines: NEDA.
- . 2012a. *Compendium of good practices on climate change adaptation*. Pasig City, Philippines: NEDA.
- . 2012b. *2012 ODA portfolio review*. Pasig City, Philippines: NEDA.
- . 2013. *2013 ODA portfolio review*. Pasig City, Philippines: NEDA.
- . 2014. *Philippine Development Plan 2011–2016: Revalidated public investment program*. Pasig City, Philippines: NEDA.

- National Organic Agriculture Board (NOAB). 2011. *National organic agriculture program 2012–2016*. Quezon City, Philippines: Department of Agriculture.
- Philippine Information Agency (PIA). 2013. Coop model climate change adaptation financing continues via DTI-Baug coop partnership. Quezon City, Philippines: PIA. <http://r13.pia.gov.ph/index.php?article=1701380014303> (accessed on March 16, 2014).
- Philippine Statistics Authority (PSA). 2013. *Annual Poverty Indicators Survey 2013*. Quezon City, Philippines: PSA.
- . 2014. *Annual Poverty Indicators Survey 2014*. Quezon City, Philippines: PSA.
- Sandoval, R. Jr. and S. Baas. 2013. Adapting to climate change: The Cordillera experience. Agriculture and Development Notes Vol. 3, No. 2. Laguna, Philippines: Southeast Asian Regional Center for Graduate Study and Research in Agriculture.
- Senate Economic Planning Office. 2012. Philippine agricultural exports at a glance. Manila City, Philippines: Senate of the Philippines, 16th Congress. www.senate.gov.ph/publications/AG%202012-02%20-%20Agricultural%20Exports.pdf (accessed on February 3, 2014).
- Turrall, H., J. Burke, and J.M. Faurès. 2008. *Climate change, water, and food security*. Rome, Italy: Food and Agriculture Organization.
- United Nations Development Programme (UNDP). 2013a. Enabling Regions 10 and 11 to cope with climate change (Project Climate Twin Phoenix). Makati City, Philippines: UNDP. www.undp.org/content/philippines/en/home/operations/projects/environment_and_energy/TwinPhoenix/ (accessed on December 29, 2013).
- . 2013b. Low emission capacity-building programme Philippine project. Makati City, Philippines: UNDP. www.undp.org/content/philippines/en/home/operations/projects/environment_and_energy/LECB-PHL-Project/ (accessed on December 29, 2013).
- Utzurum, S. Jr. and C. Ablan. 2013. *Sustainable upland farming through the establishment of Barangay Sagip-Saka Conservation Farming Villages (CFV): A modality for climate change adaptation*. Dumaguete City, Philippines: Silliman University.
- Villafuerte, M.Q., J. Matsumoto, I. Akasaka, H.G. Takahashi, H. Kubota, and T.A. Cinco. 2014. Long-term trends and variability of rainfall extremes in the Philippines. *Atmospheric Research* 137(2014):1–13.
- World Bank (WB). 2013. *Getting a grip on climate change in the Philippines*. Taguig City, Philippines: WB.

Improving Irrigation Water Governance for a Resilient Agriculture

Agnes C. Rola

Abstract

Agriculture uses about 85 percent of water that is allocated for consumption. Staples, especially rice, cannot grow without water at the right time and in the right amount. However, there are threats to water in agriculture due to: (1) competing uses across the water sectors (i.e., domestic, industrial), (2) environmental degradation, (3) climate change, and (4) inefficient use within the agriculture sector and within the irrigation system. Effective and efficient water governance mechanisms will be needed to minimize the agricultural risks emanating from a water-scarce scenario.

Using data from secondary sources, the paper assesses irrigation performance in recent years. It also discusses water governance in three scales: (1) national water governance, (2) irrigation sector water governance, and (3) irrigation system water governance. It further recommends to improve water governance toward agricultural resilience.

Introduction

Agriculture uses about 85 percent of water that is allocated for consumption (ADB 2013). Staples, especially rice, cannot grow without water at the

right time and in the right amount. Irrigation investment drives higher agricultural productivity. However, recent data from the Philippines show that even with huge irrigation investments, cropping intensity (i.e., effective crop area) was not increasing in similar pace (Inocencio 2016a). One of the several factors hypothesized to cause this problem is water scarcity, which is seen to be a real problem at the irrigation system level (Nguyen et al. 2014). The literature has pointed to water governance¹ as the culprit.

Natural occurrences, such as shifts in historical temperatures and rainfall patterns that alter the timing and quantity of annual water flows, pose ever-increasing challenges to irrigation. The current short cycle of both drought and flood events causes significant agricultural damages. The “new normal” conditions are recognized, but policy and institutional responses have been slow to adjust to achieve agricultural resilience.

¹ Over the past decade, the terms “water governance” and “water management” have entered into the standard vocabulary of professionals and academics engaged in the water sector. Water governance highlights a shifting state-society relationship in which the state has altered its responsibilities and/or activities related to water management and water services provision (UNESCO-IHE n.d.).

Agricultural resilience is about equipping farmers to absorb and recover from water-related shocks and stresses (Feed the Future 2014). Building resilience to extreme events or adapting to future climate change will require interventions in several areas: institutions and policymaking, operations and management, infrastructure, technology and innovation, capacity building and awareness, and monitoring and information systems (Inocencio 2016b).

This paper attempts to analyze the institutional arrangements at varying scales of irrigation water governance and how these have affected Philippine agricultural performance, particularly the rice sector. It offers recommendations on policy strategies and institutional arrangements to attain agricultural resilience. The analysis will focus on three scales of institutional arrangements: (1) national-level water governance, (2) irrigation sector water governance, and (3) irrigation system water governance.

Secondary data, review of literature, and reports of the various experts involved in a Philippine Institute for Development Studies (PIDS) project, which characterized irrigation water governance (Clemente 2015; Elazegui 2015;

Luyun 2015; Nguyen 2015; Rola 2015), were the sources of information for this paper. In that project, key informant interviews of actors engaged in communal and national irrigation systems were conducted. Interviews with other national government agencies and local governments were also done to understand their roles and responsibilities in the irrigation sector. The data analysis is mostly descriptive.

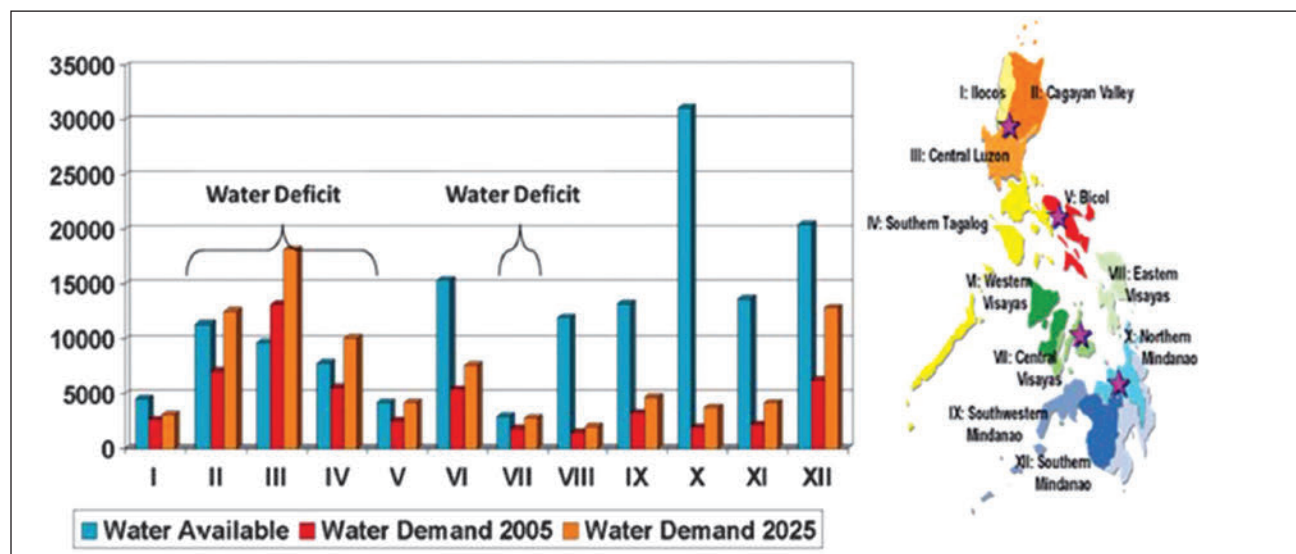
Threats to water in agriculture

Increasing competition in water use

According to the searchable database of the World Resources Institute, the Philippines has total annual renewable water resources of 479 billion cubic meters (m^3) from its surface water and groundwater sources. This translates into an annual per capita availability of about 6,100 m^3 , which is twice that of the rest of Asia, and six times the global scarcity threshold of 1,000 m^3 .

The National Water Resources Board (NWRB) estimates the total available groundwater supply to be 20,200 million m^3 /year. Based on an 80-percent probability for surface water, the total dependable surface water supply is

Figure 1. Projected regional supply and demand situation in thousand cubic meter, 2005–2025



Note: Based on the 12 water resources regions of the National Water Resources Board (NWRB)
Source: Japan International Cooperation Agency and NWRB (1998)

206,230 million m³/year, implying a total mean supply of 226,430 million m³/year. Agricultural use accounts for 83–85 percent of this amount, the remainder being shared by the industrial, commercial, and domestic sectors.

The country's water resources face major challenges, such as growing population, particularly in urban areas; water pollution; wasteful and inefficient water use; continued denudation of forest cover, mostly in watersheds; and saltwater intrusion caused by excessive withdrawal of groundwater, which is manifesting in the metropolitan areas of Cebu and Davao, and in certain areas of Metro Manila (ADB 2013).

The Philippines, like all other developing countries in Asia, has regions and times of year in which water for specific uses is scarce (Figure 1). Available data show that there is wide spatial variability of water supply and demand across the country, thus, the need for region-specific water management policies and strategies that are typical for a humid-tropical archipelagic country.

Environmental degradation leading to decline in water supply

Forest cover loss in many watersheds in the country has been severe; only the watersheds in Regions 2, 4, 8, and 11 have more than 30 percent of land area with forest cover, while Regions 5 and 7 have the least forest cover (Cruz et al. 2010). The ratio of forest cover to irrigated and irrigable land is generally quite low, and this could have serious implications on soil erosion and the availability and quality of water for irrigation.

The *2003 Philippine Environment Monitor* (WB 2003) also noted that nearly 2.2 million metric tons of organic pollution are produced annually by the domestic (48%), agriculture (37%), and industrial (15%) sectors, and that the annual economic losses caused by water pollution are estimated at PHP 67 billion (or USD 1.3 billion).

Siltation problems in the canals of national irrigation systems (NIS) cause reduced flow capacities that deprive the downstream portion

of adequate water supply (Clemente 2015). According to Clemente (2015), this is due to the lack of maintenance, especially of unlined canals, and poor watershed management, which results in upland erosion and siltation of the rivers and canals downstream of the watershed.

Siltation, which is caused by sediments in dams, is also considered a major problem in communal irrigation systems (CIS) (Luyun 2015). The presence of sediments occurs due to the absence of silt control devices that can be used in dams, midstream and upstream quarrying sites, and *kaingin* or upland agriculture.

Changing rainfall patterns and extreme weather events

Climate change is also a concern for agricultural planners, particularly with regard to its impact on mean and extreme precipitation rates. Modeling 50 years into the future, a time series-based analytic model formulated by the United Kingdom-based Climate Research Unit showed two key results for the Philippines: (1) an increase in June–August precipitation under all scenarios but (2) a decrease in December–February precipitation under the high carbon dioxide emission scenario. How these changes might affect the wet and dry seasons in the country is a subject of study. In any case, there seems to be a general consensus among climatologists that, over time, climate change will heighten the severity of droughts and deluges.

Available data in the Philippines show that from 1990 to 2009, there had been 18 disastrous tropical cyclones that brought millions of dollars of damages to the country, particularly in Luzon and the Visayas. A challenge will be downscaling relevant global data on climate change to the city and municipality level, and translating this data to decision support by the agriculture sector. A further challenge is compiling a comprehensive and meaningful information database (ADB 2013).

Climate extreme events, such as drought, can also cause water scarcity. Alternative sources of water can mitigate this event. Farmers'

adaptation measure includes new technologies, such as alternate wetting and drying, which is being demonstrated by the National Irrigation Administration (NIA) and PhilRice, and Small-Scale Irrigation Systems technologies like small farm reservoirs. Likewise, the effect of flooding as an extreme event is as disastrous as drought. Flooding problems exist in most NIS, especially during the wet season. This limits cropping to dry season only and, thus, reduce cropping intensity (Clemente 2015).

Inefficient use of water in agriculture

Currently, according to the United Nations Food and Agriculture Organization (FAO), “an astonishing 60 percent of the water diverted or pumped for irrigation is wasted—via runoff into waterways or evapotranspiration” (Wenzlau 2013). This does not have to be the case as farmers can achieve water-use efficiency gains in a number of ways: (1) by growing a diverse array of crops suited to local conditions, especially in drought-prone regions; (2) by practicing agroforestry or growing perennial crops in order to build strong root systems and reduce soil erosion; (3) by maintaining healthy soils, either by applying organic fertilizer or growing cover crops to retain soil moisture; and (4) by adopting irrigation systems like “drip” lines that deliver water directly to plants’ roots (Wenzlau 2013). Furthermore, Wenzlau (2013) noted that improved water management in agriculture could increase global water availability, catalyze development, reduce soil erosion, and lead to increased and diversified agricultural yields.

Irrigation system level conveyance inefficiency

Among the factors that cause inadequate system level irrigation water supply, according to a recent PIDS evaluation (Clemente 2015; Luyun 2015), is conveyance inefficiency. Conveyance inefficiency is caused by physical degradation of the system that can be due to storms/typhoons and faulty designs. It can also be caused by siltation, as well as by the lack of maintenance and capacity to do

maintenance, lack of funds, and lack of personnel. The motivation of irrigators’ associations (IAs) may not be enough in some cases. Major repairs will be beyond the capacities especially of the CIS.

Framework of analysis

Defining water governance

Munaretto and Battilani (2013) defined water governance as formulation and implementation of water policies, legislation and institutions, and on roles and responsibilities of government, civil society, and the private sector about ownership, management and administration of water resources, and services.

A more encompassing framework is advanced by Saleth and Dinar (2004, 2005), where two components are the: (1) governance environment and (2) governance structure. The elements of the general governance system in the country—such as the constitution, political arrangements, resources potential, development stage, and population, among other considerations—comprise governance environment (Menard and Saleth 2011). The governance structure, meanwhile, captures the institutional basis of water governance and covers essentially the water-related legal, policy, and organizational elements (Saleth and Dinar 2004).

Irrigation water governance

Specifically for irrigation water governance, Munaretto and Battilani (2013) used the four analytical dimensions of the Policy Arrangement Approach (Arts and Tatenhove 2004) to describe and analyze the irrigation water governance system in the case of river management: (1) actors and their coalitions (i.e., groups of actors engaging in policy processes to achieve a common goal); (2) division of resources, including money, personnel, facilities, instruments, expertise, knowledge, learning capacity, and communication possibilities; (3) rules guiding and constraining the behavior of individual actors by defining procedures

for decisionmaking, and division of task and responsibility between actors and organization; and (4) policy discourses where discourse is a specific ensemble of ideas, concepts, and categorizations that are underlining actors' principles, objectives, norms and values, perceptions of problems, and approaches to solutions.

Franks et al. (2013), for instance, analyzed irrigation water governance in Tanzania by looking at governance to be a system of resources, arrangements for access, and outcomes for people and ecosystems. The authors concluded that development of water resources has been successful with users assured of water supply, improvements in livelihoods, and increases in land holdings. In Cambodia, the principles of Participatory Irrigation Management and Development and the Integrated Water Resources Management were adopted (Chou et al. 2011). The participatory approach to governance was utilized where management functions were delegated to the community level.

This paper will be guided by the framework of FAO (2011) that expresses governance according to three pillars: (1) policy, legal, and institutional regulatory framework; (2) planning and decisionmaking processes; and (3) implementation, enforcement, and compliance, as data permit.

Analysis of irrigation sector performance

Status of irrigation development

The total developed irrigation service area in the Philippines is about 1.7 million hectares (ha) out of the potential irrigable area of 3.1 million ha. This is about 55 percent of potential irrigable area. The NIA operates about 200 NIS, with a total service area of just over 700,000 ha; these are mostly devoted to rice farming, with varying involvement of IAs. Also covering about 600,000 ha, CIS, meanwhile, are owned and operated by community-based IAs (Table 1).

In the Philippines, irrigation investments were heavy during the years 1965 to about 1985. Most investments were for NIS and mostly were foreign funded. In subsequent years, CIS were also built with local funding. Other small-scale irrigation systems, such as pumps and small farm reservoirs, were also constructed.

Table 2 provides a summary of comparison between NIS and CIS. For example, NIA obtains the water permit for NIS, while IAs hold the permit for CIS. IAs in NIS pay for irrigation services, while IAs in CIS pay for the cost of the CIS project under a cost-recovery scheme. Management transfer for NIS to IAs is guided by NIA's Irrigation Management Transfer (IMT) Program, while the turnover of CIS to IAs is subject to a cost-recovery scheme.

Trends of irrigation performance indicators

The indicators that are analyzed in this section are irrigation investments, irrigated area by system, and cropping intensity by system. At the national level, irrigation development and management in the country have historically been the single biggest item of public expenditure for agriculture, accounting for about a third of the total expenditure since the 1960s. In the 1970s and early 1980s, as well as in recent years when world rice prices rose at unprecedented levels, this ratio averaged even higher, at close to half of total public expenditures for agriculture. It is also noted that trend wise, irrigation investments were high during the Marcos years and drastically dropped in 1985 (Figure 2).

There is also a discernible shift in investments from wholly NIS to CIS, which was more evident during the Arroyo administration. This could also be a result of the Agriculture and Fisheries Modernization Act (AFMA) policy to build more CIS systems. The funding source has also shifted from predominantly foreign funded to locally funded.

Meanwhile, the proportion of funds for rehabilitation vis-à-vis new construction had also shifted (Figure 3). It was during the Arroyo administration that more funds were invested in

Table 1. Irrigable and firmed-up service areas in the Philippines, by region, December 2014

Region	Estimated Total Irrigable Area (ha) (1)	Firmed-Up Service Area (FUSA) (ha)				Total FUSA (2)	Irrigation Development [(2/1)x100]
		NIS	CIS	Private Irrigation Systems	Other Government Agency-Assisted Systems		
Luzon	1,761,822	464,380	332,768	151,457	118,371	1,066,977	60.56
Visayas	320,174	79,085	95,657	25,951	20,090	220,785	68.96
Mindanao	937,612	196,747	147,992	17,211	28,880	390,882	41.68
Total	3,019,608	740,213	576,419	194,620	167,342	1,678,595	55.59

ha = hectares; NIS = national irrigation system; CIS = communal irrigation system

Source: National Irrigation Administration [NIA] (2015)

Table 2. Comparison between NIS and CIS

	NIS	CIS
Service area	> 1,000 ha	< 1,000 ha
Water permit	NIA applies for water permit.	IA applies for water permit.
Implementation and/or construction	NIA with limited IA participation (e.g., providing information relevant to the project feasibility study and preconstruction phase)	NIA with IA participation
Operation and maintenance	NIA and IA through the IMT scheme	Operation and management of CIS is turned over to IAs upon project completion, subject to a cost-recovery arrangement.
Water charges	Farmers pay irrigation service fee per hectare/season/crop.	IAs amortize the chargeable cost for a period not exceeding 50 years at 0-percent interest
Purpose of water charges	For the services rendered in the delivery of water	Capital cost recovery

NIS = national irrigation system; CIS = communal irrigation system; ha = hectares; NIA = National Irrigation Administration; IA = irrigators' association;

IMT = Irrigation Management Transfer

Source: NIA (<http://www.nia.gov.ph/?q=content/construction-irrigation-systems>)

rehabilitation activities than in the construction of new systems.

Figures 4 and 5 show comparative trends in irrigated area and cropping intensity, respectively, during the past 10 years (i.e., 2005–2014). Irrigated area by the NIS is higher than that of the CIS for all years (Figure 4). Although the difference is not as significant, NIS also has higher cropping intensity than CIS (Figure 5). Unfortunately, cropping intensity has not improved through time, and may have even declined lately. This reveals the impact of some of the agricultural risks explained earlier, such as environmental degradation. Investments may be more needed in rehabilitation of the system rather than building new ones.

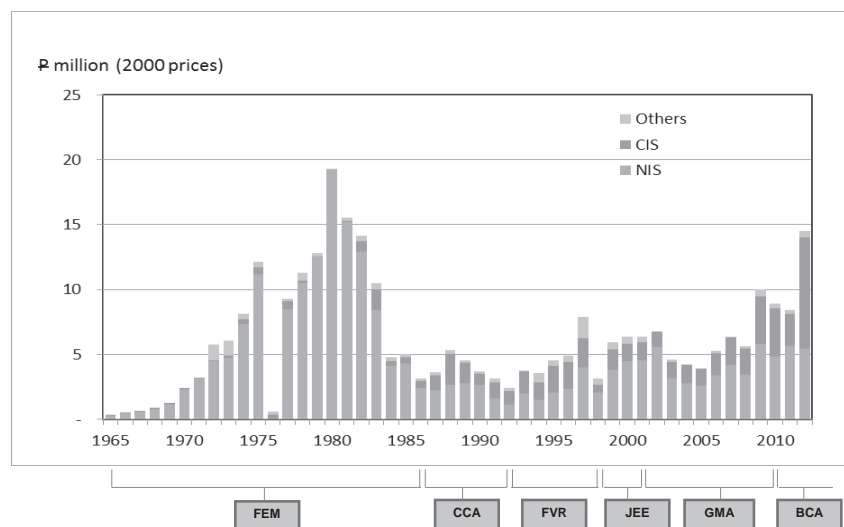
In other places, Luyun (2015) reported that one of the main reasons for the low performance of irrigation systems is the lack of water during

dry season. In some cases, while the river flows are adequate, less water is delivered because the storage capacity of the dam is reduced as the dam is already filled with sediments. There is also the quarrying problem upstream and downstream of the dam, which is one of the causes of the tilting or collapse of dams. The CIS design manual specifically stated that there should be no quarrying of the river within one kilometer upstream and one kilometer downstream of the proposed diversion dam. Forest in the watershed is already denuded due to kaingin.

Analysis of irrigation water governance structure

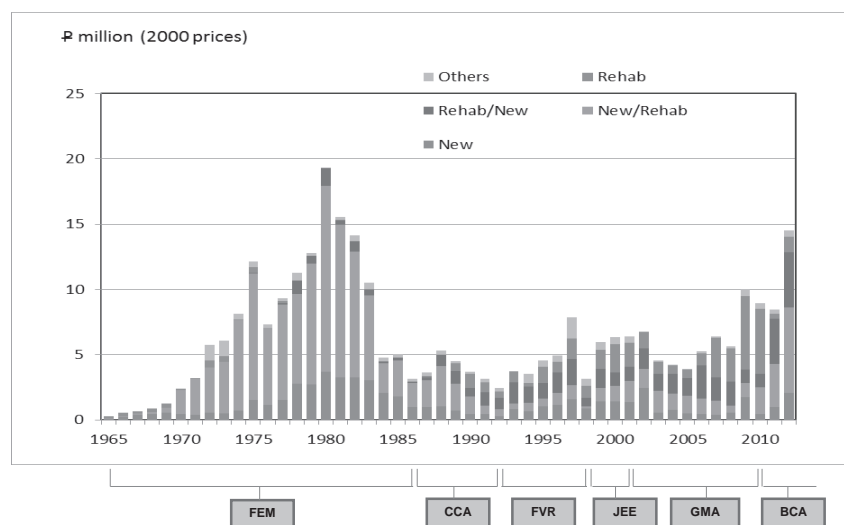
No central planning body for water resources
Water governance in the Philippines is characterized by a multiplicity of water institutions, which was a

Figure 2. Irrigation investment trends for NIS and CIS



FEM = Ferdinand E. Marcos; CCA = Corazon C. Aquino; FVR = Fidel V. Ramos; JEE = Joseph E. Estrada;
GMA = Gloria M. Arroyo; BCA = Benigno C. Aquino
Source: Rola (2015); Inocencio (2016a)

Figure 3. Trends in irrigation investments by purpose, 1965–2012

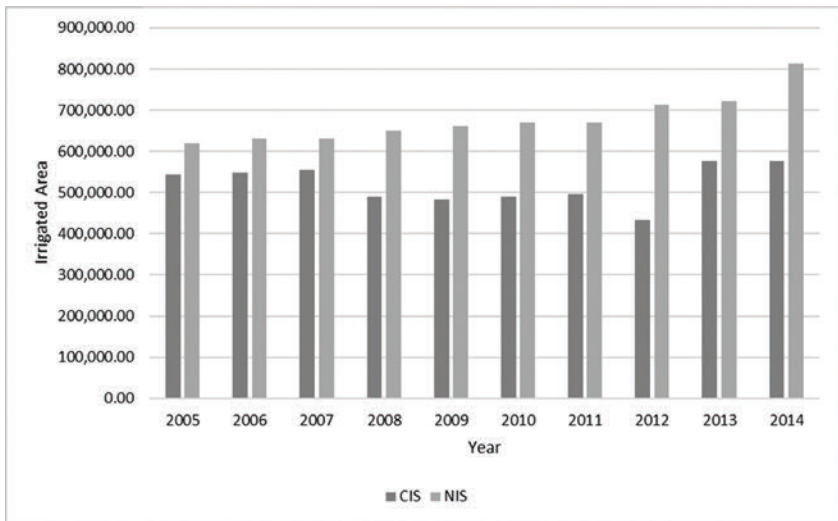


FEM = Ferdinand E. Marcos; CCA = Corazon C. Aquino; FVR = Fidel V. Ramos; JEE = Joseph E. Estrada;
GMA = Gloria M. Arroyo; BCA = Benigno C. Aquino
Source: Rola (2015); Inocencio (2016a)

result of creating offices that correspond to new laws without abolishing the old systems. There are 30 agencies—national and local government unit (LGU) based—managing the water resources of the Philippines (Paragas 2012; Tabios 2012). Among these are the following: NWRB; Local Water Utilities Administration; Department of Environment and Natural Resources (DENR);

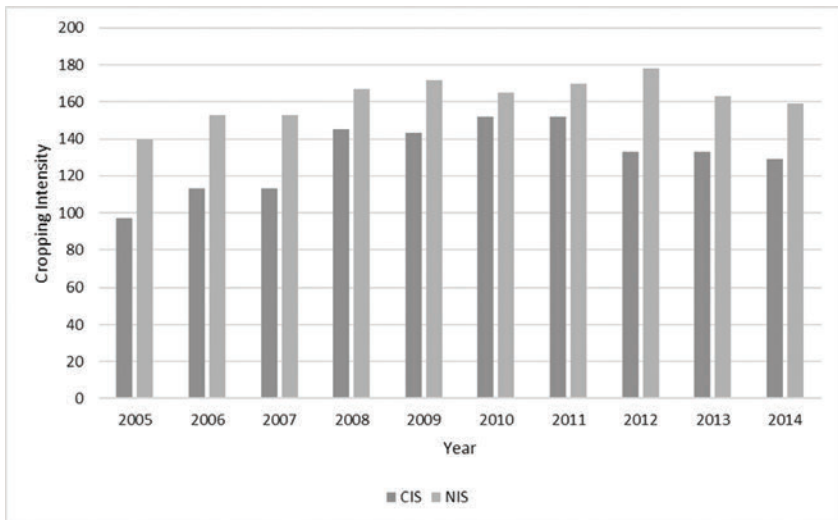
Department of Health; Department of Public Works and Highways; NIA; National Power Corporation; Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA); Department of Finance (DOF); Metropolitan Waterworks and Sewerage System; Department of the Interior and Local Government (DILG); Department of Energy; Metropolitan

Figure 4. Irrigated area trends for NIS and CIS



NIS = national irrigation system; CIS = communal irrigation system
Source: Rola (2015); Inocencio (2016a)

Figure 5. Cropping intensity trends for NIS and CIS



NIS = national irrigation system; CIS = communal irrigation system
Source: Rola (2015)

Manila Development Authority; Department of Tourism; and Laguna Lake Development Authority (Figure 6).

Their regulatory mandates cover water quality and quantity, water resource, and water services. Institutional concerns, as expected, are also varied: water sanitation and quality, watershed management, integrated area development, data collection, flood management, irrigation, hydropower, water supply, research, and cloud

seeding. While not all are present at every locality, the sheer number of potential actors and the assumed plurality of mandates (i.e., no mandate is deemed a priority over the others) make for serious political inertia in terms of getting the job done.

Elazegui (2004) highlights the high cost of coordination given this setup and the fact that: (1) some national agencies have no field presence in many localities, (2) the environment and natural resources officer is an optional position for LGUs,

Figure 6. Fragmented and overlapping range of functions of key Philippine water-related agencies

	NWRB	LWUA	DENR	LGUS	DPWH	DOH	NIA	NAPOCOR	PAGASA	DOF	MWSS	DILG	DOE	MMDA	DOT	LLDA
Policy Planning	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
Data Monitoring	●	●	●	●	●	●	●	●	●		●	●	●	●		●
Scientific modeling									●							●
Infrastructure and program dev't	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
Operations of water facilities				●	●		●	●			●			●		
Regulatory functions	●	●	●	●		●					●		●	●		●
Financing		●	●	●						●						
Public relations, Capdev't and IEC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Local RBO dev't			●													

NWRB = National Water Resources Board; LWUA = Local Water Utilities Administration; DENR = Department of Environment and Natural Resources; LGU = local government unit; DPWH = Department of Public Works and Highways; DOH = Department of Health; NIA = National Irrigation Administration; NAPOCOR = National Power Corporation; PAGASA = Philippine Atmospheric, Geophysical and Astronomical Services Administration; DOF = Department of Finance; MWSS = Metropolitan Waterworks and Sewerage System; DILG = Department of the Interior and Local Government; DOE = Department of Energy; MMDA = Metro Manila Development Authority; DOT = Department of Tourism; LLDA = Laguna Lake Development Authority
Source: Rola et al. (2012)

and (3) there is no nationally legislated funding scheme for water resource management. In terms of planning for water use, there is also no observed vertical and horizontal linkages among water-related institutions (Rola et al. 2016), thus, making the various sectors vulnerable to water demand crisis.

As a consequence of fragmented and overlapping functions, (1) there is no central planning body for water, (2) no available integrated water databases for decision support, and (3) there are known conflicts in the enforcement of the various water-related laws (Hall et al. 2014).

In terms of national-local interphase, the Philippines' legal framework allows some dichotomy in functions and jurisdiction in water resource governance. Local governance functions deal with community-based forest management, waterworks system, and water quality monitoring. However, LGUs' decisions and actions are bounded by powers at the central level. Thus, to implement

projects, including those in small watersheds serving as source of irrigation to the community, a memorandum of agreement has to be forged among DENR, DILG, and the concerned LGU (Elazegui 2004).

Multiple agencies weaken irrigation water governance

Before the devolution, NIA was the sole provider of irrigation services. Currently, there are three government entities concerned with irrigation governance: NIA, Department of Agriculture-Bureau of Soils and Water Management (DA-BSWM), and LGUs. All of these have their own legal frameworks and mandates for irrigation (Figure 7).

First, NIA is concerned with both water use management and watershed management. However, in water use management, the major player is the NWRB. NIA gets water permits from the NWRB. NWRB sets the rules in this allocation

procedure. Watershed management is not done by NIA at this time due to lack of personnel as a result of the rationalization plan. Moreover, with respect to watershed management, there is no clear institutional link between NIA and DENR, which is considered a noncompliance to the AFMA provision. Therefore, in both water use management and watershed management—the two functions that NIA needs to be relevant with—NIA is found to be marginally involved in both allocation and protection decisions, respectively. NIA manages NIS with a total effective area of about 1 million ha. The current paradigm in NIA governance is for the IAs to be more involved. Without NIA's assurance of adequate water supply at the right time, the goals of food security will be jeopardized.

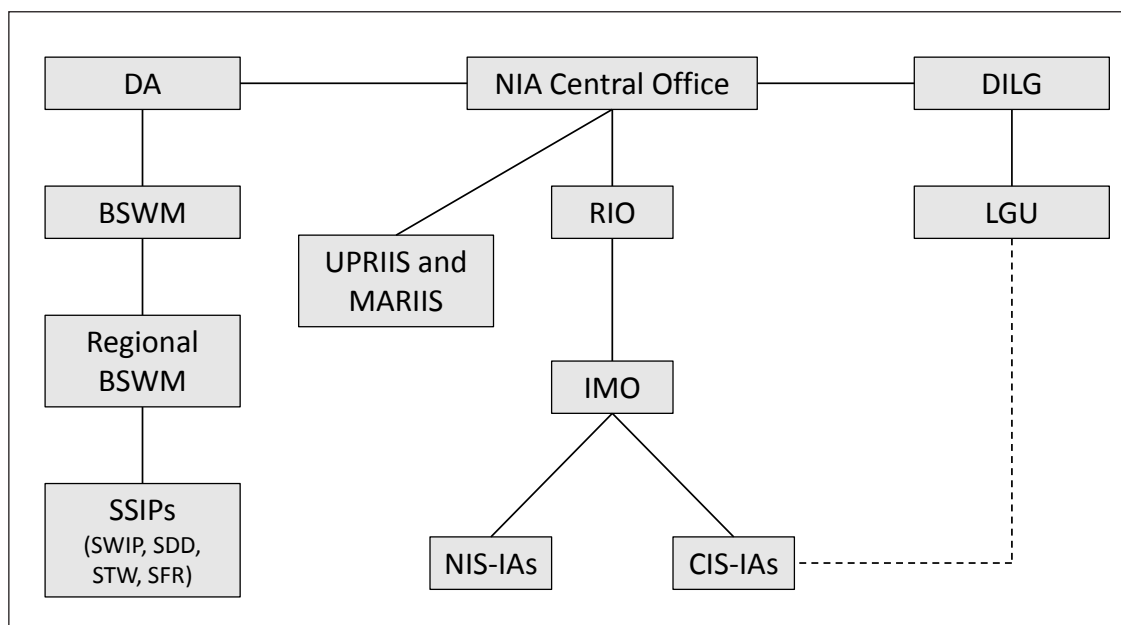
Second, with the devolution, LGUs were also given the mandate to construct CIS and to build inter-*barangay* irrigation infrastructure. According to the Local Government Code, CIS should be under the supervision of the LGU. CIS are part of the basic services provision of LGUs for

their communities, with the aim to be self-reliant. Recognizing the lack of expertise at the LGU level, however, AFMA mandated NIA to provide technical and financial support. As validated by field data, there is only one successful LGU that has managed a CIS (Elazegui 2015) from a total of 6,000 CIS in the country.

Third, the other player, as provided by AFMA, is DA through the BSWM. The bureau is in charge with the promotion of small-scale irrigation projects, such as Small Water Impounding Project, Small Diversion Dam, Shallow Tube Well, and Small Farm Reservoir for organized farmer association. It provides supplemental irrigation; incidental function, such as flood control structure; and other economic uses (e.g., for fishery and livestock production). The Small Water Impounding System Association (SWISA) was established because of these programs.

Due to the interplay among the various governance agencies, it is perceived that the multiple roles of agencies weaken development planning and implementation of irrigation

Figure 7. Philippine irrigation water governance administration



DA = Department of Agriculture; NIA = National Irrigation Administration; DILG = Department of the Interior and Local Government; BSWM = Bureau of Soils and Water Management; SSIP = small-scale irrigation project; SWIP = Small Water Impounding Project; SDD = Small Diversion Dam; STW = Shallow Tube Well; SFR = Small Farm Reservoir; UPRIS = Upper Pampanga River Integrated Irrigation System; MARIIS = Magat River Integrated Irrigation System; RIO = Regional Irrigation Office; IMO = Irrigation Management Office; NIS = national irrigation system; IA = irrigators' association; CIS = communal irrigation system; LGU = local government unit
Source: Rola (2015)

programs. Inconsistent legal procedures also confuse farmers. For instance, the BSWM program is a complete dole-out, while NIA projects recover cost. There are instances that the SWISA and CIS are located in the same barangay. With free water from BSWM projects, CIS members would tend to transfer to SWISA. With these observations, there were suggestions to have just one agency to handle an integrated irrigation program.

Weak performance of the IAs for irrigation system governance

IAs are supposed to govern the irrigation system—for both NIS and CIS. The primary aim of the two systems is to provide irrigation water to association members at the time it is most needed. A fundamental issue is how governance mechanisms can indeed ensure that water will be available at the most critical times. As of December 2015, there were a total of 8,199 IAs with about 1 million farmer-members in an area of 1.256 million ha (Table 3).

NIA is mandated to provide the needed capacity-building activities to IAs prior to the transfer of operation and maintenance (O&M) duties. Under its IMT program, NIA needs to gradually transfer the management and O&M of NIS—wholly or partially—to duly organized IAs. Likewise, NIA develops communal or small irrigation projects (CIPs), or rehabilitates existing CIS with IA participation. After which, NIA completely transfers the O&M of completed CIP or rehabilitated CIS to the IA. NIA then assists the IAs in establishing linkages with other agencies (both government and private) that provide support services and other assistance programs, including livelihood/small business ventures to increase farm productivity and family income.

In a nutshell, NIA is responsible in ensuring that the IAs are well capacitated to govern their systems. However, NIA has no explicit mandate to regulate the activities of IAs.

Table 3. Cumulative total of all IAs as of December 2015

Particulars	NIS	CIS	NIP	Total
Number of IAs organized	2,888	5,260	51	8,199
Number of farmer-beneficiaries	582,605	442,526	14,918	1,040,049
Area covered by IA (ha)	717,464	512,240	26,787	1,256,491

IA = irrigators' association; NIS = national irrigation system; CIS = communal irrigation system; NIP = new irrigation project
Source: NIA (<http://www.nia.gov.ph/?q=content/institutional-development-program>)

Functionality of IAs

The performance or success of IAs is based on NIA's functionality rating, which is based on the following parameters: O&M performance, organization, financial performance, and organizational discipline. The results of the functionality survey are used to look for outstanding IAs at the provincial, regional, and national levels. The survey provides good motivation to the IAs and their members. It also helps NIA to identify appropriate strategies to enhance IAs' capabilities. The rating is done through discussions/consultations with IAs.

The overall rating of IA functionality is an aggregation of four major factors: O&M (40%), financial performance (30%), organization (15%), and organizational discipline (15%). O&M indicators include O&M planning, implementation, and performance, such as annual cropping intensity, irrigated area compared to programmed area, status of irrigation facilities and structures, yield, and collection efficiency. Financial performance, meanwhile, includes income generation and fund utilization, and viability index. Organization includes information on membership, meetings, and recording/filing system. Organizational discipline includes attendance in meetings and group work, holding of regular elections, conflict resolution, and imposition of discipline.

NIS and IAs

The NIS scheme has been established and is being maintained by NIA. In this type of irrigation system, farmers have to pay irrigation service fees (ISF) to

cover O&M expenditures. ISF, which is paid by NIS beneficiaries, is a payment for the delivery of irrigation water services rendered by NIA.

This fee is used primarily to finance the continuous operation of the irrigation system. Rates are based on the system's development scheme (i.e., run-of-the-river, reservoir, and pump), crops planted, and season (Nguyen 2015). For instance, rice farms with a yield of 40 cavans per ha or less are exempted from paying ISF. The fees collected by NIA should only cover the costs of O&M. NIS farmers are not paying for the capital outlay.

Adhering to the current trend of participatory irrigation management, NIA now veers away from managing NIS and allows IAs to govern by themselves. In the meantime, NIA through the IMT rule should devolve the management of NIS to IAs gradually. This means that NIS IAs should also have the skills for system management.

IMT has four models (Table 4). The operation and the management of turnouts and farm-level facilities are inherent responsibilities of IAs. As of 2014, IMT accomplishments involved models 1 and 2 (95% of IAs); accomplishments in models 3 and 4, however, were minimal (Table 4). This rate raises concern if the devolution of NIS management has reached sufficient depth, especially because model 1 is limited only to the maintenance of canals and model 2 to the management of lateral canals, which is far from a complete system turnover.

For NIS, a study (Clemente 2015) in Luzon revealed that most IAs have moderate performance levels; only 12 percent show high performance, and these are found at the upstream parts, which receive adequate water supply. Downstream IAs show low performance. The study cites that—even without much technical data on flows that are included in the analysis—water delivery is one major factor causing low performance.

CIS and IAs

CIS has been established either by farmers or by NIA. CIS farmers pay for the capital outlay and

irrigation fees for the maintenance. Management is turned over by NIA to IAs for O&M (Lauraya and Sala 1995; Jopillo and delos Reyes 1998). CIS farmers use the less formal and customary rules in governing irrigation water. The legal mandate that AFMA provided was for the LGU to take charge of CIS investments and oversee CIS IA operations.

According to AFMA, DA through NIA and the Agricultural Training Institute—in collaboration with DOF and DILG—is mandated to conduct a capacity-building program to enable LGUs to independently and successfully sustain CIS. The capacity-building program for LGUs was supposed to incorporate components for technical and financial assistance, logistical support, and training. However, this task was not accomplished due to lack of coordinated efforts to improve the technical capacity of LGUs and lack of political will to implement AFMA. Hence, capacity-building has been limited for LGUs and IAs. For CIS, 80 percent of the IAs organized had achieved complete turnover of irrigation systems (Table 5).

Among the functionality indicators, a study (Elazegui 2015) in Luzon indicated that the O&M and financial indicators are the common weaknesses among CIS IAs. O&M involves different activities, such as minor repair, routine maintenance, emergency repairs, and annual repairs. IAs do not include all of these in their collection targets, as they usually refer to canal cleaning for their O&M activity. Moreover, NIA's financial assistance to CIS projects is for main diversion and main conveyance facilities. Farm-level facilities, such as turnouts, are not included in the project cost and have to be developed by the farmers themselves. Thus, even if collection efficiency is high relative to amortization payments, IAs find it difficult to collect other dues from their members (Elazegui 2015).

Emerging concerns of IAs

Water scarcity, which leads to decline in irrigation water supply, is being reported by many IAs. However, the causes of water scarcity are mostly beyond the control of NIA. Water scarcity is

Table 4. Status of irrigation management transfer of NIS as of October 2014

IMT Model	Description	Number of IAs Involved	Total (%)
Model 1	<ul style="list-style-type: none"> Maintenance of canals delegated to IA IA is compensated based on canal area maintained and existing labor rate. 	1,192	49.69
Model 2	<ul style="list-style-type: none"> Turnover of management of lateral canals to IA IA gets a share of ISF collected. Typical ISF sharing: NIA (70%), IA (30%) 	1,103	45.98
Model 3	<ul style="list-style-type: none"> Turnover of management of main and lateral canals to IA Federation (headworks/ dam not included) IAs get a share of ISF collected. Typical ISF sharing: NIA (70%), IA (30%) 	77	3.21
Model 4	<ul style="list-style-type: none"> Complete turnover of irrigation system to IA IA pays NIA a rental fee at a rate of 75–100 kilograms of dry <i>palay</i> per ha per year. 	27	1.13
Total		2,399	82.98
Total NIS IAs organized		2,891	

NIS = national irrigation system; IMT = Irrigation Management Transfer; IA = irrigators' association; ISF = irrigation service fee; NIA = National Irrigation Administration; ha = hectare
Source: NIA (www.nia.gov.ph)

Table 5. Status of CIS turnover, as of October 2014

CIS Turnover	Description	Number of IAs Involved	Total (%)
Complete turnover of irrigation system to IA for O&M	<ul style="list-style-type: none"> Generally, IA contributes 10-percent equity during the construction period and pays NIA the amortization fee of the direct cost of construction for a period not exceeding 50 years. IA has the option to contribute equity equivalent to 30 percent of the project cost, and the rest of the project cost is considered fully paid. 	4,267	80.18
Total CIS IAs organized		5,322	

CIS = communal irrigation system; IA = irrigators' association; O&M = operation and maintenance; NIA = National Irrigation Administration
Source: NIA (www.nia.gov.ph)

due to several factors: sectoral water allocation (i.e., irrigation versus domestic use, where, in times of droughts, water is allocated for domestic purposes rather than irrigation), watershed degradation, and climate change.

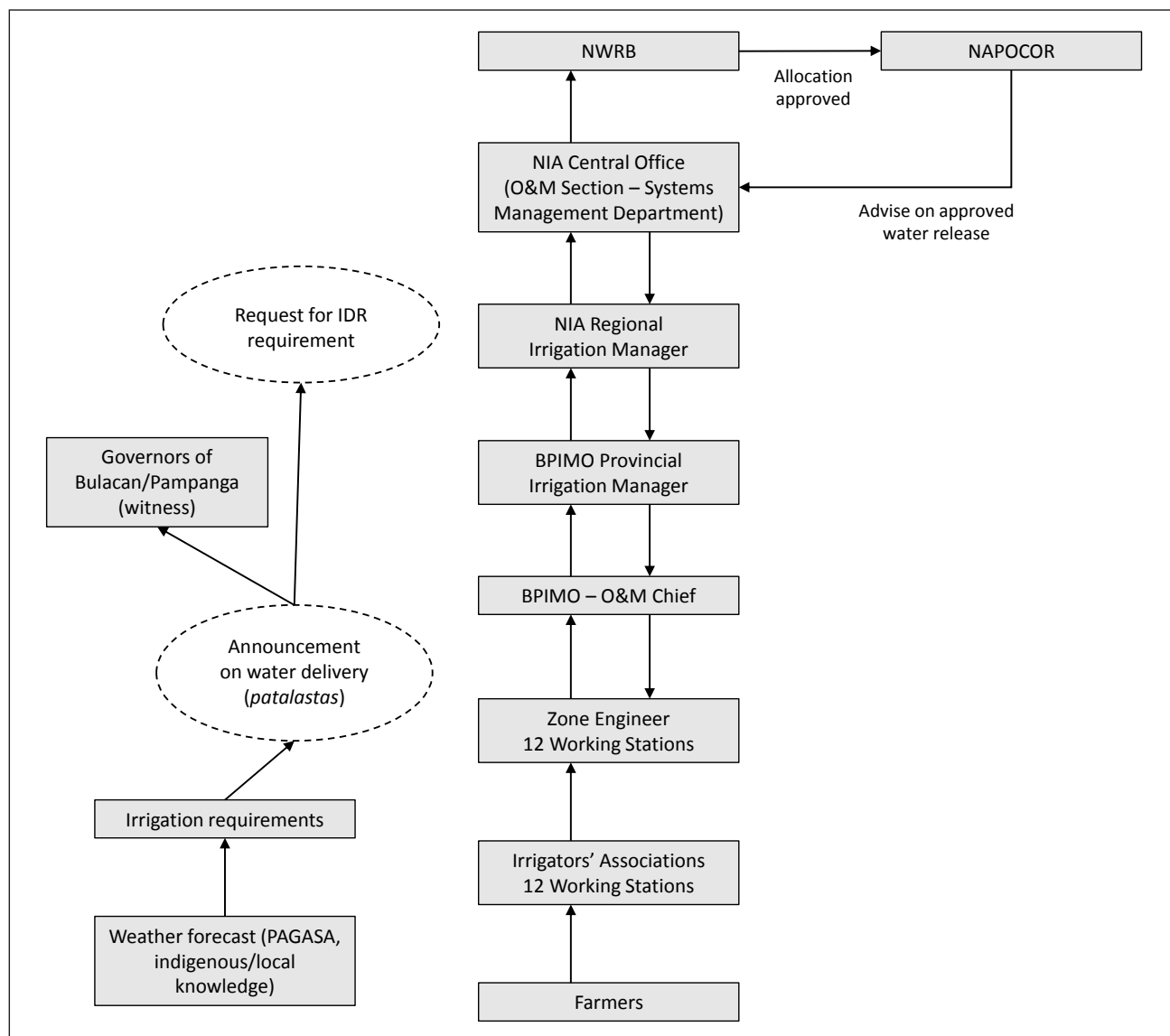
While O&M problems affect individual users, the challenge is distributing water to all sections of the system. The persistent problem in water distribution is due not only to technical aspects of the system but also to institutional factors. Canal inefficiency also influences water distribution (Clemente 2015).

Irrigation water delivery decisionmaking process: The case of AMRIS

The Angat-Maasim River Irrigation Systems (AMRIS) is used as a case to illustrate water

allocation decisions in normal and extreme events (Rola and Elazegui 2008). AMRIS is the third biggest NIS in the Philippines, next to Magat and Upper Pampanga River Irrigation System. It relies heavily on ISFs, equipment rental, and government subsidy for its funding. NIA is authorized to collect from the users of irrigation systems it constructed to finance their continuous operations and reimburse the cost of construction.

There are at least three local institutions that manage the irrigation water supply in Angat and the risks brought by climate variability. These are the Irrigation Management Office (IMO), which represents NIA at the local level; the AMRIS Irrigators' Association; and the local governments of Bulacan. These three institutions ensure that water is delivered to the farmers' fields in a timely

Figure 8. Irrigation water delivery decisionmaking process at the local level, AMRIS

AMRIS = Angat-Maasim River Irrigation Systems; IDR = irrigation delivery requirements; PAGASA = Philippine Atmospheric, Geophysical and Astronomical Services Administration; NWRB = National Water Resources Board; NAPOCOR = National Power Corporation; NIA = National Irrigation Administration; O&M = operation and maintenance; BPIMO = Bulacan Provincial Irrigation Management Office
 Source: Rola and Elazegui (2008)

and stable manner. In normal times, the cropping calendar is June 16 until November for the wet season; dry season is from November 15 to April. It is the role of the IMO to submit its irrigation program to NIA Central Office (O&M Section) for endorsement to the NWRB, which is the final arbiter of water allocation (this is unique for the Angat case only). This is done through a series of steps as described in Figure 8.

In programming water requirements, IMO uses a biophysical model, which takes into consideration the level of water in Angat dam by using rainfall data from PAGASA in setting irrigation efficiency. Aside from rainfall, other parameters considered are historical data on percolation and evaporation. Based on experience, IMO field personnel could also determine when it will rain and how far it will cover by observing the density of clouds.

Before submitting an Irrigation Delivery Requirements request to NIA Central Office, IMO confirms with farmers and local constituents the programmed irrigation requirements by circulating a schedule (locally referred to as *patalastas*) of water delivery. The *patalastas* specifies the date of initial delivery and the area to be covered by the service canal of each IA in each working station. Those in the upstream usually get the priority because upstream farmers would not agree that the operation would start downstream.

During drought, farmers downstream will be largely affected by the scarcity in water supply; during heavy rains and typhoons, it is likewise the farmers downstream who will be affected by flooding. During the worst El Niño in 1997–1998, all Angat farmers were not allocated irrigation water because priority was given to the domestic water supply of Metro Manila.

While not structurally linked, the Provincial Agricultural Office (PAO) holds a regular monthly meeting with the municipal agricultural officers (MAOs) for the following reasons: (1) giving of updates (e.g., on new guidelines or on rice, corn, or other vegetables), (2) if there will be aid coming, or (3) if an El Niño or a La Niña is expected. In times of calamity, MAOs keep track of the damages and report these to PAO. PAO, in turn, would report the damages to DA. At the village level, there is an agriculture committee to monitor the status of agriculture within the village. If projects from the province or the municipality are available, the barangay head would usually be deputized to monitor such projects.

During normal years, there are a few institutions involved in water allocation decisionmaking. In abnormal years (i.e., with extreme climate events), other institutions get involved in the decisionmaking process, as concerns beyond water allocation emerge. These institutions work on a collaborative basis through interagency bodies created through policy pronouncements, specifically for the purpose of climate risk management. Even with devolution,

the DA Central Office defines the areas to be affected whenever there are weather disturbances, such as El Niño or La Niña.

With the new normal conditions, climate forecasts can help farmers decide in terms of their production activities. Climate forecasts are officially done by PAGASA. PAGASA can help DA in targeting farmers needing adaptation strategies. While PAGASA is seen as a marginal actor in water allocation decisions, there may be a need now for NIA to work closely with PAGASA.

Conclusions and policy recommendations

Conclusions

In an attempt to analyze the ways to improve water governance for a resilient agriculture using secondary information, it was found that:

1. There are fragmented and overlapping water institutions in the country.
2. There are multiple irrigation water agencies.
3. While IMT meant that IAs should now manage the system, it was found out that there is still low capacities and severe funding constraints for O&M.
4. There are several agencies still involved in the delivery of water to farms.

Cited references also revealed that:

1. The many legal documents for water are a source of confusion.
2. Water data for planning are insufficient.
3. While there are a multitude of water agencies, these are not connected vertically nor horizontally.

Both NIS and CIS evaluations noted the decline in irrigation water supply due to conveyance inefficiency and water scarcity. Siltation is due to sediments in the dam and is a problem for both systems. High sediments

are mostly due to factors beyond the irrigation system's control, such as quarrying near the system and soil erosion due to upland farming or kaingin. Lack of maintenance is mainly due to lack of funds, personnel, and technical capacity. Likewise, the lack of maintenance was seen as an impact of NIA's Rationalization Plan.

Water scarcity is becoming a serious problem for the irrigation sector. This is more so because most of the drivers are external to the system. These include water allocation, which is the mandate of the NWRB, and watershed degradation, where watershed management is part of DENR's mandate. It was learned that DENR and NIA do not coordinate on this matter. Climate change is felt by farmers through more frequent occurrence of extreme events, such as floods and drought. Both events affect irrigation water supply and yields.

Policy recommendations

Strengthen planning and regulatory decisionmaking processes for water resources

Unclear institutional responsibilities remain outstanding issues in water governance in most developing countries, including the Philippines. An institutional framework through which all water users will understand their roles is, thus, imperative. There is currently a proposal to establish a central body to manage the water resources in the country (Tabios and Villaluna 2012) that has been submitted to the water sector agencies. This central body aims to be an efficient and effective agency to manage the country's water resources, and has a coherent decisionmaking process. Its proposed mission is to manage and protect the country's water resources for domestic water supply, sanitation, irrigation, hydropower, fisheries, aquaculture, flood control, navigation, and recreation, including the enhancement and maintenance of water quality, conservation of watersheds, control of water pollution, and environmental restoration without compromising the functions and services of the natural ecosystem.

The proposal is to strengthen the leadership and capacity of the NWRB and transform the agency to a structure that will enable it to become the management authority of the country's water resources. The transformed NWRB is fundamental to manage the country's water resources, optimize the use of this resource, and ensure water security for the different water uses (Tabios and Villaluna 2012).

The lack of data for planning and policy formulation is also glaring. There must be an effort to have a more science-based planning. The proposal to set up water resource centers in academic institutions across the country can depoliticize these planning and policy decisions.

Craft an integrated irrigation development plan

The diffusion in the irrigation institutional arrangements constrains the development of an integrated irrigation plan that is more effective, efficient, and equitable. Within the geographical levels of administration, there seems also to be a tendency toward decentralization. However, the Philippines should have an integrated irrigation development plan, which means that agencies working on irrigation should be able to coordinate their projects, their sites, and their IAs. There are suggestions to have just one agency (i.e., NIA) to handle an integrated irrigation program. It is perceived that the multiple agencies' role weakens the mandate of NIA in the development, planning, and implementation of the irrigation programs.

There is a need to rethink the AFMA provision of giving the power of managing irrigation systems to LGUs. There is no technical capacity within the LGU; so far, no LGU has taken this challenge, revealing their disinterest in this role. There is also a need to rationalize the many agencies that deal with irrigation. BSWM and NIA can work together, especially in supporting CIS. However, BSWM can focus on new water management technologies and strategies, and perform advisory roles for CIS on these. Funds for new irrigation projects, rehabilitation, and restoration; O&M costs; and managing of IAs

should be delegated to NIA alone to achieve consistency in role implementation.

Address O&M issues raised by IAs

For NIS, farmers do not pay ISF because water delivery is not sufficient; or, maybe, the timing of delivery is off-schedule. The problem of high siltation and poor quality of canals could be a reason for this. Hence, to solve O&M-related issues, there is a need to improve the design and quality of the materials used in canals and other structures. This implies that, even during extreme events, the structure will be strong. Furthermore, it also means that IAs need to make sure that during turnover, appropriate design and material of the irrigation are within or even beyond standard. This will minimize the cost of O&M in the subsequent years.

For defective dams, rehabilitation may be requested to minimize O&M activities. If farmers cannot afford the technical advice of NIA personnel, they can tap other institutions, such as nearby state colleges and universities.

Among CIS, O&M is the primary role of IAs. However, IAs still need technical advice when the structure is damaged. Other community-based participatory irrigation water governance should be promoted for the community to, for instance, minimize throwing solid wastes into the canals. Silt removal can also be a community-based activity. Moreover, communities should also be vigilant to avoid theft, particularly in staff gates and other equipment. Some successful CIS IAs have sufficiently done their O&M because they have high collection efficiency. They also pay the water master (commonly a farmer).

Strengthen NIA's links with other agencies

The recognition of water resource sustainability is paramount in future irrigation projects. At all levels of the NIA administration and IA governance, water scarcity is high in the agenda. NIA should work with the NWRB in the legal and technical aspect of water rights and water permits. NIA needs to support forest protection and

antiquarrying programs. For instance, Republic Act No. 7942 (An Act Instituting a New System of Mineral Resources Exploration, Development, Utilization, and Conservation) prohibits quarrying near dams and other waterways. Water quality is also a concern, particularly with regard to illegal settlers near irrigation systems and the improper implementation of the Solid Waste Management Act and the Clean Water Act. LGUs are charged to monitor water quality in their jurisdiction. There must be policy coordination across these sectors through local government initiatives.

Given the new normal, NIA and DA should partner closely with PAGASA for climate forecast information. In the process of water allocation, climate forecast information can inform farmers on when to plant to optimize the available water.

References

- Asian Development Bank (ADB). 2013. *Philippines: Water supply and sanitation sector assessment, strategy, and road map*. Mandaluyong City, Philippines: ADB.
- Arts, B. and J.V. Tatenhove. 2004. Policy and power: A conceptual framework between the “old” and “new” policy idioms. *Policy Sci* 37(3):339–356.
- Chou, C., N. Phirun, I. Whitehead, P. Hirsch, and A. Thompson. 2011. Decentralized governance of irrigation water in Cambodia: Matching principles to local realities. CDRI Working Paper Series No. 62. Phnom Penh, Cambodia: Cambodia Development Resource Institute.
- Clemente, R. 2015. Technical and institutional evaluation of selected national irrigation systems. Report submitted to the Philippine Institute for Development Studies.
- Cruz, R.V.O., J.M. Pulhin, and M.D. Mendoza. 2010. Reinventing CFNR: Leading the way in integrated tropical forest and natural resource management education, research, and governance (2011–2025). Paper presented at the UPLB Centennial Professorial Lecture, December 14, Nicolas P. Lansigan Auditorium, College of Forestry and Natural Resources, University of the Philippines Los Baños, College, Laguna, Philippines.

- Elazegui, D.D. 2004. Water resource governance: Realities and challenges in the Philippines. In *Winning the water war: Watersheds, water policies, and water institutions*, edited by A.C. Rola, H.A. Francisco, and J.P.T. Liguton. Makati City, Philippines: Philippine Institute of Development Studies and Philippine Council for Agriculture, Forestry and Natural Resources Research and Development.
- . 2015. Establishment of technical and institutional baseline information and preliminary evaluation of socioeconomic impacts of communal irrigation system. Report submitted to the Philippine Institute for Development Studies.
- Food and Agriculture Organization (FAO). 2011. *Framework for assessing and monitoring forest governance*. Rome, Italy: FAO.
- Feed the Future. 2014. Building resilience to climate change through irrigation development. <https://www.feedthefuture.gov/article/building-resilience-climate-change-through-irrigation-development> (accessed on August 30, 2016).
- Franks, T., F. Cleaver, F. Manganga, and K. Hall. 2013. Evolving outcomes of water governance arrangements: Smallholder irrigation on the Usangu Plains, Tanzania. Environment, Politics and Development Working Paper Series No. 62. London, United Kingdom: Department of Geography, King's College.
- Hall, R., J. Lizada, A. Rola et al. 2014. To the last drop: The political economy of Philippine water policy. Working Paper 2014-02. Research grant from the Emerging Interdisciplinary Development Research Program of the University of the Philippines System (OVPA-EIDR Code: 2-003-121010). Quezon City, Philippines: University of the Philippines.
- Inocencio, A.B. 2016a. Water in agriculture: Key challenges and opportunities for the Philippines. In *Water in agriculture: Status, challenges and opportunities*, edited by S. Banta. Paper presented at The Asia Rice Foundation Annual Rice Forum, November 24, 2015, DOST-PCAARRD, Los Baños, Laguna, Philippines.
- . 2016b. Water resources: Trends in agriculture investments, costs and uses, and climate change. In *The future of Philippine agriculture: Scenarios, policies, and investments under climate change*, edited by M. Rosegrant, M. Sombilla, and A. Balisacan. (In process.)
- Japan International Cooperation Agency and National Water Resources Board (JICA and NWRB). 1998. *Master plan study on water resources management in the Republic of the Philippines*. Tokyo, Japan: Nippon Koei Co. Ltd./Nippon Jogesuido Sekkei Co., Ltd.
- Jopillo, S.M.G and R.P. de los Reyes. 1998. *Partnership in irrigation: Farmers and government in agency-managed systems*. Quezon City, Philippines: Institute of Philippine Culture, Ateneo de Manila University.
- Lauraya, F.M. and A.L.R. Sala. 1995. Performance determinants of irrigators' associations in national irrigation systems in Bicol, the Philippines: Analysis. IIMI Country Paper: The Philippines No. 4. Colombo, Sri Lanka: International Irrigation Management Institute.
- Luyun, R.A. Jr. 2015. Technical assessment of communal irrigation systems in Luzon. PIDS Policy Notes No. 2015-27. Makati City, Philippines: Philippine Institute for Development Studies.
- Menard, C. and R.M. Saleth. 2011. The effectiveness of alternative water governance arrangements. In *Towards a greener economy*, edited by M. Young. New York, NY: United Nations Environment Programme.
- Munaretto, S. and A. Battilani. 2013. Irrigation water governance in practice: An analysis of irrigation efficiency and opportunities for change in the Canale Emiliano Romagnolo District, Italy. Paper presented at the International Conference on Public Policy, June 26–28, Grenoble, France.
- National Irrigation Administration (NIA). 2015. *NIA primer*. Quezon City, Philippines: NIA. <http://www.nia.gov.ph> (accessed on September 16, 2016).
- Nguyen, M.R. 2015. Characterizing the governance structure of the irrigation sector in the Philippines. Report submitted to the Philippine Institute for Development Studies.
- Nguyen, M.R., A.C. Rola, R. Arcala-Hall, J.C. Lizada, C.L. Abansi, and M.E. David. 2014. Comparative analysis of national and communal irrigation systems' water governance: The Philippine case.

- TGWGD Working Paper 2014-07. College, Laguna: University of the Philippines Los Baños.
- Paragas, V.S. 2012. Water regulatory policies. Paper presented at the Roundtable Discussion on Water Rights and Water Wrongs: Toward Good Water Governance for Development, January 26, Hyatt Hotel and Casino Manila, Manila City, Philippines.
- Rola, A.C. 2015. Characterizing the governance structure of the irrigation sector in the Philippines: National, regional, and irrigation management office level analysis. Report submitted to the Philippine Institute for Development Studies.
- Rola, A.C. and D.D. Elazegui. 2008. Role of institutions in managing agriculture-related climate risks: Angat Reservoir case study, Bulacan, Philippines. *Journal of Environmental Science and Management* 11(1):26–9.
- Rola, A.C., C.L. Abansi, R. Arcala-Hall, J.C. Lizada, I.M.L. Siason, and E.K. Araral Jr. 2016. Drivers of water governance reforms in the Philippines. *International Journal of Water Resources Development* 32(1):135–152.
- Rola A.C., J.M. Pulhin, C.C. David et al. 2012. Towards good water governance in the Philippines. *Trans. Nat. Acad. Sci. & Tech.* (Philippines) 34(2):299–323.
- Saleth, R.M. and A. Dinar. 2004. *The institutional economics of water: A cross-country analysis of institutions and performance*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.
- . 2005. Water institutional reforms: Theory and practice. *Water Policy* 7(1):1–19.
- Tabios, G.Q. III. 2012. A proposed water resources management framework. Paper presented at the Roundtable Discussion on Water Rights and Water Wrongs: Toward Good Water Governance for Development, January 26, Hyatt Hotel and Casino Manila, Manila City, Philippines.
- Tabios, G.Q. III and R.A.L. Villaluna. 2012. Development of the implementation and operational plan for the National Water Resources Management Office. Submitted to the Interagency Committee on Water. Quezon City, Philippines: National Economic and Development Authority.
- United Nations Educational, Scientific and Cultural Organization-Institute for Water Education (UNESCO-IHE). n.d. *Water management and governance*. Delft, Netherlands: UNESCO-IHE. <https://www.unesco-ihe.org/research-themes/water-management-governance> (accessed on August 30, 2016).
- Wenzlau, S. 2013. To combat scarcity, increase water-use efficiency in agriculture. Washington, D.C.: World Watch Institute. <http://www.worldwatch.org/combat-scarcity-increase-water-use-efficiency-agriculture-0%20accessed> (accessed on August 29, 2016).
- World Bank (WB). 2003. *The Philippines Environment Monitor 2003*. Pasig City, Philippines: WB. <http://documents.worldbank.org/curated/en/144581468776089600/pdf/282970PH0Environment0monitor.pdf> (accessed on August 30, 2016).

Review of Design and Implementation of the Agricultural Insurance Programs of the Philippine Crop Insurance Corporation

Celia M. Reyes, Christian D. Mina, and Reneli Ann B. Gloria

Abstract

Increasingly prevalent natural calamities, pests, and other unpredictable events have exacerbated the situation of the poor, many of whom participate in the country's agriculture sector. There are certain risk management tools that aid in lessening farmers' financial burden when losses related to such disasters are incurred. One of them is crop or agricultural insurance. In the Philippines, the Philippine Crop Insurance Corporation is the government organization that implements rice, corn, high-value commercial crop, livestock, noncrop agricultural asset, fishery, and term insurance programs. This study reviews the design and implementation of these insurance programs to ensure their effectiveness and sustainability.

Introduction

The contribution of the agriculture sector in economic development cannot be undervalued. Through the years, agriculture has remained an important source of food and vital raw materials, as well as employment that boosts the Philippine economy (Habito and Briones 2005). While this is true, growth in the sector has remained stagnant.

Growth in gross value added in agriculture has been erratic and has remained below 5 percent in the past decade. This slow growth in agricultural output can explain why the sector has only absorbed around 11–12 million workers, and its share to total employment has been slowly dwindling from roughly 40 percent to less than a third (ADB 2014; PSA 2014). This is a major concern because the agriculture sector absorbs a significant proportion of the working poor, particularly in rural areas (Hasan and Jandoc 2009; Reyes and Mina 2013). High poverty rates are exhibited across the different agricultural subsectors (i.e., coconut, coffee, cacao, and sugarcane). Interestingly, 42 percent of the transient poor are found to be engaged in agriculture (Reyes et al. 2011).

Venturing into the agriculture sector, particularly in crop production, entails certain risks. One bad harvest for farmers would translate to substantial losses because these farmers may not be able to recover their investments (Magno and Bautista 1989). This is not surprising given that agriculture is highly dependent on weather. With the effects of climate change being manifested through increased frequency and intensity of

typhoons and other extreme weather events, farmers are expected to face greater risks.

One mechanism for managing risk is agricultural insurance, which can be an effective safety net that would enable agricultural producers, particularly the transient poor or those who are moving in and out of poverty, to recover more quickly from shocks. In contrast to some on-farm strategies that contribute to production losses, agricultural insurance allows mitigation from “high-severity, low-frequency correlated risks” (Bangsal and Mamhot 2012, p. 3).

In the Philippines, the Philippine Crop Insurance Corporation (PCIC) is the government organization that implements rice, corn, high-value crops (HVCs), livestock, noncrop agricultural asset (NCAA), fishery, and term insurance programs.

The question thus arises regarding the effectiveness and sustainability of the said programs. This process evaluation report is first in a series of papers that aims to evaluate PCIC’s agricultural insurance programs by reviewing their design and implementation.

Overview of the agricultural insurance programs in the Philippines

The PCIC

Created by virtue of Presidential Decree (PD) No. 1467 on June 11, 1978, the PCIC has been mandated to provide insurance protection to agricultural producers in the Philippines against losses of crops and NCAA due to natural calamities, pests and diseases, and other perils. Its charter was amended by PD 1733 on October 21, 1980, and further amended by Republic Act (RA) No. 8175 on December 29, 1995. The PCIC charter (RA 8175) states that the main objective of agricultural insurance is to serve as a mechanism in managing the risks inherent in agriculture and, at the same time, in encouraging lending institutions (specifically the formal ones) to extend credit to the agriculture sector.

The PCIC operates as a government-owned and controlled corporation under the auspices of the Department of Agriculture (DA). It has 13 regional offices (ROs) and around 33 extension offices (as of 2015) operating nationwide. The PCIC has 14 plantilla positions in each RO and a number of job orders (depending on the volume of work and/or season). In 2015, the PCIC had a total of 209 regular staff and 379 job orders/consultants.

Product lines

The PCIC has seven major insurance product lines, which are as follows: rice; corn; HVCs; livestock; fishery; NCAs; and term insurance packages, which include life, accident, and loan repayment plan.

It started the nationwide implementation of its insurance programs on May 7, 1981, with rice as the only covered agricultural asset. On July 1, 1982, corn was introduced in the program (Reyes and Domingo 2009). An interim cover for tobacco was also introduced in September 1991. In October 1993, PCIC expanded its coverage to include all HVCs (Reyes and Domingo 2009).¹ For crop insurance, the object of insurance is the standing crop planted on the farmland as identified in the insurance application. These insurance products are designed to protect farmers from crop losses caused by natural calamities and other perils, such as pests and diseases.

In 1988, the PCIC joined the pool of 14 participating insurers—known as the Philippine Livestock Management Services Corporation (PLMSC)—that provided insurance to livestock

¹ HVCs include the following: abaca, *ampalaya* (bitter melon), avocado, Baguio beans, banana, broccoli, cabbage, cacao, cacao nursery seedlings, calamansi tree, carrot, cashew tree, cassava, cauliflower, celery, chayote, Chinese pechay, coffee, coconut, commercial trees like falcate/mahogany and rubber, cotton, cucumber, durian, eggplant, garlic, ginger, guyabano, honeydew, jackfruit, lanzones, lettuce, melon, mango (fruit and tree), mangosteen, marang, melon, *mongo* (mung bean), onion, oil palm, okra, onion leek, orange tree, paper tree, papaya, patani, patola, peanut, pechay, pepper, pineapple, pole sitao, radish, rambutan, shallot, snapbeans, sorghum, soybeans, squash, star apple, strawberry, stringbeans, sugarbeet, sugarcane, sweet corn, sweet peas, sweet potato, sweet/hot/bell pepper, tiger grass, tobacco, tomato, upo, watermelon, white potato, winged beans, yam, and zucchini (Cajucum 2013; PCIC 2014).

raisers.² Yet, in 2005, the PCIC decided to disengage from the PLMSC in order to “gain flexibility and strengthen control on underwriting, claims adjustment, and settlement” (Reyes and Domingo 2009, p. 2–3; Mahul and Stutley 2010).

Agricultural production does not merely involve the crops being grown or livestock/poultry being raised. Machinery, equipment, and other NCAAs also play significant roles in the whole production process. In its efforts to become a “one-stop shop for agriculture insurance”, the PCIC started with its NCAA insurance program in 1996.³

There had also been clamor among PCIC clients to get life and accident insurance because they argued that natural calamities could also put the lives of agricultural producers at risk. Thus, term insurance packages were offered in 2005. These packages include life insurance, accident insurance, and loan repayment protection plan for farmers, fisherfolk, and other agricultural stakeholders (Bangsal and Mamhot 2012; PCIC 2014).

The PCIC also offers term insurance packages that cater to the needs of agricultural producers and stakeholders, with three different plans: (1) Agricultural Producers Protection Plan (AP³), (2) Loan Repayment Protection Plan (LRP²), and (3) Accident and Dismemberment Security Scheme (ADS²).⁴

The fisheries insurance is the newest addition to the set of insurance products offered by the

PCIC. Its program has only been implemented since 2011.⁵

Types of programs

The PCIC implements and manages various agricultural insurance programs of the government, which are categorized into either regular or special. Under the regular program, the PCIC provides around 50 percent premium subsidy to its regular clients who are rice and corn farmers, while other agricultural producers (e.g., HVC farmers, livestock/poultry raisers, and fisherfolk, among others) are paying the full amount of insurance premium.

Under the special program, the insurance premium is fully subsidized by the national and/or local government. The special programs provided by the national government are the following: the Department of Budget and Management (DBM)-funded Registry System for Basic Sectors in Agriculture (RSBSA); the *Sikat Saka*, the NIA-Third Cropping, the Weather-Adverse Rice Areas (WARA), and the High Yielding Technology Adoption, which are all under DA; the Agrarian Reform Beneficiaries-Agricultural Insurance Program and the Agrarian Production Credit Program, which are under the Department of Agrarian Reform (DAR); and the Yolanda program, which is the program for the Typhoon Yolanda-affected farmers and fisherfolk. A paper, titled “Targeting the Agricultural Poor: The Case of PCIC’s Special Programs”, (Reyes et al. 2015) provides details on each of the special programs of the PCIC.

There are also some local government units (LGUs) that have established partnership with the PCIC in providing premium subsidy to local agricultural producers, such as the Cebu Provincial Government, Provincial Government of Negros Occidental, Provincial Government of Davao del Norte, and Provincial Government of Isabela, among others. The paper, titled “Opportunities for Strengthening Agriculture Insurance Programs:

² Livestock insurance covers the following livestock and poultry animals: carabao, cattle, horse, swine, goat, sheep, poultry, game fowls, and other animals. An animal becomes the object of insurance when it has been specified in the insurance application and when the insured farmer has insurable interest on it. The livestock insurance protects livestock raisers from losses of carabao, cattle, horse, swine, goat, sheep, poultry, and game fowls, and animals due to accidental death or diseases.

³ These NCAAs include the following: warehouses, rice mills, fishing boats, irrigation facilities, other farm equipment, and other agri-fishery-forestry assets and facilities (Cajucum 2013; PCIC 2014). The object of insurance for NCAA insurance is the agricultural machineries, equipment, or infrastructure to be insured. The insurance program provides protection to agricultural producers from losses of their NCAAs, such as warehouses, rice mills, irrigation facilities, and other farm equipment due to perils like fire, lightning, theft, and earthquake.

⁴ AP³ is an “insurance protection that covers death of the insured due to accident, natural causes, and murder or assault”. LRP² is an “insurance protection that guarantees the payment of the face value or the amount of the approved agricultural loan upon the death or total permanent disability of the insured borrower”. ADS², meanwhile, is an “insurance protection that covers death or dismemberment or disablement of the insured due to accident” (PCIC 2014). For term insurance packages, the object of insurance is the person whose name appears in the application.

⁵ Fishery covers inland fish structures, including fishponds, fish cages, and fish pens. The fisheries insurance protects fish farmer/fisherfolk/grower from losses in unharvested crop or stock in fisheries farms due to natural calamities and fortuitous events.

Philippine Crop Insurance Corporation and LGU Partnerships”, (Reyes et al. 2017) provides details of the aforementioned LGU programs.

Amount of cover and premium rates

The amount of insurance cover is basically based on the costs of production inputs indicated in the farm plan and budget that the farmers are required to submit upon application. The farmer also has the option to include an additional amount of up to 20 percent to cover the value of the expected harvest, with the approval of the PCIC. For borrowing farmers, the amount of insurance cover is equivalent to their amount of production loan. The amount of cover for certain insurance products is subject to cover ceilings, depending on the crop insured and on the variety of the crop.

The premium amounts to be paid depend on the amount of cover, as well as on the corresponding insurance premium rates. The insurance premium rates not only vary across products but also depend on various factors, such as type of insurance cover, risk classification, type of farmer, and geographical location, among others. Essentially, the premium rates are calculated using historical data on damage rate (ratio of claims to amount of cover).

The government heavily subsidizes the premium rates for rice and corn insurance. The government’s share accounts for a substantial portion of the total insurance premium: >60 percent if low risk, >50 percent if medium risk, and ~50 percent if high risk. Bangsal and Mamhot (2012) argued that government subsidies are generally designed to increase insurance availment and penetration rates.

On the contrary, the insurance premium of the HVC insurance is solely borne by the insured clients, and the premium rate is based on the existing market rate and “shall range from 2 to 7 percent of the total sum insured, subject to any deductible and co-insurance provisions”.

Premium rates for livestock insurance differ between noncommercial (small-scale or backyard) and commercial cover. For fishery insurance,

premium rates are determined by the PCIC, provided that the rates “depend on the result of the precoverage evaluation of the type, and other factors, such as agro-climatic conditions and terrain, project management factors, and production and loss records” (PCIC 2014). Meanwhile, premium rates for the NCAA insurance depend on the type of risk and/or equipment.

Claim for indemnities

For crop (i.e., rice, corn, and HVCs) and fishery insurance, the claim for indemnity has to be filed by the assured agricultural producer, or any of his/her immediate family member, to the concerned PCIC RO within a particular period from the occurrence of loss (e.g., 45 calendar days for rice and corn, 30 calendar days for HVC, and 7 calendar days for fishery). This is followed by verification and assessment of loss, which is done by a team of adjusters (TA). The TA then submits its findings to the RO. All claims for indemnities are settled within 60 calendar days from the submission of complete claims documents.⁶

The amount of indemnity or claims paid for rice and corn is based on the stage of cultivation at time of loss, actual cost of production inputs already applied at time of loss as per farm plan and budget, and percentage of yield loss. Yield loss is categorized as either total loss (if 90% or above), partial loss (if more than 10% but below 90%), and no loss (if 10% or below) (PCIC 2014).⁷

Insurance partners

Agricultural credit has been considered as “the most important delivery channel for agricultural insurance in the Philippines” (Bangsal and Mamhot 2012, p. 8). The Land Bank of the Philippines (LBP) is considered as the main credit arm for agricultural producers, particularly the rice and corn farmers. The LBP requires collateral among farmers who apply for loans. Crop insurance

⁶ Please refer to PCIC (2014) for claim of indemnity procedure for other product lines.

⁷ Please refer to PCIC (2014) for the computation of the amount of indemnity for other product lines.

served as a collateral substitute by the bank. The insurance program has been heavily dependent on the loans released by formal lending institutions, such as the LBP (Bangsal and Mamhot 2012).

Other than the LBP lending centers, the insurance partners of the PCIC also include the following: rural banks or cooperative rural banks, microfinance institutions or microinsurers, farmers' cooperatives or farmers' organizations, irrigators' associations, agrarian reform beneficiaries (ARB) organizations, and LGUs. The PCIC has a memorandum of agreement with each of its partners, and the primary task assigned to each of these partners is underwriting. As underwriters, these partners help in marketing agricultural insurance to their other partners, and they receive a "service fee" as incentives. Also, these underwriters may also serve as part of the TA when claims have to be paid.

Assessment of the design of the program

Agricultural insurance has been viewed in other countries as a risk management tool or as a safety net for farmers in the midst of natural shocks and other perils. It is seldom that agricultural insurance is viewed differently. Interestingly, in the Philippines and in a few other developing countries like Brazil, Mexico, and Indonesia, agricultural insurance is treated both as a risk management tool (first objective) and as a credit risk reduction mechanism (second objective). These two views are explicitly stated in the PCIC charter as the objectives of the agricultural insurance scheme in the Philippines. The attainment of dual objectives may sound promising but challenging at the same time.

The efforts made toward the attainment of the objectives might not always be balanced. Thus, there is a possibility that one of the objectives might not be fully achieved.

Access to credit

It is interesting to note that agricultural insurance programs might have been enhancing access

to credit. The PCIC mentioned that two of its major partners—the *Tulay sa Pag-unlad*, Inc. and the *Alalay sa Kaunlaran*, Inc.—have substantially increased its member-borrowers since the start of their partnership. Another piece of evidence is the fact that agricultural producers can now borrow from the LBP and take advantage of the relatively lower interest rate if they opt to be a member of an irrigators' association and/or get an agricultural insurance.

Amount of cover

The PCIC charter stipulates that the amount of cover allowed for borrowing farmers should not exceed their loan amount. This is strictly observed by lending institutions to make sure that farmers would be able to pay for their loans in case the latter's crops would be fully damaged. Essentially, it is one way of protecting the lenders from loan default and, thus, ensuring that they would continue to lend to the agriculture sector. This definitely satisfies PCIC's objective of protecting the lenders from loan default, but it may fail to address the objective of mitigating the risks that could be faced by agricultural producers.

The majority of agricultural producers who participated in the focus group discussions (FGDs) perceived that agricultural insurance is helpful in mitigating the effects of various production risks. They argued, however, that the amount of loan is usually not enough to cover the cost of production. Data show that around 97.5 percent of rice insurance policies of borrowing clients under the regular program have insurance cover less than the average production cost per hectare, which is roughly PHP 40,000 based on the estimate of the Philippine Statistics Authority (Tables 1–3). Similarly, a large proportion of corn insurance policies have amount of cover less than the average cost of producing corn per hectare (~PHP 25,500) (Table 4). These observations, which are true both in 2013 and 2014, imply that in case crop areas would be fully damaged, the amount of cover would not be enough to help farmers recover from the said losses.

Table 1. Number of rice insurance policies,* by amount of cover and by program type, 2013

Amount of Cover (PHP)	Regular	DAR	Sikat Saka	NIA-Third Cropping	WARA	All
Less than 1,000	14	-	-	-	-	14
1,000 – 4,999	358	3	-	-	4,900	5,261
5,000 – 9,999	2,023	21	-	-	-	2,044
10,000 – 19,999	21,970	778	42	4	13	22,807
20,000 – 29,999	41,462	2,699	178	24	-	44,363
30,000 – 39,999	24,673	6,517	826	601	-	32,617
40,000 – 49,999	2,408	1,275	1,037	2	-	4,722
50,000 – 59,999	66	294	21	-	-	381
60,000 – 69,999	7	-	-	-	-	7
70,000 – 79,999	8	1	1	-	-	10
80,000 – 89,999	2	-	-	-	-	2
90,000 – 99,999	1	-	-	-	-	1
100,000 and over	7	-	-	-	-	7
All	92,999	11,588	2,105	631	4,913	112,236

DAR = Department of Agrarian Reform; NIA = National Irrigation Administration; WARA = Weather-Adverse Rice Areas

Note: * limited only to borrowing clients

Source: Authors' calculations (with amount of cover adjusted to per hectare basis)

Table 2. Number of rice insurance policies,* by amount of cover and by program type, 2014

Amount of Cover (PHP)	Regular	Sikat Saka	NIA-Third Cropping	WARA	APCP	PPP	Yolanda	All
1,000 – 4,999	262	-	-	-	-	-	1	263
5,000 – 9,999	1,035	6	3	-	8	4	13	1,069
10,000 – 19,999	18,120	40	19	231	210	130	172	18,922
20,000 – 29,999	32,682	243	45	-	911	1,073	196	35,150
30,000 – 39,999	21,135	1,056	6	-	1,231	86	76	23,590
40,000 – 49,999	1,692	3,185	-	-	252	13	2	5,144
50,000 – 59,999	64	2,972	-	-	16	-	-	3,052
60,000 – 69,999	14	-	-	-	1	-	-	15
70,000 – 79,999	5	1	-	-	-	-	-	6
80,000 – 89,999	1	-	-	-	-	-	-	1
100,000 and over	5	1	-	-	-	-	-	6
All	75,015	7,504	73	231	2,629	1,306	460	87,218

NIA = National Irrigation Administration; WARA = Weather-Adverse Rice Areas; APCP = Agrarian Production Credit Program; PPP = public-private partnership

Note: * limited only to borrowing clients

Source: Authors' calculations (with amount of cover adjusted to per hectare basis)

The low amount of cover is clearly evident among special programs, particularly in the DA-WARA and NIA-Third Cropping programs. The maximum amount of cover given to beneficiaries of DA-WARA and NIA-Third Cropping is only PHP 10,000 per hectare. The amount of cover

was deliberately set at the said amount so that, given the limited budget, the program would be able to cover more beneficiaries. It appears then that the program is putting more importance on expansion of coverage (in terms of number of beneficiaries) than on provision of sufficient

Table 3. Average production cost per hectare of rice and corn (PHP), Philippines, 2012

Item	Rice	Corn
Total costs ^a	42,475.00	25,546.00
Seeds	2,101.00	2,111.00
Fertilizer	5,049.00	4,534.00
Pesticides	1,462.00	691.00
Labor ^b	11,328.00	9,618.00
Irrigation fee	662.00	9.00
Fuel and oil	960.00	270.00
Rentals	1,070.00	592.00
Repairs	1,359.00	856.00
Harvester's share	4,018.00	1,057.00
Thresher's share	3,568.00	-
Sheller's share	-	231.00
Landowner's share	3,313.00	697.00
Others ^c	7,585.00	4,880.00

Notes: ^a cash, noncash, and imputed costs; ^b operator, family, and exchange labor costs; ^c depreciation; interest payment on crop loan; and interest on operating capital, land tax, food expenses, and transport of inputs, among others

Source of basic data: Bureau of Agricultural Statistics [BAS] (www.psa.gov.ph)

Table 4. Number of corn insurance policies,* by amount of cover and by program type, 2013

Amount of Cover (PHP)	Regular	DAR	All
Less than 1,000	1	-	1
1,000 – 4,999	79	-	79
5,000 – 9,999	396	-	396
10,000 – 19,999	9,280	33	9,313
20,000 – 29,999	4,115	185	4,300
30,000 – 39,999	7,221	70	7,291
40,000 – 49,999	643	173	816
50,000 – 59,999	8	2	10
60,000 – 69,999	4	-	4
100,000 and over	2	-	2
All	21,749	463	22,212

DAR = Department of Agrarian Reform

Note: * limited only to borrowing clients

Source: Authors' calculations (with amount of cover adjusted to per hectare basis)

amount of assistance that would ensure protection from potential shocks.

It can also be observed in the table on distribution of policies by amount of cover presented in the earlier section that some special

programs are not strictly implementing its rule on the maximum cover.⁸

The figures shown in the said table were adjusted to per hectare basis, but there are policies on the amount of cover under the DA-WARA and NIA-Third Cropping programs that still contain values.

Premium rate

Because of low amount of cover, some PCIC clients who participated in the FGDs perceived premium rates to be relatively high. In particular, the premium rate for corn, even after deducting the government and lending institution shares, is still high at 8.48 percent. Insurance premium accounts for a significant percentage of the total production cost (Table 5). This was also raised by a number of corn farmers in Cagayan during the FGDs.

Similarly, premium rates for HVC and livestock insurance are high, considering there is no subsidy provided for these products under the regular program of the PCIC. The PCIC admitted that they are applying the so-called “bonus-malus” system on HVC and livestock insurance. If they incurred a loss, they usually load overhead expenses and forecasted damage rate (up to a maximum of 20%) on HVC and livestock insurance premium rates. Increase in capitalization, as suggested in the literature, might provide a solution to this issue of high premium rate.

This bonus-malus system of the PCIC—or the high premium rates of HVC—can be a serious issue because not all of the HVC farmers, particularly the small-scale and/or subsistence ones, are well off. In fact, Reyes et al. (2012) estimated that roughly half of all households whose heads are engaged in the following agricultural subsectors are considered as income poor: coconut (56.2%), coffee and cacao (53.6%), sugarcane (53.2%), and vegetables (48.1%). There might be a room for some modifications in the premium structure. For

⁸ It is interesting to note that because of the low coverage in WARA and Third Cropping, some farmers' organizations supplement this with other special insurance programs, such as WARA plus LGU-sponsored crop insurance programs, in order to fully cover their crops.

Table 5. Average production costs per hectare (PHP) and premium rate (%) of selected crops, Philippines, 2012

Item	Rice	Corn	Mango	Pineapple	Cassava	Onion	Eggplant
<i>Production cost</i>							
Total costs (PHP) ^a	42,475.00	25,546.00	68,654.00	77,351.00	20,695.00	116,138.00	120,268.00
Seeds	2,101.00	2,111.00	0.00	18,542.00	1,318.00	24,075.00	2,173.00
Fertilizer	5,049.00	4,534.00	16,734.00	17,543.00	2,413.00	15,514.00	26,093.00
Pesticides	1,462.00	691.00	7,349.00	1,583.00	0.00	2,990.00	10,932.00
Labor ^b	11,328.00	9,618.00	11,097.00	11,812.00	13,031.00	32,465.00	19,128.00
Irrigation fee	662.00	9.00	0.00	161.00	-	120.00	125.00
Fuel and oil	960.00	270.00	1,836.00	98.00	0.00	5,119.00	3,813.00
Rentals	1,070.00	592.00	4,072.00	4,324.00	1,230.00	3,871.00	5,849.00
Repairs	1,359.00	856.00	1,344.00	2,133.00	222.00	751.00	2,282.00
Harvester's share	4,018.00	1,057.00	607.00	6.00	59.00	196.00	1,279.00
Landowner's share	3,313.00	697.00	3,059.00	5.00	119.00	5,841.00	4,653.00
Thresher's share	3,568.00	-	-	-	-	-	-
Sheller's share	-	231.00	-	-	-	-	-
Others ^c	7,585.00	4,880.00	22,556.00	21,144.00	2,303.00	25,196.00	43,941.00
<i>Insurance premium</i>							
Premium rate (%) ^d	12.27	22.10	6.51	5.24	4.07	6.00	5.94
Estimated premium amount (PHP) ^e	5,211.68	5,645.67	4,469.38	4,053.19	842.29	6,968.28	7,143.92

Notes: ^a cash, noncash, and imputed costs; ^b operator, family, and exchange labor costs; ^c depreciation, interest payment on crop loan, and interest on operating capital, land tax, food expenses, and transport of inputs, among others; ^d assumption: multirisk cover, high-risk classification; ^e assumption: amount of cover (amount of loan) is equal to the production cost

Sources: BAS (www.psa.gov.ph); Authors' calculations

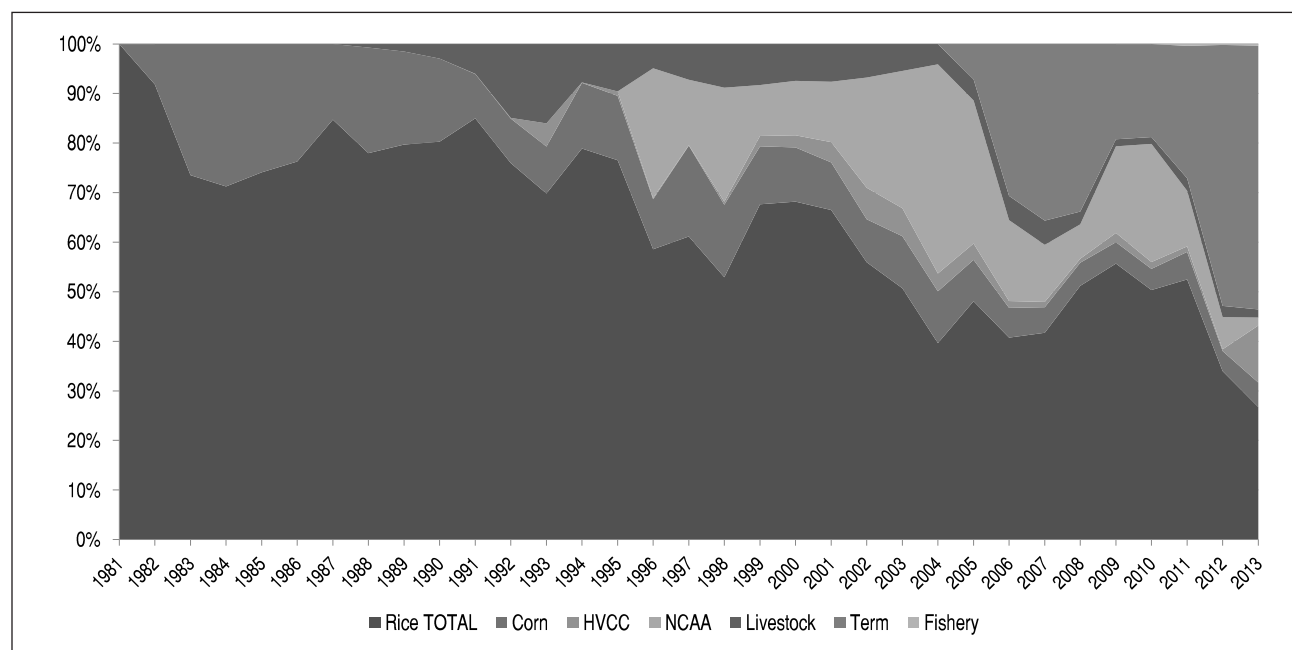
instance, premium rates may be different between commercial and noncommercial cover, similar to those for the livestock insurance, and/or rates vary across socioeconomic groups.

Another issue with premium rates is that the rates used since 1981 had been applied through the years until they were modified in 2005. Premium rates are calculated based on historical damage rates. Because climate scientists have been stressing that the effects of climate change are becoming more evident recently, it may be rational to update the premium rates on a regular basis (i.e., every 5 or 10 years). Based on the latest data on occurrence of typhoons, floods, and drought that visited the country, and on the extent of damage on rice production due to these natural calamities, Luzon has been the most affected. Israel and Briones (2013), for instance, noted that Luzon, particularly Cagayan province, had been frequently visited by typhoons from 2001 to 2010,

while Mindanao provinces had been visited by only a few typhoons during the same period. From 2007 to 2011, however, Region III topped the highest cost of damage, while the Caraga region incurred the least cost. At present, Regions V, VII, III, and VIII had the highest premium rates for rice insurance, respectively. Further refinements in the premium rates could take into account the aforementioned issues.

Type of insurance packages

Another issue related to the design is the type of insurance packages offered by the PCIC. Agricultural insurance programs in other countries mainly offer crop insurance, while a few also have livestock insurance. Only the Philippines offer NCAA insurance and term insurance packages. Since the start of the PCIC, rice and corn had been accounting for the lion's share of the total amount of insurance cover; this was until 2012 when the

Figure 1. Share of insurance product to total amount of insurance cover (%), 1981–2013

HVCC = high-value commercial crop; NCAA = noncrop agricultural asset
 Source of basic data: Philippine Crop Insurance Corporation [PCIC] (www.pcic.gov.ph)

share of term insurance packages exceeded the combined shares of all other products (Figure 1).

The PCIC charter does not explicitly stipulate that venturing into noncrop insurance, such as term insurance packages, is beyond the mandate of the PCIC. Term insurance packages, in particular, can be used as a way to market the PCIC and its main product lines, especially in underserved or rural areas. This idea is intelligible as long as the term insurance package is bundled with crop/livestock/NCAA insurance.

However, the team was able to learn during regional visits that there have been PCIC clients who only avail of term insurance but did not get crop/livestock/NCAA insurance. There can also be an issue with eligibility requirements, wherein family members up to the fourth degree of consanguinity or affinity can still be covered by ADS² and AP³. It is not explicitly stated in the guidelines that those members have to be employed in the agriculture sector as well. It is, thus, possible that some members can still be covered even if they are not agricultural workers.

Risks covered

There are also concerns about the risks covered by agricultural insurance. During the FGDs, some farmers expressed that some major risks are not covered. Sometimes, winds and rains are strong enough to damage crops, especially during the earlier stages of growth. However, if these are not induced by a typhoon (i.e., the Philippine Atmospheric, Geophysical and Astronomical Services Administration did not declare a storm signal during that period), damages would not qualify for indemnity claims. Likewise, some crop farmers reported that some pests and diseases, such as black bug, rice bug, and birds (*maya*), among others, are not covered when these are—most of the time—affecting their crops. Some livestock raisers were wondering why stunted growth and/or disability of animals were not included in the list of risks covered in livestock insurance. Some hog raisers, meanwhile, wanted to lift the 21-day rule because piglets are only covered 21 days after the purchase date. These aforementioned concerns are also among the reasons cited by some of those who

did not get agricultural insurance. Some potential clients do not want to get agricultural insurance because the risks covered have only minimal impacts on their crops or agricultural assets.

Assessment of the implementation of the program

The issues regarding the implementation of the agricultural insurance programs of the PCIC are the assessment of damages, selection of beneficiaries in special programs, and awareness of insurance packages, among others.

Awareness of the insurance packages

One of the implementation issues that emerged from the FGDs is the lack of awareness on some of the insurance lines of the PCIC, and the specific terms and conditions of the insurance lines. Many of the rice and corn farmers in Cagayan were not aware of noncrop insurance. Noncrop insurance products are not even offered in some areas (e.g., Peñablanca, Cagayan). A number of livestock raisers in some areas in Negros Occidental only knew about livestock insurance during the second half of the year when the livestock association and Negros Coop Bank organized a briefing on livestock insurance that was conducted by the PCIC. Agricultural producers in Bantayan Island, Cebu, recounted that PCIC programs were introduced to them by LGUs only recently: 2011 in Bantayan, March 2014 in Madridejos, and June 2014 in Santa Fe. Massive information campaign happened only in 2013 after Bantayan Island was severely affected by Typhoon Yolanda. Meanwhile, fisherfolk in Bantayan Island who registered their fishing boats in 2006 were automatically insured but did not renew their insurance since then. In Davao del Norte, many of the agricultural producers were not aware of the agricultural insurance. In fact, even the LGU officials and staff admitted that they were not aware of the programs of the PCIC.

One of the plausible explanations behind this is that the PCIC has not been accessible to a large number of agricultural producers. Aside from the

fact that it only has 13 ROs and around 33 provincial extension offices (as of 2015) all throughout the country, it also has a small number of personnel. Thus, the PCIC does not have sufficient resources to reach all of its target clientele. In line with this, the issue of absorptive capacity also arises because once the programs are made known to a larger number of agricultural producers, the PCIC may not be capable to facilitate all of them.

Assessment of damage

One of the main concerns of the farmer-participants who joined the FGDs conducted by the team is the assessment of damages. Majority of them perceived that agricultural insurance is helpful for them in mitigating the effects of various production risks, except that the indemnity claims that they receive only account for a small percentage of the amount of cover. If the amount of cover is not sufficient, the amount of payout is even smaller (e.g., <50% of the insurance cover), which is not enough to be able to replant after the shock. In 2013, about half (22,997 out of the total 44,513) of assured rice farmers experienced total (100%) damage. Table 6 shows that almost all of these rice farmers received indemnity amount less than the amount of cover. Around 60 percent of them received between PHP 1,000 and PHP 30,000. A small percentage of these farmers with negative values for the amount of cover less indemnity amount can be explained by the fact that the PCIC made an overpayment of claims in selected areas in 2013 (COA 2013).⁹

Looking at a particular set of samples with the same set of conditions (i.e., same *barangay*, same cropping period, same date of claims approval [December 2013], same type of crop [rice], area covered = area damaged and same cause of loss [typhoon]), the finding that the amount of cover

⁹ A net overpayment of indemnity claims amounting to PHP 340,696—covering 40.7 percent of vouchers examined in two ROs—was checked by the Commission on Audit. This was because the old indemnity schedule was embedded in the PCIC Automated Business System (a new indemnity schedule was put in place in 2012). This was only discovered on October 22, 2013, by the chief of Claims Administration Division. As of date, enhancements are continually incorporated in the PCIC Automated Business System.

Table 6. Total amount of cover less total indemnity amount (PHP) of rice farmers* who experienced total damage, 2013**

Amount of Cover Less Indemnity Amount (PHP)	Frequency	Percent
Less than 0	29	0.13
0–499	119	0.52
500–999	718	3.12
1,000–4,999	8,093	35.19
5,000–9,999	2,338	10.17
10,000–19,999	3,116	13.55
20,000–29,999	2,838	12.34
30,000–39,999	1,631	7.09
40,000–49,999	1,034	4.50
50,000–59,999	765	3.33
60,000–69,999	703	3.06
70,000–79,999	421	1.83
80,000–89,999	211	0.92
90,000–99,999	177	0.77
100,000 and over	804	3.50
Total	22,997	100.00

Notes: * Unique rice farmers (i.e., those with more than one rice insurance policy were only counted once); ** 100-percent damage; total area covered is equal to total area damaged

Source: Authors' calculation

substantially exceeds the indemnity amount has been validated (Figure 2). In addition, the scatter plot also shows that the estimated indemnity amount varies among farmers, even under the same set of conditions. This particular finding can raise doubt on the accuracy of the assessment. Plausible reasons supporting such assessment results should have been provided to clients to prevent them from casting doubts on the system.

Apparently, many farmers who participated in the FGDs have doubts in the way the payout is estimated. Some farmers thought that the assessment of damage, especially in large farms, might have been done haphazardly by just looking at one portion of the farm and then coming up with an estimate for the whole farm. They also expressed concerns about the fact that the PCIC hires “reserve” adjusters when the damage area is relatively larger. This group of adjusters

have been perceived to be less experienced than regular adjusters, and may provide varying and inaccurate estimates.

Another concern is the time it takes to receive claims payment. Settlement of claims is done on a piece-meal basis because claims applications are received on a piece-meal basis, too. On the average, it takes around two months to process a claim; this is from the filing of a Notice of Loss to the receipt of claims payment. Based on the results of the FGDs, if claims are simultaneously filed because a lot of areas are damaged, processing of claims would take around four months or more. Apparently, this could be attributed to the limited manpower resources of the PCIC.

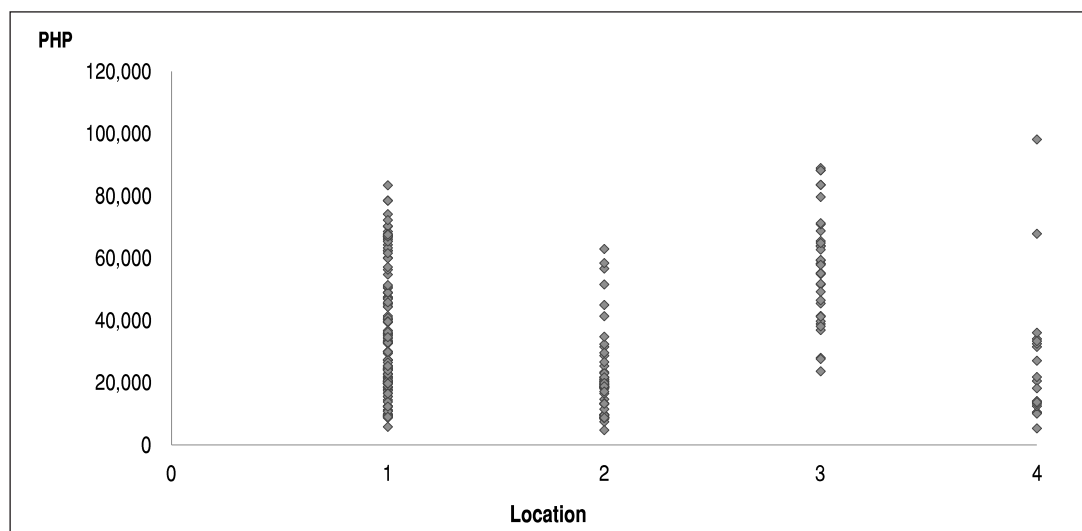
Selection and enrollment of beneficiaries

In general, the penetration rates for rice and corn insurance of the PCIC have remained below 10 percent from 1981 to 2013 (Figure 3). After 1991, the penetration rates for rice insurance have gone down and remained even below 2 percent between 2000 and 2007. It was only in 2013 when the said rates increased to 8.5 percent. This was the time when the implementation of the special programs started.

During the first half of 2014, the farmer-beneficiaries of the RSBSA program accounted only for a small percentage of the total farmers listed in the RSBSA. It is interesting to note that 100 percent of rice farmers in Isabela who are listed in the RSBSA availed of rice insurance; while the rest of the 38 provinces covered by the first two batches of the RSBSA have penetration rates of below 40 percent (60% of them are, in fact, even below 10%) (Figure 4). Similarly, the penetration rates for corn are mostly 10 percent, except for a few provinces, such as Eastern Samar with 100 percent and Mountain Province with 64 percent. In the case of HVC, Aurora has the highest penetration rate of 23 percent; the rest have penetration rates of below 10 percent.

Essentially, only a small segment of the farming population has been covered by the

Figure 2. Total amount of cover less total indemnity amount (PHP) of a specific group of rice farmers* under the same set of conditions, 2013**

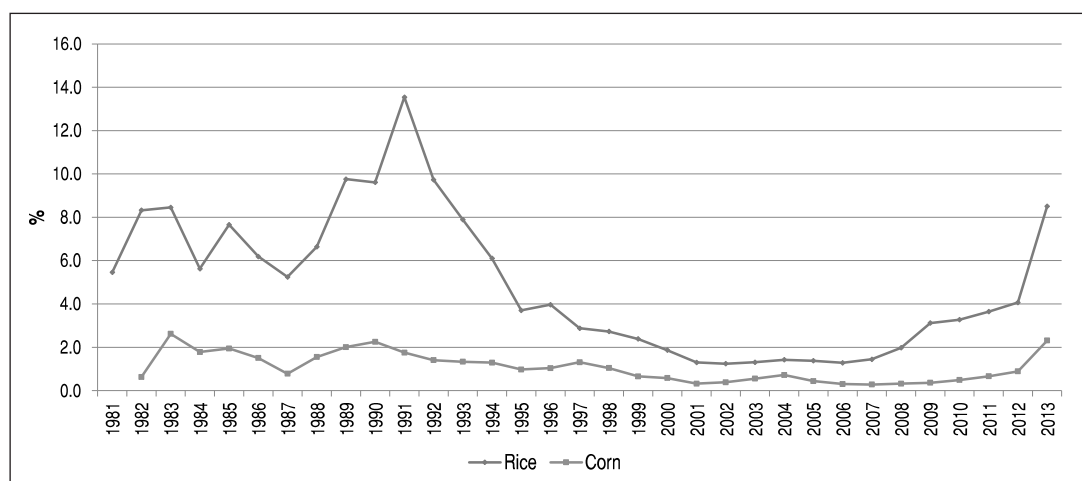


Notes: 1 = Barangay Baluluc, Apalit, Pampanga; 2 = Barangay Dadda, Amulung, Cagayan; 3 = Barangay Mallorca, San Leonardo, Nueva Ecija; 4 = Barangay Maragondong, Dagami, Leyte

* Unique rice farmers (i.e., those with more than one rice insurance policy were only counted once) in the same barangay; ** Same cropping period, same date of claims approval (December 2013), 100-percent damage (total area covered is equal to total area damaged)

Source: Authors' calculations

Figure 3. Penetration rates* for rice and corn insurance (%), 1981–2013



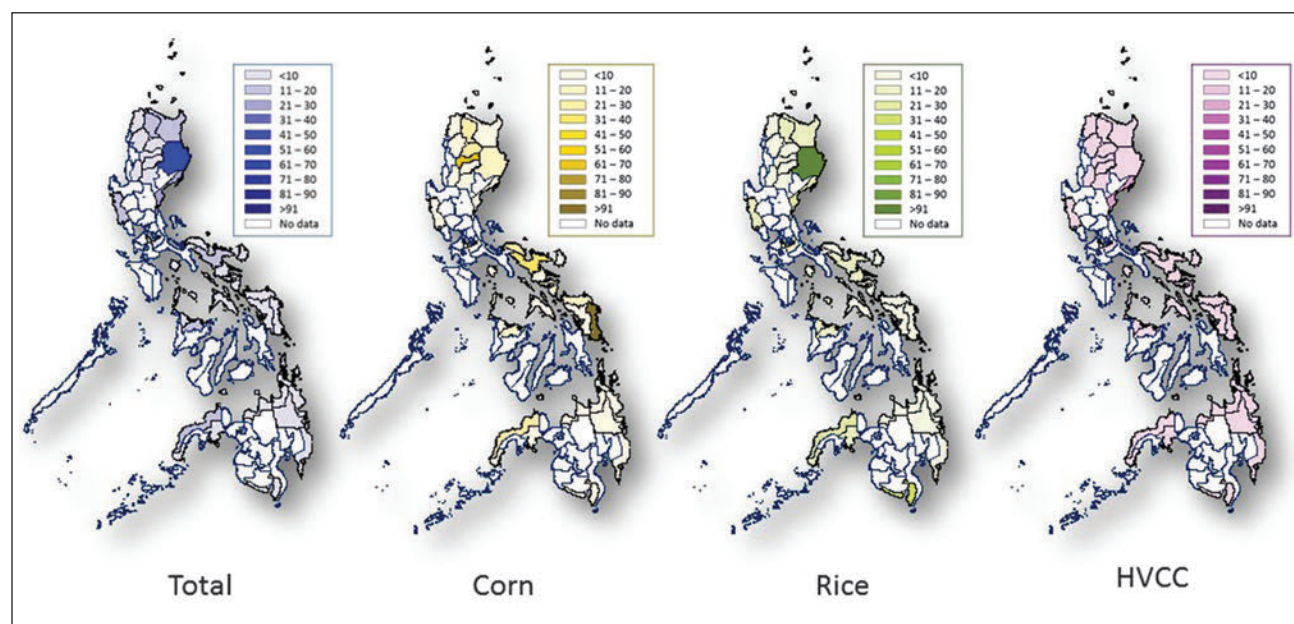
Note: * Areas insured (hectare) ÷ area harvested (hectare) (PCIC's computation)

Sources of basic data: PCIC (www.pcic.gov.ph); BAS (www.psa.gov.ph)

agricultural insurance programs of the government. In order to ensure that the agricultural insurance programs would achieve its intended impact, proper targeting system should be put in place.

For the special programs of the PCIC with DAR and DA, beneficiary selection is also the main concern. Due to documentation issues, there is no assurance that the target beneficiaries

are indeed the ones that were given the premium subsidy. Like in the case of the DAR program, there were applications not signed by the farmers and with no certifications from the municipal agrarian reform officer. For the DA-WARA program, there were farmers enrolled but not in the premasterlist of the DA-Regional Field Unit of flood-prone areas.

Figure 4. Penetration rates* for rice, corn, and HVCC insurance (%), January–June 2014

HVCC = high-value commercial crop

Note: * Number of farmers with PCIC insurance ÷ number of farmers in the RSBSA list (authors' computation)

Sources of basic data: PCIC (www.pcic.gov.ph); BAS (www.psa.gov.ph)

Feedback from FGD participants corroborates this. Some enrolled participants do not even know that they are enrolled in the insurance program. Others enrolled but did not receive any confirmation of enrollment from the PCIC or the sponsor agency that gave free premium subsidies. If the farmers did not know that they were enrolled, they would not be able to file for indemnity claims at all in case their crops and/or livestock are damaged, making the insurance program a waste of resources. In one instance, the certificates of insurance cover got stuck with the LGU and were not distributed to the clients.

Documentation is also a challenge. In one FGD, one cooperative member mentioned that it took them six to seven months to enroll all of their members because the documentation requirements were not clear, and the information was given to them on a piece-meal basis. Compliance with the standard farm plan and budget, and the sketch map, can sometimes be a challenge to the enrolling farmer, especially if he/she is not affiliated to any organization.

Meanwhile, low capitalization has also been an issue because it can limit the number of agricultural producers that can be given subsidies.

Operational issues

The implementation of special programs is also ad hoc in nature. They tend to be implemented in a rather hurried manner, and funding is discontinuous. For those in the field offices who would do the actual work—the rather short mobilization and implementation phase (8 months, for example in the DAR program)—make adjustment a challenge. From a level of transactions that are worth PHP 183.77 million for five years, field implementers are forced to cope with transactions worth more than five times as much in a span of just eight months. Training people and aligning systems and procedures to deal with the challenge would require time and resources; thus, “birth pains” are expected to happen.

Coordination among the different concerned agencies can also be a challenge. This is particularly highlighted in the DAR program. In one province, one city agriculture officer is not even aware that for 2013, his city has the most number of PCIC clients enrolled under the DAR program. It was even the research team who gave him the list of enrolled farmers in his area. The farmers

themselves, most surprisingly, do not even know that they are insured. This has implications on the success of the program because, even if their insured crops are damaged, they would not file for claims in the first place if they did not know whether they were insured or not. The LGU must also be aware because they are the ones with the infrastructure and mandate to implement welfare-increasing programs in their areas.

The issue of “who benefits” from the full subsidy is also in question. There was one banana farmers’ ARB cooperative that enrolled all their 500-odd members. They have 524 hectares planted with Cavendish banana, but they have a contract growing lease with a large corporation that produces and ships premium-quality tropical fresh produce based in the Mindanao region. The latter pays for the inputs to production of bananas, and also buys them at low prices for export to Chinese, Japanese, and Korean markets. Because it is the big corporation that both pays for the inputs and buys the outputs, the cooperative is essentially just hired workers, and not owners in the real sense of the word. They cannot sell their produce to more lucrative market contracts, and they cannot just revoke the contract with the corporation because they do not have enough capital to sustain the operations of banana production in such a large scale. One can argue, then, that the DAR subsidy is actually enjoyed by the corporation and not by the farmers. However, farmers would not have been able to participate in an export market and have a sustainable livelihood (compared to their former state) without these government agricultural support programs via agricultural insurance, of which the corporation benefits.

Connected to the abrupt implementation period and increasing personnel requirements is the tendency for field implementers to do “shortcuts” in order to reach the insurance production targets. This is especially true in the case of the DAR program, where the subsidy is given on a production basis. (Note: DBM releases the payment upon the submission of the list of farmers insured.) The 2013 Commission on Audit

report highlighted this. There was an instance of one cooperative under the DAR program that was able to insure 250 piglets under one name only, violating the maximum of 10 small ruminants/livestock per ARB farmer. There were also reports of list of borrowers being signed by one person only, and some lacking certification documents attesting that he or she is an ARB. Because of the sharp increase in personnel needed to man the special programs, the crucial services of the PCIC (e.g., claims assessment) tend to be done by job order personnel that are not as well equipped as the regular staff in doing the job.

Concluding remarks

The agricultural insurance programs in the Philippines have dual objectives: (1) protecting farmers from production risks and (2) protecting the lenders from loan default, thereby easing access to credit in agriculture. The second objective differentiates the latter from the agricultural insurance programs employed in other countries. The preliminary assessment carried out in this study notes that the major features of the insurance products of the PCIC are primarily designed to address the second objective. Although this is not necessarily bad, the PCIC should also ensure that agricultural insurance is an effective risk management tool for agricultural producers. For instance, the amount of cover can be increased to cover for the production cost in order to help agricultural producers recover easily from a shock. Premium rates, especially the market-based ones (i.e., for HVC and livestock); the risks covered; and the terms and conditions of term insurance should be carefully reviewed to make sure these are still relevant in addressing the needs of agricultural producers. Moreover, the appropriateness of the product lines being offered needs to be assessed, especially because life and accident insurance are already being offered by the private sector.

Aside from design issues, there are also a number of implementation aspects that need to be reviewed and fine-tuned. Assessment of damages should be done carefully by a group of adjusters

who are competent and considerate enough, so farmers will feel the benefits of insurance. It is also important that such process is properly explained to clients. Further streamlining of procedure to process claims will address farmers' needs for capital to finance inputs for the next planting season. To increase awareness about the PCIC and its programs, information campaign should be intensified and should be done in collaboration with LGUs and its other partners. Beneficiary selection and the enrollment process are important specifically for the fully subsidized programs, given that the current budget allocation is not enough to satisfy the total amount of the premiums. Proper targeting should be ensured to avoid channeling funds to unintended beneficiaries. In line with this, more detailed guidelines on who should be provided the subsidy would be useful to ROs.

Different mechanisms and premium sharing schemes can be explored in order for every farmer to benefit from agricultural insurance. The absorptive capacity of the PCIC must also be taken into account so that program implementation would be smooth. Training and hiring people, and adjusting systems and procedures take time, effort, and resources. As noted in the literature, increasing the capitalization of the PCIC might offer a solution to some of the aforementioned problems. Moreover, while subsidies are definitely helpful to agricultural producers, abrupt implementation of special programs could undermine the intention of the regular program, which is to instill in agricultural producers the idea of investing in agricultural insurance as a way to help them manage production risks and move away from the idea of a "dole-out" system. The lack of predictability stems from the absence of a long-term policy and strategy on crop insurance.

References

- Asian Development Bank (ADB). 2014. Country tables: Philippines. *Key indicators for Asia and the Pacific 2014*. Mandaluyong City, Philippines: ADB. <http://www.adb.org/publications/key-indicators-asia-and-pacific-2014>.
- Bangsang, N.V. and P.C.T. Mamhot. 2012. Review of the Philippine crop insurance: Key challenges and prospects. CPBRD Policy Brief No. 2012-06. Quezon City, Philippines: Congressional Policy and Budget Research Department, House of Representatives.
- Cajucum, N.R. 2013. Sharing the risk: Importance of insurance adaptation. Paper presented during the Climate Change Consciousness Week 2013, November 26, SMX Conference Hall, Pasay City, Philippines.
- Commission on Audit (COA). 2013. Annual audit report on the Philippine Crop Insurance Corporation. Quezon City, Philippines: COA.
- Habito, C.F. and R.M. Briones. 2005. Philippine agriculture over the years: Performance, policies and pitfalls. Paper presented at the Policies to Strengthen Productivity in the Philippines Conference, June 27, Makati City, Philippines.
- Hasan, R. and K.R. Jandoc. 2009. Quality of jobs in the Philippines: Comparing self-employment with wage employment. ADB Economics Working Paper Series No. 148. Mandaluyong City, Philippines: Asian Development Bank.
- Israel, D.C. and R.M. Briones. 2013. Impacts of natural disasters on agriculture, food security, and natural resources and environment in the Philippines. ERIA Discussion Paper Series 2013-15. Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia.
- Magno, M.T. and E.D. Bautista. 1989. Is there a role for crop insurance in Philippine agricultural development? ACPC Staff Paper 89-06. Quezon City, Philippines: Agricultural Credit Policy Council, Department of Agriculture.
- Mahul, O. and C.J. Stutley. 2010. *Government support to agricultural insurance: Challenges and options for developing countries*. Washington, D.C.: World Bank.
- Philippine Crop Insurance Corporation (PCIC). 2014. Programs. Quezon City, Philippines: PCIC. <http://pcic.gov.ph/index.php/programs/> (accessed in May 2014).
- Philippine Statistics Authority (PSA). 2014. CountrySTAT Philippines. Quezon City, Philippines: PSA. <http://countrystat.bas.gov.ph/?cont=9> (accessed on December 7, 2014).

- Reyes, C.M. and S.N. Domingo. 2009. Crop insurance: Security for farmers and agricultural stakeholders in the face of seasonal climate variability. PIDS Discussion Paper No. 2009-12. Makati City, Philippines: Philippine Institute for Development Studies.
- Reyes, C.M. and C.D. Mina. 2013. Where are the poor employed? Profiling the working poor. PIDS Policy Notes No. 2013-04. Makati City, Philippines: Philippine Institute for Development Studies.
- Reyes, C., A.D. Agbon, C.D. Mina, and R.A.B. Gloria. 2017. Opportunities for strengthening agricultural insurance programs: Philippine Crop Insurance Corporation and LGU partnerships. PIDS Discussion Paper No. 2017-01. Quezon City, Philippines: Philippine Institute for Development Studies.
- Reyes, C.M., R.A.B. Gloria, and C.D. Mina. 2015. Targeting the agricultural poor: The case of PCIC's special programs. PIDS Discussion Paper No. 2015-08. Makati City, Philippines: Philippine Institute for Development Studies.
- Reyes, C.M., A.D. Tabuga, R.D. Asis, and M.B.G. Datu. 2012. Poverty and agriculture in the Philippines: Trends in income poverty and distribution. PIDS Discussion Paper No. 2012-09. Makati City, Philippines: Philippine Institute for Development Studies.
- Reyes, C.M., A.D. Tabuga, C.D. Mina, R.D. Asis, and M.B.G. Datu. 2011. Dynamics of poverty in the Philippines: Distinguishing the chronic from the transient poor. PIDS Discussion Paper No. 2011-31. Makati City, Philippines: Philippine Institute for Development Studies.

Session Synthesis

Low productivity is a perennial problem in the agriculture sector. In recent years, it is further aggravated by climate change and natural hazards. In 2015, the sector grew by only 0.11 percent compared to 1.39 percent in 2014; this was largely due to weather-related shocks. Earlier years were characterized by mediocre performance at 2 and 1.2 percent in 2012 and 2013, respectively.

The hope of averting the destructive impacts of strong typhoons, floods, and droughts on the sector is not absolutely a long shot. The National Framework Strategy for Climate Change 2010–2022 puts forward a clear strategy for building the adaptive capacities of communities, increasing resilience of natural ecosystems, and optimizing mitigation opportunities.

“For the agriculture sector, adaptation and mitigation strategies have primarily focused on the development of flood hazard maps, conduct of vulnerability mapping, and capacity building through more intensive information dissemination and promotion of smart agricultural approaches and best practices in farming. Enhanced social protection through climate-proof livelihood options and financial risk management schemes is also given emphasis,” said Dr. Marites Tiongco.

According to Tiongco, recent trends in budget allocation of the agriculture department indicate the government’s increasing resolve to support mitigation and adaptation initiatives. In 2015, 20 percent of the total budget was intended for flood control, reforestation, sector-specific research and development (R&D) on climate

change, and disaster risk reduction. Efforts were also made to align programs and projects with the intended outcomes of the National Climate Change Action Plan.

“What is needed is to make sure policies and programs are monitored and evaluated for their effectiveness in reducing the impacts of climate change and climate-related risks on agriculture,” reminded Tiongco.

This task appears to be most urgent for the irrigation sector. As shown by Dr. Agnes Rola, the sector is performing poorly in minimizing agricultural risks that emanate from the growing water scarcity.

Rola revealed in her presentation that only 56 percent of the estimated total irrigable area has been developed, or only 1.7 million hectares out of 3 million hectares, creating a large gap between potential and actual area. This cannot be attributed to fund insufficiency as irrigation consistently gets a large allocation in the agriculture budget each year.

Moreover, both types of irrigation system—the national irrigation system and the communal irrigation system (CIS)—have not adequately contributed to improve agricultural productivity. In some of the cases studied by Rola, she discovered that the design of the irrigation systems was not feasible for elevated paddy areas to be reached by water, and the maintenance of existing systems was also not enough.

The capacity of irrigators’ associations to manage the CIS upon project completion was also found to be inadequate. Most irrigators’

associations also reported severe funding constraints for operation and maintenance.

Rola also underscored the poor structure in the management of water resources. “There are many water-related agencies with fragmented and overlapping functions. There are multiple agencies in-charge of irrigation and there is no central planning body for water resources,” said Rola.

Governance issues are likewise impairing the crop insurance program, an important risk management tool for farmers. Administered by the Philippine Crop Insurance Corporation (PCIC), it is a production cost insurance that covers the cost of production inputs up to a certain amount. Product lines available are for rice and corn, high-value crops, and the so-called noncrop (i.e., livestock, fishery term insurance).

Less than 1 percent of the total number of eligible beneficiaries listed in the Registry System for Basic Sectors in Agriculture (RSBSA) has availed of the program. This could largely be attributed to the low level of awareness of the program among farmers, and even among local governments, due to inadequate information dissemination by PCIC. For those who availed of the program, they are also not aware of how the insurance payments are determined.

Other factors come into play. “The insufficient insurance cover is also a deterrent. The amount of cover is not enough to finance replanting when a disaster strikes,” revealed Dr. Celia Reyes.

Reyes said this can be explained by the inadequate budget allocation to PCIC. Constrained by limited resources, PCIC had to offer a small insurance cover to service more farmers. Alternatively, it could increase the cover, but this would mean a smaller number of beneficiaries.

The good news is PCIC is up for a bigger budget starting in 2017. The proposed budget is PHP 2 billion from PHP 1.6 billion in 2016 and PHP 1.3 billion in 2015. But resolving the budget issue is only half of the story. Making sure the insurance premium subsidies are directed to the

poorest farmers is critical. After all, the program was designed to assist small farmers.

To address this, the Department of Budget and Management has also asked PCIC to prioritize, as program beneficiaries, farmers listed in the RSBSA with farms that are three hectares and below. Reyes, however, cautioned that the list of farmers in the registry also needs to be validated.

“There are many agrarian reform beneficiaries not in the registry. It excludes eligible farmers and contains nonfarmers,” said Reyes.

For a country where a large percentage of the population still depends on agriculture for livelihood and where food security is an utmost concern, building agricultural resilience is an urgent task. The National Climate Change Action Plan is a step in the right direction, but clearly more needs to be done.

Dr. Bruce Tolentino, one of the session discussants, underscored the critical role of R&D to produce rice varieties that can withstand drought, flood, heat, and salinity, or a combination of calamities.

For Dr. Mercedita Sombilla, it is important to ensure the alignment of climate change strategies with sectoral plans and to address weak institutional capacities and management skills.

Resolving issues in the crop insurance program and irrigation systems is equally essential. As Prof. Agham Cuevas, another session discussant emphasized: “Unless fundamental problems like inadequate R&D budgetary support; weak extension systems; limited access to formal credit; inadequate, low-quality, and poorly maintained infrastructure; and weak rural institutions, to name a few, are properly addressed, climate resilience in agriculture would be very difficult to achieve or it will take longer to achieve.”

During the open forum, a representative of the National Academy of Science and Technology suggested setting up of community food gardens to promote local resilience—a strategy that is being implemented in Cambodia. Villagers are trained on vegetable production and receive a subsidy for the maintenance of their food gardens.



SESSION 2

HEALTH RESILIENCE

The Challenge of Reaching the Poor with a Continuum of Care: A 25-Year Assessment of Health Sector Performance*

Orville Jose C. Solon and Alejandro N. Herrin

Introduction

The health sector review aims to assess the long-term impact on health outcomes of health sector reforms that have been implemented in the past 25 years. While it is recognized that a broader set of economic and social policies and programs implemented by various agencies is needed to influence health outcomes, this review focuses on a narrower set of concerns, namely, the delivery and financing of health services to the poor.

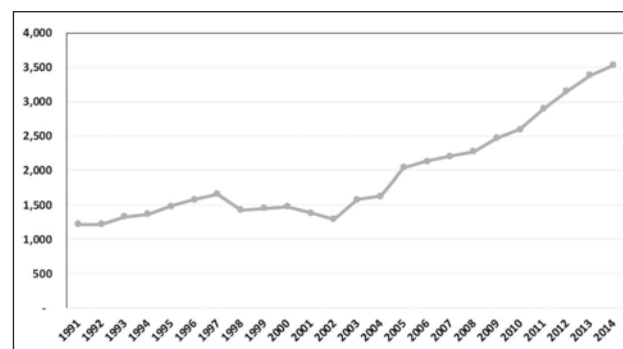
A long-run perspective adopted by the review allows for a better appreciation of long-running fundamental structural weaknesses of the health sector that constrain achievement of the full potential impact of health sector reforms on health outcomes. With the benefit of hindsight that this longer-term analysis provides, new strategies that address fundamental weaknesses can be identified.

Despite rising health expenditures and health reforms, progress in improving health outcomes

Despite rising health expenditures (Figure 1) and health reforms, progress in improving health outcomes in the Philippines over the past 25 years

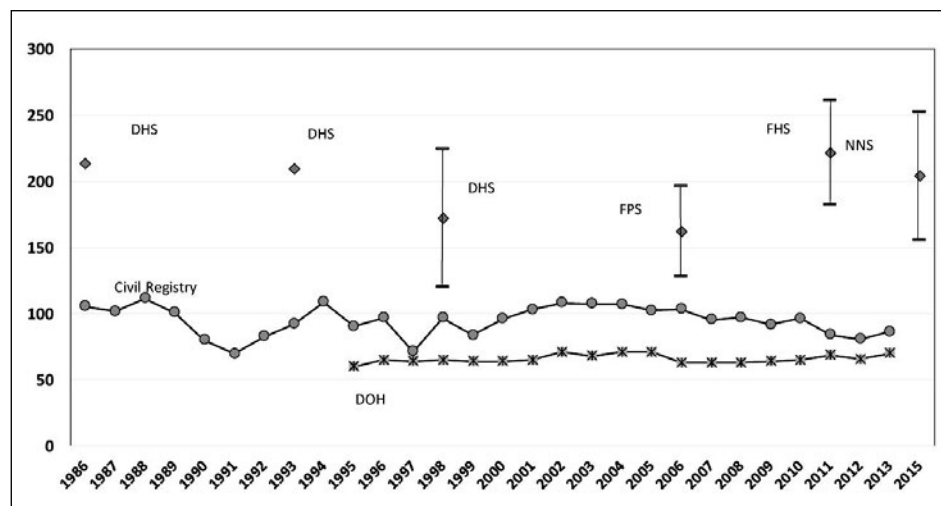
has been relatively slow compared to neighboring countries in the region, such as Thailand, Malaysia, Indonesia, and Viet Nam, or relative to the achievement of Millennium Development Goal targets. In the case of maternal mortality ratio, which represents an outcome influenced by the

Figure 1. Per capita health expenditures by financing agent, 1991–2014 (constant 2000 prices)



Source: Philippine Statistics Authority (2015) and Racelis et al. (2016)

* This paper is based on a larger report of the Health Policy Development program, a United States Agency for International Development (USAID)-funded cooperative agreement implemented by the UPecon Foundation, Inc. titled "The Challenge of Reaching the Poor with a Continuum of Care". The contents of this paper are the sole responsibility of the authors and do not necessarily reflect the views of the UPecon Foundation, Inc., the USAID, and the United States government.

Figure 2. MMR from the survey, civil registry, and the Department of Health

MMR = maternal mortality ratio; DHS = Demographic and Health Surveys; FPS = Family Planning Survey; FHS = Family Health Survey; NNS = National Nutrition Survey
 Source: Department of Health (1990, 1996, 2000, 2005, and 2010)

provision of clinical quality of care delivered in the continuum of care, this has not significantly changed during the 25-year period (Figure 2).

Devolution fragmented the delivery and financing of public health services

In 1991, the Philippines embarked on a major political reform that involved the devolution of a number of economic and social services, including the bulk of health services previously under the responsibility of the Department of Health (DOH). Under this reform, the administrative and financial control over health facilities, personnel, and governance for health was transferred from the DOH to 76 provinces, 66 cities including Metro Manila, and 1,540 municipalities. The number has since grown to 81 provinces, 143 cities, and 1,489 municipalities, as of December 2015.

The overall political reform was generally viewed to confer several advantages, such as better information about the preferences of the local population and, therefore, better matching of resources with local needs. It was also seen to engender greater accountability of local government units (LGUs) and greater local participation in collective decisionmaking.

However, in the case of health services, concerns were also raised on whether devolution would indeed promote a more efficient and equitable allocation of resources and, thereby, generate greater health improvements than what could be realized under a centralized regime.

An immediate consequence of the way devolution was implemented was the fragmentation of public health service delivery and financing. Local governments operated and financed their own health facilities independently of other LGUs. With administrative control of local health services now in the hands of LGUs, it became difficult for DOH to provide technical supervision at the different levels of the local health system, or to maintain a health information system for local and national planning let alone implement national health policies.

DOH identified major problems in the delivery and financing of health services

Almost 10 years after the implementation of the Local Government Code of 1991, the DOH, in its analysis of the health sector toward the formulation of a health sector reform agenda,

identified four major problems confronting the delivery and financing of health services (DOH 1999). First, the access to, as well as quality of, publicly provided health services varied widely across LGUs and by type of facility. Second, most LGUs failed to upgrade, if not maintain devolved facilities, and, in some areas, devolved health workers were unable to receive mandated benefits. Third, technical coordination across levels of the previously centralized system was lacking under the devolved setup. Whatever technical coordination that remained was driven by relations among health professionals. Fourth, progress to build the Philippine Health Insurance Corporation (commonly known as PhilHealth) into a social health insurance program, as mandated by the National Health Insurance Program Law of 1995, was slow. On the whole, the health sector was largely financed by out-of-pocket spending.

Reform initiatives attempted to address fragmentation

Two nationwide system-level reform initiatives were then implemented to address these problems. The first represented a whole set of initiatives and innovations directed at addressing financial and service delivery fragmentation by promoting inter-LGU planning incentivized by centrally provided grants. This is essentially the DOH FOURmula One for Health (F1).

The second set of reforms recognized the enormous transaction costs involved in the approach proposed by F1. The initiatives and innovations in the reform package intended to address transaction costs include the following: (1) the move to identify beneficiaries of the sponsored program using the National Household Targeting System; (2) full national premium subsidy for the sponsored program; (3) the creation of a centrally financed and managed fund to address investment gaps among local health facilities; (4) the passage of the Responsible Parenthood and Reproductive Health program with a fresh mandate to centrally finance and deliver family planning (FP) services; (5) the deployment of centrally contracted

doctors, nurses, midwives, dentists, and medical technologists to augment local health staff; and (6) central procurement of previously locally purchased commodities like tuberculosis drugs, FP commodities, selected maintenance drugs, antibiotics, and herbal medicines. In the last five years, this reform package has led to a significant increase in enrollment and benefit payments, as well as in DOH spending on priority national health programs. This package, popularly known as *Kalusugan Pangkalahatan*, managed to avoid large transaction costs of engaging LGUs by using centrally procured goods and services financed by “sin taxes”.

Fundamental weaknesses of the health system

That health outcomes have slightly improved, if not remained the same over the last 25 years, suggests that the reforms may have mitigated the full impact of the fragmentation of service delivery and financing on health outcomes. Alternatively, the health improvements from these two reform packages have failed to fully materialize. Available studies suggest that perhaps one reason why reform initiatives have not affected health outcomes is that these reforms have not been implemented at scale with sufficient intensity and duration to have a measurable impact.

A long-term perspective indicates that there are three major structural weaknesses that have prevented the different health sector reform initiatives from producing their full impact, which are fully discussed in the larger report. These weaknesses are the following: (1) a highly fragmented health delivery and financing system dominated by a fee-for-service private market, and a highly decentralized public delivery system brought about by the devolution of health services to LGUs; (2) a scientific community in short supply but which is needed to understand the many aspects of major health problems—including disease burdens, risk of epidemics, and effective interventions; and (3) a lack of capable managers who understand the relatively complex and

sophisticated regulatory and policy instruments and contracts needed to implement reforms. These fundamental weaknesses must be addressed if the health needs of Filipinos, particularly the poor, are to be provided effectively and adequately over the long term.

Strategies to address the fundamental weaknesses

Address fragmentation of financing and delivery of health services. There are two broad approaches to address fragmentation in financing and health-care delivery. The first is to introduce legislation amending the Local Government Code so that service delivery networks are consolidated. A viable catchment area may be a province, where a full range of public and private providers can be organized into one or more service delivery networks. A province-level approach also recognizes that many public health concerns like vector-borne diseases that cross municipal boundaries are likely to be contained within a province.

Expand and strengthen scientific community. There is a need to expand and strengthen the scientific community to provide the needed expertise in helping define and prioritize health problems and scientifically evaluate appropriate interventions. There is a need to undertake a systematic situational analysis with respect to the current stock of scientists and specific information on their training, institutional resources, and institutional partnerships within and outside the country. From such an analysis, a national plan can be formulated to include short-term and long-term strategies for capacity building directed at (1) producing individual scientists through graduate and postgraduate (master's, doctoral, and postdoctoral) training; (2) strengthening institutional bases where trained scientists will work—to teach, undertake research, publish, and pursue a career in science, including supporting outstanding research groups (centers of excellence); and (3) strengthening partnerships with international and national institutions.

Expand the capacity to manage health sector reform.

Building the supply of such expertise follows more or less the approaches described for expanding and strengthening the scientific community in core medical fields. This involves situational analysis and adoption of the three major approaches to capacity building: (1) graduate and short-term training, (2) strengthening of institutional base in which these trained experts will work, and (3) strengthening of institutional linkages with the rest of the world.

References

- Department of Health (DOH). 1990. Philippine health statistics. Manila, Philippines: DOH National Epidemiology Center. <http://portal.doh.gov.ph/sites/default/files/PHILIPPINE%20HEALTH%20STATISTICS%201990.pdf>.
- . 1996. Philippine Health Statistics. Manila, Philippines: DOH National Epidemiology Center. <http://www.doh.gov.ph/sites/default/files/publications/PHS1996a.pdf>.
- . 1999. Health Sector Reform Agenda, Philippines 1999–2004. HSRA Monograph No. 2. Manila, Philippines: Office of the Secretary, DOH.
- . 2005. Philippine Health Statistics. Manila, Philippines: DOH National Epidemiology Center. <http://www.doh.gov.ph/sites/default/files/publications/PHILIPPINEHEALTHSTATISTICS2005.compressed.pdf>.
- . 2010. Philippine Health Statistics. Manila, Philippines: DOH National Epidemiology Center. http://www.doh.gov.ph/sites/default/files/publications/PHS2010_March13.compressed.pdf.
- Philippine Statistics Authority (PSA). 2015. Vital Health and Nutrition Statistics. *Philippine Statistical Yearbook*. Quezon City, Philippines: PSA. https://psa.gov.ph/sites/default/files/2015%20PSY%20PDF_0.pdf.
- Racelis, R., F. Dy-Liacco, A. Herrin, L. David, and L. Nievera. 2016. Health accounts estimates of the Philippines for CY 2012 based on the 2011 System of Health Accounts. *Philippine Journal of Development* 41 & 42(1):185–210.



Shake, Rattle, and Roll: Emotional Resilience toward a Resilient Health System

Madeleine de Rosas-Valera

“Resilient health systems require long-term investment in the six key elements: an adequate number of trained health workers; available medicines; robust health information systems, including surveillance; appropriate infrastructure; sufficient public financing; and a strong public sector to deliver equitable, quality services. Global investment in research and development for medical products is also critical” (Oxfam 2015, p. 1).

Introduction

A resilient health system is essential for the provision of universal health coverage and for a prompt response to disasters or outbreaks of diseases.

Professor Ernesto Garilao of the Zuellig Family Foundation (2014) recommended that “to be resilient is to ensure that local governments will be able to reduce vulnerabilities of groups like mothers and their children. By reducing vulnerabilities, the local government will be able to reduce vulnerabilities, the local government will be able to reduce inequities in any postdisaster situation, by putting in place resilient and responsive development programs that would

not only address health concerns but also social protection, education, livelihood, and incomes.”

Resiliency is the ability to withstand and mitigate stresses from disasters. While there is consensus on what resiliency means, the precise resilience-building process still needs clarity. There is also limited understanding about its components. According to Oxfam (2015), one of the foundations of a resilient health system is adequate number of trained health workers.

This paper is aimed at emphasizing the need to build a resilient health workforce—one that possesses a sustained ability to withstand and recover from adversity, such as economic stress, health pandemics, and man-made or natural disasters (HHS 2005). Health workers face a lot of stress during and after a disaster. It is important to develop both their physical and emotional resilience so that they can provide proper care and efficient service, and be able to perform at their best under stressful circumstances and hazardous environments. Health workers are expected to rise from, adapt to, and recover from crises and shocks without compromising their duties.

Emotional resilience: The missing link in the disaster management strategy

Edmonstone (2013) defines emotional resilience as the ability of an individual to successfully adapt, maintain competent functioning, and “bounce back” from adversity and major life stressors. Resilience is the capacity to not only survive life’s challenges but also to learn and grow from them, and become stronger as a result of such challenges. This capacity, which is a key factor in determining how people will respond to change, is something that can be developed over time in the right circumstances (Kotze and Lamb 2012).

In November 2013, Typhoon Yolanda— noted to be the deadliest typhoon that hit the Philippines—killed more than 6,000 people and affected 16 million others. It also left behind 80,000 survivors at risk of mental health disorders, including the affected health workers from the place and other rescuers and emergency response teams that came. Were they given ample psychological preparedness, and was this ever considered as an essential part of the country’s disaster management strategy?

The national government through the Department of Health (DOH) and other agencies sent teams of health workers and volunteers to provide support and assistance to the local health staff not knowing exactly what to expect and the physical and emotional vulnerabilities they have to face.

According to Hechanova et al. (2015, p. 113), “the psychological impact of the disaster can be clustered into five categories: somatic (body pains, headaches, palpitations), emotional (anxiety, fearfulness, irritability), cognitive (guilt, inability to concentrate, hopelessness), behavioral (inability to sleep, maladaptive behavior, addiction to alcohol and drugs), and spiritual (questioning God, believing that disaster was a punishment from God).”

A disaster results in elevated stress levels. The United States Department of Health and Human Services (2005, p. 1) defines stress as “an elevation

in a person’s state of arousal or readiness, caused by some stimulus of demand”. Stress can improve health and performance, but once it becomes unmanageable or when it reaches maximum effect, the person begins to deteriorate physically and mentally. The common quick response of a person when facing any stressful event is the flight-and-fight response. The adrenaline rush increases the heart rate sending extra oxygen to the muscles and organs, dilates the lungs, and increases oxygen to the brain, which releases endorphins that keep the person alert.

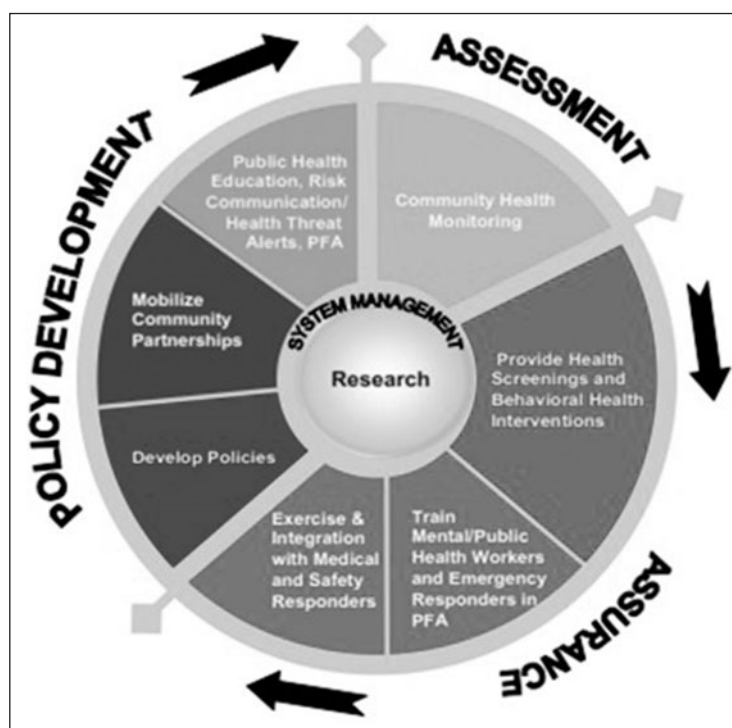
At present, there is no study that gives a snapshot of the resilience of Filipino health workers and examines the influence of emotional resilience across all health professionals and demographics. This is both a research and a policy gap that must be addressed. A prerequisite in building a resilient health system is building the emotional stability and psychological resilience of health workers and emergency responders. They are not immune to stress. For them to remain effective in providing quality health services, they must be able to not only survive day-to-day work challenges but also to remain resilient in times of crisis situations.

Adequate preparation will help minimize stress and improve their emotional resiliency before a crisis. Often, preparatory orientations are inadequate, if not neglected, prior to deployment. Reflecting on the experiences in many disaster responses, stress inoculation exercise was often not conducted. Individuals and organizations must be psychologically prepared and not just logistically prepared. Responders must know what to expect, and they must understand the extent of the damage and the type of behaviors to expect from affected health workers in the disaster area. Psychological care during and after a disaster— both for the victims and responders—must be seriously considered.

Recommendations

Research is needed to understand gaps in the resilience of health workers and community.

**Figure 1. Psychological preparedness for disaster situations:
Proposed model**



Source: Gursky (2004)

Recognizing the importance of emotional resilience as a key element of a resilient health system must first be accepted and addressed.

The DOH will have to set up a professional personal resilience strategy in the health-care workplace.

Health workers and responders must be well prepared for any deployment when an emergency or crisis occurs.

Pre-orientation briefing, daily debriefing technique, and buddy system will have to be part of the regular stress inoculation program.

The body language of health workers in disaster sites may be misinterpreted as a “disaster shock” when, in fact, it is a sign of exhaustion. Adequate rest, enough sleep, and proper rotation system contribute to the psychological health of health workers. These need to be established as part of the deployment management policy.

A good model for integrating mental health into public health planning is given in Figure 1. It

combines Gursky’s (2004) model with psychological intervention strategy (Guterman 2005).

Based on this model, it is recommended that the following be part of the disaster management strategy for health workers:

1. *Pre-event stage.* The focus must be on primary preventive care (Guterman 2005), which is composed of:
 - Psychological first aid training to help limit the consequences of a traumatic event;
 - Psychological immunization or stress inoculation to minimize the psychological impact of an impending trauma (Rosenfeld et al. 2005);
 - Preparing adaptive employee family crisis plans to ensure the safety and well-being of their family and loved ones; and
 - Integrating mental health into public health planning.

2. *Event stage*. Also known as the response stage. The focus is on secondary preventive care wherein planning for preventive intervention is discussed.
 - *Triage*. It links or connects those who are distressed or those who demonstrate disturbed mental state, cognitive impairment, or behavioral disturbance to emergency of mental health-care professionals (NSW 2000).
 - *Implementing psychological first aid*. The affected population uses the psychological first aid skills learned during pre-event stage (IOM 2003).
 - *Distributing appropriate information*. The public is provided with information that will facilitate their immediate safety and ease feelings of frustration and helplessness (IOM 2003).
3. *Postevent stage*. Also known as the recovery stage. The focus is on tertiary preventive care. The aim of this stage is to minimize the emotional suffering and enhance better long-range coping (Rosenfeld et al. 2005). The following interventions are applied:
 - Continuing psychological first aid
 - Screening of psychological symptoms
 - Treating for acute and long-term effect of trauma
 - Restoring normalcy
 - Therapy or counselling

References

- Edmonstone, J. 2013. *Personal resilience for healthcare staff, when the going gets tough*. London, United Kingdom: Radcliffe Publishing Ltd.
- Gursky, E.A. 2004. *Drafted to fight terror: US public health on the front lines of biological defense*. Arlington, VA: Analytic Service, Inc.
- Guterman P. 2005. *Psychological preparedness for disaster*. Toronto, Canada: Department of Psychology, York University.
- Hechanova, M.R.M, L.C. Waelde, P.S. Docena et al. 2015. The development and initial evaluation of *katatagan*: A resilience intervention for Filipino disaster survivors. *Philippine Journal of Psychology* 48(2):105–131.
- Institute of Medicine (IOM). 2003. *Preparing for the psychological consequences of terrorism: A public health strategy*. Washington, D.C.: The National Academics Press.
- Kotze, M. and S. Lamb. 2012. The influence of personality traits and resilience on burnout among customer service representatives in call centre. *Journal of Social Science* 32(3):295–309.
- New South Wales (NSW) Institute of Psychiatry. 2000. *Disaster mental health response handbook*. Sydney, Australia: NSW Institute of Psychiatry. <http://www.westga.edu/~vickir/ResourcesPublications/Professionals/Manuals,%20Guides,%20%20Handbooks/Disaster%20MH%20Response.pdf> (accessed on August 4, 2005).
- Oxfam. 2015. Six foundations for resilient health systems. Oxfam Briefing Paper. Oxford, United Kingdom: Oxfam. https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-never-again-resilient-health-systems-ebola-160415-en.pdf.
- Rosenfeld, L.B., J.S. Caye, O. Ayalon, and M. Lahad. 2005. *When their world falls apart: Helping families and children manage the effects of disasters*. Washington, D.C.: NASW Press.
- United States Department of Health and Human Services (HHS). 2005. *A guide to managing stress in crisis response professions*. Rockville, MD: HHS. <https://store.samhsa.gov/shin/content/SMA05-4113/SMA05-4113.pdf>.
- Zuellig Family Foundation (ZFF). 2014. Preparedness and resiliency for a vulnerable country. Parañaque City, Philippines: ZFF. <http://zuelligfoundation.org/preparedness-and-resiliency-for-a-vulnerable-country/>.

Promoting Cross-Sectoral Collaboration for Building Disaster Resilience in the Philippine Health Sector

Ronald P. Law

Abstract

Disasters impact on health in various ways. They lead to significant health risks from excess morbidities and mortalities, structural damages to health facilities, interruption of health services, and unnecessary diversion of health resources—all of which undermine health and development gains. A developing country exhibiting high vulnerability to multiple natural and biological hazards, the Philippines has a “triple burden of disease” health profile. Such profile is characterized by high prevalence and burden of infectious diseases, noncommunicable diseases, and health problems, such as emerging and reemerging diseases and pandemics, which are related to globalization, disasters, and climate change. These make it imperative for the health sector to play a strong leadership and governance role by employing health strategies, policies, and measures for reducing health emergencies and disaster risks and, ultimately, contribute to resilience building. However, there are also factors and actions that lie outside the realm of the health sector that can also influence the development of health risks. This paper underscores that effective collaboration

with other key sectors should also be prioritized. It examines how cross-sectoral collaboration can be maximized to improve health outcomes and presents models that can be explored and/or harnessed to advance disaster risk reduction and management for health.

Background

For the last 20 years, majority of disasters were caused by weather-related events, such as floods, storms, and heat waves. Although less frequent than floods, storms were the deadliest of these disasters. It killed 242,000 people in the past 21 years or 40 percent of the total number of casualties from natural hazards worldwide (CRED 2016).

In 2015, 346 disasters claimed 22,773 lives, affected over 98 million individuals, and caused economic damages worth USD 66.5 billion. Asia remains the most affected continent in terms of occurrence and impact, and next to the Americas in terms of percentage of economic losses (CRED 2016).

The Philippines is first in the list of top 15 countries with the highest annual mortality rate, affected population rate, and gross domestic

product loss rate for multiple climatic hazards (Shi et al. 2016).

From 1900 to 2012, the Philippines had a total of 531 disasters that killed 60,059 people. In 2013 alone, it experienced 16 disasters that killed 8,382 people, two-thirds of which were caused by Typhoon Haiyan (Yolanda), known as the deadliest natural disaster to enter the Philippines (NDRRMC 2013; CRED 2014). Apart from the huge toll on human lives, the typhoon injured 28,626 individuals, affected 16 million people, displaced 4 million, and inflicted the greatest economic losses that have reached approximately USD 838 million (CRED 2014).

The Department of Health (DOH) responded to a total of 70 events from 2006 to 2016. These events constitute major emergencies and disasters. Forty-one percent of them are attributable to natural hazards; 25 percent to societal causes; and 10–13 percent to special, technological, and biological hazards. In 2013 alone, three major disasters occurred that impacted the health sector—the armed conflict in Zamboanga City (September 9, 2013), the earthquake in Bohol (October 15, 2013), and Typhoon Yolanda (November 8, 2013) (DOH 2014c) (see Table 1).

Since 2005, the World Health Organization had declared the occurrence of Public Health Emergencies of International Concern, which are

events that can cause public health risks through the international spread of disease. In 1994, the global burden of disease recorded more than 1.6 million deaths, with disasters causing 2.8 percent of all deaths (Bowen et al. 2014).

The Philippines is a main source of threat for locally endemic and emerging infectious diseases, such as dengue, chikungunya, leptospirosis, measles, pertussis, and meningococemia, among others. Furthermore, the country deploys numerous workers in other countries that may harbor these diseases. The Philippines had its share of experiences in preparing for and responding to biological hazards that have posed serious health threats, such as the severe acute respiratory syndrome in 2003, the avian influenza in 2004, the Ebola Reston virus and H1N1 in 2009, the Middle East respiratory syndrome-corona virus in 2012, the West Africa Ebola virus in 2014, and the Zika virus in 2016 (Lee-Suy 2016).

The Philippine health profile is characterized by a triple burden of diseases. In 2012, noncommunicable diseases—specifically, in decreasing order, cardiovascular diseases, diabetes, neuropsychiatric conditions, cancer, and chronic respiratory diseases—topped the burden of diseases as measured in disability-adjusted life years and causes of death. Infectious diseases—particularly acute respiratory infections, human

Table 1. Summary of disasters that affected the Philippines in 2013, their health impacts, and health actions provided

Disaster	Health Impacts	Health Actions
Armed conflict in Zamboanga City (September 9, 2013)	<ul style="list-style-type: none"> Affected 14 <i>barangays</i> in Zamboanga City, 1 <i>barangay</i> in Zamboanga Sibugay, 23,794 families, 118,819 individuals 268 deaths and 266 injured 4 damaged health facilities 	<ul style="list-style-type: none"> 60 medical teams, 9 technical teams deployed PHP 18,258,108.91 worth of logistics mobilized Activated surveillance; provision of vaccines and prophylaxis; mental health and psychosocial support; water, sanitation, and hygiene (WASH); nutrition
Bohol earthquake (October 15, 2013)	<ul style="list-style-type: none"> Affected 2 regions, 6 provinces, 6 cities, 60 municipalities, 1,527 <i>barangays</i>, 671,103 families, and 3,221,248 individuals 222 deaths and 975 injured 211 damaged health facilities 	<ul style="list-style-type: none"> 18 medical teams, 14 technical teams, 10 composite teams deployed PHP 16,343,339.98 worth of logistics mobilized Activated surveillance in postextreme emergencies and disasters, WASH, nutrition
Typhoon Yolanda (November 8, 2013)	<ul style="list-style-type: none"> Affected 7 regions, 22 provinces, 73 municipalities, 33 cities, 26,675 families, and 125,604 individuals 6,300 deaths and 28,981 injured 819 damaged health facilities 	<ul style="list-style-type: none"> 278 teams deployed PHP 221,338,277.73 worth of logistics mobilized

Source: Department of Health (2016)

immunodeficiency virus, tuberculosis, and malaria—remain to be an important concern. Completing the list are unintentional injuries and deaths due to suicide, homicide, and conflict (WHO 2015). Health morbidity and mortality statistics related to disasters are not yet well established in the Philippines, but some literature have shown that morbidity and mortality profile in disasters mirrors the predisaster picture (Salazar et al. 2016).

Health emergencies and disasters lead to significant health risks in terms of numbers of people killed, injured, affected, and displaced; numbers of health facilities damaged or affected; and risks and losses sustained by health systems due to interrupted health services (DOH 2014b). These can impact on the social determinants of health, notably housing, access to food and water, and other life essentials (Bowen et al. 2014). Health risks can also affect the upstream determinants outside the health sector or those that occur at the macro level and may include government policies (Bowen and Ebi 2015). Despite these relationships, however, health sector activities remain focused on providing medical services and health logistics, and setting up disaster surveillance and monitoring systems (Bowen and Ebi 2015).

To move beyond this scenario, the health sector should consider establishing partnership mechanisms with key sectors other than health. However, there are still challenges related to this (O’Sullivan et al. 2013). This paper proposes cross-sectoral collaboration as a cornerstone strategy for an effective disaster risk reduction and management (DRRM) for health.

Role of health

The DOH as lead of the Philippine health sector plays an active role in reducing the health impacts of emergencies and disasters from prevention and mitigation, preparedness, and response, to recovery and rehabilitation (NDRRMC 2011). It oversees the design and implementation of a wide range of health programs for the prevention and control

of diseases of public health significance, including infectious diseases, noncommunicable diseases, injuries, disasters, and climate change impacts.

For natural disasters, the DOH is part of the National Disaster Risk Reduction and Management Council (NDRRMC) wherein it leads four clusters: (1) health (public health and medical); (2) nutrition; (3) water, sanitation, and hygiene (WASH); and mental health and psychosocial support (MHPSS). These are health-related clusters that are focused on health outcomes and with a multisectoral composition (NDRRMC 2014). The Health Emergency Management Bureau has the mandate in DRRM for health in the DOH, and serves as the department’s coordination arm in performing its roles and responsibilities in the clusters that it leads (DOH 2015).

For biological emergencies, the DOH has an infectious disease office and an emerging and reemerging disease program that leads in coordinative activities (Lee-Suy 2016).

To address the challenges of climate change adaptation in health, the DOH likewise has a climate change unit that spearheads related activities (DOH 2009).

In all of these programs, different health strategies are employed from policy development, capability building, infrastructure, and financial support to networking and collaboration.

The *Post-2015 Framework on Disaster Risk Reduction* makes the role of health very explicit in disaster risk reduction, putting the health sector at the center of the agenda on reducing vulnerabilities and building resilience (Murray et al. 2015). To advance these goals, a convergence of different but related fields—disaster management, climate change adaptation, and public health—is highly necessary (Keim 2008). The health sector should exhibit high levels of adaptive capacity to adapt to the changed reality of disasters and climate change, and take advantage of opportunities to get to this direction (Ebi 2011).

Challenges

Prevailing health systems challenges, such as difficulty in combating diseases, subpar quality of infrastructure and services, inadequate financial resources, and insufficient management capability, are issues that need to be addressed alongside one another (Costello et al. 2009).

Among many other factors, health governance, which is believed to be essential to ensure the synergy of actions of different health stakeholders, remains to be strengthened (Law 2016).

For response to natural disasters, biological emergencies, and climate change adaptation, coordination with other sectors has consistently been identified to be one of the major challenges (DOH 2014a; Law 2016; Lee-Suy 2016).

Thus, there is a need to synchronize the acts of different actors, individuals, institutions, and organizations via cross-sectoral collaboration. If health can provide clear vision and sound direction, coordination and collaboration across sectors employing multidisciplinary and multisectoral approaches can improve awareness and understanding of problems and potentially influence actions that can translate to good health outcomes.

This cross-sectoral collaboration should be practiced broadly, but there is a need to specify current and emerging mechanisms and models to display how this can be realized.

Collaboration

Collaboration is deemed critical for achieving community resilience, and the DOH should be cognizant of this in its governance strategies (O'Sullivan et al. 2013; Bowen et al. 2014).

Collaboration is vital because some health actions critical in DRRM for health fall under the mandate of other agencies and other sectors. Much as the DOH is active in its own health strategies, it is still necessary to pursue other strategies that can be implemented with other sectors and agencies so that desired health outcomes in disasters are secured. Health risks can still ensue even if vigorous health strategies have already been

resorted to. This is because health risks arise from multiple mediating factors that may be within the purview and control of other sectors (McMichael 2013; Bowen et al. 2014).

In the case of huge displacements after devastating typhoons, for instance, shelter is a critical issue that can lead to people being temporarily housed in evacuation camps. This scenario can give rise to various diseases that may develop because of the unsatisfactory environmental conditions that can be found in the camps. The DOH has to coordinate its actions with the social welfare sector as it is the lead in camp management and food security, with the education sector as it is responsible for the management of schools when they are used as evacuation centers, and with the water sector to ensure water availability and safety (NDRMMC 2011).

In addition, in building adaptive capacities to manage climate change impacts on health, engaging with entities outside the health sector is also important (Costello et al. 2009). Specifically, it is worth looking into two sectors with the strongest link to health and climate change—agriculture and water (Bowen and Ebi 2015). These sectors are vital because food and water security can compromise health. Low nutritional status and high incidence of waterborne diseases may arise from disasters. Thus, aside from strengthening the system for surveillance, case management, and logistics management, the DOH should also coordinate with the nutrition, social welfare, and agriculture sectors. Food and water security should be equally important priorities for health, especially in the context of human security, which is a main deliverable of the health sector.

All of these can be addressed through effective advocacy campaigns that emphasize the value of cross-sectoral collaboration. To be effective, DOH should have a concrete plan of collaboration with cross-sectoral partners, which includes regular activities to maintain their engagement (Costello et al. 2009). Specific mechanisms also have to be

elucidated to properly guide the health sector and its stakeholders in their collaborative undertakings (Bowen et al. 2014).

From the literature, three mechanisms of collaboration in varying levels of practice can be considered and put forward for implementation or strengthening. These are One Health, Disaster Risk Management/Cluster Approach, and Social Determinants of Health/Health in All Policies (SDH/HiAP) (Bowen and Ebi 2015).

The One Health approach is a strategic collaborative network at the animal-human-ecosystems interface that addresses the risks of zoonotic infectious diseases (Coker et al. 2011). It is used for managing emerging and reemerging infectious diseases and pandemics. One Health puts health in a close relationship with animal health stakeholders, including those in the agriculture and environment sectors, among many others. Through information sharing and enhanced human and animal surveillance, effective prevention and control programs can be developed and sustained.

The Disaster Risk Management/Cluster Approach is a humanitarian system to ensure predictability and accountability of response by humanitarian partners by improving prioritization and definition of roles and responsibilities (Lotfi et al. 2016). Used mainly to manage response to natural disasters, sectors and agencies in this mechanism are assigned clusters or areas of disaster response to lead. The roster of clusters ranges from search and rescue, social welfare, education, security, humanitarian relations, to transport, communications, and infrastructure, among others. Health leads in health-related clusters (public health/medical, nutrition, WASH, and mental health) with coleadership shared with United Nations (UN) agencies. Through joint assessments, planning, and implementation, response objectives can be met effectively and efficiently.

SDH/HiAP, meanwhile, entails the use of a whole-of-government approach wherein multiple sectors are working on the improvement

of health outcomes by placing equity at the center of all planning, policy, and decisionmaking (WHO 2008).

HiAP is an approach whereby health impacts are also considered in relevant policies of key sectors. This can be applied to climate change adaptation in health wherein health risks can result from actions or nonactions of other sectors (McMichael 2013). This method can also be a good venue for advocacy to these relevant stakeholders.

Understanding the role of infrastructure, transport, social welfare, water, energy, housing, agriculture, and development sectors should be done to realize the operative principles of SDH and HiAP.

Disasters and climate change issues represent opportunities for building a multidisciplinary and multi-institutional collaborative environment (Iain 2010). Health should build on this and enhance its existing strategies to reap the benefits of collaboration.

Despite the value of cross-sectoral collaboration in DRRM for health, health practitioners have come to realize its importance only lately (Bowen et al. 2014). If at all acknowledged, collaboration is sometimes constrained by institutional barriers, such as varying mandates and responsibilities, poor political leadership, siloed structures and approaches, funding and logistical concerns, and even cultural idiosyncrasies (O'Sullivan et al. 2013; Bowen and Ebi 2015).

Preventing these will require a review of existing mandates, conduct of scoping analysis and stakeholder mapping, and development of a collaboration agenda (Ebi and del Barrio 2015). Managing the resulting relationships can be a huge challenge in itself, especially when the situation is tense, public expectations are high, and demand for results is enormous.

Nevertheless, if cross-sectoral collaboration is actively pursued, and when supported by effective leadership and governance, strategic allocation of resources, and a change-oriented mindset among its people, the health sector can be in a position to

Table 2. The cluster approach in the Philippines

Cluster	Government Lead	IASC Country Team Counterpart
Food and nonfood items	Department of Social Welfare and Development (DSWD)	World Food Programme (WFP), United Nations Children's Fund (UNICEF)
Camp/IDP management, emergency shelter, and protection	DSWD	International Federation of Red Cross and Red Crescent Societies/UN Habitat, UN High Commissioner for Refugees, International Organization for Migration
Permanent shelter and livelihood	DSWD	International Labour Organization, UN Habitat
WASH, health, nutrition, and psychosocial services	Department of Health	UNICEF, World Health Organization, WFP
Logistics and emergency telecommunications	Office of Civil Defense (OCD)/NDRRMC Operations Center	WFP, UNICEF, UN Office for the Coordination of Humanitarian Affairs
Education	Department of Education	UNICEF and Save the Children
Agriculture	Department of Agriculture	Food and Agriculture Organization
Early recovery	OCD	UN Development Programme

IASC = Inter-Agency Standing Committee; IDP = internally displaced person; UN = United Nations; WASH = water, sanitation, and hygiene; NDRRMC = National Disaster Risk Reduction and Management Council

Source: National Disaster Risk Reduction and Management Council (2011)

stake its claim on DRRM even in a changed health-care environment (Bowen and Ebi 2015).

Case study: The cluster approach

A cluster is comprised of agencies in disaster management that have similar or differing mandates but whose actions are closely linked to one another and, thus, require good coordination and collaboration approaches. The Philippine health cluster, which is divided into four subclusters, is composed of the following: the DOH as government lead, UN agencies as co-leads, national and international nongovernmental organizations, civil society organizations, and the Red Cross. The health cluster promotes the effectiveness and efficiency of response, as well as ensures its predictability and accountability. Coordination is viewed as a necessity rather than an obligation in the goal of saving lives.

The cluster approach in the Philippines started in 2006 during the response to Typhoon Reming in Bicol. In 2007, the National Disaster Coordinating Council (forerunner of the NDRRMC) institutionalized the cluster approach in the Philippine disaster management system (Table 2). The DOH was tasked to lead the health, WASH, and nutrition clusters. In 2008,

the cluster approach was amended to include the MHPSS cluster.

The passage of Republic Act No. 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010 and the development of the National Disaster Risk Reduction and Management Plan for 2011–2028 paved the way for the DOH organization of clusters. After major emergencies and disasters, namely, Typhoon Ondoy (Ketsana) in 2009, Sendong (Washi) in 2011, Pablo (Bopha) in 2012, and Yolanda (Haiyan) in 2013, the cluster approach was used by the DOH as the main mechanism for coordination with partners. It was proven to be helpful because of the following key elements: sharing of information, reaching of consensus on needs and standards for response, and sharing of plans and resources. The cluster approach was also useful in bringing up lessons learned in planning out the strategic direction of the health sector in terms of disaster management.

Conclusion

The Philippines experiences multiple hazards (i.e., natural, biological, technological, and societal) that contribute to the development and exacerbation of health risks. These risks comprise a significant burden of diseases that include both communicable and

noncommunicable diseases. Ultimately, this affects the attainment of development goals that the country is actively pursuing to achieve. To address this, the health sector is using a range of strategies and activities—encompassing prevention, preparedness, response, and recovery—to ensure DRRM for health. However, much of these are focused on traditional health activities that are implemented through health programs.

In addition, there are health system challenges that still need to be addressed to be able to manage these health risks. Among other strategies, cross-sectoral collaboration is being espoused as a key strategy of the health sector in its goal of achieving resilience to disaster and climate change impacts. The role of other sectors whose actions and outcomes also determine health outcomes cannot be overemphasized. Even when this is the case, there are challenges and issues that hamper effective collaboration. As such, the DOH as lead of the health sector should be strategic in its approaches to collaborate with other entities. This paper outlined existing approaches, such as One Health, Disaster Risk Management/Cluster Approach, and SDH/HiAP, which are being implemented in varying degrees in the country. These approaches can be harnessed to promote cross-sectoral collaboration for health system resilience.

Policy recommendations

The following proposals are forwarded to achieve disaster and climate resilience using cross-sectoral collaboration as a key strategy:

1. Develop specific guidelines on coordination and collaboration
2. Include coordination and collaboration in disaster plans
3. Conduct stakeholders analysis to identify partners from other sectors
4. Develop a partnership agenda indicating points of convergence
5. Organize working groups and conduct regular meetings
6. Develop case studies for cross-sectoral collaboration for each mechanism
7. Organize joint capacity-building activities and exercises
8. Strengthen advocacy for cross-sectoral collaboration

References

- Bowen, K.J. and K.L. Ebi. 2015. Governing the health risks of climate change: Towards multi-sector responses. *Current Opinion in Environmental Sustainability* 12:80–85.
- Bowen, K.J., K. Ebi, and S. Friel. 2014. Climate change adaptation and mitigation: Next steps for cross-sectoral action to protect global health. *Mitigation and Adaptation Strategies for Global Change* 19(7): 1033–1040.
- Centre for Research on the Epidemiology of Disasters (CRED). 2014. Disaster data: A balanced perspective. CRED Crunch Issue 34. Brussels, Belgium: CRED.
- . 2016. What is the human cost of weather-related disasters (1995–2015). CRED Crunch Issue 42. Brussels, Belgium: CRED.
- Coker, R., J. Rushton, S. Mounier-Jack et al. 2011. Towards a conceptual framework to support One Health research for policy on emerging zoonoses. *The Lancet Infectious Diseases* 11(4):326–331.
- Costello, A., A. Mustafa, A. Allen, S. Ball, S. Bell, R. Bellamy, S. Friel et al. 2009. Managing the health effects of climate change. *The Lancet* 373(9676):1693–1733.
- Department of Health (DOH). 2009. *Climate change and health handbook*. Manila, Philippines: DOH.
- . 2014a. DOH Post-Yolanda strategic plan. Manila, Philippines: DOH.
- . 2014b. Public health in emergencies. In *Public health emergencies in the Asia and Pacific*. Manila, Philippines: Health Emergency Management Bureau, DOH.
- . 2014c. Typhoon Yolanda report. Manila, Philippines: Health Emergency Management Bureau, DOH.
- . 2015. *Manual of operations on health emergency response and management*. Manila, Philippines: Health Emergency Management Bureau, DOH.

- . 2016. Final report of major health emergencies and disasters. Manila, Philippines: Health Emergency Management Bureau, DOH.
- Ebi, K. 2011. Climate change and health risks: Assessing and responding to them through 'adaptive management'. *Health Affairs* 30(5):924–930.
- Ebi, K. and M.O. del Barrio. 2015. *Lessons learned on health adaptation to climate variability and change: Experiences across low- and middle-income countries*. Geneva, Switzerland: World Health Organization.
- Iain, B. 2010. Defending against disasters: Global public health emergencies and opportunities for collaboration and action. *Asia-Pacific Journal of Public Health* 22(3 suppl):222S–228S.
- Keim, M.E. 2008. Building human resilience: The role of public health preparedness and response as an adaptation to climate change. *American Journal of Preventive Medicine* 35(5):508–516.
- Law, R.P. 2016. Climate change adaptation and disaster risk reduction in the Philippine health sector: Challenges and way forward. *Philippine Journal of Health Research and Development* 20(1):65–72.
- Lee-Suy, L. 2016. *The emerging and reemerging infectious disease program*. Manila, Philippines: Department of Health.
- Lotfi, T., L. Bou-Karroum, A. Darzi, R. Hajjar, A. El Rahyel, J. El Eid, M. Itani et al. 2016. Coordinating the provision of health services in humanitarian crises: A systematic review of suggested models. San Francisco, CA: PLOS Currents: Disasters. <http://currents.plos.org/disasters/article/COORDINATING-THE-PROVISION-OF-HEALTH-SERVICES-IN-HUMANITARIAN-CRISES-A-SYSTEMATIC-REVIEW-OF-SUGGESTED-MODELS/#> (accessed on November 5, 2016).
- McMichael, A.J. 2013. Globalization, climate change, and human health. *New England Journal of Medicine* 368(14):1335–1343.
- Murray, V., A. Aitsi-Selmi, and K. Blanchard. 2015. The role of public health within the United Nations post-2015 framework for disaster risk reduction. *International Journal of Disaster Risk Science* 6(1):28–37.
- National Disaster Risk Reduction and Management Council (NDRRMC). 2011. *National Disaster Risk Reduction and Management Plan 2011–2028*. Quezon City, Philippines: NDRRMC.
- . 2013. Final report re effects of Typhoon Yolanda (Haiyan). Quezon City, Philippines: NDRRMC.
- . 2014. *National disaster response plan*. Quezon City, Philippines: NDRRMC.
- O'Sullivan, T.L., C.E. Kuziemy, D. Toal-Sullivan, W. Corneil. 2013. Unraveling the complexities of disaster management: A framework for critical social infrastructure to promote population health and resilience. *Social Science & Medicine* 93:238–246.
- Salazar, M.A., A. Pesigan, R. Law, and V. Winkler. 2016. Postdisaster health impact of natural hazards in the Philippines in 2013. *Global Health Action* 9(10):3402.
- Shi, P., X. Yang, J. Fang, J. Wang, W. Xu, and G. Han. 2016. Mapping and ranking global mortality, affected population and GDP loss risks for multiple climatic hazards. *Journal of Geographical Sciences* 26(7):878–888.
- World Health Organization (WHO). 2008. Closing the gap in a generation: Health equity through action on the social determinants of health. Final report of the Commission on Social Determinants of Health. Geneva, Switzerland: WHO.
- . 2015. *Philippines: WHO statistical profile*. Manila, Philippines: WHO.

Session Synthesis

The health sector plays an important role in building the country's resilience to different types of risks. Alarming pandemics that spread geographically like wildfire pose a significant challenge to the sector's capacity to avert looming threats. However, failure to address other risks, such as climate change, food crises, water supply, and unemployment, also has detrimental effects on health. In short, while playing a vital role, the health sector is also vulnerable to risks and shocks.

Health experts who attended the session on health resilience agree that building and enhancing the resilience of the Philippine health sector is imperative to combat compounding health issues. Central to this are better management of the delivery and financing of health services; cross-sectoral collaboration between and among health units, government agencies, the private sector, and civil society; and a holistic approach in ensuring the emotional resilience of health workers.

Better management

According to Dr. Orville Jose Solon, outcomes have remained essentially unchanged despite reforms in the health sector.

Together with Dr. Alejandro Herrin, Solon looked at how the health sector has progressed in the last 25 years in terms of health and poverty, health-care financing, and disasters and emergencies, among others. They noted that there have been significant efforts to address both inequities and

inefficiencies in the areas of health financing, service delivery, and regulation. However, the impact on the health status of Filipinos remains mixed because, for the most part, the health needs of the poor have not been adequately addressed.

"Investments in human capital have not translated into real outcomes. The structural problems that the Department of Health faced in 1999, such as the fragmented delivery and financing of public health services due to devolution, remain today," Solon said.

These perennial health problems have led to a wide variation in access and quality of health services. Health facilities in local government units have also not been upgraded, and technical coordination between and among health units remained low or nonexistent.

Whether or not these challenges will be addressed, according to Solon, depends on the government's capacity to manage and sustain reforms, and the scientific community's ability to design and evaluate interventions.

Solon and Herrin recommended expanding and reinforcing the scientific community by investing in graduate-level scientific training, capacitating local research and academic institutions, and strengthening international linkages. Likewise, to better manage health sector reforms, both experts agree that the government should invest in trainings for specific managerial expertise and create partnerships with local and international experts.

Cross-sectoral collaboration

Meanwhile, Dr. Ronald Law underscored that there are factors and actions that lie outside of the realm of the health sector that influence the development of health risks.

According to Law, the key challenges the health sector faces, particularly during disasters, include difficulty in combating diseases, subpar quality of infrastructure and services, inadequate financial resources, poor management of health risks, and lack of coordination and collaboration.

“Health should be at the center of disaster risk reduction. Health straddles both climate change and disaster, so it will play a huge role in building resilience. How can you expect to use a system to respond to disaster when the system itself is weak,” asked Law.

The necessary response, according to Law, is cross-sectoral collaboration—or the “synchronization of the acts of different actors, individuals, institutions, and organizations”. In a changing health-care environment, Law said cross-sectoral collaboration can make significant advances on the whole health system.

For former Health Secretary Manuel Dayrit, one of the session discussants, fixing the internal weaknesses in the health sector means building resilience on trust. He noted that the Philippine health sector must build trust both within the sector (intersectoral) and outside the sector (cross-sectoral) to fully move forward.

“We have to develop a system where we build trust. Legal mandates, guidelines, organizational leadership, understanding of roles, and mobilization of resources are all necessary, but it is trust that is the glue that will keep us together. The greater the fragmentation, the bigger the challenges in the Philippine health sector. The weaker the science, the less the inclination to trust interventions. The poorer the capacity to manage the system, the less likely we are to trust the system. We need to bond together in the spirit of trust,” said Dayrit.

Welfare of health workers

To make the approach more inclusive, Dr. Madeleine De Rosas-Valera believes that the welfare of health workers should not be neglected. According to her, a resilient health system is essential for the provision of universal health coverage and for a prompt response to disasters or outbreaks of disease.

One key element to make this possible is an adequate number of trained health workers.

Health workers, to be effective in providing quality health services, must rise from, adapt to, and recover from crises, shocks, or stresses without compromising their duties, said De Rosas-Valera.

“We talk about infrastructure resilience, but very few talk about the emotional aspect of resilience. Health workers face the issue of resilience not only during disasters but also during day-to-day situations; they are not immune to stress,” she added.

She recommended setting up of a professional and personal resilience strategy that involves preorientation and daily debriefing activities, buddy system at work, and rotation program among health workers to provide them with enough rest and sleep.

According to Ms. Johanna Banzon of the United Nations Children’s Fund, investing in the welfare and the emotional resilience of health workers helps in improving the productivity of the whole workforce and human capital.

The effect of federalism on the health sector was asked during the open forum. The overall sentiment from the panel was to think carefully before shifting to a federal form of government and to look at its potential effects in the delivery of basic social services. Dr. Dayrit emphasized the need to carefully analyze the center-periphery (national-local) dynamics in the country.



SESSION 3

MACROECONOMIC RESILIENCE

Financial Market Resilience Through Financial Stability (Even Though We Do Not Know Much of It Yet)

Johnny Noe E. Ravallo

Abstract

Financial markets have experienced significant shocks over the past three decades. The Asian financial crisis (AFC), for example, highlighted the point that dislocations may not be of the form that textbooks anticipate, thus, putting into question the validity of traditional intervention tools. Despite its effects, the AFC was still seen as a “localized” issue that affected specific jurisdictions in the developing markets because of particular macrofinancial imbalances.

The global financial crisis (GFC) a decade after erased any doubt about the ramifications of financial risks. Rather than a localized issue, the GFC was a global phenomenon that emanated from advanced economies and brought markets to the proverbial edge of the cliff. It was no longer about identified stand-alone risks but rather the effects of systemic risks that were apparently unseen. Effectively, the mindset for global best practices—those that are put in place to guide jurisdictions in building resilient financial systems—had to be significantly revised.

The reform agenda crafted as a result of the GFC in particular is premised on the notion of “financial stability”. To date, this is

the prevailing prudential standard against which all macrofinancial developments are assessed. Within the regulatory community, we can clearly see this in the Basel 3 Accord, the new standards for financial market infrastructures, the requirement for transparency in over-the-counter derivatives and in repos, the enhanced standards for market governance and Board of Directors responsibilities, as well as the institutionalization of consumer protection and financial literacy norms as part of prudential requirements.

For all of its significance, there is, in fact, much that has to be learned about financial stability. One can readily argue that the traditional textbook approach of depicting banks as mobilizers of savings and intermediaries for credit is too static and too oblivious of actual market practice. Instead then of allocating scarce funds, agent behavior needs to be evaluated as an allocation of risk... and the resulting web of exposures that these stand-alone risks create, which is the boiler plate for systemic risks to materialize.

The paper will discuss this shift in thinking. It will focus on how the pursuit of financial stability has altered the architecture of the financial market from the perspective of regulatory authorities,

what it means for financial market agents, and its impact on the financial consumer. The case of the Philippines will be canvas against which the challenges and benefits of this regulatory focus will be painted. The collaborative efforts of the *Bangko Sentral ng Pilipinas*, Securities and Exchange Commission, Insurance Commission, Philippine Deposit Insurance Corporation, Department of Finance, and Bureau of the Treasury will be highlighted, including the risk issues that the collective body has focused its efforts to date. A discussion on capacity building will likewise be covered—both from a local market standpoint and in the context of the integration of the Association of Southeast Asian Nations. Issues on the way forward close the paper.

Introduction

Financial markets have always been recognized as performing a critical function in macroeconomic development and in advancing the welfare of consumers. However, despite clear advances in economic thinking, there has been difficulty in formalizing a holistic framework that situates banks, securities firms, insurance companies, and broker-dealers, among others, within the ambit of the theory of firms in neoclassical economics.

Banks, in particular, are difficult to model because the distinction between “input” and “output” is rather inexact. Deposits are booked on the liability side of the balance sheet (thus, seemingly an input), but by construction only banks have a national franchise in offering such a product to the public (which reasonably makes it an output of the bank as a microeconomic entity). Banks likewise provide advisory services, but such output is not evident anywhere in its books other than the gross income that has been generated. Oftentimes, banks are found to maintain significant levels of nonearning cash, but how this constitutes as an “output” is less clear.¹

¹ Understandably, such cash level is meant to manage liquidity needs. However, liquidity is best understood as an output only if the production function manages something else other than sourcing cost-bearing funds and then redeploying these as earning assets on a markup basis.

Setting booking issues aside, would it then be possible to construct a production function for banks where outputs, such as advisory services, can be identified but matching inputs are not readily specified? To be sure, all other firms have labor inputs, but only banks and some other financial institutions have the ability—and the regulatory authority—to provide financial advisory services. Would it then be dependent on a specific type of labor and on a certain concentration that distinguishes the bank’s production function? Would this same production function allow deposits to be both an output (because it is a banking product by itself) and an input (because it ultimately funds bank assets)?

Perhaps, as a reflection of such conceptual difficulties, the pedagogical approach for economic courses on money and banking focuses on: (1) the role of money in the macroeconomy, (2) banks as an intermediary for mobilizing savings and intermediating these as loans, and (3) issues that relate to the competitive structure of the banking industry. In most cases, the analytical issues raised by such a presentation are formed in a topical manner rather than within a holistic thematic framework.²

The unfortunate result is that we see banks as a “black box” whose *raison d’être* is to allocate funds. Although discussions (e.g., on interest rates, the money multiplier, and the Cambridge equation) do arise, banks are largely passive within this framework. Moreover, although recent textbooks on money and banking already incorporate discussions on financial markets, banks will remain passive agents in the absence of specific optimization of behavior in the face of financial risks.

Optimization for banks cannot simply be in the form of maximizing profits. Unlike established microeconomic theory, the revenue function of the banking firm is not necessarily concave with respect to output (which is not easily defined).

² To see attempts to incorporate the issues into a single framework, see Klein (1971).

To see this, consider a given portfolio of assets, A_i with returns of r_i , which will then define the revenue function simply as:

$$R = \omega_1 r_1 A_1 + \omega_2 r_2 A_2 + \dots + \omega_n r_n A_n \quad \sum_{i=1}^n \omega_i = 1 \quad (1)$$

This function is linear with respect to the choice of the bank over ω_i . That is, the bank can always increase its revenue by shifting its portfolio allocation toward assets with higher expected returns. One should note that banks are price-setters in the sense that they can set the yields, i_j , on their own liabilities (deposits) $j=1$ to m , as well as assets that they themselves issue, r_j , such as loans and other credit accommodations. Thus, they have the power to satisfy:

$$r_j > i_j \quad \forall j \quad (2)$$

while accepting that some assets such as investments in fixed income or equity instruments have market yields, which are set exogenously to the bank (i.e., $r_b = k^*$).

Stated differently and without loss of generality, banks will continue to cover variable costs because they can satisfy:

$$\omega_1 r_1 L + \omega_2 r_2 V > i_j D_j \quad (3a)$$

$$\omega r(1-R)D + (1-\omega)k^*(1-R)D > iD \quad (3b)$$

where D = deposits, R = the reserve requirement, L = loans, V = investments in financial instruments, while ω = share of assets in loans.³ As seen above, the impact of the reserve requirement is to reduce funds that can be deployed on the bank's asset side of the balance sheet. Nonetheless, this is readily offset by the bank's ability to price a spread between its own assets and its liabilities, ($r_j > i_j$), subject to fixed market yields on investment instruments, ($r_b = k^*$).

This pricing framework can be seen as the bank's breakeven rate (i.e., solve for r that ensures that equation 3b is fulfilled as an equality). However, the flow of deposits, ΔD , is known only *ex ante*,

³ The presumption is that reserves are not remunerated and, thus, represent a deadweight loss to the bank.

while r is typically announced *a priori*. Thus, from the bank's standpoint, equation 3b is a portfolio allocation over ω so that, at the margin, the bank remains profitable.

For as long as there is an outlet for funds via loans and/or where investments in market securities provide a yield higher than the bank's cost of sourcing deposits (a rate which the banks can adjust), then banks will indeed generate marginal profits. This is an unbounded optimization unless there is a portfolio constraint against further loans or investments.

Indeed, there is such a constraint, and this is in the context of financial risk. The principle behind Markowitz (1952) modern portfolio theory is that financial agents do consider risk and not just financial returns. Specifically, financial markets are inherently prone to uncertainty and risk. As such, returns are not a given, but they materialize as a distribution over several uncertain, if not unknown, states. On net, this suggests that higher returns can only be achieved by systematically taking on greater risk exposures. Financial agents that are assumed to be risk averse will then pursue returns within the bounds of the agent's own risk tolerance.

Formally, the behavior of financial agents is defined as managing both the expected return and the uncertainty over the occurrence of the return of his portfolio:

$$\text{Expected portfolio return: } E(R_p) = \sum_{i=1}^n \omega_i E(R_i) \quad (4a)$$

$$\text{Portfolio risk: } \sigma_p^2 = \sum_i \sum_j \omega_i \omega_j \sigma_i \sigma_j \rho_{ij} \quad (4b)$$

where R_i = return on asset i , σ_i^2 = the variance of R_i , and ρ_{ij} = the correlation coefficient between R_i and R_j .

Just to expound a bit further, in the respective cases of a two-asset and three-asset portfolio, equation 4b expands into:

$$\sigma_{p2}^2 = \omega_1^2 \sigma_1^2 + \omega_2^2 \sigma_2^2 + 2\omega_1 \omega_2 \sigma_1 \sigma_2 \rho_{12} \quad (5)$$

$$\sigma_{p3}^2 = \omega_1^2 \sigma_1^2 + \omega_2^2 \sigma_2^2 + \omega_3^2 \sigma_3^2 + 2\omega_1 \omega_2 \sigma_1 \sigma_2 \rho_{12} + 2\omega_1 \omega_3 \sigma_1 \sigma_3 \rho_{13} + 2\omega_2 \omega_3 \sigma_2 \sigma_3 \rho_{23} \quad (6)$$

All the returns R_i are exogenous, as well as the corresponding parameters, σ_i , σ_j , and ρ_{ij} . Thus,

the problem continues to be an allocation choice over ω_i , noting the $E(R_p)$ is linear in ω_i but σ_p^2 is a nonlinear function of ω_i .

One can define the terms $\omega_i^2 \sigma_i^2 \forall i$ to represent “stand-alone risks”, while $2\omega_i \omega_j \sigma_i \sigma_j \rho_{ij} \forall i, j$ are the resulting interaction between pairwise risks. For risk-averse investors, the solution to this model is defined and bounded such that one chooses to increase the portfolio allocation, ω_i , for the asset with a high return, R_i , but only to the point that the increasing portfolio risk, σ_p^2 , is tolerated.

The concepts represented in the simple equations above are well established in academic literature. However, it was useful to present them nonetheless for two reasons. *First*, they provide a basis to argue that banks are a profit-maximizing entity but one that uniquely faces the constraint of the uncertainties of their own risk exposures. This qualification is significant because it shifts our appreciation of banks from a passive entity that allocates funds to one that proactively creates and then allocates risks.

Taken in this context, the resilience of financial markets cannot be about financial institutions taking on financial risks. Rather, it must be about whether the risk exposures can be effectively managed (i.e., are there effective tools for monitoring, measuring, and mitigating those risk exposures). Banks, for example, are leveraged institutions by their very nature because they must create liabilities against themselves (i.e., borrow) to be able to provide loans. The expectation is that these loans are for maturities longer than the usual tenors for deposit products, and that they can operate across different instruments and different currencies.

If this is the norm for banking, then our understanding of “building resilience” must take into account such risk exposures. Indeed, the value proposition of banks is that they can service the needs of savers, borrowers, and transactors within this environment of risk. Without risks, the system degenerates at the extreme to a corner solution of barter. Neither can a case be made that a resilient

banking system is one that does not take “too much risks”. Stating it this way leaves the impression that the level of risk is the issue. This is incorrect because one expects that different financial entities have different capacities to manage risk and, thus, they can position themselves in the market within such distinction. It is then incumbent upon supervisory authorities that these different capacities are continuously and effectively managed to redound to the benefit of financial consumers.

This segues to the issue of prudential oversight and how it contributes to “resilience”. But pursuing this line of thinking presupposes that we have a clear understanding of how we can define and nurture resilient financial systems. Unfortunately, recent crises should debunk any thinking that we are well aware of what needs to be done. The Asian financial crisis (AFC), for example, highlighted the point that dislocations may not be of the form that textbooks anticipate, thus, putting into question the validity of traditional intervention tools.

The global financial crisis (GFC) that followed a decade after erased any doubt about the ramifications of financial risks. Rather than a localized issue—as the AFC was depicted—the GFC was a global phenomenon that emanated from the advanced economies and brought markets to the proverbial edge of the cliff. It was no longer about identified stand-alone risks but rather the effects of systemic risks that were apparently unseen. Effectively, the mindset for global best practices (i.e., those that are put in place to guide jurisdictions in building resilient financial systems) had to be significantly revised.

The reform agenda crafted, as a result of the GFC in particular, is premised on the notion of “financial stability”. To date, this is the prevailing prudential standard against which all macrofinancial developments are assessed. Within the regulatory community, we can clearly see this in the Basel 3 Accord, the new standards for financial market infrastructures (FMI), the requirement for transparency in over-the-counter (OTC)

derivatives and in repos, the enhanced standards for market governance and Board of Directors responsibilities, as well as the institutionalization of consumer protection and financial literacy norms as part of prudential requirements.

For all of its significance, there is, in fact, much that has to be learned about financial stability. This takes me back to my *second* reason for highlighting portfolio theory. Specifically, the basic portfolio model represents the current thinking of the *Bangko Sentral ng Pilipinas* (BSP) with respect to systemic risk. As will be apparent below, we view systemic risk as akin to portfolio risk. Given the decisions that agents make, the possibility of systemic risk boils down to the correlation term ρ_{ij} . If there is no statistical correlation—comingling, if you wish—between risks, then the overall risk is simply the simple sum of stand-alone risks. If, however, ($\rho_{ij} \neq 0$), then the resilience of the financial system extends beyond both the risks that we know and how these risks behave.

This is the main gist of this paper. It will focus on how the pursuit of financial stability has altered the architecture of the financial market from the perspective of regulatory authorities. This, in turn, changes some of the dynamics with and among financial market agents, and it has a corresponding impact on the financial consumer.

Recent crises and why they matter for financial market resilience

Our understanding of the behavior of banks is certainly central to our thought process for achieving financial market resilience. Banks, after all, manage the bulk of financial market resources and provide a high percentage of the term funding needs of corporations. Following the typology of financial systems as has been discussed by, for example, Levine (2002) and Allen and Gale (1999), the Philippines is very much bank-based rather than a market-based financial system.

One would naturally argue, then, that the resilience of our financial market would considerably depend on the “health” of the banking

industry.⁴ As noted above, that would essentially point to the Basel Accord and its attendant risk-based guidelines. However, for all the prudential intent to “identify, measure, monitor, and control risk”,⁵ the global financial market found itself on the brink of collapse. Something was clearly overlooked by the prudential framework, and/or there are aspects of financial risks that are, in hindsight, not yet well understood after all.

Lessons from the AFC

In hindsight, the 1997 AFC reinforces the view that banks respond proactively to the incentive structure of the market. With exchange rates largely fixed and offshore interest rates lower, the incentive was to borrow in foreign currency terms just as there was an incentive for capital to flow into the region.

Several papers have commented on the triggers for the crisis. Corsetti et al. (1999, p. 36), for example, argued that much of the capital inflow was intermediated through banks because equity and fixed income markets in the region were largely underdeveloped. They present data to reflect a confluence of overborrowing, overlending, and undercapitalized banking. They further noted that: “Figures suggest a serious mismatch between foreign liabilities and foreign assets of Asian banks and nonbank firms. Domestic banks borrowed heavily from foreign banks but lent mostly to domestic investors.”

Many scholars focused on structural macroeconomic imbalances as the key lessons from the AFC.⁶ There were those, however, who focused on bank balance issues, specifically on currency mismatches, maturity mismatches, and

⁴ One should be careful though not to interchange “resilience” with “growth”. The results of Levine (2002) show that financial development and growth are correlated (as they are expected to), but the distinction between bank based versus market based does not lead to any robust conclusion that one or the other is the optimal structure with respect to financial development.

⁵ This phrase was repeatedly used in “Core Principles for Effective Banking Supervision” (October 2006). In the September 2012 enhancement of the Core Principles document, the phrase has since been expanded into “identify, measure, evaluate, monitor, report, and control or mitigate” when referring to various risks.

⁶ For examples, see Mishkin (2000) and Frankel (1999).

excessive risk taking. According to Hale (2011, pp. 2–3):

“borrowers accumulated large currency mismatches on their balance sheets. Their liabilities were mostly denominated in dollars, while their assets were, to a large extent, denominated in domestic currency.

East Asian financial systems were subject to two additional risk factors: maturity mismatches due to liabilities that were predominantly short term and assets that were much longer term or illiquid, and excessive risk taking.

East Asian countries experienced severe banking crises. Nonperforming loan ratios skyrocketed because of prior excessive risk taking, and most banks had to be recapitalized by their governments.”

None of the above are untrue. Indeed, evidence shows that banks aggressively built their loan portfolio, took advantage of the fixed exchange rate to borrow in foreign currency terms to lend in local currency, and took the gapping risk of borrowing in short-term tenors and created longer-term—largely illiquid—credits.

The difficulty with this reasoning is that these are precisely the things that banks do: they create liabilities against themselves to fund assets and undertake maturity transformation in the process. Banks are, therefore, highly leveraged entities. Because their business model is to operate on “spreads”, their norm is necessarily to operate as risk takers, recognizing further that banking products and services are largely homogenous such that each bank is a direct substitute to another.

Perhaps, then, the issue—as far as the resilience of each institution and of the market is concerned—is not whether there are risks but rather when and how this crosses into the realm of “excessive”. Unfortunately, this question is not a simple matter of volume of risk. Instead, it involves the quality of risk exposures and the channels through which these risks can coningle and evolve.

Lessons from the GFC

This was put into full view during the GFC. Just like the AFC, there has been a lot of *ex post facto* analysis of the whys and wherefores. The difference, though, is that some of the wounds from the GFC are still apparently not healed, and the massive reform agenda to address the identified weaknesses is still very much in progress.

What we do know is that one cannot overlook the fact that the “Great Moderation” preceded the United States (US) mortgage crisis that then evolved into the GFC. As Cooley (2008) observed:

“So how did we get from the Great Moderation to the Great Conflagration that we seem to be in now? It may turn out to be the case that we are still in a low volatility world—but I wouldn’t bet on it.

There is another, deeper possible link between the Great Moderation and the financial crisis that is worth thinking about, because it may help to inform the financial regulation of the future. The idea is simply that the decline in volatility led financial institutions to underestimate the amount of risk they faced and overestimate the amount of leverage they could handle, thus, essentially (though unintentionally) reintroducing a large measure of volatility into the market.

Risk managers are supposed to address these problems with stress testing—computing their value at risk assuming extreme events—but they often don’t. The result was that firms vastly overestimated the amount of leverage they could assume, and put themselves at great risk. Of course, the desperate search for yield had something to do with it as well, but I have a hard time believing that the managers of Lehman, Bear Stearns, and others knowingly bet the firm on a systematic basis. They thought the world was less risky than it is. And so, the Great Moderation became fuel for the fire.”

Several writers have contributed their views on the lessons that should be learned from the GFC. From Arends' (2013) admonition that "the people in charge don't know much more than you" to the 10 lessons cited by Fischer (2011)⁷ and to the more formal approach used by Claessens et al. (2010), there is a universal acceptance for the need to manage systemic risks, which involve significant challenges.

This view significantly alters our thinking on building financial market resilience. Instead of positing that the resilience of the market derives from the health of the component financial institutions, recognizing the prudential role of systemic risk suggests that the resilience of the market greatly influences the welfare of market stakeholders.

To see the nuance of this difference, consider again equation 6 as a representation of financial market health. Under the prior approach, our understanding of resilience would mean that containing the terms $\omega_j^2 \sigma_j^2 \forall j$ would be sufficient. Under the new approach, managing these stand-alone risks are necessary but not a sufficient condition for ensuring that σ_p^2 is effectively managed.

Furthermore, we need to consider the comingling of risks, $\omega_i \omega_j \sigma_i \sigma_j \rho_{ij} \forall i, j$, as well as the fact that overall health is actually nonlinear in the choices that agents make, $\omega_j^2 \sigma_j^2 \forall j$. The former highlights the point that there may be channels through which risks evolve and are propagated. Because we do not necessarily appreciate the full dynamics of the terms $\rho_{ij} \forall i, j$, it is reasonable to surmise that these channels are not well understood. However, we do need to appreciate $\rho_{ij} \forall i, j$ if we are to manage financial market resilience. This is complicated further by the fact that risks have this unfortunate characteristic of not being additive when taken collectively. Thus, if we are to think of financial market resilience, we need to think of the "systemic-ness" of risks, which raises the obvious challenge of (1) determining how risks

become systemic, (2) deciding who should oversee these systemic risks, and (3) defining the channels through which they evolve and are propagated.

The pursuit of financial stability

The preceding succinctly describes the financial stability agenda. The idea is to remodel the financial market architecture, where prudential standards and market-conduct expectations are clearly identified, nurturing the overall health of the financial system. This means that we are cognizant of systemic risks, ensuring that any possible buildup is addressed early on. To clearly distinguish this new prudential norm, financial stability risks are said to be managed through so-called "macroprudential policies".

The term "macroprudential" did not emanate from the reforms out of the GFC. According to Clement (2010), the term was first officially used by the Cooke Committee (which was the forerunner of the current Basel Committee on Banking Supervision [BCBS]) in June 1979. In that meeting, macroprudential policy was cited as a new field of interest of the committee because "microeconomic problems (which were of concern to the committee) began to merge into macroeconomic problems (which were not)."⁸

In contemporaneous use, the term macroprudential policy has taken a different flavor. From the standpoint of the International Monetary Fund (2011, p. 7): "Macroprudential policy uses primarily prudential tools to limit systemic or system-wide financial risk, thereby minimizing the incidence of disruptions in the provision of key financial services that can have serious consequences for the real economy, by (1) dampening the buildup of financial imbalances; (2) building defenses that contain the speed and sharpness of subsequent downswings and their effects on the economy; and (3) identifying and addressing common exposures, risk concentrations, linkages, and interdependencies that are sources of

⁷ Lesson 4 cites the necessity for macroprudential supervision, but Lesson 10 also reminds to "never say never".

⁸ *Ibid*, citing the minutes of the June 28–29, 1979 meeting of the Cooke Committee. The specific context was the concern over rapid lending to developing economies and what its macroeconomic impact would be.

contagion and spillover risks that may jeopardize the functioning of the system as a whole.”

There are many other papers that define macroprudential policy, but they all eventually talk about mitigating systemic risks and/or addressing procyclicality. Constancio (2016), for example, noted that “the ultimate objective of macroprudential policy is to prevent and mitigate systemic risk, which includes strengthening the resilience of the financial system and smoothening the financial cycle.”

Constancio (2016) further noted that while many systemic risk indicators have been proposed since the GFC, many of these have “a ‘microlevel’ dimension dedicated to calculate the contribution of significant institutions to systemic risk”. These, he found, are not useful in predicting future systemic risk levels because they are more specific measures rather than holistic of the market.

With all that has been written about macroprudential policy and attendant tools, the next question would be: Is the pursuit of financial stability well underway? The answer is both yes and no.

Financial stability is underway because the global reform agenda post-GFC is structured precisely in its pursuit. In every publication, one can clearly discern the prescribed intention to reduce the possible buildup of systemic risks. We see this in the Basel 3 Accord, which sets the prudential bar higher, coupled with the updated supervisory guidelines set by the BCBS Core Principles for Effective Banking supervision. The same is evident in the reform of FMI and the OTC derivatives market, where the new standards aim to ensure that risks do not emanate from inefficient FMIs or the opaqueness of bilateral derivative transactions. We see this as well in the revisions in the guidelines for board and management behavior, so that there are no incentive incompatibilities that can lead to excessive risk taking or outright malfeasance.

What impedes financial stability, however, are specific challenges in execution. Operationally, three issues are often raised.

Defining financial stability

While macroprudential policy has evolved into a more systemic-risk-centric concept, it turns out that the idea of financial stability is difficult to define. A working group under the aegis of the Bank for International Settlements (BIS) undertook a review of the issues and found that there is no universal definition for what constitutes as financial stability.⁹ As presented in the report, various definitions can be categorized according to: (1) defining preconditions (rather than outcomes), (2) the absence of the negatives, (3) definitions that reflect the outcome of smooth functioning markets and institutions, (4) those where robustness to shocks are the key tenets, (5) those combining smooth functioning with robustness, and (6) those that refer to specific objectives.

Since the publication of that report, nothing much has changed in terms of the definition of financial stability. Among its alternative definitions is “the absence of instability”, which is actually practical because everyone is aware of the consequences of such instability, particularly after the GFC and the European debt crisis that followed after. However, as Gadanez and Jayaram (2009, p. 366) noted, defining it this way neglects the “positive contribution of a well-functioning financial system to overall economic performance”.

In addition, there will be considerable dependencies among stakeholders to ensure such stability. This is why the European Central Bank (n.d.) defines financial stability “as a condition in which the financial system—intermediaries, markets, and market infrastructures—can withstand shocks without major disruption in financial intermediation and in the general supply of financial services.”

Stated in this manner, it seems to be about the resilience of the financial system. This raises the point, though, of how one can distinguish between

⁹ This is according to a report—titled “Central Bank Governance and Financial Stability”—prepared by the Central Bank Governance Group, which was chaired by Stefan Ingves, governor of Sveriges Riksbank, and issued in 2010. The initial version was meant for restricted circulation among Central Bank governors. The second version was made public and released by the BIS in May 2011.

the microprudential requirements of both banking supervision and payments systems versus the macroprudential focus of financial stability. There is also no explicit reference to macroeconomic conditions—as was the case with the Cooke Committee—or the time consistency issues that typically arise in dynamic macroeconomic analysis.

Outlining the five key principles in defining financial stability, Schinasi (2004) argued that financial stability is a dynamic concept where financially stable outcomes at one point in time may turn out to be more or less stable at another point despite having the same parametric conditions. He added that disruptions in the financial market need not all be considered financial stability issues unless there is a threat of damage to economic welfare in general. Like other writers, Schinasi noted that achieving financial stability cannot depend merely on “the absence of instability” and must require that all aspects of the financial market are functioning.

The five principles outlined by Schinasi (2004) are useful because they address several key considerations. They allow us to distinguish between sectoral/industry disruptions from those we can classify under financial stability while recognizing the complex dependencies that must “work together” to ensure a smooth-functioning market. Because his definition requires stability to proactively avoid vulnerabilities, he is likewise able to focus on the resilience of agents from shocks and the achievement of the desired outcome for financial services.

Measuring systemic risk and unique macroprudential tools

Schinasi (2004) does raise the issue, though, that the relationships across agents are dynamic, which means that the context of financial stability will change over time. This is a critical concern because it suggests that financial stability is a moving target. That makes it difficult to parametrize.

In fact, the bigger concern is whether we have settled on how we measure systemic risk, the

very outcome that financial stability—however it is defined—desires to mitigate. It turns out that systemic risk itself is not a scalar concept. In the first working paper (Bisias et al. 2012, p. 1) published by the Office of Financial Research (OFR),¹⁰ they presented 31 indicators for systemic risk. This was not meant to be an exhaustive list but was driven by research and policy considerations. The paper noted that: “This partial listing of possible definitions suggests that more than one risk measure will be needed to capture the complex and adaptive nature of the financial system. Because systemic risk is not yet fully understood, measurement is obviously challenging, with many competing—and sometimes contradictory—definitions of threats to financial stability.”

Therefore, neither is there a universal definition of financial stability nor is there a consensus view on how to measure systemic risk. The result is that, in practice, many of the indicators used are existing microprudential metrics but deliberately applied with a macroprudential interpretation.¹¹ Ratios, such as loan-to-value and debt-to-income, and the whole slew of measures under the capital, asset quality, management, earnings, liquidity, sensitivity to market risk framework have long been used by banking authorities.

As noted earlier, Constancio (2016) expressed a view that using microprudential indicators for macroprudential purposes would not be satisfactory precisely because the complex dependencies and interconnectedness across variables are lost. Stated differently, we may have a better grasp of the dynamics of $\sigma_j^2 \forall j$, but we remain less informed of how $\omega_i \omega_j \sigma_i \sigma_j \rho_{ij} \forall i, j$ behaves across pairwise agents, across related risks, and across time. It is then reasonable to suggest that the state of play in this regard remains consistent with the report of the Central Bank Governance Group, where it states that “to date, no instrument uniquely suited

¹⁰ The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 established the OFR to support the Financial Stability Oversight Council, the council’s member organizations, and the public.

¹¹ For examples, see the Financial Soundness Indicators maintained by the International Monetary Fund (2013) and Israël et al. (2013).

for macroprudential policy has been deployed” (Constancio 2016).

Legal mandate and possible policy trade-offs

Regardless of how we define and measure the state of financial stability, it is undoubted that its intention is to ensure that financial markets function as they should, and any buildup of potential systemic-wide disruptions are mitigated well before they become contemporaneous concerns. This reiterates the extensive breadth and depth of the prudential focus.

Some jurisdictions have already formally inscribed a financial stability mandate, designating in the process the specific entities that are in charge. Within the European Union (EU), it is the European Systemic Risk Board (ESRB) that is tasked with the financial stability agenda.¹² In the US, the Dodd-Frank Act created the Financial Stability Oversight Council (FSOC) for this purpose.¹³

There are many other variants, however. In Australia, the Council of Financial Regulators (CFR) has been in place since 1998 and serves as a forum to coordinate on financial stability issues.¹⁴ In Singapore and Malaysia, specific legislation designates the central bank as the responsible agency for financial stability, while in Indonesia this is handled by the newly formed *Otoritas Jasa Keuangan* (i.e., Indonesia Financial Services Authority).

The legal mandate prescribed with a designated entity or the preference for collaboration among regulatory agencies is material to the extent that financial stability covers the entire gamut of

the financial market and its dependencies on the real economy. That would mean banking, securities, insurance, pension, derivative, asset management and other products, credit from nonbank sources (i.e., the so-called shadow banks), the payment system, the state of corporate sector leveraging, concentration type risks, cross-border dealings, and consumer protection issues, among others. It is categorically broad in breadth and depth, and there will always be some concern if the resulting policy recommendations are within the ambit of those who are working on financial stability.

A related concern is whether the pursuit of financial stability can conflict with other objectives. In the case of central banks, the flexible inflation targeting framework—and the embedded loss function—that is used for price stability purposes has a macroeconomic disruption aspect but not any explicit financial stability feature. This leaves open the possibility of conflicted outcomes.

Goodhart (2010, p. 8) has already argued that achieving price stability through the calibration of the policy interest rate “does not guarantee financial stability”. This is not just a technical issue of having one policy trigger for two problems (i.e., the mathematical equivalent, so to speak, of “two equations in one unknown”). To a fair measure, it likewise extends beyond the “bluntness” of interest rates as a policy tool versus the targeted needs of financial stability.

To be more precise, raising interest rates is the conventional prescription when monetary authorities believe there is too much liquidity in the system, which can raise inflation in the longer term. However, once interest rates are raised, there can be pass-on effects from the higher cost of credit, and the higher market yield will attract more cross-border capital inflows. In this case, the conventional monetary prescription may lead to perverse financial stability outcomes of higher price levels and more onshore liquidity. This is not to suggest at all that monetary policy is ineffective; rather, it highlights the frequently repeated point that financial stability does reflect complex and broad interdependencies.

¹² The ESRB was established in 2010 to oversee the financial system of the EU. It is responsible for the macroprudential oversight of the EU financial system, and the prevention and mitigation of systemic risk. The ESRB, therefore, has a broad remit, covering banks, insurers, asset managers, shadow banks, financial market infrastructures, and other financial institutions and markets (ESRB n.d.).

¹³ The FSOC has a clear statutory mandate that creates, for the first time, collective accountability for identifying risks and responding to emerging threats to financial stability. It is a collaborative body chaired by the secretary of the Treasury that brings together the expertise of the federal financial regulators, an independent insurance expert appointed by the president, and state regulators (US Department of Treasury n.d.).

¹⁴ The CFR is nonstatutory body made up of the Reserve Bank of Australia, the Australian Prudential Regulation Authority, the Australian Securities and Investments Commission, and the Treasury.

The possible issues are not limited to monetary versus financial stability. Institutions that perform auxiliary functions in the financial market—such as central depositories, trade repositories, trading platforms, OTC arrangements, and securities settlement systems (now collectively referred to as FMIs)—are central to the development of the financial market. Yet, how these FMIs link with the Real Time Gross Settlement (RTGS) system that is typically managed by the central bank is not well monitored in most advanced economies. Clearly, this is new ground for financial stability oversight even though these FMIs have long been in operation in some form or another in many jurisdictions.

Development of the capital market is yet another key advocacy. Pundits often cite the value of having active repo markets. Yet, the experience during the GFC is precisely that the opaqueness and contagion of these so-called shadow banking activities had a direct impact on propagating the crisis and extending its persistence.¹⁵ While there should not be any doubt in the value proposition of an active repo market toward cash and capital market development, the possibilities of financial instability from it should not be overlooked as well.

The Philippine experience

On the whole, financial stability is a work in progress, as several aspects remain unclear. However, two facets are abundantly evident: (1) the dislocations created by the realization of financial instabilities are significant, if not persistent, and (2) the global financial market architecture is being restructured under a blueprint that is geared specifically to

¹⁵ According to International Monetary Fund (2013, p. 42): “The term ‘shadow bank’ was coined by economist Paul McCulley in a 2007 speech at the annual financial symposium hosted by the Kansas City Federal Reserve Bank in Jackson Hole, Wyoming. In McCulley’s talk, shadow banking had a distinctly US focus and referred mainly to nonbank financial institutions that engaged in what economists call maturity transformation. Commercial banks engage in maturity transformation when they use deposits, which are normally short term, to fund loans that are longer term. Shadow banks do something similar. They raise (that is, mostly borrow) short-term funds in the money markets and use those funds to buy assets with longer-term maturities. But because they are not subject to traditional bank regulation, they cannot—as banks can—borrow in an emergency from the Federal Reserve (the US central bank) and do not have traditional depositors whose funds are covered by insurance; they are in the ‘shadows’.”

nurture a thriving financial market and to reduce the likelihood of financial instabilities.

Realizing the limits of what we fully comprehend at this point—which is euphemistically referred to as the “known unknowns”—is not treated as a binding constraint. Thus, jurisdictions move forward in their pursuit of financial stability despite the complexities of uncertainties because we have seen the certainty of what financial instability looks like in a market that is globalized and inherently interconnected.

The Philippines is no exception, and the effort has been initiated at two complementary levels.

Financial stability initiatives of the BSP

Article XII Section 20 of the 1987 Philippine Constitution designates the Central Bank of the Philippines, the precursor of the current BSP, as the central monetary authority. Under this mandate, it provides policy direction on matters related to money, banking, and credit while exercising supervision over banks and other designated entities.

As is the case with most central bank charters, the New Central Bank Act (Republic Act No. 7653) makes explicit that the primary mandate of the BSP is to “maintain price stability conducive to a balanced and sustainable growth of the economy”. In addition, the BSP operates the country’s Large Value Payment System, where the settlement is done directly through the demand deposit accounts of the banks.

As the monetary authority, banking regulator and operator of the country’s RTGS, the BSP already covers a lot of ground. Yet, despite recent positive developments,¹⁶ the BSP is cognizant that financial stability must be actively pursued if the gains of the past are to be sustained. We have been clear in the nuanced difference between financial system stability and financial stability, formalizing

¹⁶ The sovereign has been elevated to investment-grade status by the international ratings agencies on the face of strong macrofinancial performance. The banking system has been rated with a positive outlook by Fitch Ratings, the only such system to have done so for two consecutive ratings periods. Its efforts on making the banking industry more inclusive have been likewise recognized globally, while its regulatory environment has been cited by the World Bank for its “impressive focus on consumer protection”.

our initiatives in the latter through the creation of a high-level Financial Stability Committee (FSComm).

Chaired by the BSP governor, the FSComm includes the three deputy governors, the assistant governor for Treasury, the managing director for Monetary Policy, and the assistant governor for Financial Supervision Research and Consumer Protection,¹⁷ the latter serves as the head of the Technical Committee. The main Executive Committee convenes six times a year, while the Technical Committee meets weekly. Specific “workstreams” or working groups have been created to focus on specific concerns.

Among the first issues that the FSComm addressed was a working definition of “financial stability”. After due consideration of all the concerns and alternative approaches, the BSP formalized the following: “Financial stability is achieved when the governance framework of the market and its financial infrastructure enable and ensure the smooth functioning of the financial system conducive to sustainable and equitable economic growth.”

This definition subscribes to the framework outlined by Schinasi (2004). It reiterates the central need for the totality of the financial system to function as it is expected.¹⁸ This goes beyond the traditional demarcation of markets, institutions, and products but must necessarily include the infrastructure that is needed to execute and consummate transactions.

However, the financial market is inherently risky and prone to conflicts of interest; market conduct and overall governance are just as critical. All of these are interconnected—cross-sectional working dependencies, if you will—and their success must ultimately redound to a sustained intertemporal path of economic growth and welfare improvement.

¹⁷ The assistant governor for Financial Supervision Research and Consumer Protection has since been reassigned to head the newly created Office of Systemic Risk Management.

¹⁸ As explained in the concluding section, a functioning financial system is necessarily responsive to the needs of all financial consumers. This will necessarily be “inclusive” and one that espouses consumer protection.

Within this context, the agenda of the FSComm is structured to take a position on prevailing global and regional concerns. For example, mindful of the experience brought about by the Great Moderation and Minsky’s (1992) critique under his Financial Instability Hypothesis, we have workstreams that look into corporate leverage (particularly cross-border debt issues) and shadow banking in the context of real estate exposures (Danielsson et al. 2016).

Recognizing that the continued strength of the Association of Southeast Asian Nations (ASEAN) relative to the pronounced economic slowdown elsewhere provides an incentive for capital inflows; one other workstream is evaluating the effect on market liquidity and possible distortions in market prices. Extending on the issue of liquidity as a central reform initiative, one other workstream is focused on intraday liquidity issues within the context of the country’s FMIs. Not to overlook is another workstream focused on possible financial stability concerns brought about by increased interconnectedness due to ASEAN integration initiatives.

These workstreams are not an early judgement of vulnerabilities. They are, instead, proactive initiatives that intend to evaluate possible channels through which systemic risk may be transmitted. Laying the groundwork for the analysis allows us to better understand the interconnectedness among risks and to intervene at an early stage when warranted.

Financial stability as a collaborative undertaking among like-minded agencies

The work of the FSComm serves as inputs to the Financial Stability Coordination Council (FSCC). Composed of the Department of Finance, Bureau of the Treasury, the Securities and Exchange Commission, the Insurance Commission, the Philippine Deposit Insurance Corporation, and the BSP, the FSCC was established in October 2011 as a voluntary undertaking of the agencies to collaborate on financial stability issues.

The FSCC is, thus, similar to the nonstatutory structure of Australia's CFR but with the specific focus of the FSOC of the US or the ESRB of the EU. Any overlap in the focus of the FSComm and the FSCC is deliberate. As is the case with the former, the latter has workstreams on corporate leverage and real estate shadow banking, respectively. The initial analysis is done by the FSComm, with further collaboration undertaken at the FSCC.

A third workstream covers the broad array of risks emanating from capital market development. Pricing and valuation issues are the primary concern, as well-informed choices in the cash, capital, and contingent markets emanate from price-discovered, fully transparent market transactions. Unlike the securities-heavy financial market structure of the US, for example, there are specific challenges faced by the Philippine financial market in this area.

One can argue that developmental policy need not be a financial stability concern. This is accepted, and the intervention of the FSCC in this regard is from the perspective of the risks that arise when cash, capital, and contingent markets are not functioning properly, particularly in as fundamental a concern as pricing and valuation. The fallback is for the banking industry to carry the long-term funding needs of corporations even though the funding source of banks is heavily skewed toward savings deposits. As argued earlier, these gapping risks are indeed endemic to banking but without sufficient auxiliary support, these risks can easily escalate into systemic proportions.

FMI-related concerns are also under the purview of the capital market development workstream. Functioning markets require a viable and efficient "piping" for funds and securities to be transferred and transacted. Making sure that liquidity and operational risks are duly managed within the context of these FMIs is clearly an issue that is called upon by financial stability.

It may be worth emphasizing that the work program of the capital market reform workstream

is decidedly broad as it looks into critical aspects on pricing and valuation, market liquidity, and the requisite infrastructure support. To organize this program, the FSCC Executive Committee has approved the following principles, serving as the foundation of the reform initiatives:¹⁹

1. Institutionalizing transparency
2. Expanding the government securities market
3. Adapting global best practices and reform principles while adopting the same for execution to local requirements
4. Enhancing the capital market as a venue for raising capital and to provide investors with wider choices
5. Enhancing the surveillance of the capital market in line with established financial stability objectives

There is a fourth workstream—one that focuses on crisis management, recovery, and resolution. The value of this undertaking cannot be overemphasized, as it is important that regulatory agencies act together when market difficulties arise. However, the task of this workstream is not limited to the rules of engagement during "bad times". Such arrangements can only be understood well when there are corresponding rules in "good times". At a time when financial institutions venture into multiple product lines across the typical categorization of banking, securities, and insurance, having such guidelines formalized is certainly critical as far as pursuing financial stability.

While the FSComm has a Technical Committee, the FSCC has its Steering Committee as its equivalent. A periodic assessment of the macrofinancial market is conducted by the FSComm Technical Committee to identify possible vulnerabilities that may be brewing "under the surface". This is shared as an input to the Steering

¹⁹ This is based on the Executive Committee meeting held in August 2015.

Committee which may, at its discretion, update the assessment using inputs from other agencies.

A key difference, though, is that the Steering Committee stands as the standing committee for financial stability concerns over regional integration and the communication strategy of the FSCC.

The regional integration concern finds a counterpart in the FSComm workstream. However, the communication of financial stability-related issues is unique to the FSCC, which is rightly so given broad cross-agency considerations. This should not be mistaken as a public relations initiative. Rather, it has been established by many analysts and operationalized in many jurisdictions that communicating to targeted constituencies is a critical financial stability task in itself. Whether it is to inform about the actions that need to be taken, update on recent developments, or make transparent evolving concerns, the critical facet is to engage stakeholders so that well-informed choices can be made.

Moving forward: It has to be more than resilience

Putting all of the above together, the thesis of this paper is that financial system resilience can no longer be structured exclusively along the lines of submarkets and specific institutions that operate on their own in a safe and sound manner. The efficiency of the system as a whole cannot be evaluated simply by tracking the flow of funds from savers to borrowers or by evaluating the accession of savers into investors. And while price stability is undoubtedly a critical and necessary objective, it is perhaps not a sufficient condition if—and this point is central to the discussion—the preferred premise of overall financial market resilience is the effective management of systemic risks and system-wide disruptions.

This heightened focus on systemic risk is certainly an outcome of global events over the past decade and a half. The mortgage crisis in the US arguably ripened into the GFC, which then fed into and/or exacerbated the European debt crisis

that followed. The markets worldwide were glued to day-to-day developments, whether because the financial fortunes (somewhere and at some time) were deteriorating so quickly or because all of these spawned the age of “unconventional monetary policy”. Whether it was an identified subset of jurisdictions, such as the so-called GIIPS²⁰ or the specific situation of particular jurisdictions thereafter (i.e., Greece, more recently China, and certainly the US), analysts have been focused on trying to decipher what all of these mean for the global economy, almost without regard to whether or not a particular jurisdiction finds itself with the same macrofinancial predilection.

Academic literature has not been remiss in offering various measures for systemic risk, and so its very idea and its existence are certainly not new. But, clearly, recent generations have not seen the ramifications of the interconnectedness of products and institutions within the financial market, the evolving transmission channels between the real economy and the financial market, and certainly the linkages across jurisdictions. That is, until the world saw what instability would look like when the prevailing (old) financial architecture began to unravel.

From a policy perspective, it would seem that the authorities had the “right answers to the wrong questions”. The consensus view is that the global best practices up to the turn of the millennium had assumed that strong individual institutions with a clear understanding of their own balance sheet would create healthy markets. The macrofinancial dislocations over the past decade and a half highlighted the fact that “something else” was missing. That “something” turns out to be an explicit and deliberate focus on systemic risks. This is a top-down view that contrasts with the previous bottom-up approach. Instead of looking at strong institutions to deliver functioning markets, we now want to ensure that systemic dislocations do not infect market stakeholders.

²⁰ GIIPS refers to Greece, Italy, Ireland, Portugal, and Spain.

This defines the pursuit of financial stability as the *de facto* and overarching prudential policy directive. Given its espoused objectives, it would seem that we now are asking the “right questions”. Based on the discussions on this paper, we now know that we do not know everything that we would want to know.

There are a number of issues that are within the FSComm and FSCC radar screen. For purposes of connecting financial stability back to market resilience, it is useful to summarize these under 4Cs.

CL-2 risks

Financial stability is a work in progress. We are clear that we want to address the buildup of systemic risks, but we are not quite sure how this is supposed to be universally measured or through what channels such risks actually evolve. At both the FSComm and the FSCC, these are clear challenges, but they do not constrain us from moving forward. Operationally, we focus on four risks, which collectively we refer to as “CL-2 risks”: credit concentration, contagion, liquidity, and leverage.

We believe that CL-2 risks need to be effectively managed if we are to achieve financial stability, as we have defined formally. These risks, in our view, are the main risks that will define an outcome of instability. All four do not have to be evident on every concern; however, they are not only the most probable to exist but also the most likely to comele and evolve into systemic proportions.

The prolonged low interest rate environment has incentivized increased leverage both onshore and cross-border. The financial stability risk here is not necessarily the volume of credit but more so the credit underwriting standards that were used in deploying the credit. Should interest rates reverse (e.g., with the looming rise of the US Federal rate), what would be the risk exposure to repricing risk and how systemic would such effects be? Stress tests and network analysis are currently being used

by the FSComm and FSCC to anticipate its likely impact and to recommend any intervention the evolving situation warrants.

Interestingly, the low interest rate environment has not clearly succeeded in jump-starting major economies. Instead, the prognosis continues to be a slowdown in global growth in most economic groupings, except perhaps in the ASEAN. Would Philippine growth be compromised then with its external weaknesses? Can local demand compensate? The financial stability concern is not so much whether growth rates would hold but rather what it may mean if they do not (or if they do). Through what channels and what timing should we expect the changes, either a slowdown or some offsetting effects? What would these mean to gross incomes and their capacity to pay contracted debt obligations?

Although the rest of the world may experience an economic slowdown, ASEAN jurisdictions seem to at least hold their growth paths or, at worst, feel a slight slowdown but still significantly higher than in most other jurisdictions. This would suggest that capital inflows into the ASEAN is the norm for the foreseeable future and with that the effect of the added liquidity on financial prices. Have the recurring inflows made onshore financial prices diverge from their economic fundamentals? Are our existing measures of market liquidity even still relevant, or do we need new ones to look at the financial stability concerns?

Consumer concerns:

Literacy, inclusion, and protection

The same low interest rate environment has nurtured investors’ search for higher yields. It is not clear, however, if those who are seeking higher yields also accept that this typically means higher risks—both in its usual risk-return trade-off context and under the new regime of “loss absorbency” under the Basel 3 framework. Studies conducted by the Organisation for Economic Co-operation and Development (OECD) suggested that the effects of the GFC were magnified because

investors did not fully understand *ex ante* the risks that they were taking, which then materialized *ex post*. In this light, financial literacy is defined by new global standards as a financial stability issue and not a lip service that is otherwise a nice-to-have auxiliary.

But a financial literacy program will not roll out by itself. It has to be designed and coordinated. This is not a trivial task considering our socioeconomic differences across the archipelago. This is actually “aggravated” by the fact that several rounds of surveys put our financial literacy results at surprisingly low levels, even among those who consider themselves “financial experts”.²¹

In this context, a National Strategy for Financial Education is currently being drafted. The idea is to have core messages that can be further calibrated to address the specific needs of various constituents across the archipelago. This will also be a complement to the National Strategy for Financial Inclusion (NSFI) that was already launched with no less than Her Majesty Queen Maxima of the Netherlands in attendance.²²

Just like financial literacy, financial inclusion cannot be left as a buzzword. It is critical to our financial stability because we do want our financial market to serve its purpose, which is to respond to the needs of financial consumers—and not the other way around—including those who are currently financially excluded or underserved

by the formal markets because of geographical location or socioeconomic circumstance. Our ventures into alternative delivery channels, such as electronic banking, value-chain financing, and a calibrated regulatory framework for microfinance, are concrete steps in this direction.²³ These nurture inclusion and endear financial stability.

With BSP’s commitment to advocate financial literacy and financial inclusion, we need to solidify this intervention by ensuring that there is an appropriate consumer protection framework. Again, the analytical support for this is found in several OECD studies. Taken together, financial literacy, financial inclusion, and consumer protection represent a triumvirate that not only is useful as a consumer welfare intervention but also furthers financial stability.

This is so because we can only sustain stability over time if we have consumers who can make well-informed choices. Different individuals are under different circumstances and will, thus, make differentiated choices. What is important is that the process of informed decisionmaking is ingrained in their behavior.

Over time, this will redound to improvements in their financial well-being—balanced against the periodic need for redress and protection against malfeasance—and this measured improvement in financial well-being itself fuels financial stability. This is the very point of arguing that issues relevant to financial stability must have an impact on economic development. We need to be explicit, however, that such impact is not just at the aggregate macrolevel but must be felt directly at the agent-stakeholder level.

Cross-border issues

Another facet that will have a direct impact on achieving our financial stability and the smooth functioning of our financial market is the ongoing initiative to integrate the ASEAN. While ASEAN integration is happening at various levels, focusing

²¹ The report, *Enhancing Financial Capability and Inclusion in the Philippines*, which was published in July 2015 and was based on the World Bank National Financial Capability Survey conducted in 2014, showed that, on average, Filipino adults were able to answer less than half (3.2) of the seven financial literacy-related questions correctly. Only 2 percent answered all seven questions correctly, while 10 percent did not get any of the seven questions correctly. Another survey—the SOLAR FLARE Financial Literacy Advocacy Report 2013 by Sun Life of Canada Philippines, Inc.—showed that 20 percent of the respondents claim to be experts in money matters, but only 8 percent scored above 80 percent in the financial literacy quiz.

²² Her Majesty is the United Nations Secretary-General’s Special Advocate for Inclusive Finance for Development. The NSFI is a collaboration among the BSP, Commission on Filipinos Overseas, Cooperative Development Authority, Department of Budget and Management, Department of Education, Department of Finance, Department of Social Welfare and Development, Department of Trade and Industry, Insurance Commission, National Economic and Development Authority, Philippine Deposit Insurance Corporation, Philippine Statistics Authority, and Securities and Exchange Commission. On June 2, 2016, Executive Order No. 208 was issued to institutionalize the Financial Inclusion Steering Committee (FISC)—the governing body that provides strategic direction, guidance, and oversight in the implementation of the NSFI. The FISC consists of government agencies instrumental in crafting the NSFI.

²³ The Economic Intelligence Unit’s 2015 Global Microscope on Financial Inclusion ranked the Philippines as first in Asia and third in the world in terms of regulatory environment for financial inclusion.

on the ASEAN Financial Integration Framework is warranted.

This has several component undertakings, but—broadly speaking—we are looking at the integration of the banking, securities, and insurance markets, respectively, as well as the payments and settlement systems. The challenge, of course, is that ASEAN jurisdictions are at varied levels of development in each of these different facets. While the objective falls short of the structure of the euro zone, one has to recognize that institutionalizing various modes of integration will necessarily open up local jurisdictions to intra-ASEAN contagion.

There could be several channels for possible contagion. The payment systems of the 10 jurisdictions need to be functionally linked to be able to execute any semblance of a regionally harmonized financial market.²⁴ Glitches in information technology will be a risk, but the failure to settle obligations cross-border as they fall due could be systemic depending on how the dependencies across transactions—either trade for trade or in some form of a queue—will be structured. Difficulties confronted by a qualified ASEAN bank (QAB)²⁵ operating in a host jurisdiction could be another channel of contagion if the needed intervention is delayed. Moreover, opening up capital (securities) and contingent (insurance) market products for intra-ASEAN execution should have the needed support mechanisms (i.e., from appropriate financial literacy and consumer redress mechanisms to clearing and settlement arrangements as well as macroeconomic policies for managing the regionalization of currencies) if the region is to fully accrue its benefits.

This is *not* to argue that regionalization is a net negative externality. It is a reminder, however, that cross-border dealings have the potential for introducing episodes of financial instability, no different from purely onshore transactions. The objective is to remain vigilant of these risks and monitor the channels through which they can have a pass-through effect.

The complexity of this last statement, however, is easy to overlook. If we face a challenge with defining our measures for systemic risk in an onshore context, how then does one proceed with cross-border engagements? For now, that would mean first defining measurable milestones for the regionalization initiative and then extending our monitoring tools for cross-border purposes. This will be an evolving initiative that will be rather data intensive.

It also reminds us of nonstationarity and time inconsistency as a key element of financial stability. It is difficult to think of financial stability in a purely domestic setting; now we have to execute this for a region that is defined by its socioeconomic differences, which forms part of its value proposition of being stronger together than apart. Quoting Hill and Menon (2010, p. 1):

“[ASEAN] is a region of great diversity, probably more so than any other group in the world. Indeed, its economic, political, cultural, and linguistic diversity is greater than that of the European Union, for example. This diversity was accentuated by colonial experiences, with Brunei Darussalam, Malaysia, Myanmar, and Singapore part of the British empire; Cambodia, the Lao People’s Democratic Republic (Lao PDR), and Viet Nam annexed by the French; Indonesia ruled by the Dutch; the Philippines under first Spanish then American rule; while Thailand was never formally colonized. Political structures are equally diverse, including freewheeling democracies (Cambodia, Indonesia, Philippines), communist states (Lao PDR and Viet

²⁴ Whether the systems are interoperable (i.e., effectively operating as a single system but through remote sites) or interlinked (i.e., will have access to each other although each domestic system can be different from another) remains to be seen. However, in the absence of any linkage, direct cross-border financial transactions cannot occur because one has to be in a jurisdiction to be able to execute a transaction in that jurisdiction.

²⁵ Under the ASEAN Banking Integration Framework, a QAB is a bank from a home ASEAN jurisdiction that is permitted to operate in a host ASEAN jurisdiction. This QAB shall meet certain standards before it can be accepted by the host regulator, but, in return, the QAB enjoys the same treatment as a domestic bank in the host jurisdiction.

Nam), a constitutional democracy with a highly influential monarchy (Thailand), heavily managed democracies with one party in continuous rule since independence (Malaysia and Singapore), a military-dominated authoritarian state (Myanmar), and an all-powerful sultanate (Brunei Darussalam).

ASEAN includes one very wealthy nation (Singapore) alongside some of the world's poorest. The per capita income of the richest is about 80 times that of the (imperfectly measured) poorest. It includes the world's two largest archipelagic states (Indonesia and the Philippines) together with Singapore's city-state, and the tiny oil sultanate of Brunei Darussalam. It includes the world's fourth most populous nation (Indonesia), three states with populations between 60 and 90 million people (Philippines, Thailand, and Viet Nam), while Singapore and Lao PDR have less than five million people; Brunei Darussalam less than half a million."

Capacity building

In laying out this framework, the proponents openly accept the reality that "known unknowns" is the norm at this juncture. We believe that recent episodes of financial instability played out at the global stage should never be a viable alternative. While we may not know *a priori* the extent of any systemic shock bred onshore, we do realize that financial authorities do not have the blank check that Troubled Asset Relief Program provided or the resources that unconventional quantitative easing requires.

We also believe that financial markets today are much more complex because of the interconnected dependencies within the financial market, with the real economy and across other jurisdictions. This is the market architecture that we operate in today.

To reasonably move forward on nurturing financial market resilience through financial stability, there will have to be a committed effort

to continuously build capacity because we want to minimize what is unknown, maximize what is already known, and constantly challenge what we think we know.

Within the FSComm and FSCC, this effort is exemplified by our periodic assessment of brewing market volatilities and the institutionalization of our monitoring dashboard. There is no timeline for updating our appreciation of the dependencies and interconnectedness because it simply will have to be a continuing effort in line with the changing nature of financial stability.

At the level of the ASEAN Banking Integration Framework (ABIF), an ABIF Learning Roadmap (ALR) has been designed, principally crafted by subject matter experts from the BSP. This ALR takes a building-block approach, structured in four layers, of what is believed to be the necessary foundations of how financial market risks and risk contagion channels should be understood. The courses are to be handled by subject matter experts from ASEAN-5, and while the road map itself is principally targeted for authorities in BCLMV²⁶ jurisdictions, there should be nothing in the learning structure that will dissuade those from the ASEAN-5 jurisdictions to participate.

The ALR will be managed by the ABIF Working Committee through the South East Asian Central Banks. Like other components of the financial stability agenda, this ALR is a work-in-progress and should be updated as the region learns more from our own cross-border interactions and from our own domestic experiences.

Final thoughts

This paper reexamines the context of pursuing and achieving financial market resilience. The enduring lesson from the dislocations that played out at the global stage over the past decade and a half is that something is significantly and critically amiss when we simply rely on the market components to make the whole market "resilient". Hence, the classic

²⁶ BCLMV refers to Brunei, Cambodia, Lao PDR, Myanmar, and Viet Nam.

approach to financial market supervision—and, more generally, the context of central bank policy actions—needed to be reevaluated in light of the massive costs arising from the global crisis.

That “something” is “systemic risk”, and the point is that there should be explicit recognition and oversight of such systemic risks, over and above the traditional focus on microprudential issues. This is the prudential objective of financial stability, and the full array of global reform initiatives is explicitly geared toward this overarching standard.

With 20-20 hindsight vision, it is not difficult to appreciate the need for financial stability. While the crisis and its socioeconomic consequences speak for themselves, the world simply seemed to have forgotten the most fundamental tenet of financial markets: finance is intrinsically underpinned by the workings of risks that do not have the convenient properties of either being always evident or being additive.

Why are brewing risks not evident? Long periods of relative stability (i.e., the so-called period of the Great Moderation in the US) gave agents the comfort that markets had stabilized and that there were no reasonable grounds to believe that any shock was forthcoming. It turns out, as Minsky (1992) had argued, that it is ironically possible that “stability is destabilizing” and there is now empirical validation that this is so.

And why does it matter that risks are not additive? It is the totality of risks that will systematically impinge upon the market as a whole, and not knowing the full extent of interconnected risks means that agents (i.e., regulator, intermediaries, and financial consumers) are effectively underestimating and underpricing risks. This misrepresentation of risks and the actions that agents take as a result of the results that they see are the seeds of risks materializing into crisis proportions.

This agenda of financial stability is, thus, reshaping how financial authorities are approaching market governance and policy formulation. There is still a lot of “known unknowns”, but not taking

concrete action is no longer an option. Already, several prominent experts are on record arguing for central banks to make financial stability an explicit mandate (Eichengreen et al. 2011) or at least recognizing the need for a macroprudential policy framework within central banks, as monetary policy alone will not be able to address the challenges that were highlighted by the global crisis.²⁷

In the Philippines, work in this area is underway through the FSCC. Although the country’s financial market has avoided many of the issues that were evident throughout the global crisis, this strength does not make us immune from further systemic risks. The work then of the FSCC is not only to ensure resilience of our market but also to build up the gains that we have already achieved. This is the very essence of financial stability.

References

- Allen, F. and D. Gale. 1999. *Comparing financial systems*. Cambridge, MA: Massachusetts Institute of Technology Press.
- Arends, B. 2013. Six lessons you should have learned from the financial crisis: Are we any wiser than we were five years ago? *Wall Street Journal*. New York, NY: Wall Street Journal. <https://www.wsj.com/articles/SB10001424127887324665604579081223815849080>.
- Bernanke, B.S. 2015. *Should monetary policy take into account the risks to financial stability?* Washington, D.C.: Brookings Institute. <https://www.brookings.edu/blog/ben-bernanke/2015/04/07/should-monetary-policy-take-into-account-risks-to-financial-stability/>.
- Bisias, D., M. Flood, A.W. Lo, and S. Valavanis. 2012. A survey of systemic risk analytics. OFR Working Paper No. 0001. Washington, D.C.: Office of Financial Research, US Department of Treasury.
- Claessens, S., G. Dell’Ariccia, D. Igan, and L. Laeven. 2010. Lessons and policy implications from the global financial crisis. IMF Working Paper No. 44. Washington, D.C.: International Monetary Fund.

²⁷ For examples, see Goodhart (2010); Fischer (2011); Yellen (2014); and Bernanke (2015).

- Clement, P. 2010. The term macroprudential: Origins and evolution. *BIS Quarterly Review*. Basel, Switzerland: Bank for International Settlements.
- Constancio, V. 2016. Principles of macroprudential policy. Speech delivered at the ECB-IMF Conference on Macroprudential Policy, April 26, Frankfurt am Main, Germany.
- Cooley, T.F. 2008. How we got here. *Forbes OpEd*. Jersey City, NJ: Forbes.
- Corsetti, G., P. Pesenti, and N. Roubini. 1999. What caused the Asian currency and financial crisis? NBER Working Paper No. 6833. Cambridge, MA: National Bureau of Economic Research. <http://www.nber.org/papers/w6833.pdf>.
- Danielsson, J., M. Valenzuela, and I. Zer. 2016. Learning from history: Volatility and financial crises. Finance and Economics Discussion Series 2016-093. Washington, D.C.: Board of Governors of the Federal Reserve System.
- Eichengreen, B., M. El-Erian, A. Fraga, T. Ito, J. Pisani-Ferry, E. Prasad, R. Rajan et al. 2011. Rethinking central banking. Committee on International Economic Policy and Reform. Washington, D.C.: Brookings Institution. <https://www.brookings.edu/research/rethinking-central-banking/>.
- European Central Bank (ECB). n.d. *Financial stability and macroprudential policy*. Frankfurt am Main, Germany: ECB. <https://www.ecb.europa.eu/ecb/tasks/stability/html/index.en.html>.
- European Systemic Risk Board (ESRB). n.d. *Mission and establishment*. Frankfurt am Main, Germany: ESRB. <https://www.esrb.europa.eu/about/background/html/index.en.html>.
- Fischer, S. 2011. Central bank lessons from the global crisis. Presented during a dinner lecture as governor of the Bank of Israel, March 31, Jerusalem, Israel.
- Frankel, J. 1999. Ten lessons learned from the Asian financial crisis. Remarks presented at the forum sponsored by the Korean Economic Institute of America at the World Bank.
- Gadanecz, B. and K. Jayaram. 2009. Measures of financial stability: A review. Irving Fischer Bulletin No. 31. Basel, Switzerland: Bank of International Settlements. <http://www.bis.org/ifc/publ/ifcb31ab.pdf>.
- Goodhart, C.A.E. 2010. The changing roles of Central Banks. BIS Working Paper No. 326. Basel, Switzerland: Bank for International Settlements. <http://www.bis.org/publ/work326.pdf>.
- Hale, G. 2011. Could we have learned from the Asian financial crisis of 1997–98? FRBSF Economic Letter. San Francisco, CA: Federal Reserve Bank of San Francisco.
- Hill, H. and J. Menon. 2010. ASEAN economic integration: Features, fulfillments, failures and the future. ADB Working Paper Series on Regional Economic Integration No. 69. Mandaluyong City, Philippines: Asian Development Bank.
- International Monetary Fund (IMF). 2011. Macroprudential policy: An organizing Framework. Washington, D.C.: Monetary and Capital Markets Department, IMF.
- . 2013. Finance and development. *Finance & Development* 50(2). Washington, D.C.: IMF.
- Israël, J., P. Sandars, A. Schubert, and B. Fischer. 2013. Statistics and indicators for financial stability analysis and policy. Occasional Paper No. 145. Frankfurt am Main, Germany: European Central Bank.
- Klein, M.A. 1971. A Theory of the Banking Firm. *Journal of Money, Credit and Banking* 3(2):205–218.
- Levine, R. 2002. Bank-based or market-based financial systems: Which is better? NBER Working Paper No. 9138. Cambridge, MA: National Bureau of Economic Research. <http://www.nber.org/papers/w9138.pdf>.
- Markowitz, H.M. 1952. Portfolio selection. *The Journal of Finance* 7(1):77–31.
- Minsky, H.P. 1992. The Financial Instability Hypothesis. Working Paper No. 74. Annandale-on-Hudson, NY: The Jerome Levy Economics Institute of Bard College.
- Mishkin, F.S. 2000. Lessons from the Asian crisis. NBER Working Paper No. 7102. Cambridge, MA: National Bureau of Economic Research.
- Schinasi, G.J. 2004. Defining financial stability. IMF Working Paper No. 187. Washington, D.C.: International Monetary Fund.
- United States (US) Department of Treasury. n.d. Financial Stability Oversight Council. Washington, D.C.: US Department of Treasury.
- Yellen, J.L. 2014. Monetary policy and financial stability. Speech delivered at the 2014 Michel Camdessus Central Banking Lecture, July 2, International Monetary Fund, Washington, D.C.



MACROECONOMIC
RESILIENCE

Can Cheap Oil Hurt Net Importers? Evidence from the Philippines*

Arlan Z.I. Brucal and Michael R.M. Abrigo

Abstract

Conventional wisdom suggests that oil price increases have a negative effect on the output of oil-importing countries. This is grounded on the experience of the United States between 1940s and late 1980s where recessions were generally preceded by oil price increases. This paper evaluates the impact of oil price shocks on the Philippines—a developing country and a net oil-importing economy. Following Kilian’s (2008) structural decomposition of real oil price change, we find indications that the recent oil price decline may have lowered the Philippine economy’s output growth, potentially due to the economy’s reliance on remittances from abroad and the export market.

Introduction

With its history of ups and downs, oil price has been in its deepest decline since the 1990s. Brent crude oil generally increased from about USD 20 per barrel in 1991 to more than USD 110 per barrel by mid-2008 before it slid down to less than USD 50 per barrel at the end of the year. It stabilized at USD 110 per barrel from 2010 to mid-2014 before it plunged by more than 50 percent

by mid-2015. As with any other major economic phenomenon, the sharp declines in the global crude oil price will create winners and losers.

Conventional wisdom suggests that unanticipated oil price increases have a positive effect on the output of oil-exporting economies while reducing that of oil-importing economies. Assuming the effect is symmetric, an unanticipated drop in the price of oil should be seen as a boon for net oil-importing economies and a bane to net oil exporters. This notion is supported by a number of studies, including the recent study by Oxford Economics (Bullockford and Sterne 2015), which postulated that the recent decline in oil prices increases gross domestic product (GDP) growth for most importing countries, with the Philippines gaining the most of the oil price slump, while Russia suffers at the bottom.

A major limitation of earlier studies, including the recent Oxford Economics analysis, is that they take oil price shocks as exogenous.

* This study benefits from helpful comments from Michael Roberts, Peter Fuleky, and participants to seminars/conferences held in Hawai’i and the Philippines. Mr. Brucal acknowledges support from the Grantham Foundation and the Economic and Social Research Council through the Centre for Climate Change Economics and Policy.

Modern literature recognizes that price shocks are symptoms of more fundamental economic developments that drive demand and supply of oil (Barsky and Kilian 2002, 2004; Kilian 2009), with different drivers having different effects. For example, when oil and gas prices fall due to unanticipated increase in global supply of crude, people would have more money to spend on other goods and services. But when the world economy grows faster—for reasons unrelated to the global crude oil market—demand for crude oil grows, driving prices up including nonenergy goods. This inflationary effect may reduce consumption, thus, dampening the earlier positive effect of an oil price drop. Moreover, this complex dynamics of global crude oil market makes it extremely difficult to assess the causal effect of an oil price change on macroeconomic aggregates without disentangling the factors that drive oil price movement.

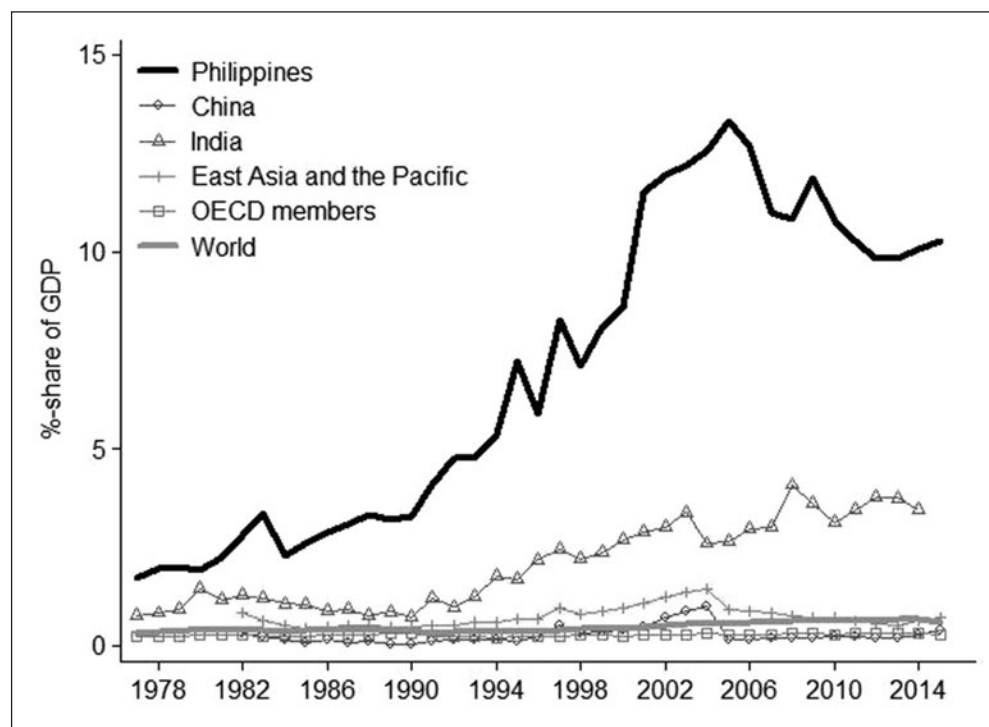
The notion that positive oil price change can have serious negative impact on oil-importing economies can also find basis from the experience of the United States (US) and other advanced countries. In a series of contributions, Hamilton (1983, 2009a, 2009b) provided empirical evidence for the negative relationship between oil price and the US macroeconomy. Meanwhile, Jimenez-Rodriguez and Sanchez (2005) and Jimenez-Rodriguez (2008) contributed to the literature by analyzing select Organisation for Economic Co-operation and Development countries, with results being generally the same with that of the US and only differ in magnitude. Surprisingly, only a few studies look into the effect of oil price shocks on emerging and developing economies, with limited focus on oil-importing economies. For example, Berument et al. (2010) analyzed the effect of oil price shocks on Middle East and North African countries, and found that oil price increases have: (1) positive impact on output in most exporting countries but (2) ambiguous effect on oil importers, depending on whether the price shock is driven by demand or supply factors.

Recent developments in the crude oil market reignited interest in providing global perspective to

the macroeconomic influence of oil price shocks. By using a two-country dynamic stochastic general equilibrium model, Bodenstein et al. (2011) illustrated that although oil importers experience a deterioration in the oil component of their trade balance, an improvement in the nonoil trade balance substantially dampens the effects on the overall trade balance. Kilian et al. (2009) empirically validated this theory by using a structural vector autoregressive (VAR) model of the global crude oil market. They found that the overall effect of an oil price shock on current account depends critically on the response of the nonoil trade balance, with oil-importing economies tending to experience an improvement in this balance and the opposite being the case for oil-exporting countries. Meanwhile, Rasmussen and Roitman (2011) found that the correlation of GDP and oil prices is positive. They also found that imports and exports move in the same direction as oil prices, which may be an indication that petrodollars gained by oil exporters during oil booms are likely to be recycled in the global economy through international trade. At the country-specific level, Mohaddes and Raissi (2013) found that oil price increases drive Jordan's output growth through their impact on external income and, in turn, on capital accumulation.

In this paper, we evaluated the dynamic impact of oil price shocks on the Philippine economy. Studying the Philippine economy in the context of oil shock–macroeconomy relationship offers a number of advantages. First, the Philippines is among the top developing economies in terms of share of imports to total energy use (Bulloford and Sterne 2015). Second, the Philippines has become increasingly reliant on external markets to boost its economy since the 1980s. For instance, in 2015, the country's exports made up more than 27 percent of its GDP, which is higher than the average share of middle-income countries. In 2014, the country ranked third in terms of the amount of personal remittances received from abroad, next to China and India. More interestingly, the share of personal remittances to total output is highest in the Philippines and significantly higher than the

Figure 1. Personal remittance, 1976–2015



GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development
Source: World Bank (n.d.)

world and regional averages (Figure 1). Third, the top destinations of most overseas Filipino workers are oil-exporting countries, such as Saudi Arabia, United Arab Emirates, Qatar, and Kuwait. Thus, one can expect that any disturbance to global crude oil that affects these oil-exporting economies will have influence on the growth of the Philippine economy through remittances. The country's energy dependence on oil imports and its reliance on external markets, particularly on remittances from oil exporters, make the Philippines an interesting case to empirically investigate the net effect of oil price shocks to a developing economy.

Our major results can be summarized as follows: First, contrary to recent popular views that supply shocks cause oil price to fall, we found strong evidence to suggest that recent oil price shocks have been predominantly driven by a combination of aggregate and precautionary demand shocks. Second, the magnitude, duration, and direction of response of the Philippine economy to oil price shocks highly depend on

whether changes in oil price are driven by supply or demand factors. Third, the recent oil price decline may have lowered the growth of the Philippines' services and goods exports and, ultimately, its output, which suggests that not all oil price drops are beneficial to net oil importers.

Empirical strategy

Historically, a number of researchers consider oil price shocks as exogenous. This is possibly because most of these shocks concurred with war-driven oil production shortfalls and geopolitical uncertainties in oil-exporting countries (Hamilton 1983; Guo and Kliesen 2005; Rahman and Serletis 2010; Melichar 2013). However, there is an increasing recognition that oil price shocks are associated not only with shocks on the current physical availability of oil but also with: (1) unanticipated changes in the aggregate demand and (2) shocks driven by uncertainties about the expected supply relative to the demand for oil (Barsky and Kilian 2004; Kilian 2009; Kilian and Murphy 2014).

Another evidence suggests that, since the late 1970s, exogenous changes in oil production are significantly less important in influencing global oil price compared to changes in precautionary demand for oil and global demand fluctuations (Kilian 2008). Macro aggregates may also have influence on oil prices. One channel is through monetary conditions, which may result in changes in the demand for oil and, eventually, in oil price (Barsky and Kilian 2002).

The endogeneity of oil price changes has implications on how researchers evaluate the influence of crude oil price changes on macroeconomic aggregates. Identifying the underlying demand and supply shocks in the global crude oil market helps us understand what is driving oil price changes and determine how macroeconomic aggregates are affected by different shocks influencing oil price changes (Kilian 2009). Hence, it is important to recognize the extent to which oil price changes are driven by one shock or another because it is plausible that different oil price shocks may have different effect on the Philippine macroeconomy.

In order to account for the potential endogeneity of crude oil prices, we used Kilian's (2009) VAR model to extract the underlying structural innovations behind each oil price shock (see equation 1). We updated the sample period up to 2015 to cover the most recent oil price changes. The model uses monthly data of $\mathbf{z}_t = (prod_t; rea_t; rpo_t)$, where $prod_t$ refers to global crude oil production from the Energy Information Administration (EIA); rea_t denotes the index of real economic activity derived from the bulk dry cargo shipping rate index developed by Kilian (2009); and rpo_t is the refiner's acquisition cost of imported crude oil provided by EIA and deflated by the consumer price index from the US Bureau of Labor Statistics, which serves as proxy to global crude oil price.¹ Except for rea_t , which is stationary by construction, all of the series are period-to-

period log-transformed differences. The sample period is 1974.1–2015.10. We removed seasonal variation by including monthly dummies in the specification:

$$A_0 z_t = \alpha + \sum_{i=1}^{24} A_i z_{t-i} + \varepsilon_t \quad (1)$$

As in Kilian (2009), the following exclusion restrictions are imposed to the reduced form errors, ε_t , in order to estimate the structural shocks underlying oil price changes:

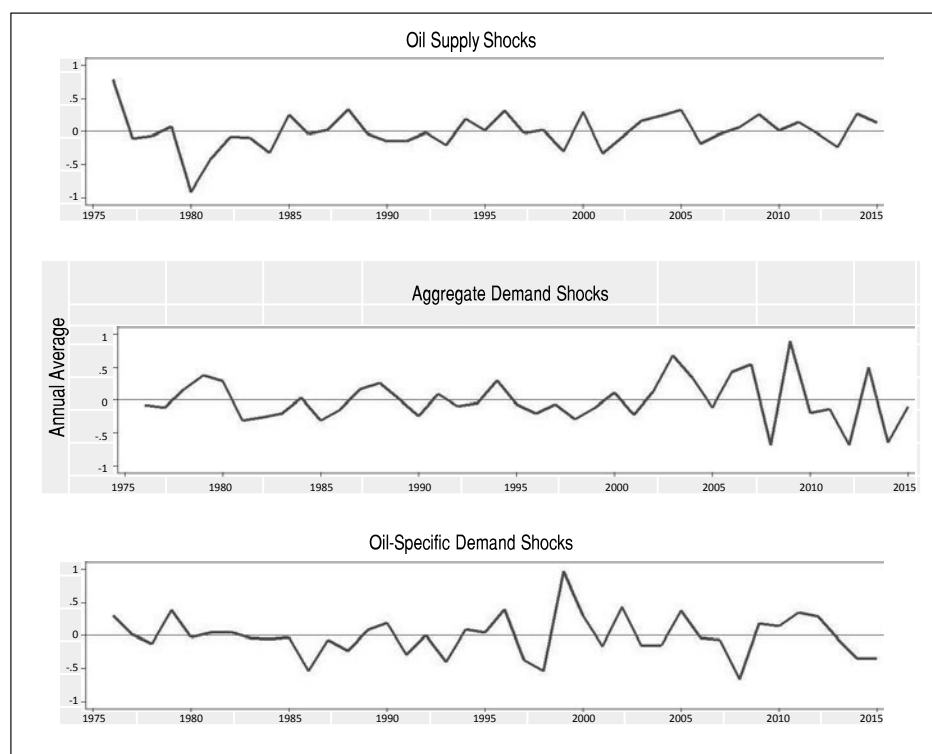
$$\varepsilon_t = \begin{pmatrix} \varepsilon_t^{prod} \\ \varepsilon_t^{rea} \\ \varepsilon_t^{rpo} \end{pmatrix} = \begin{pmatrix} \alpha_{11} & 0 & 0 \\ \alpha_{21} & \alpha_{22} & 0 \\ \alpha_{31} & \alpha_{32} & \alpha_{33} \end{pmatrix} \begin{pmatrix} \varepsilon_t^{oil\ supply\ shock} \\ \varepsilon_t^{aggregate\ demand\ shock} \\ \varepsilon_t^{oil-specific\ demand\ shock} \end{pmatrix}$$

where ε_t^k denotes the serially and mutually uncorrelated structural shocks in each VAR equation $k = 1; 2; 3$. The exclusion restriction implies the following: *Oil supply shocks* denote unanticipated innovations in global crude oil production and are assumed not to respond to any innovation in the demand for oil within the same month. The assumption reflects the slow response of global crude oil production to demand shocks because of costly adjustment in production and uncertainties in the future state of the crude oil market. Shocks to global real economic activity are referred to as *aggregate demand shocks*.² The exclusion restriction implies that oil-specific demand shocks, which increase oil price, will not lower real economic activity within the same month but only with a delay of at least one month.

This exclusion restriction is consistent with the sluggish response of major economies to major oil price increases observed in the sample period and in previous studies (e.g., Hamilton 1983). Finally, unanticipated oil price changes—here referred to as *oil-specific demand shocks*—denote shocks to changes in demand for crude oil not already captured by instantaneous shifts in aggregate demand for industrial commodities and supply of oil. These shocks include changes in precautionary

¹ Some studies use monthly price data of Western Texas Intermediate crude oil, while others use Brent crude oil as proxy to world oil price. We are agnostic as to which price data should be used, although these prices are highly correlated within the sample period.

² Kilian (2009) clearly distinguishes aggregate demand for industrial commodities in this context as opposed to aggregate demand for overall goods and services.

Figure 2. The historical evolution of the structural shocks, 1976–2015

Note: The figure illustrates the estimated structural residuals from the vector autoregressive model, averaged to annual frequency.
Source: Energy Information Administration [EIA] (n.d.); Kilian (2009)

demand for oil due to shifts in expectations about future demand relative supply of oil. For example, crude oil price started to escalate in 1979, even though there was no significant disruption in the global crude oil production. The increase in crude oil price in 1979 is associated with the outbreak of the Iran-Iraq War in 1980 (Kilian 2009).³ While the residual shocks in the model may also include other shocks (e.g., unexpected weather patterns and changes in references), there is evidence to support that the residual shock largely represents exogenous shifts in precautionary demand for oil.⁴

Figure 2 plots the historical evolution of the structural shocks implied by the VAR model. The shocks are expressed in annual averages for better readability. The spikes and drops in the figure capture the important oil price shocks in history, as documented by Kilian (2009) and Hamilton (2013)

³ The 1978–1979 Iranian revolution brought insignificant changes in the global production of oil, as Iranian cutbacks were more than offset by increased production elsewhere (Kilian 2009; Hamilton 2013).

⁴ For detailed discussion, see Kilian (2009).

and based on the recorded US recessions from the National Bureau of Economic Research. For example, there was a global oil supply disruption in 1980, which was associated with the outbreak of the Iran-Iraq War. Meanwhile, the years 1978, 1979, and 1980 experienced large positive economic shocks attributed to the growing global economy. There was also an unanticipated increase in oil-specific demand in 1979, which was consistent with the increased uncertainties on the future supply of oil due to geopolitical conflicts in the Middle East. These estimated structural shocks also capture the 2008 unanticipated fall in aggregate demand following the Great Recession, which also coincided with a drop in oil-specific demand due to low expectation on future demand for oil. In 2014, US oil production increased, causing a slight unexpected uptake in global oil production.

After estimating the monthly structural shocks in the global crude oil market, we performed historical decomposition of price changes over

the same period, following Burbidge and Harrison (1985). We then took the quarterly average of the estimated contribution of the shocks to oil price change in order to have the same frequency with the quarterly GDP estimates of the Philippines provided by the Philippine Statistics Authority for the period 1981.q1–2015.q4, as follows:

$$\hat{\zeta}_{jt} = \frac{1}{3} \sum_{i=1}^3 v_{j,i,t}, \quad j = 1, 2, 3 \quad (2)$$

where $v_{j,i,t}$ refers to the estimated contribution of the residual to oil price change in the J^{th} equation in the VAR model in the i^{th} month of the t^{th} quarter of the sample.

We can examine the influence of these structural shocks on Philippine macroeconomic aggregates based on the specification:

$$\Delta y_t = \alpha_j + \sum_{i=0}^{12} \phi_{ji} \hat{\zeta}_{jt-i} + Qtr_k + \epsilon_t, \quad j = 1, 2, 3 \quad (3)$$

where y_t is a $n \times 1$ vector denoting growth rates of each macroeconomic variable at period t , $\zeta_{j(t-i)}$ refers to the quarterly averaged contribution of structural shocks to oil price changes, Qtr are quarter dummies to account for potential seasonality in the macroeconomic variables, and the ϵ_t is the usual standard error. Following Kilian (2009), the impulse response coefficient at horizon h in this regression model correspond to ϕ_{jh} .⁵

Results and discussion

Figure 3 plots the relative contribution of each oil demand and oil supply shock to the movement of real price of oil. Historically, the biggest contributions are due to aggregate demand shock and oil-specific demand shocks, consistent with Kilian (2009). Oil supply shocks are relatively stronger pre-1980s. Thereafter, these shocks only

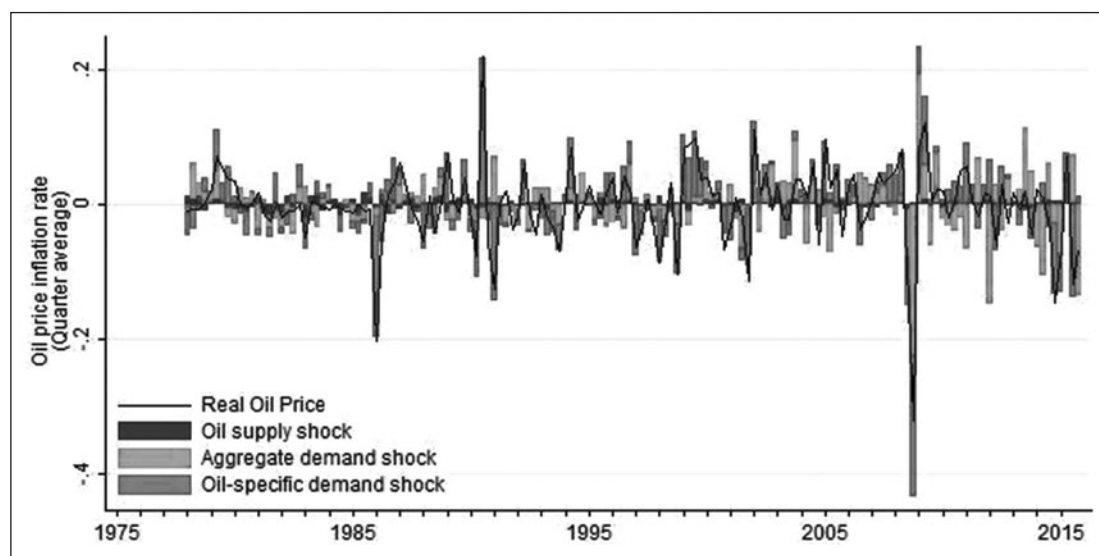
serve either to amplify oil price surges or lower oil prices at other times. Oil-specific demand shocks are relatively stronger in the late 1980s up to the early 2000s. The biggest drops, which were around 2008–2009 and 2014–2015, were mostly driven by both aggregate demand and oil-specific market demand shocks. This is in contrast with the popular view that the 2014–2015 oil price collapse is a manifestation of the unprecedented increase in US domestic crude production.

Figure 4 summarizes the response of the GDP growth rate of Philippines, along with consumption and exports. Results show significant differences in how each structural shock in oil demand and oil supply underlying oil price changes influences the movement of key macroeconomic aggregates. Our estimates suggest that a 1-percent decrease in the price of oil driven by an unanticipated increase in the global supply of oil increases GDP growth by about 1 percent on impact, and its cumulative effect is increasing over time. The response of GDP growth is positive at all horizons, although one-standard error bands imply that the impact is mostly statistically insignificant. An unanticipated increase in aggregate demand, which increases oil price, induces a positive but statistically insignificant effect on GDP growth. The effect is generally increasing up to three years.

Meanwhile, a 1-percent increase in the world crude oil price due to unanticipated increase in oil-specific demand increases output growth by 0.11 percent. This result is striking because oil-specific demand shocks can be driven by uncertainties in the future demand for oil relative to supply of oil, which appears to benefit the Philippine economy in the short run (at the very least). The effect is also nontrivial given that recent crude oil price declines are quite significant.

We also looked at the subcomponents of the economy's output to determine how each underlying structural shock to oil price changes influences output growth. For consumption, only unanticipated supply shock influences consumption. This is fairly intuitive because,

⁵ We also estimated the impact of each oil shock on the Philippine macroaggregates, following the estimation of impulse response function by local projections developed by Jordà (2005). We found that the qualitative results remain using a different estimation method.

Figure 3. Historical decomposition of oil price changes, 1976–2015

Source: Authors' calculations

holding demand constant, a price decline driven by exogenous increase in global crude oil production (e.g., discovery of fracking) increases the purchasing power of consumers. A positive aggregate demand shock, in contrast, has two opposing effects: (1) the short-run stimulating effect of higher global demand and (2) the growth-retarding effect of higher inflation due to higher prices of oil (and, presumably, other commodities). Our results imply that the two effects generally offset each other. The effect of oil-specific demand shock is generally small and statistically insignificant at all horizons.

Exports gain from any unanticipated increase in the global production of oil, with a statistically significant (one-standard error) positive uptake after a year. Aggregate demand shocks have (if there is any) positive effect on exports, and it is increasing up to one year. Interestingly, unanticipated increase in oil-specific demand, which increases crude oil price, significantly increases exports on impact and is sustained up to two quarters, followed by a decline below an initial level in the third quarter, then rising again after a year. The effect after a year is statistically significant.

The key results can be summarized as follows: First, positive oil supply shocks, which bring down oil price, have immediate, short-

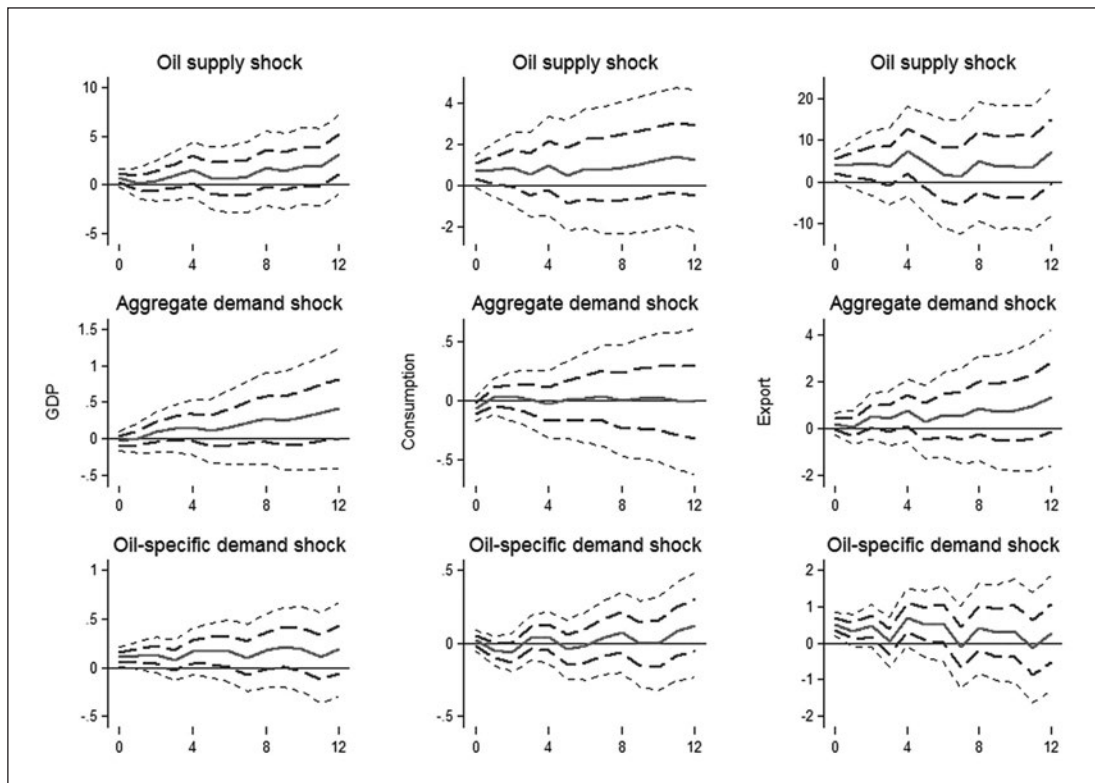
lived, and statistically significant effect on output, consumption, and exports of the Philippines. This is fairly intuitive because oil supply shocks in this context are seen as a rightward shift in the aggregate supply curve of the economy, and are expected to drive down price, thus, reducing both the cost of production and consumption, holding other things constant.

The findings for positive aggregate demand shocks are consistent with earlier findings in literature, which suggest two opposing effects on output: (1) the short-run stimulating effect of higher global demand and (2) the growth-retarding effect of higher inflation due to higher prices of oil (and, presumably, other commodities). Finally, positive precautionary demand shocks appear to be beneficial to the Philippine economy. This finding is consistent with other studies that looked into the direct and indirect effect of oil price shocks through factor mobility (Mohaddes and Raissi 2013) and international trade linkages (Kilian et al. 2009; Bodenstein et al. 2011; Rasmussen and Roitman 2011).

Conclusion

Conventional wisdom suggests that oil price declines are generally good for oil importers.

Figure 4. Cumulative responses of Philippine macroeconomic aggregates to each structural shock point estimates with one- and two-standard error bands



GDP = gross domestic product
Source: Authors' calculations

Previous studies, particularly those focusing on advanced oil-importing economies, provided empirical basis for why oil price increases are traditionally seen as boon to exporters and bane for importers. Quite surprisingly, literature on oil price–macroeconomy relationship applied to developing countries remains thin. Moreover, only a few looked into net oil-importing countries.

In this paper, we took the Philippine economy as a test case to empirically assess how oil price shocks can influence an oil-importing developing economy and determine other potential mechanisms by which global crude oil price changes can benefit or harm an economy.

This study is far from being perfect. First, the uniqueness of the Philippine economy in terms of its reliance on foreign remittances can cast doubts on the ability of the study to generalize its results. Future research can improve on this study by

looking at other labor-exporting countries, such as India and China, and Pacific Islands.

Second, we are agnostic on how much of the influence is due to exchange movement associated with oil price fluctuations. Presumably, exchange rates are also affected by oil price movements (and vice versa in the case of the US), which may greatly influence exports.

How correlated is Philippine foreign exchange to crude oil price, and what are its implications to export and output growth are questions that are beyond the scope of this study.

Despite these limitations, this study provided results that appeal to the conventional wisdom, which makes it relevant both at the theoretical and policy fronts. In particular, we found evidence suggesting that recent oil price declines, which were largely driven by demand shocks, may have harmed the Philippine output growth. This is due

- Kilian, L., A. Rebucci, and N. Spatafora. 2009. Oil shocks and external balances. *Journal of International Economics* 77(2):181–194.
- Melichar, M. 2013. Essays on the macroeconomic effects of energy price shocks. Unpublished manuscript. Manhattan, KS: Kansas State University.
- Mohaddes, K. and M. Raissi. 2013. Oil prices, external income, and growth: Lessons from Jordan. *Review of Middle East Economics and Finance* 9(2):99–131.
- Rahman, S. and A. Serletis. 2010. The asymmetric effects of oil price and monetary policy shocks: A nonlinear VAR approach. *Energy Economics* 32(6):1460–1466.
- Rasmussen, T. and A. Roitman. 2011. Oil shocks in a global perspective: Are they really that bad? IMF Working Paper. Washington, D.C.: International Monetary Fund.
- World Bank (WB). n.d. World development indicators. Online database. Washington, D.C.: WB. <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators> (accessed on May 14, 2016).

Extreme Flooding in Metro Manila Cities: Its Impact on Local Economies Using a Multiweek CGE Analysis

Ramon L. Clarete, Philip Arnold P. Tuaño, and Marjorie S. Muyrong

Abstract

The adverse effects of extreme flooding on the cities of Pasig and Marikina caused by Typhoon *Onboy* in 2009 are significant. This paper estimates that both cities may have lost about PHP 758 million a week or a total of PHP 15 billion, taking 29 weeks to be the estimated duration of the flood and its immediate consequences. The estimated loss is more than 10 percent of the estimated value of output losses, according to the estimates of the Philippine government and its development partners (WB 2011). The results indicate that the residents of Pasig and Marikina may be willing to pay up to PHP 13 billion and PHP 2 billion, respectively, to avert losses from extreme flooding, the difference reflecting the respective gross domestic products and the incidence of flooding in both cities. A multiweek, local economy computable general equilibrium analysis was used to obtain the estimates of this study.

Introduction

The economic effects of natural disasters have been acknowledged in the literature. However, most of the studies done were on developed

countries and involved assessments of such events at the national level. Very little information is available about the impacts of such disasters in developing countries and, more so, at the city level. A typical economic assessment of natural disasters in the Philippines is of the damages to agriculture and infrastructure facilities (WB 2005, 2011). However, more significant than the actual damages is the opportunity cost in terms of reduced productivity and, in turn, forgone income induced by natural calamities. There were assessments of these effects of major typhoons in the country.¹ However, measuring the damages they caused had not been undertaken.

This research developed and used a multiweek computable general equilibrium (CGE) economic model of a city. The framework allows the economic analysis of climate-related disasters affecting typically subnational economies over a time period that is typically less than a year. It is applied to two coastal cities (i.e., Pasig and Marikina) in the National Capital Region (NCR), which had been submerged for several days by Typhoon

¹ See, for example, the postdisaster study on the economic effects of Typhoon *Onboy* in 2009 in World Bank (2005).

Ondoy in 2009, and coped with it for about 29 weeks altogether. The procedure preserved the general equilibrium theoretic relationships among the different variables of an economy. It developed a weekly social accounting matrix (SAM) of a city's economy based on the following: (1) an estimated national annual SAM, (2) the city's contribution to the national gross domestic product (GDP), and (3) the assumption that the city's GDP is equally distributed across all the weeks in a year.

The research involved getting information from a group of businessmen of the city to identify the disruptions of their businesses caused by extreme flooding—both the extent and duration of adjustments. The suspension of their businesses, in turn, was introduced as shocks to the supply of productive factors in the city CGE economic model in order to simulate the economy-wide effects of extreme flooding. The simulation was sequentially done for a total of 29 weeks, which experts determined to be the length of the adjustment period.

Measuring the cost of natural disasters

Globally, the economic cost of natural disasters is estimated to be large and rising. Benson and Clay (2004) reported that the average total loss in the 1990s caused by natural catastrophes in the world reached USD 66 billion per year, which was 15-fold higher compared to the 1950s. Between 1994 and 2013, 6,730 disasters were recorded, killing over 1.35 million people globally—or 68,000 each year—and costing the world economy about USD 2.63 trillion (CRED 2015). In the Philippines, natural disasters have been estimated to affect 4–6 million people each year. Using data from the Centre for Research in the Epidemiology of Disasters (CRED),² the International Federation of Red Cross and Red Crescent Societies (2012) reported that almost 20,000 people had died, 2.7 million people have been directly affected, and 94 million people

have been indirectly affected by natural disasters from 1992 to 2011.

The economic impacts of natural hazards are classified into direct, indirect, and macroeconomic or secondary impacts (Pelling et al. 2002; Benson and Clay 2004; Hallegate and Pryzluzki 2010). Direct impacts are the immediate consequences of natural disasters. These cover deaths or injuries to the population, damages to physical assets, machineries, and capital equipment, crops and livestock, inventories of raw materials and final outputs, as well as to infrastructure facilities, such as irrigation systems, roads, and bridges. Damages are estimated at market prices or agreed-upon replacement costs.

Pelling et al. (2002) noted that the measurement of direct losses has typically been the focus of most studies on disaster effects. The estimated damages have been used in disaster mitigation, preparedness, and risk insurance programs. The typical immediate effects of natural disasters are damages to housing, business facilities, industrial production, crops and livestock, and infrastructure.

Indirect impacts, meanwhile, are costs associated with reduced productivity resulting from the damages to productive capacities of business establishments, forgone household incomes, and lower expenditures over a period of time until productive assets are fully recovered. These effects reflect the extent by which the direct impacts of disasters have spread to the economic system.

Impairment to critical infrastructure (e.g., road networks, bridges, ports, electricity, telecommunications, and water systems, among others) reduces the productivity of the agriculture, industrial, and services sectors of the economy. Even if firms had not sustained any asset damage, their productivities get affected. Disruptions of the flow of labor and raw materials as markets fail to function temporarily due to lack of transportation, power, and other critical services have their toll on the economy. At the household level, jobs are temporarily lost; families are left with no adequate

² CRED was established in 1974 with the mandate of examining the socioeconomic and long-term effect of large-scale disasters. Its headquarters is in Geneva, Switzerland.

income-protection insurance, which lowers household incomes and expenditures. Likewise, exports decline due to reduced productive capacity.

Economy-wide secondary impacts are losses in overall output and incomes, which are measured by changes in national, sectoral, or subnational GDP, as well as other macroeconomic indicators (i.e., capital investments, trade flows, balance of payments, inflation, fiscal deficit, employment, and level of indebtedness). The economic effects of disasters have wider and longer adverse impacts on production, distribution, and consumption of goods and services. Overall output falls, and prices for basic commodities increase pushing inflation. The overall unemployment and underemployment may temporarily go up as businesses stop production. The balance of payments may be adversely affected given the disruptions in export capacity and the need for short-term imports that would cover interruptions in production. Fiscal deficits may rise as tax revenues fall and public expenditures go up to pay for short-term relief and rehabilitation of the economy.

The analysis of economy-wide or secondary impacts is typically carried out using economic input-output (IO) and CGE models. IO studies can assess the reduction of industrial assets, following the damages to infrastructure, machinery, and other productive assets in key sectors that are directly affected by natural hazards. These effects ripple throughout the whole economy as output losses deprive other productive sectors of intermediate inputs.

A fuller analytical technique involves CGE models, which can examine the impacts of natural hazards in both the production and consumption sides of the economy. Relative prices of goods, services, and factors change; this affects household incomes and expenditures. Unlike in IO models, productive factors are substitutable with each other in CGE models.

Few studies examine the impacts of climate change in geographical areas, specifically that of infrastructure, health, energy use, and water

availability (e.g., Hunt and Watkiss 2011). However, most of the studies on climate-related disasters are on the effects on households and vulnerable sectors (e.g., Zoleta-Nantes 2002; Porio 2011; Israel and Briones 2014). None of these studies, however, assessed the economic impacts of climate change at the city level.

In other countries, studies on the effects of natural disasters at the city level have been undertaken, but these are in developed countries (e.g., Hunt and Watkiss 2011; Gertz and Davies 2015). Gertz and Davies (2015) examined the effects of flooding on the economy of Vancouver in Canada using a dynamic CGE model. This study does a similar analysis on the effects of extreme flooding on two cities in NCR, namely, Marikina and Pasig.

An overview of the analytical framework

This part of the paper describes the recursive multiweek CGE model applied to the cities used in this study. The model tracks the different payment flows and exchanges that institutions of the economy undertake. Figure 1 illustrates the range of transactions in the economy involving the services of productive resources, intermediate inputs, and final outputs. Payment flows between institutions cover the transfer of ownership of intermediate inputs, products, and primary factor services in the economy.

Agents, incomes, and spending

There are five institutions or agents in the model: households, firms, government, financial intermediaries, and the foreign sector. Except for households, these institutions are represented by one entity: the government. Agents generate incomes and spend the same on the products produced in the economy, or provide exogenous net income transfers to other institutions. Households and businesses pay taxes to the government. Agents save part of their incomes.

Income levels differentiate types of households. Households generate their incomes from selling the services of the primary factors they own ($fr0$) to firms, which will then be used in production. These include wages of high- and low-skilled labor, as well as returns to capital and agricultural lands. Other income components include exogenous transfers from other institutions ($tr0$), particularly from the government. Households pay income taxes ($it0$), purchase goods and services for final consumption ($c0$), including public goods spent by the government ($g0$).

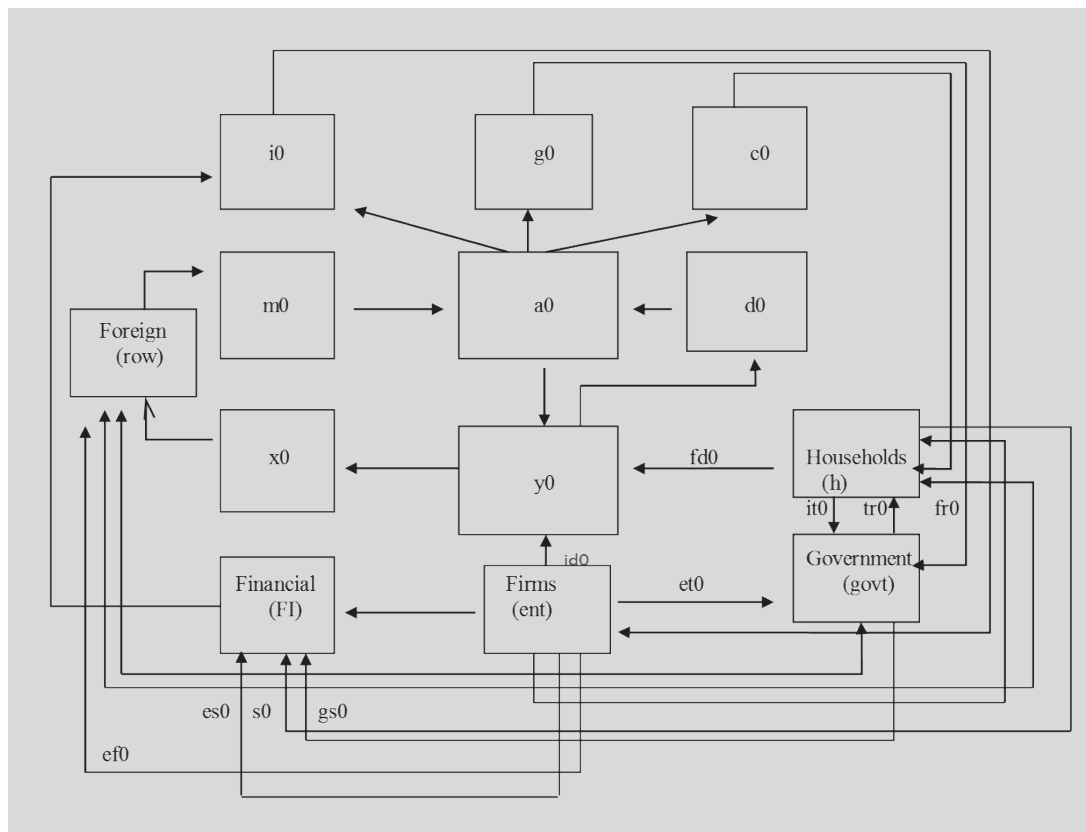
Firms provide intermediate inputs ($id0$) from other firms, and factors from households ($fd0$) and firms to produce goods, which are either sold domestically ($d0$) or are exported abroad ($x0$). Locally produced goods to be sold in the home market and imported products and services ($m0$) make up the intermediate inputs, as well as products

used in final consumption by households and other agents. A hypothetical composite product of both types of goods—called the “Armington good” ($a0$) (Armington 1969)—conveniently represents the transactions involving local and imported products.

Net income transfers between the economy and the foreign sector are exogenous. These transfers include net remittances of incomes of the labor force working abroad, profits of the capital that is invested overseas, and net purchases of financial assets. The exchange rate is endogenous; its level is changing depending on the net flows of merchandise and services trade between the country and the rest of the world.

On the other hand, government receives taxes from households ($it0$) and from enterprises ($et0$), and spends these on transfers to households. The representative financial intermediary receives savings from different institutions including

Figure 1. Illustrative flow of transactions in a general equilibrium model



Source: Markusen and Rutherford (2004)

households ($bs0$), business enterprises ($es0$), government ($gs0$), and the foreign sector ($fs0$). It uses the aggregate savings to invest in new capital assets in the economy ($i0$), thereby increasing the stock of capital available for use in the following time period. In the short-run model used in this paper—the time period being a week—there is no saving and investment in new capital.

The interdependencies of the agents in the economy depicted in Figure 1 confirm that any disruption in one part of the economy will affect the rest of the economy. For example, a loss of productive factors due to a disruption in the flow of capital, for example, will reduce output in the economy and, therefore, will reduce the total amount of goods available for household consumption, firm investment, and government spending. This will lower household incomes and total investment in the economy.

Equilibrium conditions

The basic CGE model used in this paper is described in Rutherford (1999) and Rutherford and Paltsev (1999). The model is a standard Walrasian model with neoclassical closures (i.e., total spending of all agents equals exactly their aggregate incomes). While other agents save, the act of saving represents a purchase of financial asset from the financial intermediary. It models a typical “economy” where firms maximize their profits subject to technology and input constraints.

Endowed with primary factors, households maximize their respective utilities consistent with their budget constraints. Both households and firms are presumed to be price takers, and markets are perfectly competitive. The optimization behaviors of economic agents in the model produce market demands and supplies of goods, services, and factors of production. The corresponding markets settle to equilibrium with appropriate adjustments to commodity and factor prices.

The production model in the CGE model assumes that there are so-called “zero-profit

conditions”³ in the production and goods market, and that the commodity markets in the model are assumed to be perfectly competitive. The condition for each type of factor is assumed to be fully mobile across sectors. The zero profit functions for domestic output, $Y(s)$, and the Armington, $A(s)$, are as follows:

$$PD(s) * d0(s) + PE(s) * (px0(s) * x0(s)) - \sum_{\forall g} PQ(g) * id0(g, s) - \sum_{\forall f} PF(f) * fd0(f, s) \leq 0 \quad \perp Y(s) \geq 0 \quad (1)$$

which is the zero profit function for domestic production determining $Y(s)$; and,

$$PQ(s)a0(s)(\tau auz(s)/(1 + \tau auz(s)) - PM(s)pm0(s)m0(s) - PD(s)d0(s) \leq 0 \quad \perp A(s) \geq 0 \quad (2)$$

which is the zero profit function for Armington supply determining $A(s)$, and where $\tau auz(s)$ is the indirect (sales) tax for the sector s (also characterized by the italicized letter g). $d0$, $x0$, $m0$, $id0$, and $fd0$ are benchmark domestic supply, exports, imports, intermediate demands, and factor demands, respectively, while $pm0$ and $px0$ are the respective benchmark price levels for imports and exports. PD , PE , PQ , and PF are the domestic, export, Armington, and factor price levels, respectively, calculated from the model.

Each of the cities in this analysis is assumed to trade with the “rest of the world”. To simplify the analysis, the “rest of the world” assumes all regions outside the subject city (i.e., Marikina and Pasig). The amount of exports of a given locally produced good to the rest of the world is a constant elasticity

³ Utilizing the framework from Matheisen (1985), Markusen (2002) suggested the solution to solving a series of production functions, factor supply, and consumer income equations would be to convert the problem into a series of equations, and solve the system. This would be undertaken by solving the underlying cost minimization problem for consumers and producers (i.e., solving for cost and expenditure functions, so that the optimizing behavior is embedded in the solution system). These equilibrium conditions can then be formulated as a complementarity problem, in which each inequality is associated with a particular variable; the complimentary variable can be noted as what is not produced if strict inequality in the equation holds. As with “strict inequalities”, there would be three inequalities in the general equilibrium system: (1) zero-profit conditions, (2) market clearing conditions, and (3) income balance.

of transformation function based on the volume of the local good produced. Locally produced goods are imperfectly substitutable with imported goods. Thus, domestic products are assumed to be differentiated from imported products, and exported merchandise is assumed to be qualitatively different from those sold in domestic markets. In the case of imports, the model assumes cities are “small open economies” and, thus, are assumed to be a price taker in these markets. Zero-profit conditions are also assumed for consumption of different institutions, including households (personal consumption), firms (investment), and government (public consumption). Household consumption assumes Cobb-Douglas aggregation of the different goods purchased.

Another requirement for equilibrium to hold is the condition for “market balance”. Market clearance is characterized by the equilibrium between the demand and supply of all commodities in each of the sectors. Therefore, market clearance conditions can be characterized by the following:

$$Y(s) * d0(s) - d0(s) * A(s) \leq 0 \quad \perp \quad PD(s) \geq 0 \quad (3)$$

for domestic goods determining the price of domestic goods, $pd(s)$;

$$\sum_{vh} RA(h) * fe0(f, h) + ENTR * ek0(f) + ROW * xk0(f) - \sum_{vs} fd0(f, s) * Y(s) \leq 0 \\ \perp \quad PF(f) \geq 0 \quad (4)$$

for primary factors (i.e., labor and capital) determining price of primary factors $PF(f)$; where the italicized letter f stands for the factor; where RA , $ENTR$, and ROW represent activity levels for household h , enterprises, and the rest of the world, respectively; and $fe0$, $ek0$, $xk0$, and $fd0$ represent factor endowment, enterprise capital, rest of the world capital, and factor demand, respectively;

$$A(s) * a0(s) - \sum_{vg} id0(g, s) * Y(s) - \sum_{vh} C(h) * c0(s, h) - GOV * g0(s) - INVEST * i0(s) \leq 0 \\ \perp \quad PQ(s) \geq 0 \quad (5)$$

where $PQ(s)$ is the price of the Armington good.

In the same vein, there is equal demand and supply of exported and imported commodities, while the demands for household, investment, government, and enterprise consumption goods are equal to their supplies.

The last condition for equilibrium to hold is to note that the income and expenditures of the various institutions are equal to their expenditures.

Briefly, the illustration provides the information that, initially, the impacts of a hazard event would be the damage that would result in terms of infrastructure or physical assets. Around two-thirds of all losses in flood-related events in Asia are infrastructure losses, including housing, road networks, agricultural systems, and firm physical structures. Natural disasters severely impact households in terms of the partial or full damage of their residential areas, and on assets that are utilized for generating incomes.

This study is undertaken by identifying key economic parameters, in which flooding affects changes in income and productivity of several sectors in the economy, and then identifying the dynamic nature of these changes in the economy. The geographical unit utilized in the analysis is the level of metropolitan regions and key cities in Metro Manila affected by the flooding. These parameters included the flows of: (1) productive factors, including labor and capital in firms affected by flooding; (2) intermediate inputs in firms affected by the flooding; and (3) goods and services that flow into a local economy.

The effects on households would lead to the decline in consumption and investment in favor of activities that would help individuals and families cope with the aftereffects of natural damage. Private consumption significantly declines after the onset of a catastrophic event, while public consumption also falls but to a smaller degree (Aufret 2003). At the same time, private investments are diverted to reconstruction and rehabilitation of firm physical capital and infrastructure. The resulting effect would be a short-term decline in economic output. Because of the decline in output, there would be a

decrease in the demand for labor services, leading to a decline in employment and cuts in formal sector wages and informal sector income (Skoufias 2003). In some cases, because of disruptions in agricultural output and in the distribution of goods, there would be a slight increase in prices until the marketing channels are restored.

At the same time, the literature (Benson and Clay 2004; Hallegate and Pryzluzki 2010) also suggests that there are several factors that would affect secondary impacts of hazard (in terms of economic values):

1. changes in prices due to disaster shock
2. length of reconstruction
3. output effects due to negative “network effects”, such as vulnerabilities in transportation infrastructure and utilities (e.g., water, electricity, gas, and transportation) whose effects can be felt throughout the economic system
4. the stimulus effect of disasters, which may be positive or negative depending on whether the resources are mobilized or diverted (as the case may be) because of reconstruction activities that need to take place

Because of disruptions in supply, prices could possibly rise, reflecting the loss or damage to goods, and transport and marketing infrastructure. The increase in prices could also be due to an increase in demand for certain goods that are needed in disaster relief and rehabilitation, such as canned foodstuff, clothing, and housing materials. In some disaster episodes, there may also be a decline in demand for luxury goods, which may temper the general increase in prices, but these comprise only a small percentage of the expenditure baskets of ordinary households.

In the Philippines, for example, the combined effects of the 1990 Central Luzon earthquake and the 1991 Mount Pinatubo disaster increased prices of fruits and vegetables by 46 percent at the peak of supply disruptions.

In order to better identify the temporal impacts of flooding, key informant interviews were undertaken with business associations in Pasig and Marikina; the informants were primarily key leaders of the local chambers of cities in their respective areas. The qualitative extent of the impacts of the three parameters discussed above were assessed by these leaders using their experiences during the onslaught of Typhoon Ondoy in their areas. These qualitative impacts were then translated using estimated quantitative impacts to be utilized in the CGE model.

This approach was also partly undertaken in response to the lack of quantitative impacts of flooding among agricultural, industrial, and services establishments in the country. The national and local government provided quantitative assessments of agricultural damages only, which in the urban/city context may not be useful in terms of developing a complete picture of the extent of economic effects of flooding.

A major limitation on the use of a CGE model is the inadequacy of practical data at the city level that can be used to construct a SAM. Economic data on households, firms, local governments, and the flow of resources among these institutions and with the economy outside the city, including the profile of these institutions, are very scarce. This information is also absent among local government units. Many assumptions were made to construct the dataset based on available national-level data.

City-level impacts of the 2009 massive flooding events in the Philippines

The massive inundation of Metro Manila due to flooding events in 2009 had affected not only the social sector (i.e., households) but also the business sector. Business owners and employees alike in Metro Manila and neighboring cities and municipalities had to contend not only with damaged assets and inventories but also with forgone income from output losses arising from business interruption (i.e., indirect losses).

According to key resource persons, 90 percent of Pasig's geographical area was reportedly inundated during the day of the typhoon, while 85 percent was reported in Marikina.⁴ Expectedly, the shoe industry of Marikina was reported to have been heavily affected (IPC 2010).

As explained earlier, the shock in both capital and labor stock arising from city-wide flooding reverberates in the economy through constraints in the supply of goods from affected industries (Gertz and Davies 2015). In the case of Metro Manila, the damages to offices, plants, and machineries—as well as the inability of personnel to report to work—were the main constraints. The interruptions in the production of goods and services due to flooding, therefore, increased trade constraints faced by each city in Metro Manila.

Further, as this shock is not static, and recovery and reconstruction occur both spatially and temporally, it becomes imperative to consider the dynamic nature of climate shocks like typhoons. This is further underscored by the possibility that these indirect losses can exceed direct losses (Hallegatte 2008). In order to assess the impacts of disasters on cities, the following are the scenarios undertaken: (1) reduction in labor supply to firms (i.e., reflecting the loss of labor availability to firms at time t), (2) reduction in capital supply to firms (i.e., reflecting the loss of capital availability to firms at time t), and (3) reduction in enterprise capital to firms (i.e., reflecting the loss of raw materials availability to firms at time t). Thus, all of the variables in equations 1 to 5 include a time subscript.

The effects are then assessed as follows. A shock variable (*shock*) is calculated at week t , using the capital and labor availability information provided in Tables 1 to 3. Any change in labor or capital stock would affect the total stock of endowments of factor f in sector s at time t . This can be noted as $fe0_t(f,s)$, affecting the market balance of commodities and, therefore, the price

of factors $PF_t(f)$. Changes in the factor prices at time t causes a decline in factor f , $fd0_t(f,s)$, used in sector s and, therefore, reducing output in sector $Y_t(s)$, increasing the price of domestic good $PD_t(s)$. The following are the expected signs of changes in factors, output, and prices:

$$\frac{PF_t(s)}{fe0_t(f,s)} < 0 \quad \frac{fe0_t(f,s)}{PF_t(s)} < 0 \quad \frac{Y_t(s)}{fe0_t(f,s)} > 0 \quad \frac{PD_t(s)}{Y_t(s)} < 0$$

The effects on sectoral output (i.e., change in output on the different production sectors); sectoral prices (i.e., change in prices across production sectors); and household welfare (i.e., as measured by the equivalent variation) are then assessed.

Social accounting matrix

SAM is the primary data utilized for the simulation model to assess the impacts of flooding on Metro Manila. It is a square matrix consisting of row and column accounts that represent different sectors, agents, and institutions of an economy at a certain desired level of disaggregation. SAM traces the circular flow of incomes from producers/suppliers through factor payments to households and back to product markets through expenditures on final goods (or sales from activities). Additionally, income flows involving producers, government, financial intermediaries and the rest of the world (ROW) are also accounted for in the matrix. Table 1 shows the basic structure of SAM.

Activities involve the local production activities of enterprises and other producers, which are undertaken through intermediate inputs from other producers and production factors and are sold domestically (local or domestic sales) and to foreigners (exports). Commodities refer to the total amount of goods produced domestically and coming from foreigners that are sold to private households, government, or firms (as investment expenditures). Factors include labor and capital. Institutions include households, enterprises, government, the financial sector (savings-investment sector), and ROW.

⁴ Based on the interviews of the research team with the Pasig Business Center (on May 10, 2016) and with the Philippine Chamber of Commerce and Industry Marikina Chapter (on May 27, 2016).

While data would be available for some of the cells needed to conduct SAM (especially those related to the components GDP), the data for most of the cells, especially those related to the data coming from the IO table, are not readily available. This is so because the IO table is only available at the national level. Thus a procedure was undertaken to reduce the data in the national-level SAM to a Metro Manila-based SAM by normalizing the values to the proportion of the regional GDP to the national-level GDP. In 2009, regional GDP was 31.7 percent of national-level GDP (PHP 2.53 trillion vs. PHP 7.97 trillion for the national GDP).

In the construction of SAM for the year 2009, the method suggested by Cororaton (2003) for the 1994 SAM was utilized. Further, the 2009 national income accounts, government accounts and the balance of payments, and the data structure from the 2006 IO table and Supply and Use Accounts were also utilized. The IO table provides for the analysis of the utilization of intermediate and primary input (labor and capital) utilization of each of the sectors. Sectoral value added included compensation of employees, depreciation, indirect taxes, and operating surplus. For Metro Manila, from 240 sectors, the data were aggregated to sixteen production sectors (i.e., 2 agricultural sectors, 5 industrial sectors, and 8 service sectors):

1. Agriculture (Agri), which includes crop production and agricultural services
2. Natural resources (Natr), including fishing and forestry
3. Food processing (Food)
4. Textile and garment processing (Text)
5. Nonmetallic processing, such as chemicals, plastics, glasses, rubber (Nmet)
6. Machinery and electronics equipment (Mach)
7. Other manufacturing (Otmn)
8. Construction (Cons)
9. Utilities, such as electricity, gas (Util)
10. Transportation services (Tran)
11. Retail and wholesale trade (Trad)

12. Financial services (Finl), including banking
13. Real estate (Real)
14. Public administration and services (Ppsr), including health and education
15. Hotel, restaurant and tourism services (Htrt)
16. Other services (Otsr)

The 2009 National Income Accounts (NIA) was also obtained from the National Statistical Coordination Board, which is based on the 2011 revision of the NIA (NSCB 2012); these accounts were the primary information source for GDP values. The financing tables from the 2009 Budget of Expenditures and Sources of Financing and the Department of Finance were utilized for obtaining government interest payments to the rest of the world (government transfers to the rest of the world) and foreign borrowings of the government (rest of the world transfers to the government). The 2009 Balance of Payments account was also utilized for obtaining dividends paid to foreigners.

In terms of trade with the entities outside the Philippines, export and import data were adjusted to confirm with the flows of commodities in the seaports and airports in Metro Manila. This information is available in the annual Foreign Trade Statistics of the Philippines.

In addition, to complete the regional-level GDP, information on two additional resource flows were obtained. The first was information on Metro Manila trade with other regions—which was obtained from the 2009 Commodity Flow accounts published by the Philippine Statistics Authority—that provide information on the values of inflows and outflows of goods and services to and from the region. Local government receipts and expenditures (i.e., expenditures on public goods, taxes from households and enterprises, and internal revenue allotments from government) were the second set of information; these were obtained from the Bureau of Local Government Finance.

In summary, SAM has 16 production sectors, 2 production factors (i.e., labor and capital), and 7 institutions (i.e., households, enterprises/firms,

Table 1. Social accounting matrix basic structure

	Activities	Commodities	Factors	Households	Enterprises	Government	Savings-Investments	ROW	Totals
Activities		Local sales						Exports	Domestic production
Commodities	Intermediate inputs			Private consumption		Government consumption expenditures	Investment expenditures		Market supply
Factors	Value added (labor, capital)								Factor income
Households			Labor income		Dividends	Government transfers, social security payments		Net income from abroad	Household income
Enterprises									
Government			Capital income		Corporate taxes			Foreign loans	Enterprise income
		Import tariffs, indirect taxes		Personal taxes, social security contributions					Government income
Savings-Investments				Household savings	Corporate savings	Government savings		Foreign investments	Savings
Rest of the world		Imports	Capital revenue to ROW		Dividends to foreigners	Foreign debt repayments			Forex outlays
Totals	Cost of production	Absorption	Value added	Household expenditures	Enterprise expenditures	Government expenditures	Investment	Forex earnings	

ROW = rest of the world
Source: Cororaton (2003)

financial intermediary, national government, local government, rest of the Philippines, and ROW). A fundamental issue that one encounters in the construction of a SAM is that the row and column sums do not coincide. In order to address this, a balancing process has to be undertaken in order to have equivalent amounts of row and column totals. The study utilizes the RAS or biproportional adjustment method for balancing the matrix.

Data and empirical implementation

Ninety percent of Pasig's geographical area was reportedly inundated during the day of the typhoon, while 85 percent was for the case of Marikina City.⁵ Expectedly, the shoe industry of Marikina was reported to have been heavily affected (IPC 2010). Simulations were, therefore, undertaken to construct a breakdown of the impacts on the factors of production, capital, labor, and raw materials.

To do this, consultations with business organizations from Pasig and Marikina were implemented to develop a more nuanced understanding of the temporal impacts of Typhoon Ondoy on firms. These interviews helped drive the simulations in order to quantitatively assess the true impacts of the typhoon.

The information gathered from one type of sector were generalized to similar sectors, allowing the research to take advantage of a SAM that disaggregates city-level production into various economic sectors at the local level. The firms that participated in the study also provided information on the amount of time that business operations stopped and the length of recovery period, shedding light on the time it took before the various types of firms were able to recover.

The tables in this section, thus, give the results of these interviews in a matrix showing the level of shock sustained by the availability of labor and capital, and the flow of raw materials when Typhoon Ondoy hit. They show how the changes in the availability of labor and capital, and the flow

of raw materials on weekly basis as the industries affected recovered after the typhoon. The numbers in the matrices give the proportion of the three types of production factors that were available in the weeks following Typhoon Ondoy.

Hence, if the number = 0, there was no capital, labor, or raw materials available for production for the particular industry in the indicated week. If the number = 1, 100 percent of the capital stock, labor, or raw material was available. In most cases, when the representative firms report that their operations stopped for a period of a month, capital stock is pegged at 0 percent over that time period. The first general assumption, therefore, is that, for firms that were affected, virtually all capital assets (i.e., machineries and plant) were deemed unfit for production.

Economic impacts on the cities of Marikina and Pasig

Years of infrastructure development made Marikina less flood prone. The amount of water Typhoon Ondoy brought, however, was unexpected even for Marikina residents. Many micro, small, and medium enterprises (MSMEs) located in areas near the river were washed out, including struggling shoemakers in *Barangay* Calumpang.

In the case of Pasig, its central business district—the Ortigas Center—was fortunately spared due to its elevation. Those near the Manggahan Floodway and those located in Pasig-Marikina borders were the ones heavily affected. One of the major challenges of the city was the persistence of floodwaters months after the typhoon. Similar to Marikina, the MSMEs in Pasig were the ones badly hit. Some of the larger firms, on the other hand, have either set up mechanisms to mitigate the impacts of flooding or possess business continuity protocols, or both.

Capital availability after Typhoon Ondoy

According to interviews, the average time it took for Marikina firms before they were able to resume operations was 1.5 months; the estimate is just

⁵ Based on the interviews of the research team with the Pasig Business Center (on May 10, 2016) and with PCCI Marikina Chapter (on May 27, 2016).

about 1 month for Pasig firms (see highlighted cells in Table 1). In both cities, firms needed to repair, replace, or clean up their plants and machineries, which took most of the time and resources due to the muddy nature of floodwaters. Hence, it was assumed that the time it took to resume operations is closely related to the availability of capital that can be utilized for operations, as noted above. Another period of 1.5 months was needed before Marikina firms were able to go back to normalcy. Pasig firms, meanwhile, needed another 6 months (Table 2). These scenarios were assumed for most types of firms in both cities.

As shown in Table 1, some sectors were able to resume their operations faster than other sectors. For instance, it took two weeks for affected financial institutions and real estate firms to resume their operations. Notable in their quick response to the damages to their capital were utility and communication firms. Transportation and other public services were also assumed to have continued operations despite the massive inundation.

In Pasig, one firm reported that operations were not affected despite inundation of actual plant due to mechanisms already in place. Hence, in the case of the many nonmetallic processing firms located in Pasig, they were assumed to have little disruptions in their operations.

It must be emphasized, however, that there were MSMEs that were not able to recover. This is modeled by disallowing some of the sectors, which are mostly composed of MSMEs, to go back to 100-percent capital availability.

Labor and raw materials availability after Typhoon Ondoy

Within the first work week after Typhoon Ondoy, workers in most industries in both cities were back to work. Interviews with Marikina firms, for instance, revealed that labor supply was not affected substantially, as workers were willing to go back to work during the first work week after the typhoon. According to one manufacturing firm interviewed,

as soon as workers were done cleaning their own homes, they went to the company to help clean it up; the workers knew that they needed to help their companies restart operations as well. In return, the companies continued to hire them even without operations and paid them for the clean-up. Interviews with representative firms from Pasig also revealed the same scenario for Pasig employees. Absences were only prevalent during the first two to three days of the first work week after the typhoon.

Hence, it can be assumed that labor supply was not substantially reduced even in the first work week after the typhoon, as employees themselves were keen on getting back on their feet. Labor supply was assumed to have been only affected on the first few days of the first work week after Ondoy (Table 3).

In the case of raw materials supply in Marikina, however, most firms experienced difficulties in getting raw materials within two weeks after they resumed operations, as Marikina was still difficult to enter due to various debris not yet cleaned up. This scenario of difficult access to raw materials was assumed for the entire city. In Pasig, only industries that needed agricultural products were assumed to have been affected in terms of raw materials supply (Table 4).

In conclusion, the supply of the factor of production in Marikina and Pasig was able to resume operations in the same year. In fact, in the case of labor, workers proved to be highly resilient. Labor supply returned to normalcy within the first work week after Typhoon Ondoy due to: business continuity management of firms and employees' recognition of the need to rehabilitate the businesses (i.e., their income sources). On the other hand, damages to capital stock were mainly due to muddy floodwaters the typhoon brought; for most companies, cleaning-up the plants and machineries took the most time. Raw materials supply was also affected due to road blockage that was not cleaned up immediately.

Table 2. Capital availability in the cities of Marikina and Pasig

Panel A: Marikina City

Code	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16
Agriculture	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Natural resource extraction	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Food, beverages, and tobacco	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Textile, garments, and apparel	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Nonmetallic mining and processing	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Machinery and electrical industries	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Other manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Utilities	0.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transport and communications	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Trade	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Financial	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real estate and commercial	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public and private services	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel and restaurant	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Other services	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.43	0.57	0.71	0.71	0.99	0.99	0.99	0.99
Average	0.13	0.19	0.31	0.31	0.31	0.31	0.41	0.51	0.61	0.71	0.80	0.80	0.99	0.99	0.99	0.99

Table 2. (continued)

Panel B: Pasig City

Code	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16
Agriculture	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Natural resource extraction	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Food, beverages, and tobacco	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Textile, garments, and apparel	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Nonmetallic mining and processing	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Machinery and electrical industries	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Other manufacturing	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Construction	0.00	0.00	0.00	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48
Utilities	0.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transport and communications	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Trade	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Financial	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real estate and commercial	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public and private services	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel and restaurant	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other services	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Average	0.19	0.25	0.37	0.37	0.58	0.60	0.62	0.63	0.65	0.67	0.69	0.70	0.72	0.74	0.76	0.77

Panel B: Pasig City (continued)																
Code	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	Week 31	Week 32
Agriculture	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	0.99	0.99	0.99	0.99
Natural resource extraction	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	0.99	0.99	0.99	0.99
Food, beverages, and tobacco	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	0.99	0.99	0.99	0.99
Textile, garments, and apparel	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	0.99	0.99	0.99	0.99
Nonmetallic mining and processing	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Machinery and electrical industries	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	0.99	0.99	0.99	0.99
Other manufacturing	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.00	1.00	1.00
Construction	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.00	1.00	1.00
Utilities	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transport and communications	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Trade	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Financial	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real estate and commercial	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public and private services	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel and restaurant	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other services	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Average	0.79	0.81	0.83	0.84	0.86	0.88	0.90	0.91	0.93	0.95	0.97	0.98	1.00	1.00	1.00	1.00

Source: Authors' interview of stakeholders

Table 3. Labor availability in the cities of Marikina and Pasig

Code	Panel A. Marikina City				Panel B. Pasig City			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Agriculture	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Natural resource extraction	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Food, beverages, and tobacco	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Textile, garments, and apparel	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Nonmetallic mining and processing	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Machinery and electrical industries	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Other manufacturing	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Construction	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilities	0.90	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Transport and communications	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Trade	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Financial	0.50	0.50	1.00	1.00	0.50	0.50	1.00	1.00
Real estate and commercial	0.50	0.50	1.00	1.00	0.50	0.50	1.00	1.00
Public and private services	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel and restaurant	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Other services	0.50	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Average	0.59	0.94	1.00	1.00	0.86	0.94	1.00	1.00

Source: Authors' interview of stakeholders

Observations from the model simulations

In this section, the results from the simulations undertaken using the CGE model of the Philippine economy to better understand the adjustment induced by extreme flooding are discussed. The study considered not only the shock but also how it had tapered off through time. Thus, the CGE model was set up to come up with weekly equilibria of the respective city economies. This temporal analysis made use of the information obtained from local businessmen and government officials about the time it took for the city to adjust.

Economic effects on the economy of Pasig

The paper responded to the above drawbacks of the analysis by redoing the analysis on the city economies of Pasig and Marikina, which were both flooded during Typhoon Ondoy in 2009.

Two features were adopted in the analysis. One is that the GDP and related economic variables

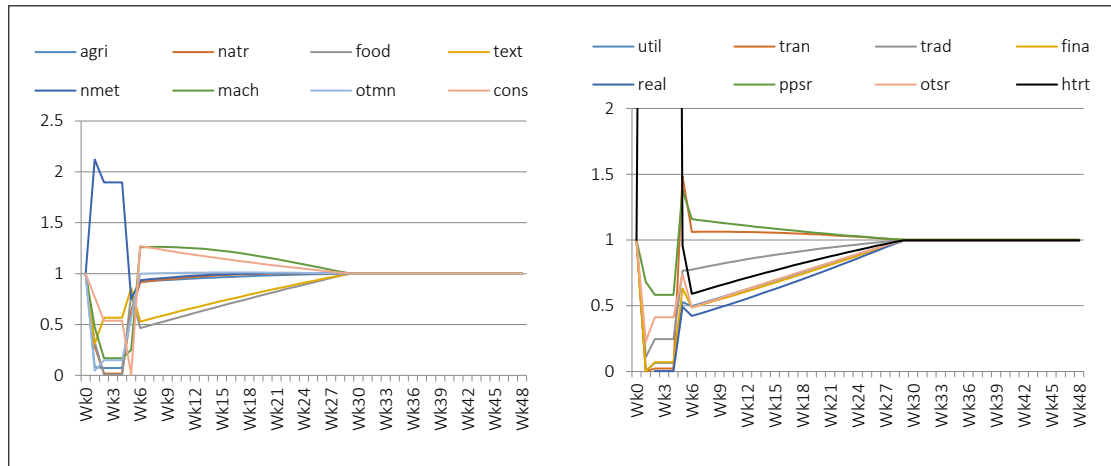
of the city economy in a given week were used. The information was extracted from NCR's SAM, which was then used to assemble the simulation economic model. Essentially, the extraction of the city's economic variables was guided by the share of the city's economy in the overall GDP of NCR. Secondly, the corresponding annual SAM of the city was divided by 52 to extract a weekly version of it.

As mentioned above, the study team interviewed stakeholders of each city—businessmen and local officials—to find out the time path of the flooding, and how labor and capital, as well as the flow of goods were affected. Disruption in the flow of raw materials in Pasig was not prolonged and confined only to four industries, namely, agriculture, natural resources, processed foods, and textiles and garments. The owners of business reported that there were no raw materials in these affected industries for four weeks.

Table 4. Raw materials availability in the cities of Marikina and Pasig

Code	Panel A. Marikina City									Panel B. Pasig City					
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Agriculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Natural resource extraction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Food, beverages, and tobacco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Textile, garments, and apparel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Nonmetallic mining and processing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Machinery and electrical industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transport and communications	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Trade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Financial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real estate and commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public and private services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel and restaurant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.75	0.75	0.75	0.75	1.00	1.00

Source: Authors' interview of stakeholders

Figure 2. Effects on weekly outputs of the industries in Pasig City, by week

Note: Output at the base is equal to 1.

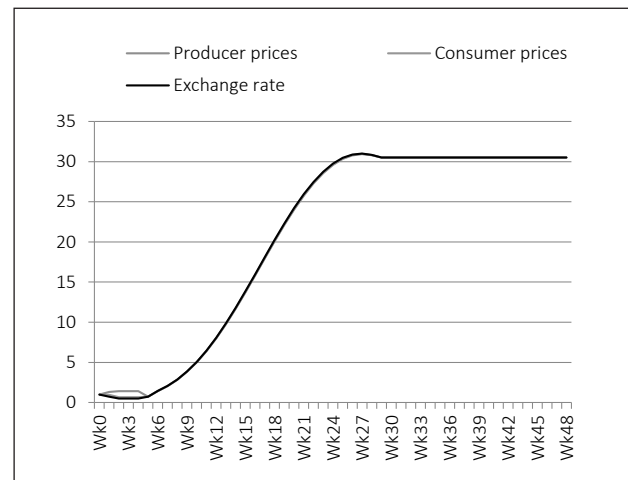
Source: Authors' calculations

The weekly changes of outputs by industries are shown in Figure 2, which plots the output multiples, with 1 representing the base output of a given industry. The next four weeks pulled down the respective production levels of most of the industries, but there were two industries (i.e., nonmetallic and hotels and restaurants services) that expanded their outputs instead. The expansion of hotels and restaurants services reached 11, which is not charted any more in Figure 2 to get a better plot of other industries' outputs. This result may be explained by the full employment of factor equilibrium condition of the model. If other industries contract, the resources that these industries do not use may have gone to other industries, in this case to nonmetallic industries and hotels and restaurant services.

In most industries, however, the first four weeks comprised a period of contraction. The recovery started at the fifth week. However, production levels fell again in the sixth week. It was only in the seventh week that the gradual recovery back to their normal levels became consistent.

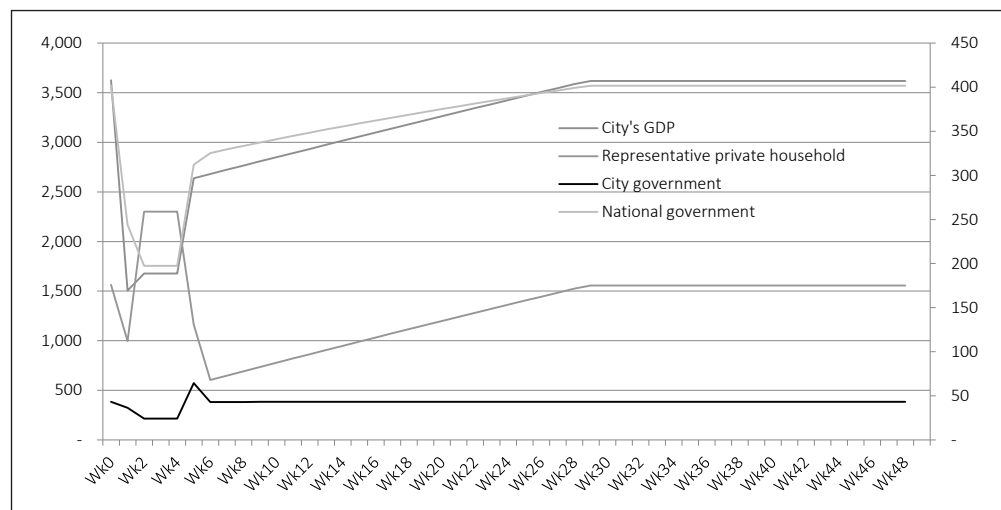
Four industries overshoot in their recovery. In the fifth and sixth weeks, their respective output expanded by more than their levels before the shock. Starting in the sixth or seventh week, the expansion reversed and converged to normal level, which is 1, in the 29th week.

The effects on producer and consumer prices differ negligibly (Figure 3). All products in the model are tradable. Most industries export the products they make. The products destined for the local market, while different from those that are exported, are valued not far from the prices of the products that are exported, in equilibrium. The country imports products that substitute with local ones. All prices change through the adjustment period of 48 weeks very similarly. Instead of plotting the price of every product, two price indices (i.e., one of consumer and another of producer prices) are computed using the industry's share

Figure 3. Effects on producer and consumer prices, Pasig City, by weeks (% change in prices)

Source: Authors' calculations

Figure 4. Effects on the city's GDP, household final consumption, and national and local public spending, Pasig City (PHP million)



GDP = gross domestic product

Note: City GDP, final consumption, and national spending in the left-hand scale, while local public spending in the right-hand scale.

Source: Authors' calculations

in GDP as weights. The lines in Figure 3 show the projection of the two price indices, and their respective charts are practically identical. They moved from week 1 in the base case and stabilized at 30 in five to six months. The exchange rate drives the results. Local prices of locally produced tradable products would have to be at par with imported substitute in equilibrium. The model's equilibrium is computed each week, and the weekly equilibrium domestic prices closely mirror the movement of exchange rate (also plotted in Figure 3).

Figure 4 shows the weekly GDP of the city, real consumption of the representative households, and the public spending of the national and city governments. On average, the city's industries produce about PHP 3.2 billion of GDP each week. About 31 percent of this amount goes to the private household, which uses it for its final consumption.

During the onslaught of Typhoon Ondoy, the city's GDP contracted in the first week and started to recover gradually in second week. It went back to its level before the shock in the 29th week. Household's final consumption, likewise, fell in the first week, and recovered in the second and third week; it recovered by 48 percent higher than its preshock level. This is traceable to falling

consumer prices in those weeks. The currency was strong in the first three weeks, which can be traced to the competitiveness of imports given that local production was adversely affected by the shock. After these first few weeks, final consumption of households fell due to rising consumer prices and weaker currency. Like the GDP, final consumption stabilized in the 29th week.

Public spending (read from the secondary axis) followed a similar trajectory as the city's GDP. The local public spending fell first and recovered fully in the sixth week.

Overall well-being, measured by the equivalent variation of income, fell in the first week and became positive in the second and third week (Figure 5). This is consistent with the improvement in real consumption of the representative household, which this study links to falling consumer prices and temporary strengthening of the currency. In the fourth week, the equivalent variation went back to negative terrain, indicating residents were worse off. In the sixth week, however, overall well-being started its recovery until the 29th week, when it went back to its normal level as before the shock.

Equivalent variation is also an indicator of the willingness to pay of adversely affected residents for

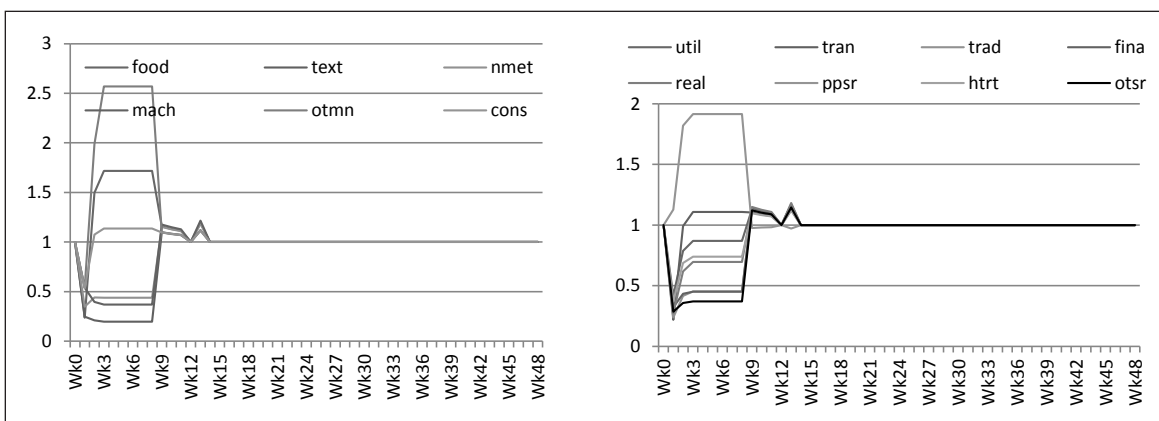
programs that make their communities more resilient to climate change-related shocks. On a per year basis, residents may be willing to pay up to about PHP 13 billion for programs that make the city residents immune to shocks. Just like in the analysis on the impact of flooding in NCR, monies may be allotted from the budget for programs aimed at strengthening resilient communities. A practical way is for the national and local governments to invest in resiliency, promoting interventions using their tax incomes.

Economic effects on the economy of Marikina

In contrast with Pasig, the industries in Marikina only reached their predisaster output at the sixth week (Figure 6). There were some sectors that reached their predisaster output earlier, improved significantly, and then fell. For example, the other manufacturing sector improved by the second week and sustained its gains for the next 10 weeks before falling again to their preflooding level. This is also true for the construction and public and private services sector.

Producer prices fell significantly; and by the 12th week stay constant at a quarter of preflooding prices (Figure 7). This is due to the fact that there is a significant fall in the so-called “exchange rate” in the city; this is the price of domestic goods vis-à-vis the price of foreign goods. Weak demand for products result in a fall in prices in the city.

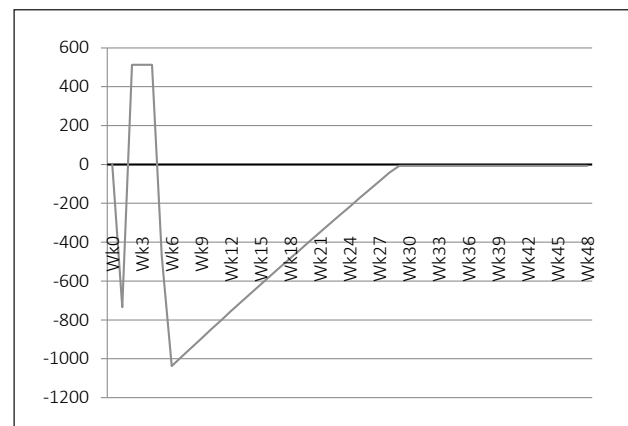
Figure 6. Effects on weekly outputs of the industries in Marikina City



Note: Output at the base is equal to 1.

Source: Authors' calculations

Figure 5. Overall well-being of city residents, Pasig City (PHP million)

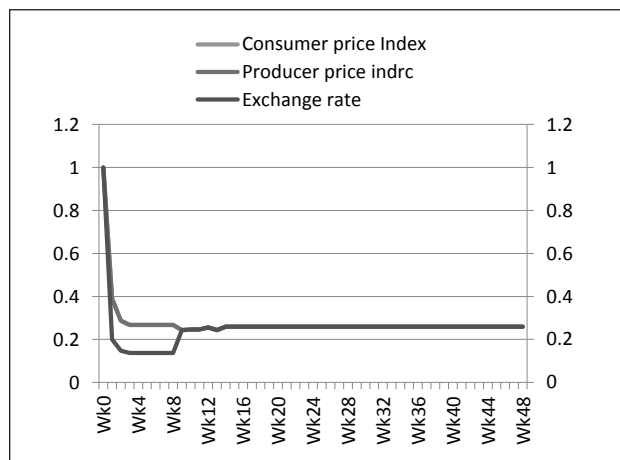


Source: Authors' calculations

Figure 8 portrays the weekly GDP, and the income of the representative household and the national government and the Marikina local government. On average, the city's industries produce about PHP 1.2 billion of GDP each week. The city's GDP contracted in the first week, and started to recover gradually in the seventh week. It went back to its preflooding level by the eighth week, with a total loss of PHP 2 billion during the eight-week period.

Conclusion and recommendations

The adverse effects of natural disasters, such as extreme flooding in large areas of a city caused by a typhoon, are significant. In this study, the base

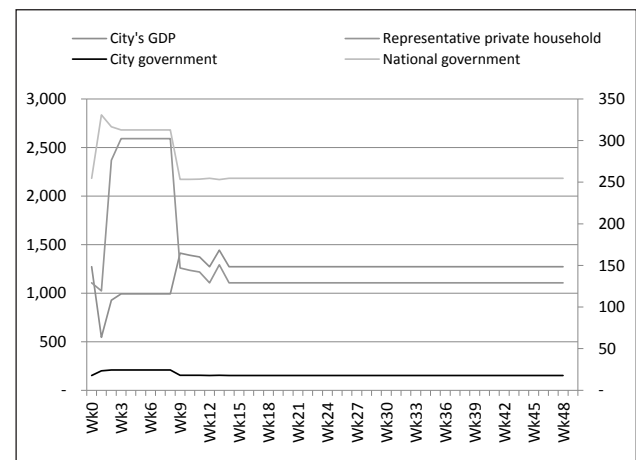
Figure 7. Effects on producer and consumer prices, Marikina City

Source: Authors' calculations

case GDP of Pasig and Marikina is estimated to be PHP 3.6 billion and PHP 1.3 billion a week, respectively. Using the equivalent variation of income, residents in Marikina are willing to pay up to PHP 13 billion for programs that make them immune to shocks. The computation for Marikina is around PHP 2 billion per Ondoy-like typhoon.

If one takes Pasig or any of the cities in NCR to be the lowest area where one can apply a quantitative analysis, local government officials may be guided by this study's results: the city's residents are willing to invest billions of pesos just so to reduce their exposure and vulnerability to the adverse effects of extreme flooding. There is adequate willingness to increase public spending for resilience. Rather than just undertake relief programs following a natural disaster, making the city less vulnerable, if not completely resistant, to climate change shocks gives a good return of investment.

The lack of empirical links between the physical attributes of flooding and the displacement of the productive factors of production or the flow of raw materials in affected areas is one weakness of the study. Hence, interviews with the stakeholders were conducted to get a better idea of the adjustment process. This necessitates making the assumption that the economy equilibrates each week. The availability of secondary data is

Figure 8. Effects on the gross domestic product of Marikina City

GDP = gross domestic product

Note: City GDP, final consumption, and national spending in the left-hand scale, while local public spending in the right-hand scale.

Source: Authors' calculations

driving the way for these analyses as the basis for undertaking an analysis using a CGE framework.

Nevertheless, this study provides a contribution to the literature on the effects of disasters, as this is one of a few papers examining flooding impacts at the city level. With the information on the extent of damages, this could be a useful tool for planning the extent of resources necessary to help mitigate disasters among local governments.

References

- Armington, P. 1969. A theory of demand for products distinguished by place of production. *International Monetary Fund Staff Papers* XVI(1):159–78.
- Aufret, P. 2003. High consumption volatility: The impact of natural disasters. World Bank Policy Research Working Paper 2962. Washington, D.C.: World Bank.
- Benson, C. and J.E. Clay. 2004. Understanding the economic and financial impacts of natural disasters. World Bank Disaster Risk Management Series Paper No. 4. Washington, D.C.: World Bank.
- Center for Research on the Epidemiology of Disasters (CRED). 2015. *The human cost of natural disasters 2015*. Brussels, Belgium: CRED.
- Cororaton, C. 2003. *Construction of Philippine social accounting matrix for the use of CGE-microsimulation*

- study. Nairobi, Kenya: Partnership for Economic Policy. <http://www.pep-net.org/sites/pep-net.org/files/typo3doc/pdf/reconciliation-Philippines.pdf> (accessed on June 15, 2016).
- Gertz, A. and J. Davies. 2015. A CGE framework for modelling the economics of flooding and recovery in a major urban area. Economic Policy Research Institute Working Paper No. 2015-2. Ontario, Canada: Department of Economics, University of Western Ontario.
- Hallegatte, S. 2008. An adaptive regional input-output model and its application to the assessment of the economic cost of Katrina. *Risk Analysis* 28(3):779–799.
- Hallegatte, S. and V. Przyluski. 2010. The economics of natural disasters: Concepts and methods. World Bank Policy Research Working Paper 5507. Washington, D.C.: World Bank.
- Hunt, A. and P. Watkiss. 2011. Climate change impacts and adaptation in cities: A review of the literature. *Climate Change* 104(1):13–9.
- Institute of Philippine Culture (IPC). 2010. Rapid assessment of the social impacts of tropical storm Ondoy on urban poor communities. Paper for the Philippine Post-Disaster Needs Assessment. Quezon City, Philippines: IPC. http://www.pdf.ph/downloads/PDNA/PDNA-Social_Impact_Assessment_FINAL_20100725.pdf.
- International Federation of Red Cross and Red Crescent Societies (IFRC). 2012. *World Disasters Report 2012*. Geneva, Switzerland: IFRC.
- Israel, D.C. and R.M. Briones. 2014. Disasters, poverty, and coping strategies: The framework and empirical evidence from micro/household data – Philippine case. PIDS Discussion Paper No. 2014-06. Makati City, Philippines: Philippine Institute for Development Studies.
- Markusen, J.R. 2002. Multinational firms and the theory of international trade. MPRA Paper No. 8380. Cambridge, MA: Massachusetts Institute of Technology Press. https://mpa.ub.uni-muenchen.de/8380/1/MPRA_paper_8380.pdf.
- Markusen, J. and T. Rutherford. 2004. *MPSGE: A user's guide*. Boulder, CO: Department of Economics, University of Colorado.
- Mathiesen, L. 1985. Computation of economic equilibria by a sequence of linear complementarity problems. *Mathematical Programming Study* 23:144–162.
- National Statistical Coordination Board (NSCB). 2012. *National income accounts*. Makati City, Philippines: NSCB.
- Pelling, M., A. Özerdem, and S. Barakat. 2002. The macro-economic impact of disasters. *Progress in Development Studies* 2(4):283–305.
- Porio, E. 2011. Vulnerability, adaptation, and resilience to floods and climate change-related risks among marginal, riverine communities in Metro Manila. *Asian Journal of Social Science* 39(4):425–445.
- Rutherford, T.F. 1999. Applied general equilibrium modeling with MPSGE as a GAMS subsystem: An overview of the modeling framework and syntax. *Computational Economics* 14(1–2):1–46.
- Rutherford, T.F. and S. Paltsev. 1999. *From an input-output table to a general equilibrium model: Assessing the excess burden of indirect taxes in Russia*. Boulder, CO: Department of Economics, University of Colorado.
- Skoufias, E. 2003. Economic crisis and natural disasters: Coping strategies and policy implications. *World Development* 31(7):1087–1102.
- World Bank (WB). 2005. *Natural disaster risk management in the Philippines: Enhancing poverty alleviation through disaster reduction*. Taguig City, Philippines: WB.
- . 2011. *Philippine postdisaster needs assessment*. Taguig City, Philippines: WB.
- Zoleta-Nantes, D. 2002. Differential impacts of flood hazards among the street children, the urban poor and residents of wealthy neighborhoods in Metro Manila, Philippines. *Mitigation and Adaptation Strategies for Global Change* 7(3):239–266.

Session Synthesis

The objective of building a more resilient financial sector is especially challenging because, by nature, financial markets are all about taking risks. Unlike in other sectors, resilience in finance amounts not to reducing risks but to managing risks well. After all, risks in finance are related to generating profits. Building financial resilience, therefore, said *Bangko Sentral ng Pilipinas* (BSP) Assistant Governor Johnny Noe Ravalo requires diligently understanding the complexities of financial risk.

“The issue of financial resilience and financial market stability,” said Ravalo, “boils down to what is it that we know, and what is it that we do not know.”

In dealing with what is known, Ravalo warns against the temptation of thinking that there is a magic formula for building financial market resilience, or that the effective policies today will work tomorrow when market conditions are different.

Risks have a “nasty habit” of being “nonadditive, nonlinear, nontransparent, and they come together with each other”. Apart from being interconnected, constantly evolving, and unpredictable, the nature of risks in financial market also depends on the financial institution concerned.

For banks, they deal with the risks that come with credit. For security firms, they deal with liquidation-related risks; and for insurance companies, risks are found in liabilities, and so on.

Managing these risks depends on the gains that each sector or institution wants to make, and for that, Ravalo said, there is no hard limit.

“It is unbounded. You can always take home more returns if you are willing to take the risk. *Sino po ang magsasabing sobra*, and how do you know it is excessive? What is the basis of *sobra*?”

More often than not, the only way experts know the financial system has undertaken excessive risks is when the risks have already translated into shocks.

For regulators at the BSP, Ravalo admitted that they “only see the balance sheets in the fourth quarter. Where in the balance sheet is the systemic risk?”

Regulators are not privy to the decisions that go into the funding of the balance sheets, making it all the more difficult to determine *ex ante* the degree of risks institutions undertake, and whether they are still manageable or excessive leading to collapse.

“The homework for financial stability is not just to connect the dots. The homework for financial stability is to connect invisible dots. We have to figure out what it looks like before the evidence presents itself,” said Ravalo.

Not only must the BSP be proactive, but it also has to be comprehensive in its approach.

“It is a terrible mistake to look at the financial market in its parts. The entire system is an

integrated nexus of related issues, whether short term or long term. The homework for financial stability is to look for those linkages,” said Ravalo.

He emphasized that understanding how risks interact with one another, and the degree in which they affect one another, will ultimately inform how financial institutions and regulators can work together to better manage financial risks.

On the subject of bank behavior, session discussant Dr. Mario Lamberte said that theory is not yet sufficient to explain the actions of banks and central banks. A theory of financial instability should incorporate two things, he said. One, it should say something about market share because it leads banks to devise stability-generating pricing strategies. Two, it should include the real sector as financial instability arises from the interactions of financial and nonfinancial institutions.

Lessons from the crises

Concerned with the ambiguity of the lessons on the complexity of financial market resilience, Dr. Vicente Paqueo, during the open forum, asked Ravalo to enumerate specific examples of instances the BSP has averted a financial disaster and saved the economy.

Ravalo mentioned the BSP proactively runs all kinds of simulations at the onset of the 2008 economic crisis to anticipate the nature of its impact on the country. In the end, the BSP decided to make sure the impact would lead to a liquidity issue not a solvency issue—meaning, making sure the economic meltdown did not disrupt the Philippines’ ability to finance its long-term obligations.

At the time, Ravalo relayed, “nobody was borrowing because interest rates had spiked, and nobody was lending because nobody wanted to let go of their liquidity.”

In response, the BSP created a dollar liquidity board, encouraging banks and financial institutions to continue lending and borrowing despite growing fears abroad of credit defaults, and ensuring the continuing flow of funds needed for a healthy market.

“The signal was if you lend or borrow, [the BSP] will be there.”

Since then, the Philippines has moved from having the highest insurance risk in the region, measured through credit default swaps, to having the lowest. The dollar-peso rate has not moved to the extremes either way, growth remains at 7 percent this year, inflation is low, banks seem profitable, and the market spreads have not spiked.

Prof. Sarah Daway, another discussant, acknowledged the BSP’s “vigilance” in creating buffers for the financial system to resist the impact of the 2008 crisis, especially given the fact that the BSP had to deal with a lot of uncertainties.

Still, Daway said the context is important. Financial market resilience implies that the system “has the capacity in terms of scale to take on risks by adopting new, perhaps destabilizing, innovations and measures that also open up opportunities for growth and development.”

In the case of the Philippines, attributing the country’s resilience to actions taken by the BSP in connection with the 2008 crisis may be overlooking the fact that the country had very little exposure to the global market to begin with.

The Philippines receives a lot less foreign direct investment than the rest of its neighbors. “There is also the issue of the lack of financial development scale,” added Daway.

But for Ravalo, “size is irrelevant.” It is not about the size of the market but the size of the risks taken by the market, and the channels of that risks taken to interact and potentially grow.

Currently, the BSP regularly runs stress tests by sector, making it possible to “categorically” predict the impact of sectors collapsing on other sectors, thereby identifying “channels of contagion”. The surveillance is updated in a weekly basis, said Ravalo.

Other contemporary issues

In addition to Ravalo’s presentation on building financial market resilience, other macroeconomic

experts were also present to discuss other relevant areas of policy in building macroeconomic resilience.

Dr. Arlan Brucal tested the “conventional wisdom” that claims oil price drops positively affect oil nonimporters. For a developing, oil-importing country like the Philippines, the theory applied means “if the price falls below the 40-dollar mark, the gross domestic product growth would increase by 2 percent.”

However, noted Brucal, “what we see is actually the reverse. We did not see [growth] in the first quarter of 2015. It was the lowest.”

The problem is only a few studies have been done on the impact of oil shocks on non-Organisation for Economic Co-operation and Development countries. Furthermore, the new wisdom gaining ground looks at price shocks now simply as symptoms reflecting some other shocks in some other parts of the world.

“Prices are endogenous,” said Brucal.

The recent oil price shock, in particular, was affected by other events like the development of fracking, the slowdown of the Chinese economy, and the recurrence of destabilizing conflicts across the Middle East. Lamberte suggested to Brucal to look into how the inclusion of remittances might affect the results of his study.

For the Philippines, Brucal concluded that “the recent oil price decline actually hurt the Philippine economy,” whereby its export labor and services were deeply impacted by the negative impact of the shock on Middle East economies.

Brucal’s study drove home the lesson on the interconnectedness of risks. It is not enough to focus on one component or one channel of interaction. One shock may be good for a sector, but it can also be bad for another.

Creating “meaningful policies” requires disentangling the shocks related to and influencing the oil price shock, and identifying the various mechanisms through which they can affect various sectors of the Philippine economy.

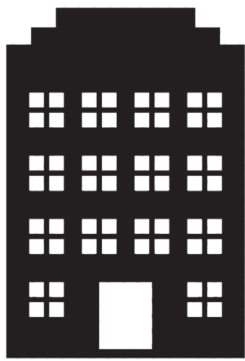
Meanwhile, the joint paper of Dr. Tuaño and Dr. Clarete demonstrated how helpful it is to disaggregate the impact of shocks like weather disruptions on the economy. Their focus on the impact of Typhoon *Ondoy* on the cities of Pasig and Marikina showed that the services and manufacturing sectors had different experiences of resilience and recovery.

“The typhoon more greatly impacted the textile and garments, and hotel and restaurant industries,” reported Tuaño. “Manufacturing industries were affected by the availability, mainly, of raw materials and also the destruction of their capital equipment. Meanwhile, services companies were affected by the lack of availability of personnel.”

Eventually, services recovered much more quickly, and manufacturing less, because replacing capital machineries took longer.

Overall, the economic losses for Pasig City and Marikina City were almost the same numerically, but because Marikina’s economy is only a third of Pasig, Marikina’s losses were greater in degree.

Session moderator Dr. Lawrence Dacuycuy noted that the importance of Tuaño and Clarete’s study lies in shedding light on the critical details that are useful for policymakers to focus on, such as identifying the sectors that need the most assistance in building resilience.



SESSION 4

URBAN ENVIRONMENT RESILIENCE



Location Strategies in Building Resilient Settlements: Technical and Political Considerations

Arturo G. Corpuz

“Ah yes the future is ours! I see it rose-tinted... I see towns rise along the railroads, and factories everywhere... I smell the oil—the sweat of monsters busy at incessant toil... These pure air, and these stones, now so clean, will be crowded with coal, with boxes and barrels, the products of human industry, but let it not matter, for we shall move rapidly in comfortable coaches to seek in the interior other air, other scenes on other shores, cooler temperatures on the slopes of the mountains” (Rizal 1891).

Abstract

Location strategies to increase resilience are typically applied to individual infrastructure projects. However, less attention has been given to their application at the urban or regional scale—building new towns or cities and the relocation of major urban functions—toward the objective of a resilient settlements network. At this scale, location strategies are justified based on environmental problems of large metropolitan areas, such as Metro Manila (e.g., traffic congestion, pollution, flooding). But they are also easily associated with the objective of reducing interregional inequity

in response to the dominance of an “imperial” capital city. The result is a popular combination of efficiency and equity objectives. Broken down into their core arguments, however, the objectives rely on a specious chain of logic that ignores, in spite of the serious environmental problems facing its constituents, the vital development role of Metro Manila and other similar metropolitan areas. Moving forward, location strategies to build the resilience of Metro Manila and its surrounding regions are best pursued as part of a broader regional development framework.

Introduction

Although commonly associated with infrastructure, location strategies may also be applied at the urban-regional scale to increase the resilience of the settlements network. This involves building new towns or cities, and relocating major functions and facilities to the extent that they alter the structure—essentially the location and roles of urban centers—of the network of settlements. Resilience is enhanced by moving or locating new activities to less vulnerable sites (existing or new), as well as by providing redundancy in regional transportation and other lifeline systems.

Notably, resilience at the settlements level is given less attention compared to infrastructure because budgets are attached to infrastructure projects and not to settlements. Settlements tend to attract interest only at the conceptual and planning levels.

Location strategies may be grouped into three basic categories (Kha et al. 2013):

1. *Avoidance*: avoiding disaster prone areas, such as fault lines and floodways, among others
2. *Relocation*: moving out of disaster prone areas
3. *Redundancy*: building alternative facilities, routes, and processes to ensure continuity

This paper looks at the objectives of location strategies intended to increase the resilience of the settlements network. It will not go into the details of how resilience is achieved, with the understanding that location strategies applied at the urban-regional level increase resilience beyond that provided by individual infrastructure at the local level. The initial focus of the paper is on resilience with respect to the physical environment, but it will also discuss resilience from a political perspective.

The paper aims to help provide clarity on the logic and expectations surrounding the objectives of location strategies. Much of the discussion will involve Metro Manila because most of the proposals to employ location strategies in the Philippines are centered on the National Capital Region (NCR).

Location strategies and resilient settlements

Location strategies may be viewed as default responses to environmental problems. Typically, places that are subject to constant floods, landslides, or similar hazards are avoided in favor of less disaster-prone areas. This may not have been as important for early, mobile slash-and-burn societies but once sedentary agriculture and some degree of permanence or regularity in settlement sites began to take place, the

significance of location decisions and land use became even more apparent.

Location and land use, however, are multidimensional (e.g., flood plains tend to be fertile and near sources of water and navigable transportation). Therefore, notwithstanding the logic of avoiding what would now be considered as disaster-prone areas, settlements grew near places that were also subject to significant environmental risks; many expanding into the metropolitan regions of today.

In the case of Metro Manila, it is often described as too big or overconcentrated because of its severe traffic congestion, chronic flooding, and poor air quality, among other issues. We will not go into the causes and other details of these problems and simply acknowledge that they are indeed unacceptable, especially based on international benchmarks (Corpuz 2016).¹ But the question arises as to whether these justify moving out of Metro Manila instead of building new infrastructure and putting in place the necessary service and governance systems to address them. In other words, if something is broken, do you discard it (by moving to another location) or do you fix it in its place?

Understandably, many proposed solutions to Metro Manila's environmental problems employ location strategies in the same area where the problems occur. These solutions range from community relocation projects (e.g., clearing earthquake fault lines and flood-prone riverbanks of occupants) to large-scale, long-term regional plans covering several local government units and taking into account extended growth trends.²

¹ As stated, Metro Manila is too big and overconcentrated because it is disaster prone. This is easily confused with the argument that Metro Manila is disaster prone because it is too big and overconcentrated. As general statements, both are flawed because in the absence of empirical data and information specific to a location, being disaster prone does not have to be connected with size or density.

² An example of a local location strategy is a provision in the Makati City Zoning Ordinance declaring occupied areas in the city traversed by the West Valley Fault as open space, with the intention of relocating its occupants and converting the area into a linear park. An initial concept/master plan has been prepared for this purpose, and a possible relocation site in the Pembo area has been identified (Makati City Ordinance No. 2012-102).

One example of a large-scale plan is the government-approved Dream Plan, which includes a variety of transport projects intended to relieve the congestion and address the land transport requirements of Mega Manila (i.e., Metro Manila, Central Luzon, and Calabarzon) (ALMEC Corporation 2014). Another is the Department of Public Works and Highways' Flood Management Master Plan for Metro Manila and Surrounding Areas, which encompasses various river and drainage basins covering 435,000 hectares in Metro Manila, Bulacan, Rizal, and Laguna. Although large in scale, these urban-regional plans are similar to local projects because they are not intended to alter the structure of the existing settlements network. The existing functions of settlements are more or less given even if some relocation activities may be involved.

Other policy responses are more pessimistic. They view Metro Manila as increasingly dysfunctional or even unlivable. Therefore, there is a need to decongest it by relocating major urban functions or building new cities outside the existing metropolitan area (Sepe 2016). The rest of this paper will focus on these location strategies, which may be grouped into two types of related objectives: technical and political.

Technical objectives

The first type is consistent with the argument that Metro Manila is too big and overconcentrated. However, instead of trying to address the environmental problems within the area of concern, it proposes to relocate major urban functions outside the metropolitan area in order to avoid or significantly reduce environmental risk.

A common proposal involves the transfer of the seat of government to another location; Clark is often mentioned as a preferred site although others (e.g., Cebu, Iloilo, Davao, or an entirely new city) have also been proposed (Yap and Alegado 2015; Bondoc 2016; Navales 2016).

In 2013, for example, Senator Antonio Trillanes IV filed a bill to create a commission

tasked to study whether the NCR should be retained as the country's seat of government. According to Trillanes: "lack of urban planning—as manifested by antiquated drainage systems, traffic gridlocks, hazardous air quality, and compounded by the proliferation of illegal settlers—makes Metro Manila a place with only little space for development." Trillanes further lamented that "Metro Manila is a capital which could hardly stand proud in the ranks of national capitals throughout the world" (Trillanes 2016).

Consider these two specific proposals to build and relocate major urban functions:

1. *Clark Green City* is proposed to be built at the Clark Special Economic Zone by converting the 35,000-hectare Sacobia area into an "environmentally sustainable, socially inclusive, economically competitive, culturally relevant, and technologically integrated" city. Initiated by the Bases Conversion Development Authority in 2015, it is planned to be developed over a 50-year period through a public-private partnership scheme. Clark Green City is described as an environment-friendly development: "It has residential, business (and commercial) establishments. It is like developing a new Metro Manila or a new Quezon City, but this time it is going to be a city that does not have the problems of Metro Manila (Clark Green City 2016)."
2. *Pacific Coast City* is a 28,000-hectare development located along the Pacific coast in the provinces of Aurora and Quezon. Intended to be three cities in one (i.e., resort city, industrial city, and university city), including a new national capital district, it was declared a flagship project by President Joseph Ejecito Estrada in 1999. As described, Pacific Coast City "is a grand design that is all-embracing because it solves the multilevel problems that seem to beset Metro Manila residents and government

officials forever”. The problems identified include “overdensity”, water and power shortages, inadequate waste disposal, traffic congestion, lack of housing, criminality, flooding, and pollution—all contributing to the overall problem of poor quality of life (Roxas 1988).

Whatever the function proposed to be relocated, the direct implication of these location strategies is that existing problems are too difficult to fix, causing the need to move elsewhere. Several observations may be raised at this point.

First, other larger and/or higher density cities (e.g., Hong Kong, Tokyo, and Shanghai) have performed much better in minimizing the kind of environmental problems that drive the proposed relocations from Metro Manila. These cities have been more successful in terms of disaster risk reduction along with economic growth, poverty reduction, service delivery, and overall quality of life. Although circumstances clearly vary among large cities, the levels and quality of road, rail, airport, port, and other infrastructure that are in place in these metropolitan areas are not found in Metro Manila (Corpuz 2016).³ (See Table 1 for a comparison of population, density, extent of population concentration, gross domestic product [GDP] per capita, and rail line-population indicators for selected metropolitan areas.)

It is also difficult to equate density, which is one of the most easily perceived characteristic of an urban area, to levels and perceptions of quality of life. Services and environmental conditions in some higher density urban areas are much better than in Metro Manila. In Hong Kong, where quality of life is arguably much better, Kowloon has a density of over 45,100 persons per square kilometer (sqkm); the density of Kwun Tong district is even higher at 56,300 persons/sqkm. An area of Hong Kong even reaches 400,000 persons/sqkm. These are higher than Metro Manila’s 20,300 persons/sqkm

or even the 40,400 persons/sqkm of the City of Manila, which approximates the scale of Kowloon (Corpuz 2013). On the other hand, in a recent poll in Metro Vancouver, which has a much lower population density of only 860 persons/sqkm, 90 percent of the respondents felt that the city’s density was already at the desired limit and did not want to accept any additional increases in density (Hyslop 2016).

Second, the relatively better environments in other cities suggest that Metro Manila’s problems can be addressed and that its large size and high density are not absolute constraints. In fact, there is no basis for saying that Metro Manila or any other city is too big and overconcentrated if technological conditions, such as the amount and levels of service of infrastructure, are not constant. Clearly, these are not or should not be constant. They are, after all, primary government responsibilities, which have simply not been delivered to the extent similar to other cities. Whether the government can provide the infrastructure and services necessary to address its environmental problems within an acceptable timeframe is another matter. But the point remains that, ultimately, city size and density thresholds are products of history, governance, and technology, and none may be considered as empirical absolute limits.

Lastly, an implied assumption is that the government has the means and capability to manage relocation, which, depending on the specific proposal, may require building a new or expanding an existing city. Relocation is justified by admitting that the government cannot deliver what is required in the existing metropolitan area but, at the same time, promising that it can provide similar requirements in a different location. This is not necessarily a safe assumption, particularly if the same governance system will be in place in both locations.

Focusing on the specific proposal to move the capital outside Metro Manila, the expectation is that this will result in a significant reduction of congestion. However, many other things will

³ In terms of overall national infrastructure competitiveness ranking in the Association of Southeast Asian Nations, only Myanmar ranked lower than the Philippines; even Lao PDR, Cambodia, and Viet Nam ranked higher (WEF 2015).

Table 1. Population, density, GDP/capita, and rail-BRT indicators, selected metro areas

Metro Area	Population (2011–2015)	Land Area (sqkm)	Population Density (pop/sqkm)	Metro/ National Population (%)	Rail-BRT Length (km/mil pop)	GDP/capita \$PPP (Brookings 2014)
Greater Metro Manila*	25,766,253	7,441	3,463	26	2.54	
Metro Manila	12,877,253	636	20,247	13	6.13	14,222
Bangkok Metro	10,624,700	7,762	1,369	15	11.65	19,705
Kuala Lumpur Metro/ Klang Valley	7,200,000	2,793	2,578	24	60.83	28,076
Ho Chi Minh	22,000,000	30,404	724	24	19.70	8,660
Singapore	5,535,000	716	7,730	100	33.24	66,864
Jabodetabek	30,019,191	6,392	4,696	12	17.59	9,984
DKI Jakarta	10,135,030	664	15,264	4	22.20	
Hong Kong	7,241,700	1,082	6,690	100	30.13	57,244
Hong Kong Urban	7,241,700	262	27,645	100	30.13	57,244
Shanghai	24,250,000	6,341	3,824	2	19.18	24,065
New Delhi	16,787,949	1,484	11,313	1	12.69	12,747
Kolkata	14,112,536	1,887	7,480	1	1.94	4,036
Lagos	21,324,000	1,171	18,206	12	1.29	
Rio de Janeiro	12,280,702	4,540	2,705	6	34.20	14,176
Paris	12,405,426	12,012	1,033	19	19.83	57,241
London	20,090,000	12,109	1,659	38	34.02	57,157
Tokyo-Yokohama	35,840,000	13,562	2,643	28	131.54	43,664
Tokyo	13,490,000	2,191	6,157	11	22.70	

GDP = gross domestic product; BRT = bus rapid transit

Notes:

* Metro Manila, Cavite, Laguna, Rizal, Bulacan

- Although Metro Manila has a high population density, other metro areas (Hong Kong Urban) have higher densities; the density of Greater Metro Manila is par for its peers, those with similar population sizes and land areas.
- In terms of extent of concentration (metro/national population ratio), Metro Manila and Greater Metro Manila are comparable to other metro areas. Some of the more developed metro areas, such as London and Tokyo, are more concentrated; considering similar-sized metro areas, Bangkok, Kuala Lumpur/Klang Valley, and Paris are more concentrated than Metro Manila. Notably, other large metro areas like New Delhi and Kolkata are less concentrated.
- Metro Manila is among the worst as far as mass transit availability is concerned. Some metro areas (e.g., Jabodetabek and Ho Chi Minh City) with lower GDP/capita are better.
- As a final note, while the table provides some comparability, interpreting the data should be done with caution because comparability is compromised by the variety of data sources. Further, the data are best appreciated through several levels (local, metropolitan, and extended metropolitan-regional) because they are based on political boundaries.

Source: Authors' compilation

determine whether congestion will, in fact, be reduced. For example, if the relatively low density government activities in Malacañang, Batasan, and other affected areas are replaced by high-density, large-scale commercial and residential uses (following the prevailing practice of maximizing government revenues from the disposition of public land), then, it is likely that congestion, at least in those parts of Metro Manila, will worsen. In the case of the 240-hectare portion of Fort Bonifacio that the government auctioned off in 1995, total gross floor area has increased more than

ten times since it was initially redeveloped. It has been transformed into the second largest business district and one of the largest traffic generators in the country; by the time it is fully built, its total floor area can further double based on the current master plan.

Moving the capital will take some time. The national government employs about 325,000 people in Metro Manila (CSC 2010),⁴ which is

⁴ A 2010 Civil Service Commission report listed the number of employees of national government agencies in Metro Manila at 325,037; this is 78 percent of all government personnel in the NCR and approximates the total population of Angeles City according to the 2010 census. Metro Manila accounts for 29.5 percent of total government personnel in the country (CSC 2010).

about the same number as the entire population of what might be considered as Clark's host city (i.e., Angeles City). Some of them will have to relocate to the new capital, or be replaced by others already residing in the new capital area, or their positions will have to be made redundant. This will be a long-term transition, especially because not just the employees will be affected but their families as well.

Also, the demand for national government services is higher in Metro Manila compared to any other new capital site. If we assume it will be Clark, then Metro Manila-based demand will be roughly 10 times more. We can expect, therefore, that this will continue to generate substantial traffic between Metro Manila and Clark well into the extended future.

Malaysia's experience in moving the federal seat of government from Kuala Lumpur to Putrajaya is instructive. Almost two decades after the transfer, Putrajaya remains sparsely occupied, with relatively few residents in its vicinity (including Cyberjaya) and with Kuala Lumpur still experiencing extreme tidal traffic flows.⁵ Kuala Lumpur and Metro Manila are, of course, different (e.g., Klang Valley has a superior road network and a higher automobile use per capita), but in both cases, as in other large metropolitan areas, there is simply no way that congestion can be relieved significantly without the extensive use of mass transit—whether or not the capital is moved. This will take some time, resources, and resolve to put in place.

By itself, moving the capital or other urban functions will not necessarily reduce congestion. It has to be part of a set of programs and projects that include how the vacated areas will be redeveloped, infrastructure support for the transfer, and incentives and other measures for affected employees and communities, among others. Notably, except for talk of a new rail connection between Metro Manila and Clark, none of these support initiatives have been mentioned.

⁵ In 2010, Putrajaya had a population of less than 90,000, comprising 1.5 percent of the total population, and ranking 9th out of the 10 urban centers of Greater Kuala Lumpur/Klang Valley (*Inside Investor* 2012).

Political objectives

The argument that Metro Manila is too big and overconcentrated is also the basis for location strategies seeking to reduce the dominance (in terms of share of national income and other resources as well as political authority and influence) of what has been described as “imperial” Metro Manila. Increasing resilience is now transformed from reducing congestion in the existing metropolitan area to reducing interregional inequity—a shift from physical resilience to some form of political resilience, with the notion that reduced interregional inequity improves social inclusiveness (Habito 2016).

A policy to de-imperialize Metro Manila has a strong mass appeal because reducing inequity in general is a popular objective. Disparities in income and other economic and welfare indicators between Metro Manila and other regions are often mentioned in support of this policy. Thus, for many, redirecting investments and relocating major functions from the Goliath-like capital to other cities and less developed regions of the country are simply the right things to do.

In support of the policy, it is usually accompanied by proposals to relocate key facilities and offices, such as the country's gateway airport to Clark, primary international port facilities to Subic and Batangas, national government departments to various parts of the country (e.g., Department of Agrarian Reform and Department of Agriculture to Central Luzon, Department of Transportation and Communications to CALABARZON, Department of Tourism to Cebu, National Anti-Poverty Commission to Mindanao, the Army to Nueva Ecija, the Air Force to Siquijor, and the Navy to Subic) (Antiporda 2014; Bondoc 2016). Similar to location strategies seeking to relieve congestion and increase resilience, a consistent favorite proposal is the transfer of the seat of government outside the metropolitan region, arguably the most direct and visible symbol of a de-imperialized Metro Manila.

Many countries have moved their capital cities to achieve political objectives. In general, it is more common in postcolonial states—thus the use of the term “de-imperializing”—where colonial capitals served the interests of the imperial powers and not necessarily those of the postcolonial native rulers who now had their own political and economic priorities. Typically, relocation of the capital was intended to strengthen the political power of rulers or diminish perceived threats from opposition groups. For example, the capital can be moved to the hometown region of the incumbent power in order to reinforce authority, or to the region dominated by the opposition in order to curb or crush resistance, or to a new location that can better serve as a city-monument that boasts and announces the arrival of the nation state to modern international status. New capitals are formed as physical expressions of a new dominant ruler, ideology, or policy, such as de-imperializing the capital toward interregional equity, even if the function remains constant (Schatz 2003).

Given the interregional equity objective, the success of the various relocation proposals depends on the extent to which welfare disparities between Metro Manila and other regions have decreased. Some of these will not be easy to attribute to specific location strategies. For example, the contribution of relocating the capital to an increase or decrease in interregional equity is not easily defined or measured, even if from a political point of view it may already be viewed as a worthy accomplishment.

Given these premises, two important points arise. First, an anti-imperial Manila policy may be directly relevant to interregional equity but not necessarily to social equity. The notion that Metro Manila is “imperial” implies that it is exercising undue influence and power over the rest of the country. This attributes political power to a location (along the lines of Lefebvre’s spatial fetish) rather than to social relations, where location is only one among many other factors that determine how power is formed, distributed, and exercised.

Transferring the national capital to another region, for example, will not necessarily diminish the power of political institutions that remain in Metro Manila. It is possible that it may even strengthen the latter, if they are relieved of direct supervision from incumbent authorities that have transferred.

There is evidence that reducing inequity may have a positive impact on economic growth, but this refers to social and not necessarily to interregional inequity (Gould and Hijzen 2016). Interregional equity is incidental to social equity. (If we believe that all men are created equal, this does not automatically mean that all cities are created equal.) Ultimately, there is no congruence between the two (Gore 1984).

Second, giving investment priority to other regions because of an anti-imperial Metro Manila policy is a complex and not an easy task. Government may be able to shift public investments away from the capital region,⁶ but it will be much more difficult when it comes to the private sector. This is critical because about 95 percent of GDP and 90 percent of employment in the country are generated by the private sector (Paderanga 2011). In order to attract private investments, the government has to be more successful in removing constraints to doing business; the most problematic according to a global competitiveness report are: corruption, inadequate infrastructure, tax regulations, inefficient government bureaucracy, tax rates, policy instability, and restrictive labor regulations (WEF 2015). Except for infrastructure, however, these are not location specific and/or are largely dependent on local government performance. Addressing these constraints, while necessary, will not be directly helpful in channeling investments to national government’s preferred regions.⁷

One option is for the government to intervene directly by prohibiting specific types of private

⁶ Under the Aquino administration, for example, Mindanao received the largest share (27%) of the budget of the Department of Public Works and Highways. North Luzon was next at 23 percent followed by South Luzon (20%), Visayas (18%), and, lastly, by Metro Manila (12%) (Corpuz 2016).

⁷ Mindanao regions have the additional constraint of combined Islamic secessionist and communist-inspired insurgency movements, which have deterred investments for decades. Addressing this will be necessary if larger scale domestic and foreign investments are to flow into Mindanao.

investments in Metro Manila, similar to the Marcos-era ban on industrial development, which, arguably, contributed to the growth of nearby provinces of Cavite, Laguna, and Batangas into the country's manufacturing hub. President Rodrigo Duterte expressed a similar interventionist view, with his usual disdain for the capital region, when he told business investors to invest outside the capital:

“Manila is already saturated... If there are investors coming in, I will not allow building for like factories in Manila not only [because] it is a dead city but [also] because I have to build a new environment for the people... I will establish an economic zone, and I will relocate them there wherein I will provide assistance, and the Department of Social Welfare and Development can come in. I will make sure first that within the economic zones there will be hospitals, roads, and markets, among others. I will ensure first that there is economic activity, so if they got there they will have jobs” (*Sun Star Davao* 2016).

Duterte recognized that “economic activity” is needed to generate jobs necessary to attract and develop new investment areas outside Metro Manila. What he left unsaid, however, is that economic activities outside Metro Manila, like any other economic activity of significance, require markets of sufficient scale and agglomeration in order to develop, survive, and thrive.

Overall, scale and agglomeration economies will continue to be most influential in determining the location of private investments. These will favor urban areas—with large metropolitan areas favored most—as investment destinations. This is the reason why 84 percent of the value of awarded public-private partnership projects is in Metro Manila and surrounding provinces; 93 percent of the value of the same awarded projects serves large urban markets (PPP 2016).

Resilient settlements network as a growth strategy

There is another thing in common with the way locations strategies have been articulated. In a somewhat odd way, the problems attributed to Metro Manila are highlighted to justify relocating functions and investments, but there is limited discussion of what happens to Metro Manila thereafter; it is as if the problems are going to be solved once the move takes place or once Metro Manila is no longer of consequence. In any case, we will not dwell into why Metro Manila cannot be ignored, other than reiterate precisely what some of those who label it as “imperial” have mentioned—that it accounts for more than a third of the country's GDP; its population has the highest average family income, lowest poverty incidence, and lowest underemployment rate; and it serves as the largest venue for poverty reduction in the country. It is difficult to think of the country's development without including Metro Manila into the picture, regardless of whether it is imperial or not.

Moving forward, the following are some considerations toward the objective of increasing resilience within Metro Manila and its surrounding regions:

1. *Relocating certain functions outside the metropolitan area makes sense in order to avoid aggravating existing problems while trying to address them (i.e., disrupting already constrained services while building new infrastructure and service systems).* Relocation is a pragmatic response to what can actually be done on the ground given limitations of funding and other resources, including management and institutional capacities (e.g., national-local government coordination inefficiencies). The key assumption here is that relocation is accompanied by projects and other initiatives to address existing problems in the metropolis.
2. *Location strategies are best integrated into a broader regional development plan, framework, or context.*

This allows for (1) effective geographical convergence of projects (projects of different agencies in the same area can be made compatible and complementary) and (2) efficient phasing (projects can build on each other), bundling, and clustering of projects to provide scale and resilience to the settlements network (e.g., new roads intended to serve local areas can be designed to be part of a network that provides redundancy at a regional scale).

For example, a transit connection between Metro Manila and a new capital at Clark should be built to serve other complementary development nodes (e.g., manufacturing, education, tourism). These nodes can also serve as evacuation and emergency relief centers in the event of disasters. The new transit facility can be built faster and investments may be recovered earlier, even as the transfer of the seat of government is still being worked out because other economically productive objectives are also driving the project.

3. *Location strategies should work with current trends, such as the declining population of Metro Manila relative to other regions, the rapid and piecemeal growth of its periphery, and the continuous expansion of Metro Manila's day-to-day orbits of economic and social influence.* Thus, relocation and increased resilience should be pursued in the context of a Metro Manila that is already deconcentrating demographically, with its share of household income decreasing even as its contribution to GDP continues to increase (from 29% in 1980 to 38% in 2015). This emphasizes the increasing importance of establishing efficient physical and digital connectivity between Metro Manila and its surrounding regions, as places of production and consumption strain to become more footloose in the face of dwindling infrastructure and other service capacities. It also reinforces the increasing irrelevance

of Metro Manila as a functional unit, with most of its day-to-day activities and service requirements already oblivious to internal and external borders.

4. *Relocating functions from Metro Manila to surrounding regions (e.g., moving the capital to Clark) is only one of many possible strategies.* Others include: (1) increasing the utilization of the Subic and Batangas Ports by capping the use of ports in Manila; (2) developing manufacturing-industrial sectors along SCTEX and STAR⁸ (leading to Clark and the ports); (3) managing urban expansion (e.g., along the northeast toward Fort Magsaysay); (4) lowering density, ecotourism, and institutional uses within the constrained environments of Manila Bay and the foothills of the Zambales and Sierra Madre mountains; and (5) preserving strategic agricultural and forest lands.
5. *As mentioned earlier, a key component of building resilience is hazard risk assessment.* This means understanding (1) existing and potential hazards, (2) elements at risk (e.g., population and economy), and (3) vulnerability (degree of preparedness).

Most planners focus on the first aspect, typically with emphasis on ridge-to-reef analysis that maps out risks and land uses. In comparison, demographic and economic drivers are given scant attention. Population data are typically compiled but often not interpreted in terms of their spatial and market dynamics. Economic activities are even less understood and often ignored. This is especially evident in land use plans, which tend to offer only lip service, especially to the demand side. At most, land use standards are employed, but the origins and bases of these standards are not verified or even understood. In some cases, land use constraints (e.g., no

⁸ SCTEX refers to the Subic-Clark-Tarlac Expressway, while STAR refers to the Southern Tagalog Arterial Road.

build zones) are proposed at the expense of current livelihood and employment activities, with little regard for a less disruptive phased approach. This is unfortunate because one of the most effective ways of building resilience is to strengthen the local or regional economy.

6. *The overall development strategy of the regional plan will have to deal with managing growth along various corridors from Metro Manila: northwest (Subic), north (Clark), northeast (Bulacan and Nueva Ecija), east (Rizal), southwest (Cavite), and south and southeast (Laguna and Batangas). Growth is already dispersing from Metro Manila, but it needs to be managed with infrastructure, land use controls, and catalysts. The intent is for each corridor to have multiple and more efficient urban nodes served by a hierarchy of transit while providing redundancy and avoiding hazard-prone areas.*

Conclusion

Seemingly diverse objectives can converge, especially when it comes to planning and implementing location strategies. This is not surprising. Being a platform as well as an agent of social relations, both land and location cannot be exclusive to specific sectors of activity. Relocating a facility or a function is likely to have an impact on physical as well as political resilience. Thus, for example, popular location strategies can be combined into a single statement that summarizes their proposed collective logic: *Moving the capital will relieve congestion in Metro Manila, which is the result of overconcentration and indicative of interregional inequity driven by the dominance of imperial Metro Manila.*

This is a powerful statement. It appeals to popular sentiments because it combines efficiency and equity objectives. It is straightforward and plays into an underdog mindset against the dominant metropolitan center. Broken down into its core arguments, however, it is a specious chain of logic; relocating the seat of government will not necessarily reduce congestion and increase resilience, there is

no optimum city size or density, and interregional equity is not the same as social equity.

The popular appeal of reducing inequity among regions will continue to fuel proposals to relocate major urban functions and facilities and divert investments from Metro Manila. But even if implemented, these should not be interpreted to necessarily mean a reduction of social inequity. Further, investment destinations will continue to be heavily influenced by scale and agglomeration economies and, therefore, will be biased toward metropolitan and other large urban areas.

Some location strategies intended to relieve congestion and build resilience may be worth pursuing as a pragmatic response to the limitations of what can be done to solve existing problems. Conditions may be expected to worsen while building new infrastructure required to address existing congestion. In situ solutions are especially complex and may be difficult given current limitations of service capacities and metropolitan governance inefficiencies.

Moving forward, location strategies intended to increase resilience should be part of a larger regional development framework in order to increase planning and implementation efficiency.

References

- ALMECCorporation. 2014. Road map for infrastructure development for Metro Manila and its surrounding areas. Report submitted to Japan International Cooperation Agency and National Economic and Development Authority. <http://www.neda.gov.ph/wp-content/uploads/2015/03/FR-SUMMARY-12149597.pdf>.
- Antiporda, J. 2014. Transfer of government agencies to decongest Metro Manila. *The Manila Times*. September 14. <http://www.manilatimes.net/transfer-govt-agencies-decongest-mm/126713/>.
- Bondoc, J. 2016. Big government to move out to decongest Manila. *The Philippine Star*. August 12. www.philstar.com/opinion/2016/08/12/1612643/big-govt-move-out-decongest-manila.

- Civil Service Commission (CSC). 2010. 2010 Inventory of Government Personnel. Quezon City, Philippines: CSC. <http://www.csc.gov.ph/2014-02-21-08-28-23/pdf-files/category/387-igp-2010> (accessed on September 8, 2016).
- Clark Green City. 2016. Clark Special Economic Zone. <http://www.greencityclark.com> (accessed on July 14, 2016).
- Corpuz, A. 2013. National spatial strategy. Paper prepared for the National Economic and Development Authority.
- . 2016. Infrastructure, urbanization and the Filipino 2040 Vision. Paper prepared for the Asian Development Bank and National Economic and Development Authority as part of the *Ambisyon 2040* project.
- Gore, C. 1984. *Regions in question: Space, development theory and regional policy*. London, United Kingdom: Methuen.
- Gould, E.D. and A. Hijzen. 2016. Growing apart, losing trust? The impact of inequality on social capital. IMF Working Paper WP/16/176. Washington, D.C.: International Monetary Fund. <https://www.imf.org/external/pubs/ft/wp/2016/wp16176.pdf>.
- Habito, C. 2016. The edge of imperial Manila. *Philippine Daily Inquirer*. August 9. <http://opinion.inquirer.net/96373/edge-imperial-manila>.
- Hyslop, K. 2016. Density is coming, say urban thinkers, but to whose backyard. *Tyee Solutions Society*. January 22. <https://thetyee.ca/News/2016/01/22/Density-Is-Coming-to-Vancouver/>.
- Inside Investor*. 2012. Planning for a cleaner, greener city. <http://etp.pemandu.gov.my/upload/Inside%20Investor%20%20Greater%20KL%20and%20Klang%20Valley.pdf>.
- Kha, A., T. Miner, and Z. Stanton-Geddes, Editors. 2013. *Building urban resilience: Principles, tools and practice*. Washington, D.C.: World Bank.
- Makati City Ordinance No. 2012-102. 2013. An ordinance adopting the new zoning regulations for Makati and providing for the administration, enforcement and amendment thereof and for the repeal of all ordinances in conflict therewith. Makati City, Philippines: City Government of Makati.
- Navales, R. 2016. Clark-Subic eyed as new Philippine capital. *Sun Star Pampanga*. February 23. <http://www.sunstar.com.ph/pampanga/local-news/2016/02/23/clark-subic-eyed-new-ph-capital-458912>.
- Paderanga, C.W. Jr. 2011. *Private sector assessment: Philippines*. Mandaluyong City, Philippines: Asian Development Bank.
- Public-Private Partnership (PPP) Center. 2016. Status of PPP projects (as of July 1 2016). Quezon City, Philippines: PPP Center.
- Rizal, J. 1891. *El Filibusterismo*. Ghent, Belgium: F. Meyer van Loo Press.
- Roxas, R. 1988. The dynamics of national development planning in the Pacific Coast cities. Makati City, Philippines: Green Circle Properties and Resources, Inc.
- Schatz, E. 2003. When capital cities move: The political geography of nation and state building. Kellogg Institute Working Paper No. 303. Notre Dame, IN: The Helen Kellogg Institute for International Studies. <https://kellogg.nd.edu/publications/workingpapers/WPS/303.pdf>.
- Sepe, F. Jr. 2016. Why Metro Manila will be uninhabitable in 4 years. *ABS-CBN News*. January 7. <http://news.abs-cbn.com/nation/metro-manila/v2/01/07/16/why-metro-manila-will-be-uninhabitable-in-4-years>.
- Sun Star Davao*. 2016. Duterte to bizmen: Invest outside Manila. May 26. <http://www.sunstar.com.ph/davao/local-news/2016/05/26/duterte-bizmen-invest-outside-manila-475972>.
- Trillanes, A. 2016. Trillanes pushes for transfer of seat of government. Official website of Senator Antonio Trillanes IV. <http://www.trillanes.com.ph/media/press-releases/trillanes-pushes-for-transfer-of-seat-of-government/> (accessed on September 8, 2016).
- World Economic Forum (WEF). 2015. *The Global Competitiveness Report 2015–2016*. Geneva, Switzerland: WEF.
- Yap, K. and S. Alegado. 2015. Philippines plans back up capital to prepare for disasters. *Bloomberg*. December 16. <http://www.bloomberg.com/news/articles/2015-12-15/philippines-plans-backup-capital-city-to-prepare-for-disasters>.



The Quest for Coherence: Energy/ Water Efficiency and Metro Manila Sustainability Standards

Alvaro P. Artigas

Introduction

Today, more than ever, the issue of sustainable development in emerging markets is closely associated with the issues of urban infrastructure development and modernization of utilities. The past few decades have seen the gradual transformation of a development model that is formerly driven by ad hoc interventions. This model seeks instead to adopt a systematic approach where territorial diversity, a multisectoral approach, and a long-term perspective are intertwined. Driven by national sociopolitical dynamics, but equally by the active promotion of international development agencies, former command-and-control decision templates have more or less resolutely moved toward better accounting for the complexity of multilevel political administrative dynamics and participatory demands voiced by society. Whereas it might still be early to assess the outcomes of these development programs in terms of their contribution to better living conditions for the concerned urban territories, or even the fight against climate change, they shed an interesting light on government's priorities and contradictions pertaining to these processes.

This development model has been based on strategies to attract foreign investments (whether public or private), in a context of trade surpluses for some countries and easy access to credit for others. The first countries that made this strategic shift are Brazil, Russia, India, China, and South Africa. Following them are the new emerging markets of the Pacific Rim— Malaysia, Thailand, Philippines, Chile, Peru, and Colombia, among others—that have placed infrastructure deployment at the heart of their development agendas. Their agendas also include a strong territorial dimension wherein infrastructure decisions impact urban primary and secondary centers and may hinder local governance of these processes. Therefore, they pose a major challenge to urban, metropolitan, and national governments' ability to combine these objectives with socioenvironmental redistributive goals at circumscribed territorial scales.

Large urban centers, in particular, now play a pivotal role in the development of production chains and the (trans)-continental transit of raw materials. This infrastructure deployment raises the issue of consistency between “neodevelopmental” interventions that are clearly

geared toward production and urban policies intended at conservation at the local level. Given the investment dynamics of major networks that extend beyond a regional or even national scope, how can decisionmakers integrate local, controlled, and sustainable development concerns that would fall under the remit of utilities? Furthermore, can utility governance in these new emerging markets be viewed through the lens of sustainability and conservation without integrating the consequences of national production-oriented objectives?

All of these considerations converge in the context of Southeast Asian countries toward green growth-inspired strategies that seek to reconcile the objectives of economic development with the imperatives of social stability and sustainable growth. Urban services are integrated under comprehensive frameworks within these programs, but specific sociotechnical, institutional, and regulatory path-dependent legacies reveal the complexity of this coordination and some of the shortcomings of green growth planning. In a context of an ever-growing demand for utilities and reliable and affordable services, and increasingly acknowledged interactions among water, energy, and waste (Sheng and Thuzar 2012), vital metropolitan utilities adjust, enhance their networks, and address the issue of efficiency in the provision of services (Lorrain 2014). But are these goals achievable in a context of increasing governance segmentation and contradictory objectives that converge at the territorial scale of capital cities? At the same time, how do the different government levels engaged in city planning taking into account the complexities of urban services provision and addressing the issue of coordination, given the interactions with other policy sectors?

Bearing these questions in mind, this paper will address some of the fundamental issues pertaining to the governance of these processes, bearing in mind the importance of coordination (Le Galès 1995; Papadopoulos 1999) inherent to policy design, in order to raise relevant questions in the case of Metro Manila. We begin with an

analytical overview of the key transformations that the countries of the “Global South” like the Philippines have been undergoing in terms of infrastructural development to address existing environmental dimensions. We will address, in particular, how national development priorities based on a rapid integration to the world economy and the promotion of specific policy instruments, such as public-private partnerships (PPPs), have adversely impacted the sustainability of utility networks, hindering the government’s capacity to oversee their development at the metropolitan level. The tensions between national development strategies and these new interdependencies reveal a critical but often overlooked dimension of conservation in the cities of the South.

Infrastructure development programs: A conceptual framework for new emerging markets

The upgrading of urban infrastructures remains a complex process in emerging markets, especially at the nexus of sectoral, institutional, and corporate dynamics (Lorrain 2014; Artigas 2015a). It often reflects significant changes in the role of public authorities and, more fundamentally, of the state (Cingolani et al. 2015). Historically, urban utilities and network services development has followed a haphazard progress in most countries of the Global South: from decades of public authorities’ neglect (Gomez-Ibanez 2003), national trajectories were subject to frequent ownership and regulatory frameworks leading to uneven and often incomplete development of water, energy, transportation, and logistics networks. Public authorities developed these sectors in accordance with production-based models, exposing them to these programs’ inherent contradictions in terms of implementation and sustainability. At the institutional level, infrastructure planning has often been subject to interbureaucratic conflicts, sometimes fostered by the state itself to reassert its control. In addition, patrimonial types of relational networks, which are more or less entrenched depending on national contexts (Kang 2003),

strengthen the pivotal role of economic groups in the implementation of certain initiatives and the failure of certain modernization projects.

An integrated approach to infrastructure: Structural constraints and desirable outcomes

Analysis of development programs in new emerging markets begins with the following observation: significant gaps remain in urban services (water, waste, electricity), as well as in transportation and energy infrastructure for production centers. While urban technical networks and large infrastructure systems do not necessarily operate at the same level, rapidly developing city hubs bring them together in decisionmaking processes that are now closely interdependent. Sectoral specificities aside, these decisionmaking processes have much in common and share similar issues when it comes to the formulation and implementation of reforms. Common features involve, among others, the trade-off between public service considerations (universal services, citizen rights) and considerations involving market-based private property and service exchanges, thus, pointing to the structural role of these decisionmaking processes and the intrinsically political nature of urban infrastructure networks (MacFarlane and Rutherford 2008).

Thus, with regard to network industries and utility development: what are the respective roles of the central government and the local governments? Through its access to resources and a strategic and technical planning capacity, central government tends to have control over the formulation and decisionmaking phases, while local governments become important for the implementation of local development programs and the assessment of their effects. The issue of preferred scale of infrastructure and utility development ultimately leads to the issue of the consolidation of formal principles of economic efficiency. The design of major infrastructure programs makes economic efficiency an operating principle meant to mark a departure from a debt-creating interventionist state

model. PPPs gradually became the main instrument in the countries of the Global South due to the support of international organizations, bilateral cooperation programs, and specialized consulting firms (ADB 2015). However, a review of their first decade of operation provides a much more nuanced picture. The formal principle of efficiency and the illusion of state control often lead to phenomena of state capture by economic groups (Artigas 2015a), as well as significant socioenvironmental externalities. The latter can become sources of institutional and social resistance and, therefore, can potentially limit the reach of these programs and undermine initial objectives.

A transformation of the state's role in a context of crisis

The analysis of the trajectories of emerging powers also highlights utility regulatory systems that stem from different legal traditions. Whether they nurtured independent, Anglo-Saxon types of regulatory systems or more interventionist management models (rate setting system, renegotiation, etc.), states are witnessing the rapid dissemination of public policy instruments aiming to encourage competition and private sector participation in the management of these sectors.

Traditionally, in the countries of the Global South, the state was responsible for investments in networks and utilities and operations through state-owned enterprises. However, its role came under increasing criticisms of high operational costs and poor quality of infrastructure and related services (Jordana 2012). Following the active intervention of international organizations, such as the International Monetary Fund and the World Bank, governments of emerging countries quickly saw the value of privatization as a solution to their budget constraints (Parker and Kirkpatrick 2005). Beyond the privatization of public enterprises, which yielded around USD 50 billion per year in nonmember-countries of the Organisation of Economic Co-operation and Development (OECD) (Nestor and Mahboobi 2000), many of

these countries opened their infrastructure sector to private participation. At the end of 2001, emerging markets had received over USD 755 billion in private investments for almost 2,500 infrastructure projects (WB 2003).¹ However, the most significant development was the growing use of PPPs, which, for over two decades, had allowed governments to transfer investment costs to private actors and to keep projects going (Linder and Vaillancourt Rosenau 2000).

The 2008 financial crisis also raised the question of the state's ability to govern economic development in the Global South in connection with the social and environmental impact of these interventions both on the private sector and on the emerging middle classes. Beyond "more or less market", the key issues revolved around the state's ability to coordinate economic development, the most appropriate level of state intervention, and the state's more or less proactive role in the national market's expansion. The creation of infrastructure development programs points to a very important aspect of the postcrisis evolution of public intervention, which will be referred here as *proactive mediation* by the state. The latter played a major role in forming growth coalitions and, like industrialized countries, would redefine in these terms its role as "guarantor of social order, namely through ideology and by regulating the various social interests... as social order is an essential condition for real estate investment [and] it later intervenes in the accumulation phase" (Scott and Le Galès 2010, p. 121).²

The permanence of regional particularities

A few regional particularities must be mentioned, even though the state remains a relatively autonomous player and at the helm of economic policymaking in all cases, be it in a Korean-style developmental model (Johnson 1982; Deyo 1987; Wade 1990; Woo-Cumings 1999), a patrimonial

model like Singapore (Mackie 1988; MacIntyre 1991), or a bureaucratic-authoritarian model like Brazil and Peru (Schneider 1999). In each of these development trajectories, the central state's ability to achieve its objectives stems from political and institutional dynamics that account for the sufficient concentration of power, the creation of administrative operational capacity, and the desire to legitimize its actions to society.

While studies of public infrastructure and utility development traditionally highlighted characteristics that were often shared, they also showed, through their focus on formulation and implementation, the limits of the state's infrastructural power (Artigas 2017). In the absence of *oversight capacity* by public authorities throughout their territory, development programs faced implementation difficulties. In Latin America, for example, the bureaucratic authoritarian regimes of the 1960s and 1970s were not able to counter the power of strongholds of regional elites, who could block, if not scuttle reform, despite the deployment of significant administrative resources and use of violence. These specific constraints account for fragmented and segmented development trajectories and show the limits of state intervention.

The adoption of structural reforms in the 1990s and the greater participation of private actors played a key role in this process of reformulating the role of the state. The objective was, on one hand, to rethink the role and place of public institutions and organizations with the explicit goal of protecting them from the control of political leaders; and, on the other hand, to prevent capture of the state apparatus by special interests (Hellman et al. 2000). The scope of reforms and the specific terms of their implementation in Southeast Asia, to this day, reflect the difficulty of preserving the independence of public entities responsible for development policymaking. The influence of private interests in agencies responsible for promoting infrastructure development and regulating key sectors of the economy shows the persistence of patrimonial relations in Asia (Gomez and Saravanamuttu 2012)

¹ According to the World Bank's Private Participation in Infrastructure database for the 1984–1989 period, the share of private investment totaled only USD 19 billion in 26 countries.

² As demonstrated by new forms of government intervention, city negotiations with companies, and privatization through coproduction (Pierce 2015).

and of appointive bureaucracies that are sources of penalizing discontinuities in the completion of these programs.³ These two characteristics, which are most often present concurrently, contribute to an uneven setting of economic growth objectives and inevitably lead to asymmetrical and controversial development (Schneider 1999).

Over time, such development trajectories erode the state's ability to pursue coherent and articulated policies, and limit the scope of government action during implementation across the territory. The instability generated by successive financial crises (1997–1998 and 2008) and the steady but poorly managed increase in financial and production flows in the Pacific Rim reinforced these asymmetrical relations between the state and the market, thus, raising the question of the retreat of the state in the face of economic and financial globalization (Strange 1996).

A state overwhelmed by territorial and sustainability challenges?

Rather than conclude that the state's role has diminished, it is more appropriate to underscore its extension through territorial and environmental dynamics to the extent that it remains able to act during critical periods or in sectors considered to be strategic.

In this sense, despite their destabilizing effects, the economic crises of 1997–1998 and 2008 demonstrated the state's capacity for action in the form of policies to stimulate and accelerate growth. Such policies require the mobilization of substantial financial resources, as evidenced by the growth in multisectoral infrastructure development programs in many new emerging countries. This capacity for action also involves a reorganization of the state apparatus by strengthening or creating agencies. These sections of the state have also benefited from a reconfiguration of authority:

³ In such a system, entering governments dismiss thousands of civil servants (especially managers) to replace them with supporters selected on the basis of personal allegiances rather than skills (Schneider 1999). This system, known as "spoils system" in the United States, remains very present in the literature on public administration, although it may be more significant in a context of fewer resources and poorly consolidated party systems. See Van Riper (1976).

given their strategic position, these public entities benefited from the dynamics of globalization, in which they actively participated through feedback processes (Jessop 2002).

Due to the aforementioned factors, state infrastructure projects now include an implicit territorial scope. Investments in road and transportation infrastructures primarily, but not exclusively, target major urban centers, which are key areas of socioeconomic progress (Özel 2011; Ebenau 2014; Artigas 2017). The fact remains, however, that the planning, governance, and integration of networks in the metropolis of the Global South are unfolding in the aforementioned context of limited state steering.

Thus, several accelerated infrastructure development programs gave rise to new systems that are controlled by funding agencies that were beefed up or specially created for this purpose (Artigas 2015a), and whose capacity for action remains dependent on a complex territorial and multilevel interlinkage shaped by conflicting dynamics.

The state's limited ability to carry out these transformations is also related to the persistence of its dependent relationship with special interest groups. More specifically, these programs lead to the deployment of infrastructure serving national production networks that turn urban centers into major parts of production chains. Related flagship projects are often pursued with little consideration for the needs of the territories involved and of the reduction of inequalities in access to services. The effects of all these programs remain poorly understood and poorly articulated with the conservation and sustainability objectives set by urban areas.

Far from being a secondary aspect in this transformation of the state's role in new emerging markets, sustainability is actually a key indicator of these gaps and of the difficulty in reconciling constantly growing production-oriented considerations and the needs of cities experiencing rapid growth and seeking to limit their territorial, sectoral, and network expansion.

The management of environmental resources in the new emerging markets

The development trajectories of metropolises located on the two sides of the Pacific (McGuirk 2014) resulted in environmental issues receiving a growing amount of attention, even though they still have a precarious status that is subject to economic and political vagaries (Burnell and Randall 2014). The trade-offs between development “imperatives” and environmental “concerns” are an indicator of the political system’s greater or lesser capacity to convey the demands of populations affected by the negative environmental externalities of growth. They are linked to the effects of transformations underway at the urban level with regard to social justice (Artigas 2015b) and, more generally, to the ability to think about city development on the basis of a distinct model that is not necessarily compatible with that of major state-led interventions.

These trade-offs are also largely determined by the economic needs and social imperatives specific to export-oriented models. The latter are based on sustained growth and result in the intensive exploitation of natural resources (Malaysia), the creation of special economic zones for exports that are sometimes under the direct patronage of foreign governments (Dawei in Myanmar, by the Thai government), and the establishment of business process outsourcing (Metro Manila in the Philippines; Iskandar in Malaysia). The main objective is to attract foreign capital to territories where labor and environmental norms can compete with those of industrialized economies.⁴

Moreover, the use of a command-and-control type of approach in environmental policies is not conducive to taking into account the complexity of impacted areas. An integrated approach to network development would be based on an assessment of the formal and informal needs of residents, as opposed to ad hoc interventions (eco-neighborhoods built from scratch, separate “environmental” sections)

pursued hierarchically and without real consultation with residents. Given the political system’s inability to integrate complexity in these states, opposition to national programs results in legal action or violent mobilization (Svampa and Antonelli 2010; Mundaca 2014). It is important to note that the socioenvironmental impact of these infrastructure programs remains poorly understood given a lack of public policy evaluation systems in many of these national bureaucracies—a situation that is, however, increasingly being addressed by a larger array of stakeholders such as nongovernmental actors and new cooperation venues. This is a major environmental management challenge in the metropolises of the Global South and underscores the state’s limited scope for intentionality in these countries.

In this context, the evolution of the discourse on sustainability at the global level bridges the conflictive goals of economic competitiveness on one hand and socioenvironmental justice on the other. The private sector appears as a key player in this dynamics, which tips the scale toward a political preference for short-term priorities, especially in the context of the post-2008 economic recovery. National and local governments see PPPs as a cost-effective model in which economic players, government agencies, and civil society can develop more ambitious yet sustainable projects and with more explicit specifications. In the urban centers using them, PPPs focus on specific interventions that are limited in space but intensive in resources. This omnipresent funding mechanism in emerging countries has accelerated the shift toward competitiveness-centered political agendas, in which it is difficult to fit social cohesion and environmental protection considerations.

As a result, market integration strategies based on principles of “spatial selectivity” (Jones 1997) tend to favor the needs of competitive sectors, which serve as vehicles for development at the global level and are mostly located in major urban centers. In this context, infrastructure planning is supposed to generate positive externalities for other economic sectors city wide (Raco and Flint 2012).

⁴ In the Pacific Rim, these strategies are widely used by states with significant development gaps compared to their neighbors, as demonstrated by the examples of Iskandar and Metro Manila.

Yet, these interventions appear to be inconsistent with the founding principles of sustainable development, particularly the territorial balance identified during the 1992 Rio Summit as a part of Agenda 21. Whole sections of the population are left at the margins of these large projects, heightening tensions (Bullen and Whitehead 2005).

The role of global production chains in the definition of urban interventions

Besides this dimension, these countries participate in “bottom-up” market integration, which manifests itself by increased competition in establishing logistics and production platforms. The growing importance of the Pacific Rim’s production chains frames the definition of infrastructure needs at the national level in terms of type of activity—extractive for South America, and extractive and productive for Southeast Asia—of services and of the dependent territories (Van Dijk and Trienekens 2012).

The full scope of logistical network development extends beyond national boundaries (Bair 2005) and creates competition between individual producers and clusters of producers on these local, regional, or international markets.

More specifically, these dynamics are particularly relevant to explaining motivations that may at first appear to be endogenous—interior market development through better territorial integration—but are now interlinked with the aforementioned transnational dynamics. Moreover, these interventions are increasingly connected to regional forms of coordination, rather than merely national ones. These urban utilities and network industries are now open to competition, in line with the concept of market optimization, and their strategic development is part of a regional dynamic that supersedes the simple framework of local and national considerations. In this context, the strategies of transnational companies, or ones associated with them, play a key role because their choices result in

some cities and metropolises becoming strategic territories for regional production activities, rather than just “local” ones. Thus, metropolises like Metro Manila and the state of their infrastructure, are closely examined by private investors, investment banks, and rating agencies (Artigas 2017). In response to the constant pressure to improve infrastructure, these issues have been elevated to the top of government agendas to encourage the establishment of production processes and related services.

Infrastructure rankings provide a comprehensive look at the state of development of logistics and nexus-related infrastructure. In these national trajectories, it is worth noting the growing interdependence between investments pertaining to extractive or service territorially related infrastructure, which involves moderate risks, and those in urban infrastructure, which is more socioeconomically complex and has more unpredictable repercussions.

Given the limited economic and human resources to enforce existing legislation (especially in terms of environmental and social impact assessments), both hasty implementation and delivery delays provide opportunities to challenge infrastructure interventions in cities. While residents’ demand for quality infrastructure is increasing, interventions in major emerging metropolises are complex because of the way networks and services are organized; to date, this demand remains poorly understood and its impact is often diffuse.

Finally, the last dimension of infrastructure proliferation in Pacific Rim cities like Metro Manila is that the very nature of their programs is a source of increased environmental risks. Given the preferred approaches to creating and implementing environmental policies, the ex-ante assessment of project sustainability is underdeveloped. Insofar as infrastructure development remains beholden to increasingly extraterritorial dynamics, these interventions are acknowledged to be potentially environmentally harmful, especially since they do

not necessarily lead to the integrated development of urban networks but rather often result in specific and segmented spatial interventions. They can, therefore, create externalities that are difficult to manage from an environmental conservation perspective (Artigas 2015a).

Green growth in Metro Manila: The relation between water and energy development

Given the abovementioned general framework, green growth strategies at the metropolitan level in the Association of Southeast Asian Nations (ASEAN) seek to address the issue of sustainability, as it is currently a concrete political problem that needs to be dealt with at the scale of cities and within the framework of important national development programs.

To assess how these strategies are exerting a concrete impact on urban governance, we analyzed two important utilities that can play a crucial role in the fulfillment of green growth goals as set by the World Bank and the OECD in recent years. The modernization of water systems and electricity grids at the metropolitan scale and within these specific programs is aimed at reducing environmental risks, such as greenhouse gases emissions and hydraulic pressure.

The development of utilities within these territories and green growth programs is increasingly allowing transversal sustainability goals to define much of their deployment and governance framework. Two metropolises of Southeast Asia will be analyzed within the framework of this project to assess how these dynamics unfold within green growth strategies that have been adopted in recent years in the region and in the Philippine capital.

Interrelating climate change with metropolitan hubs development

More than any other region in the world, Southeast Asia faces the immediate consequences of climate change that has an important impact on most

of its population, especially those in the urban areas. Urbanization dynamics, as of today, have often resulted in unbridled development and poor planning that have led to congested urban territories, where inequality levels have soared beyond previous expectations.

These dynamics, which are common in Global South countries, are very much present in the Asian context, where the urban population is seeing rapid growth. It is expected that in 2020, as many as 50 percent of the population of ASEAN member-states will be living in cities. Growing urban population and continuous economic growth create adverse environmental impacts, such as worsening air quality. The increase in air pollution is partly due to the greater volume of traffic (e.g., growing number of private cars and motorcycles). Other means of transport, such as shipping and logistics, also influence air quality and cause local environmental problems, such as coastal pollution. Cities and urban regions also contribute significantly to climate change. They cause approximately 70 percent of global carbon dioxide emissions.

In many cities in the ASEAN region, the transport sector is the main source of these greenhouse gases, but other sectors, such as energy generation and water networks, rely heavily on nonrenewable sources that are relevant sources of emissions. Thus, one of the major challenges facing urban decisionmakers is to introduce more sustainable transport systems while reducing air pollutants and greenhouse gases. At the same time, and as already mentioned in the first section of this paper, cities—where much of the developmental initiatives and funding (public investments or foreign direct investments) are often concentrated—play a central role in national development processes. Cities are also the main locus of environmental initiatives drafted by central governments, and they tend to converge within urban territories with other local initiatives.

With a few exceptions, such as the case of Singapore, ASEAN member-states'

implementation of sustainable and climate-friendly policies at the national or local level has been highly reactive. While issues such as resilience and risk prevention have made a long way in national policy frameworks, the role of utilities and an understanding of their sectoral necessities and constraints in the light of a sustainable framework are less visible.

There are a number of programs, strategies, and action plans concerning specific utilities, such as the transport sector at ASEAN level, but they are, more often than not, part of highly growth-driven strategies, such as the Wawasan 2020 program in Malaysia. Environment and climate change mitigation has played a negligible role to date. The Brunei Action Plan, for example, which is ASEAN's key document concerning the specific transport sector, has a strong focus on enhanced connectivity and only vaguely mentions "exchange and adoption of experiences, projects, and knowledge related to environmentally friendly transport systems, vehicles, and fuels" (ASEAN 2010, p. 22).

These issues have suffered from central government neglect, lack of support of local initiatives, and poor articulation by local governments, which, in many cases, have failed to formulate and implement far-reaching plans. In spite of this general framework, several initiatives are at work today in the region at the scale of cities that seek to combine economic growth dynamics with an integrated framework for environmental protection.

Green growth and sustainability in Metro Manila

Due to rapid growth, infrastructure shortages, poor provision of urban services, and stagnation of living standards are increasingly being felt in Metro Manila. These issues reduce the competitiveness of the Philippines and the pursuit of sustained economic growth. In recent years, these issues have become a central concern, as new public management approaches have transformed the role of the state in the provision of public

goods and the modalities by which the financing of infrastructure and its operation are procured.

Yet, despite the proliferation of new modalities of regulating infrastructure, little is known about the environmental toll of cost-efficient utilities that, under the previously existing framework, have failed to integrate sustainability concerns. Why do certain regulatory regimes fail and others succeed? What regulatory designs and institutional features produce outcomes that are not only economically sound but also integrate sustainability concerns into a longer-lasting strategy of development? And through which specific institutional settings and policy instruments?

The main institutional frameworks and policy sector governance that have been emerging from the introduction of green growth programs have been increasingly adopting a cross-sectoral approach to utilities development.

Meanwhile, several initiatives from the bottom-up approach have been linking the issue of efficiency in water and energy final user approach within specific economic sectors, such as the construction industry, which proves that green growth can be harnessed at different levels and by differentiated set of actors. What matters in the end is the capacity of these emerging governance regimes to set up new modes of social interaction for efficient resource use of water and electricity, such as specific channels of communication with key strategic social actors on the uses, needs, and development prospect of associated utilities.

In the case of Metro Manila, the city has been engaged in a process of reconversion since 2012. The Metro Manila Development Authority announced a process to create Greenprint 2030, which is considered the green development blueprint for Metro Manila. The plan will include a spatial strategy that will guide the urban areas of the metropolis, the primary infrastructure, green systems, and the clustering of economic activities to improve livability. The *2011–2016 Philippine Development Plan* provides a conceptual template of growth and poverty reduction that is consistent

with the protection of the environment. It points to the necessity of providing efficient, reliable, cost-effective, and sustainable infrastructure in its different chapters.

The case for water: A contested framework determined by water supply privatization reforms

The modernization of Metro Manila's institutional framework for water governance went hand in hand with the introduction of market principles, which were aimed at improving a rapidly deteriorating situation prior to 1997.

The financial insolvency of the Metropolitan Waterworks and Sewerage System (MWSS) and its failure to provide a reliable service and to plan ahead the development needs of the metropolis led to a water privatization process that raised serious concerns. Considered to this day the largest privatization project in the world—given its demographic impact on 11 million inhabitants (Montemayor 2003)—it bore the promise of better and cheaper service access for the lower fringes of the urban population of the city capital. Driven by an unsustainable model, initial successes in terms of tariff and improvement of operations were quickly reversed by price surge and rampant instability. The two concessionary firms (i.e., Manila Water and Maynilad) in charge of this dual-stakeholder provision model experienced a divergent trajectory that led to one of them terminating the initial agreement out of financial losses and the takeover of its operations by a new concessionaire.

By 2013, both Manila Water and Maynilad were pursuing a tariff increase, which was ultimately denied by the Philippine government and led to a conflicting international ruling that neither approved nor discarded these demands and delayed a much-needed streamlining of water regulation for these companies' operations in the metro (Valencia 2015; Artigas 2017).

The importance of Manila's water privatization should not be understated as it

reveals much of the challenges of transforming the operational systemic framework of this vital utility, under the auspices of new regulatory frameworks and governance modes. For instance, the lack of adaptive evaluation of the water sector reforms failed to produce a proactive water governance mechanism in the Philippines to address the increasing population, urbanization, and high economic growth, let alone environmental concerns. Because the Philippine government is departmentalized, decentralized, and organized in intertwining national, regional, and local levels, any solution to the water problem must necessarily arise beyond the boundaries of one government layer, unit, or even beyond the government as a whole (Teisman and Edelenbos 2011).

For instance, the Philippines' legal framework allows some subsidiarity in terms of functions and jurisdiction in water resource governance. With the democratization after 1986 and through the Local Government Code of 1991, the management of water became decentralized. Local governments (towns and *barangays*) were once again given the task of financing and operating their own water supply systems and to address pollution, watershed degradation, and water quality at their level. Local governance by the local government units (LGUs) include waterworks system and water quality monitoring, among other functions, while their actions are still bounded by powers at the national level.⁵

In a context where most cities in the region are embracing integrated frameworks that address the whole resource cycle in the form of an integrated regional water management (IRWM) and consolidating readable regulatory settings, the persistence of contradictory rules may deter initiatives that seek to address the full ecosystemic complexity of water systems in large metropolitan areas. Some fundamentals of improved water governance are those revealed in the integrated

⁵ Other local water organizations, such as water districts, irrigation associations, and communal-based waterworks systems, are overseen by national agencies, such as the Local Water Utilities Administration, the National Irrigation Administration, and the Cooperative Development Authority.

water resources management template. Several possible tracks of reform are available for concerned cities (Teisman and Edelenbos 2011), such as: (1) adoption of a single structure and level of government with clear lines of demand that links local and national levels, (2) connecting the institutions of water with other networks of organizations (government and nongovernment) in related policy fields, and (3) integration at the management level of both subnational and national sectoral administration (e.g., creation of a watershed management structure).

In many respects, it can be argued that because many privatization programs have been disavowed in contexts similar to the Filipino and Latin American cases (Artigas 2017), public provision for private management of water resources has grown to be a highly politicized issue in the Global South (Castro 2007). The fact that water access and quality have been improving under direct public management in several cities of the industrialized world—such as the European Union countries—has reinforced the status of this resource as a public good. Yet, it also heightened concerns over governance models that disregard this and other local long-standing arrangements.

The issue of water accessibility is closely correlated to the overall success of a green growth framework. Both Manila Water and Maynilad have sought to connect the urban poor to the network, notwithstanding the legal limitations that preclude the connection of illegal settlers to the network by private utilities. Consequently, community-based innovative solutions, such as the provision of a water system for isolated low-income communities (Manila Water's *Tubig sa Barangay*) and the installation of bulk water systems (public faucet with a mother meter), have been found to provide a solution to this problem, facilitating accessibility in some areas of the city.⁶

The adoption of green growth tools and instruments, which are required to implement a sustainable, multilevel governance water

policymaking, is underway, but water supply reforms in Metro Manila following 1996–1997 led to a substantial transformation of water governance for the city capital and account for the hurdles in the way of an integrated environmental governance framework. The objective factor that could have influenced this mindset was the inability of the public sector to ensure a universal water provision and the attractiveness of pro-market measures actively pursued under the administration of former President Fidel Ramos (1992–1998). While a voluntarist implementation took place, government regulations led to a substantial rise in water tariffs in Metro Manila at levels higher than other similar emerging markets. The tariff increase aimed to encourage a rational use of water resources, and recent reports by institutions (e.g., World Bank and the OECD) have highlighted the need to deal with the issue at the national and local levels.

Efforts at these levels, however, have also failed considerably due to the inability of the national government to oversee private sector actors. In Metro Manila, the privatization of the MWSS into two concessionaires (Maynilad and Manila Water) led to a dual development of water resources, with diverging universalization and nonrevenue water reduction scores, which highlight structural flaws and the complex articulation of IRWM.

The adoption of a successful IRWM approach is highly dependent on the operationalization and effective implementation of an institutional reform that would ensure that both the supply and the protection of the resource are handled from a cooperative perspective, expanding the sources of production and resorting to the most renewable sources in priority (surface over underground aquifer resources). This approach would equally ensure that the decisions pertaining to the expansion of existing sources—through the construction of new dams that are an urgent necessity for Metro Manila—are carried out while taking into account the full array of

⁶ Author's interview with Maynilad executive in Manila on June 2, 2016.

their environmental, financial, and governance externalities/consequences.⁷

The decision by the national authorities to adopt a model of regulated utilities (Alexander and Harris 2005) under the umbrella of the National Water Resources Board (NWRB) would allow for a governance model that coordinates the different actors concerned and provides holistic responses to what has been, so far, a piecemeal solution for each territory and each segment of activity. The role played by the NWRB, which is the government agency in-charge of regulating the water sector, is still, however, a modest one, as limited human and financial resources confined its regulatory scope to the immediate borders of Metro Manila (Araral 2010).

The scattering of water decisionmaking across many agencies involved in the planning, management, and regulation of water resources in the Philippines (Elazegui 2004) reveals that the past water governance reform process was symbolic and procedural and short of substantive changes. True organizational change did not take place, while investments in strengthening regulatory processes were not forthcoming.

It is in this particular framework that the Philippines has committed efforts to addressing national concerns toward a coordinated IRWM framework. While the environmental and ecosystemic interest of such a move is aligned with international commitments of the Philippines, it is still unclear as to how the country will reconcile its key economic role in the provision of public goods and planned public infrastructural works in a reliable way, which demands a higher threshold of bureaucratic coordination and governance response.

The case for electricity

As in the case of water provision, the issue of electricity provision for Metro Manila has to be

examined in the light of the same international commitments and national constraints pertaining to the system and its externalities. One fundamental aspect of the privatization of electricity provision for Metro Manila under the Electricity Power Industry Reform Act of 2001 lies in the state's retreat from issues of electrification and the concerns of the urban poor. While the law allowed for a decentralization process that favored the emergence of new local actors in an unbundling structure, it exacerbated asymmetries at the territorial level, in terms of access to the resource.

Within this structure, the distribution agency for Metro Manila ended up accumulating increased power to the detriment of the Department of Energy whose regulatory capacity waned with the reforms. Inasmuch as the reforms introduced market operating principles to the system, it has failed to deliver a reliable and affordable service, which accounts for widely dissimilar infrastructure development, as well as shortage in generation capacity due to increasing energy demand. A lasting outcome of the sector's unbundling and evolution since 2001 has been the highly expensive price of electricity, which raises serious concerns for the competitiveness of the country's main economic sectors.

Energy networks at the metropolitan level bear an increasingly important place within development programs. As a nation, the Philippines suffers from reliable supply that has been, however, addressed by the administration of President Benigno Aquino III (2010–2016) by developing every form of electricity, such as wind farms, biomass, natural gas, geothermal, and new coal plants. However, the organization of the power sector and its dependence on the National Grid Corporation of the Philippines, and the limited impact of energy savings at the city scale, have raised concerns over the suitability of expanding the energy infrastructure and the generation capacity as the most adequate and more environmentally friendly response to Manila's energy problems.

⁷ The use of dams as primary/secondary sources of electricity production for metropolitan areas and its regulation remains marginally studied and should be the object of further research in order to highlight possible conflicting but also fruitful areas of interaction.

Given the structural constraints of energy supply for Metro Manila, the issue of energy efficiency has become a central concern among agencies that are engaged in the optimization of existing resources and the gradual phasing out of nonrenewables. The development of electricity provision and its expansion to larger territorial units are confronted by issues of diversifying energy sources and, more recently, the implementation of smart grids. Here, information and communication technologies play a significant role in an efficient distribution and commercialization, as proven by the dissemination of smart meters for certain city districts by the Manila Electric Company, and contribute to the objectives of emission reduction and risk prevention.

A salient feature in recent years has been the increasing attention given by the construction sector to these objectives and the dissemination of green building standards as a salient feature of energy efficiency in cities.

Existing initiatives on drafting a green building code in Metro Manila show the interest but also the limitations of such initiatives. Looking at their specific features and responses to the constraints they are confronted with, it is possible to recognize the segmentation and asymmetrical intervention capacity of different ministerial departments and levels of government.

Two elements should be stressed before going further. First, LGUs, such as Quezon City or Pasig City, are among the first in the metropolitan region—and in the country—to undertake such endeavor.⁸ They are an exception rather than the norm. Second, their green building codes have not been passed and implemented at the same time. While it is possible to draw a number of conclusions from the Quezon City case as it has been in place for a few years now, assessing the impact of the Pasig code, which has yet to be implemented, is not possible at this stage.

The example of Quezon City, which established a green building code with the Green

Building Ordinance of 2009, is a good example of these dynamics. It was therefore a pioneer in this area. The administration established the Quezon City Green Building Rating System that distinguishes six levels of compliance, each giving access to fiscal incentives. The code includes a number of features that range from solid waste and waste water treatment schemes to elements pertaining to energy, such as the use of renewable energy and the energy efficiency of the building. This last point refers to “building envelope design”, air-conditioning system, natural ventilation, and electric consumption reduction. This scheme is applicable both to new constructions and retrofitting projects. The first certification was awarded in November 2012 to the Robinsons Magnolia Town Center.⁹

The approach by the Pasig City government is quite different. This initiative has been triggered several years ago as part of the “Green City Vision” program established by the city administration, which is leading an “aggressive”¹⁰ policy regarding the environment that has earned numerous awards.¹¹ Such policy includes campaigns like “carless days”—where some of the major roads are transformed into pedestrian areas—and the introduction of “e-jeepneys” and “e-tricycles”.¹² The city aims to brand itself as “the Green City”; hence, drafting and implementing a building code were important issues. The drafting of the code was undertaken as open as possible by conducting consultations with stakeholders (i.e., building managers; members from the business sector, academe, and government; homeowners’ associations; and barangay captains).

The second notable element is the way it organized the implementation of the principles promoted by this policy. Instead of creating a building code from scratch, the city government

⁹ For more details, see: <http://quezoncity.gov.ph/index.php/recent-news/936-green-building-cert>.

¹⁰ This is the term employed by several members of the Environment and Natural Resources Office of Pasig.

¹¹ Notably the 2013 International Awards for Liveable Communities (Xiamen, China), as well as a number of national awards rewarding various environmental projects.

¹² Jeepneys and tricycles are traditional means of transportation.

⁸ With the notable exception of Mandaluyong City, which passed its code in 2014.

partnered with the Philippine Green Building Council (PhilGBC) and adopted its “Building for Ecologically Responsive Design Excellence (BERDE)” code,¹³ from BERDE 1 or the basic adherence to the national regulation to BERDE 5, which is the highest environmental standards where incentives vary from 2 to 10 percent of discount on property tax. A green building division consisting of a head and two staff was created under the Environment and Natural Resources Office. The certification of buildings is carried out by assessors from the PhilGBC. Within five years, the current structure will be evaluated to assess if the city administration can handle the certification function internally.

The initiatives put in place by these LGUs are interesting in several aspects. First, they show how different models can emerge in the absence of strong national guidelines that can steer policies in a common direction. What we see is the desire at the local level to influence policies at the national level. This decentralized model of policymaking raises the question of the homogeneity of regulations in Metro Manila and in the entire country.

The second element that can be emphasized is the difficulty faced by LGUs when it comes to building capacity and expertise to carry out their project. The solutions to this challenge vary, but a common element is that they sought assistance from other organizations to draft their code. In addition, the phase of implementation can reveal a lack of capacity, and here the story of Quezon City offers a good example. The success of its green building program among developers is mixed. Applying for the certification that could potentially bring them tax credits is often not deemed attractive enough by developers given the delays induced by the certification process.

To address this issue, which can be attributed to insufficient capacity to absorb high demand for certification, Pasig City relies on a private partner, PhilGBC, to handle the certification process. This arrangement offers the city government a certain

flexibility (i.e., it does not have to hire or train a large number of municipal employees) at the cost of a loss of control over this process.

Given the weak stance adopted by the national government, and the difficulties that LGUs are faced with when it comes to adopting green building standards, the regulatory framework is not very constraining. The reasons for this unwillingness to enact rules, which could be perceived as detrimental to their activity by stakeholders and, more specifically, by real estate developers, may be numerous.

One of them has to do with the competition between cities. Because the regulatory framework pertaining to energy efficiency does not come from the national level and each city has its own framework, this creates a situation where a developer has a latitude to choose a setting for its operations that will be the most convenient for a given project.

In other words, cities cannot adopt too strict a regulation, or it faces the risk of limiting the attractiveness of its territory. The situation of competition between cities wherein each seeks to attract investment (Brenner 2004; Theodore et al. 2011) was mentioned earlier.

The case of Metro Manila offers a powerful illustration of this phenomenon in terms of green building. Thus, when it comes to the modernization of energy networks, we see that the interventions by the central state at the generation level are but a dimension of the problem, which would greatly benefit from a more coordinated and metropolitan approach to the issue of energy efficiency. The fact that this issue is mostly developed under foreign patronage raises doubt as to the capacity of the present institutional system to provide articulated responses to the energy challenges of Metro Manila in the years to come.

Conclusion

The concern on sustainable cities and conservation cannot be considered separately from the dynamics and challenges raised by infrastructure

¹³ BERDE is a play on word; it means “green” in Tagalog.

development. The impact of infrastructure deployed at the metropolitan level is shaped by a hierarchical decisionmaking that is not insulated from institutional resistance. The latter reflects the limits of the state to act, as well as the concrete terms in which national objectives are operationalized to address the complexity of the territorial interventions. While the new emerging countries of the Pacific, including the Philippines, are in a race to grow at all costs, the issue of conservation in infrastructure development now intersects with growth projects developed at the national level with territorialized models of urban development that are more sensible and sustainable. These are at the risk of creating major conflicts in the absence of appropriate coordination mechanisms at the metropolitan level.

References

- Alexander, I. and C. Harris C. 2005. The regulation of investment in utilities: Concepts and applications. World Bank Working Paper No. 52. Washington, D.C.: World Bank.
- Araral, E. 2010. Reform of water institutions: Review of evidences and international experiences. *Water Policy* 12(S1):8–22.
- Artigas, A. 2015a. Internationalization and a competitiveness agenda: State development finance agencies and the financial crisis in Brazil and Chile. In *Government-linked companies and sustainable, equitable development*, edited by E.T. Gomez, F. Bafoil, and K.C. Cheong. Malaysia: Routledge.
- . 2015b. Developmental pains, right to the city and green growth ambitions in Moscow's environmental governance today. In *Collective right to the city for a safe and just world: The case of the BRICS*. Rio de Janeiro, Brazil: BRICS Policy Center/Oxfam.
- . 2017. Infrastructures et nouveau émergents: Impacts territoriaux et environnementaux. In C. Halpern C., D. Lorrain, and C. Chevauché. *Villes Sobres*, Paris, Presses de Sciences-Po (in press forthcoming 2017).
- Asian Development Bank (ADB). 2015. *Asian Development Outlook 2015: Financing Asia's future growth*. Mandaluyong City, Philippines: ADB.
- Association of Southeast Asian Nations (ASEAN). 2010. Brunei Action Plan (ASEAN Strategic Transport Plan) 2011–2015. Jakarta, Indonesia: ASEAN.
- Bair, J. 2005. Global capitalism and commodity chains: Looking back, going forward. *Competition and Change* 9(2):153–180.
- Brenner, N. 2004. *New states spaces: Urban governance and the rescaling of statehood*. Oxford, United Kingdom: Oxford University Press.
- Bullen, A. and M. Whitehead. 2005. Negotiating the networks of space, time and substance: A geographical perspective on the sustainable citizen. *Citizenship Studies* 9(5):499–516.
- Burnell, P. and V. Radall, Editors. 2014. *Politics in the developing world*. 3rd edition. Oxford, United Kingdom: Oxford University Press.
- Castro, J.E. 2007. Water governance in the twentieth-first century. *Ambiente e Sociedade* 10(2):97–118.
- Cingolani, L., K. Thomsson, and D. de Crombrugghe. 2015. Minding Weber more than ever? The impacts of state capacity and bureaucratic autonomy on development goals. *World Development* 72(C):191–207.
- Deyo, F., Editor. 1987. *The political economy of the new Asian industrialism*. Cornell Studies in Political Economy. Ithaca, NY: Cornell University Press.
- Ebenau, M. 2014. Comparative capitalisms and Latin American neodevelopmentalism: A critical political economy view. *Capital and Class* 38(1):102–114.
- Gomez, E.T. and J. Saravanamuttu, Editors. 2012. *The new economic policy in Malaysia: Affirmative action, ethnic inequalities and social justice*. Singapore: NUS Press.
- Gomez-Ibanez, J.A. 2003. *Regulating infrastructure: Monopoly, contracts and discretion*. Cambridge, MA: Harvard University Press.
- Hellman, J.S., G. Jones, and D. Kaufmann. 2000. Seize the state, seize the day: State capture, corruption and influence in transition. World Bank Policy Research Working Paper 2444. Washington, D.C.: World Bank.

- Jessop, B. 2002. *The future of the capitalist state*. Cambridge, United Kingdom: Polity Press.
- Johnson, C. 1982. *MITI and the Japanese miracle*. Stanford, CA: Stanford University Press.
- Jones, M. 1997 Spatial selectivity of the state? The regulationist enigma and local struggles over economic governance. *Environment and Planning* 29:831–864.
- Jordana, J. 2012. The institutional development of Latin American regulatory state. In *Handbook on the politics of regulation*, edited by D. Levi-Faur. Cheltenham, United Kingdom: Edward Elgar.
- Kang, D. 2003. Transaction costs and crony capitalism in East Asia. *Comparative Politics* 35(4): 439–58.
- Le Gales, P. 1995. Du gouvernement des villes à la gouvernance urbaine. *Revue Française de Science Politique* 45(1):57–95.
- Linder, S.H. and P. Vaillancourt Rosenau. 2000. *Mapping the terrain of the public-private policy partnership*, edited by P. Vaillancourt Rosenau. Cambridge, MA: MIT Press.
- Lorrain, D., Editor. 2014. *Governing megacities in emerging countries*. Farnham, United Kingdom and Burlington, VT: Ashgate.
- Mackie, J.A.C. 1988. Economic growth in the ASEAN region: The political underpinnings. In *Achieving industrialization in East Asia*, edited by H. Hughes. Cambridge, United Kingdom: Cambridge University Press.
- McFarlane, C. and J. Rutherford. 2008. Political infrastructures: Governing and experiencing the fabric of the city. *International Journal of Urban and Regional Research* 32(2):363–374.
- McGuirk, J. 2014. *Radical cities: Across Latin America in search of a new architecture*. London, United Kingdom: Verso.
- Montemayor, C. 2003. The Manila water privatization fiasco and the role of Suez Lyonnaise/Ondeo: Brief history of water privatization in Metro Manila. <https://www.tni.org/en/archives/act/17355> (accessed on April 4, 2016).
- Mundaca, R. 2014. La privatización de las aguas en Chile (the privatization of water in Chile), America en Movimiento (America in movement), Santiago, Chile. <http://americaenmovimiento.cl/wp-content/uploads/2015/01/agua-03-introduccion1.pdf> (accessed on December 12, 2016).
- Nestor, S. and L. Mahboobi. 2000. Privatisation of public utilities: The OECD experience. In *Privatization, competition and regulation*. Paris, France: OECD.
- Özel, I. 2011. Emerging and hybrid: The cases of Turkish and Brazilian market economies. *Brazilian Political Science Review* 2(1):65–95.
- Papadopoulos, Y. 1999. Gouvernance, coordination et légitimité dans les politiques publiques. Issue 20-99 of EUI working paper. RSC, European University Institute.
- Parker, D. and C. Kirkpatrick. 2005. Privatisation in developing countries: A review of the evidence and policy lessons. *Journal of Development Studies* 41(4):513–541.
- Pierce, G. 2015. Beyond the strategic retreat? Explaining urban water privatization's shallow expansion in low- and middle-income countries. *Journal of Planning Literature* 30(2):119–131.
- Raco, M and J. Flint. 2012. *The future of sustainable cities: Critical reflections*. Bristol, United Kingdom: The Policy Press.
- Schneider, B.R. 1999. The desarrollista state in Brazil and Mexico. In *The developmental state*, edited by M. Woo-Cummings. Ithaca, NY, and London, United Kingdom: Cornell University Press.
- Scott, A. and P. Le Galès. 2010. A British bureaucratic revolution? Autonomy without control, or freer markets, more rules. *Revue Française de Sociologie* 51:117–143.
- Sheng, Y. K. and M. Thuzar, Editors. 2012. Urbanization in Southeast Asia, issues and impacts. In *The challenges of promoting productive, inclusive, and sustainable urbanization*, edited by Yap Kioe Sheng and Moe Thuzar. Singapore: ISEAS–Yusof Ishak Institute.
- Strange, S. 1996. *The retreat of the state*. Cambridge, United Kingdom: Cambridge University Press.
- Svampa, M. and M. Antonelli, Editors. 2010. *Minería Transnacional, narrativas del desarrollo y resistencias sociales*. Buenos Aires, Argentina: Biblos.
- Teisman, G.R. and J. Edelenbos. 2011. Towards a perspective of system synchronization in water governance: A synthesis of empirical lessons

- and complexity theories. *International Review of Administrative Sciences* 77(1):101–118.
- Theodore, N., J. Peck, and N. Brenner. 2011. Neoliberal urbanism: Cities and the rule of markets. In *The new Blackwell companion to the city*, edited by G. Bridge and S. Watson. Oxford, United Kingdom: Wiley-Blackwell.
- Valencia, C. 2015. Maynilad wins appeal to increase water rates. *The Philippine Star*. January 6.
- Van Dijk, M.P. and J. Trienekens. 2012. Global value chains: An overview of the issues and concepts. In *Global value chains: Linking local producers from developing countries to international markets*, edited by M.P. Van Dijk and J. Trienekens. Amsterdam, Netherlands: Amsterdam University Press.
- Van Riper, P. 1976. *History of the United States civil service*. Westport, CT: Greenwood Press.
- Wade, R. 1990. *Governing the market: Economic theory and the role of government in East Asian industrialization*. Princeton, NJ: Princeton University Press.
- Woo-Cumings, M., Editor. 1999. *The developmental state*. Cornell, CA; Cornell University Press
- World Bank. 2003. *Private participation in infrastructure: Trends in developing countries, 1990–2001*. Washington, D.C.: World Bank and Public Private Infrastructure Advisory Facility.



Research on Urban Resilience to Natural Disasters of Households, Firms, and Communities in the Philippines

Danilo C. Israel and David Feliks M. Bunao

Abstract

The paper looks into the current socioeconomic research on resilience to natural disasters among urban households, firms, and communities in the Philippines. It reviews related analytical frameworks, methodologies, and empirical studies already available with the end purpose of identifying research gaps and recommending studies and actions that can be undertaken to address them. The paper explains that the Philippines and Manila at present are among the least resilient countries and cities in the world, respectively. It also shows that there are locally developed analytical frameworks and methodologies on urban resilience that have been used in research. Furthermore, it found that there are already a number of empirical studies covering urban resilience of households, firms, and communities particularly to natural disasters than have been conducted in specific areas like Metro Manila and other Philippine cities. From the review, the paper identifies some important gaps in the current research on urban resilience and recommends specific researches and related activities that can be undertaken in the future.

Introduction

Resilience is a widely researched subject internationally at present. Among others, research on resilience has been viewed as filling in the gaps of traditional disaster risk and vulnerability-oriented approaches and extending the focus to potentials, opportunities, and capacities of natural disaster-prone populations (UNDP-DDC 2013). In the Philippines, socioeconomic research on resilience, in particular, is also gradually gaining momentum as the country needs to conduct more and in-depth empirical studies on macroeconomic and microeconomic vulnerability, and how systems resilience can be boosted and strengthened (Llanto 2016).

In the area of microeconomic analysis, households, firms, and communities are among the most important socioeconomic units considered. Likewise, urban areas are of critical significance because of the leading role they play in overall economic development. In a similar vein, natural disasters have been a major development problem in the country due to its geographical location. Thus, it is necessary that the issue of urban resilience to

natural disasters among households, firms, and communities is a major domain in socioeconomic resilience research efforts in the country.

The general objective of this paper is to review socioeconomic researches conducted on urban resilience to natural disasters among households, firms, and communities in the Philippines. The end purpose is to identify gaps in current research and recommend future studies that can be undertaken to address them. Specifically, the paper (1) provides relevant definitions of relevant terms, (2) discusses the current state of the Philippines and its cities in terms of resilience in comparison to other countries and cities, (3) reviews analytical frameworks and methodologies used in urban resilience research in the Philippines, (4) presents the different socioeconomic and policy studies that were conducted in the Philippines on urban resilience related to natural disasters, and (5) identifies gaps in research and provides some recommendations for future research.

The paper uses secondary data and information from the literature, and primary information gathered from key informants. The paper is not comprehensive, as time and access limitations confined coverage only to studies that were available to the authors.

Definitions

Resilience

There are numerous and varying definitions of resilience used in the literature, but they contain the common elements of capacity to bounce back after a shock and the capacity to adapt to change (FAO et al. 2012).

In the Philippines, resilience is officially defined in the context of natural disasters as “the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (Republic Act No. 10121

or the Philippine Disaster Risk Reduction and Management Act of 2010).

Urban resilience

Urban resilience is defined as the ability of an urban system—and all of its constituent socioecological and sociotechnical networks across temporal and spatial scales—to maintain or rapidly return to its desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity (Meerow et al. 2016). Other different but similar definitions can be found in the literature.

Natural disaster

A natural disaster is an event caused by natural hazards that overwhelm local response capacity and greatly affect the social and economic development of a region (Sivakumar 2005). It is classified into three categories based on its origin: (1) hydro-meteorological disasters like typhoons, floods, drought, and extreme heat waves; (2) geophysical disasters like earthquakes and volcanic eruptions; and (3) biological disasters like epidemics and insect infestations (Cavallo et al. 2010). From an economic perspective, a natural disaster can be defined as a natural occurrence that causes a disruption to an economic system, with a significant negative impact on assets, production factors, output, employment, or consumption (Hallegatte and Przyluski 2010).

Resilience to natural disasters

In the context of natural disasters, resilience is the ability of individuals, communities, and states and their institutions to absorb and recover from natural shocks while positively adapting and transforming their structures and means for living in the face of long-term changes and uncertainty (OECD 2013). It is the ability of countries, communities, businesses, and individual households to resist, absorb, recover from, and reorganize in response to natural hazard events without jeopardizing their sustained socioeconomic advancement and development (ADB 2013).

Table 1. Global Resilience Index, top 10 countries, 2016

Country	Composite		Factors					
			Economic		Risk Quality		Supply Chain	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Switzerland	1	100.0	2	94.9	73	57.2	1	100.0
Norway	2	99.6	3	89.6	10	80.3	12	82.4
Ireland	3	98.4	7	77.2	1	100.0	25	73.8
Germany	4	94.6	16	72.1	13	78.4	4	91.2
Luxembourg	5	94.5	1	100.0	79	54.5	11	84.4
Netherlands	6	94.3	20	68.9	9	80.5	3	92.0
United States	7	94.2	13	72.2	3	88.4	17	80.5
Canada	8	92.7	19	69.0	2	88.7	21	80.2
Australia	9	90.9	10	76.5	8	81.0	23	75.6
Denmark	10	90.8	5	77.8	70	64.0	6	90.3

Source: Modified from FM Global (2016)

Relative resilience of the Philippines

The Philippines relative to other countries

In 2016, a Global Resilience Index (GRI) was prepared using the definition of resilience as a combination of the vulnerability of a country to supply chain disruption and the country's ability to recover from such disruption (FM Global 2016). This index uses nine key drivers of resilience, namely, conflict and political unrest, terrorism, corruption, vulnerability to oil shortages and price shocks, natural disasters, extreme weather, maturity in risk management capabilities, investment in risk management, infrastructure, and the quality of local suppliers. The drivers are aggregated into three broad factors—economic, risk quality, and supply chain—which, in turn, combine to form the index.

The aforementioned GRI provided ranked scores for 130 countries and territories around the world. Of the countries considered, Switzerland and Norway occupied the top two places in the index (Table 1). Switzerland placed first overall (composite) and for the supply chain factor, second for the economic factor, and 73rd for the risk quality factor. Norway ranked second overall, third for the economic factor, 10th for the risk

quality factor, and 12th for the supply chain factor. It is interesting to note that the top six of the 130 countries considered are all located in Europe, while the United States (US) only ranked 7th, Canada 8th, and Australia 9th in the index.

Meanwhile, Venezuela and Dominican Republic occupied the bottom two places in the GRI (Table 2). Venezuela placed last overall and for the economic factor, 127th for the risk quality factor, and 128th for the supply chain factor. Dominican Republic ranked 62nd for the economic factor, last for the risk quality factor, and 94th for the supply chain factor. It can be seen that five of the bottom countries are located in South America, four are in Africa, and one is in Europe.

For the Philippines, specifically, the country was ranked 108th for the composite index, 84th for the economic index, 114th for the risk quality index, and 90th for the supply chain index. Thus, the country was in the bottom 25 of the GRI and ranked very low in all of indexes for individual factors considered.

Manila relative to other world cities

In 2014, a resilience ranking of 50 world cities was done (Grosvenor 2014). In this work, resilience was defined as the ability of a city to avoid or

Table 2. Global Resilience Index, bottom 10 countries, 2016

Country	Composite		Factors					
			Economic		Risk Quality		Supply Chain	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Honduras	121	32.5	112	27.9	117	37.9	78	34.3
Jamaica	122	31.1	119	23.8	117	37.9	74	35.3
Algeria	123	30.9	118	24.1	75	56.2	116	16.8
Egypt	124	29.0	125	16.4	75	56.2	107	20.6
Ukraine	125	28.5	127	10.9	79	54.5	95	27.1
Mauritania	126	27.9	116	24.5	36	66.1	130	0.0
Nicaragua	127	26.1	104	32.5	117	37.9	120	14.5
Kyrgyz Republic	128	22.2	128	7.5	97	52.5	110	18.1
Dominican Republic	129	20.4	62	42.4	130	0.0	94	27.6
Venezuela	130	0.0	130	0.0	127	24.1	128	2.3

Source: Modified from FM Global (2016)

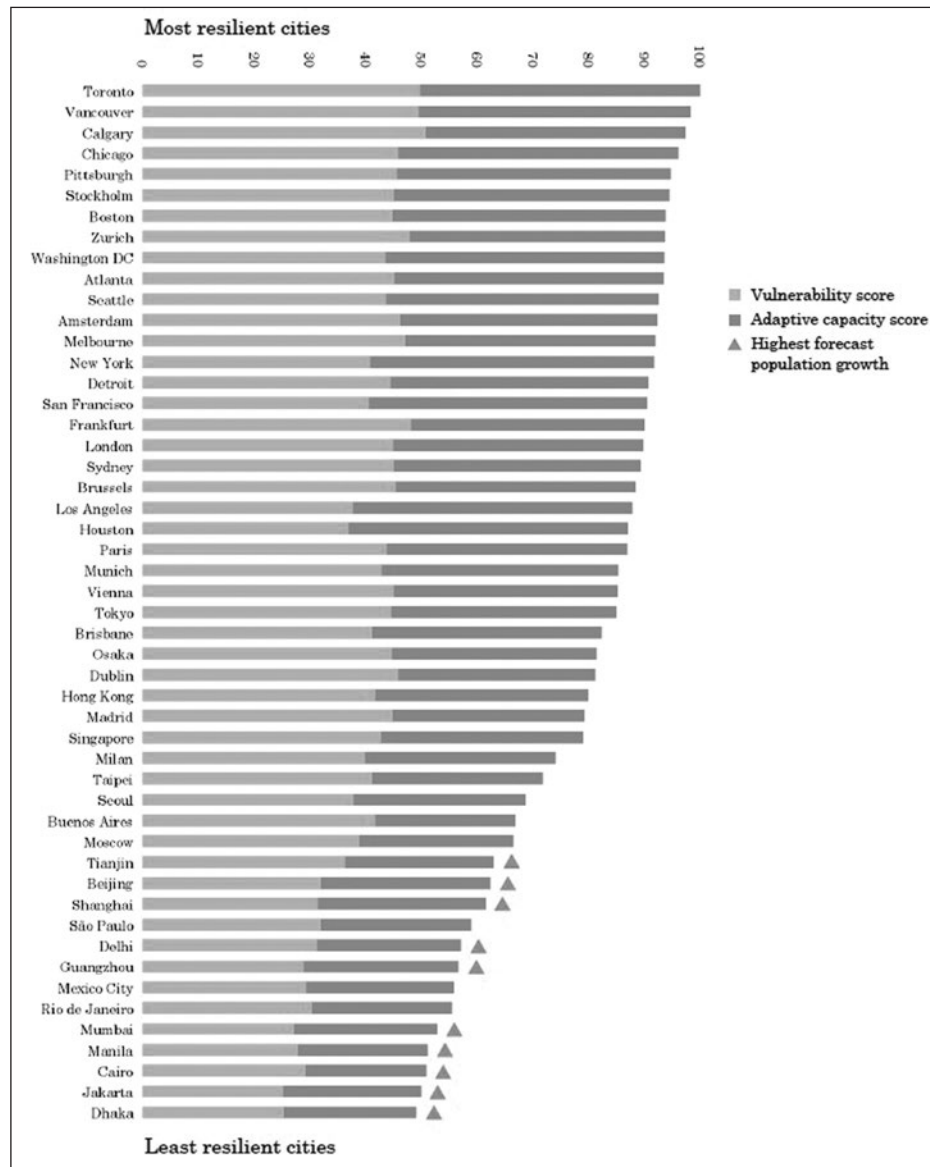
bounce back from an adverse event that comes from the interplay of vulnerability and adaptive capacity. Furthermore, resilience was measured as a six-stage process: (1) the key components of vulnerability and adaptive capacity were identified; (2) accurate independent data were collected, from as many sources as possible, on each component; (3) the different individual data sets were transformed into ordinal ranking systems with the same distribution and units, so that the data sets can be added together and averaged; (4) the cities in each individual component of vulnerability and adaptive capacity were ranked to know their relative position by means of an unweighted average, an overall ranking of cities for vulnerability, and adaptive capacity were created; and (6) the rankings from vulnerability and adaptive capacity were averaged again, and an overall ranking of world cities in terms of their resilience was created.

The results of the aforementioned ranking of 50 world cities are summarized in Figure 1. The three most resilient cities in the world were in Canada (Toronto, Vancouver, and Calgary), six were in the US (Chicago, Pittsburg, Boston, Washington D.C., Atlanta, and Seattle), and one was in Europe (Stockholm). The middle group of cities—ranked 11 to 30—were also considered

resilient. Most European cities fall into this group of countries, including the weakest (Moscow, Milan, and Madrid) and the strongest (Zurich, Amsterdam, and Frankfurt). The bottom 20 cities were considerably weaker than the top 30 and were considered the least resilient. Many of these were found in Asia, while a few were in Europe, South America, Africa (particularly Cairo), and North America (particularly Mexico). It can be seen from Figure 1 that of the bottom 10 countries, seven were in Asia (Dhaka, Jakarta, Manila, Mumbai, Guangzhou, Delhi, and Shanghai). Manila, in particular, was rated 4th from the bottom, only ahead of Dhaka, Jakarta, and Cairo in terms of overall city resilience.

City of Manila versus other cities of Metro Manila

In 2010, the Climate and Disaster Resilience Initiative used the Climate Disaster Resilience Index (CDRI) to analyze the existing level of climate disaster resilience of 16 cities and one municipality in Metro Manila. In this study, climate-related natural hazards were mainly considered, such as typhoons, flooding, sea level rise, rainfall-induced landslides, heatwave, and drought. CDRI was used to measure climate disaster resilience by

Figure 1. Resilience ranking of selected world cities, 2014

Source: Grosvenor (2014)

considering five dimensions (i.e., physical, social, economic, institutional, and natural). The CDRI values ranged from 1 to 5, which were the averages of the individual indices of the five dimensions. Higher CDRI values were equivalent to higher preparedness of an individual city to cope with climate change and natural disasters, and vice versa.

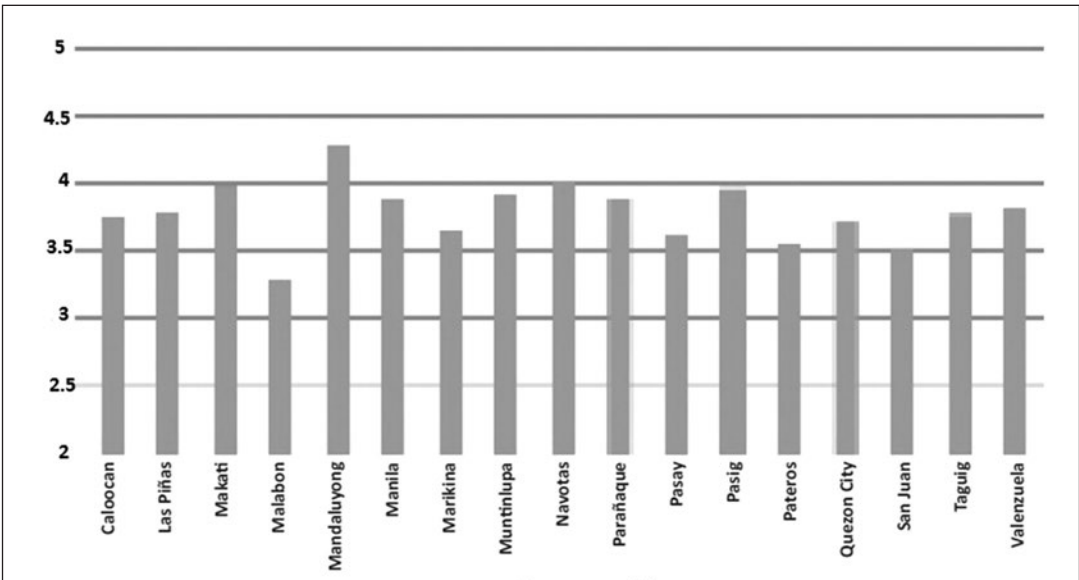
Based on the CDRI values generated, the City of Manila was ranked sixth (about equal to Parañaque) in overall climate disaster resilience among the 16 Metro Manila cities and one

municipality after Mandaluyong, Navotas, Makati, Pasig, and Muntinlupa (Figure 2). Therefore, the capital city of the Philippines is clearly not among the top resilient cities in the urbanized area of Metro Manila.¹

To summarize this section, the Philippines and Manila were among the least resilient countries and cities in the world. Much, therefore, clearly

¹ For Metro Manila, out of a perfect score of 5.0, the individual CDRI indexes for the dimensions were 4.35 for physical, 4.01 for social, 3.14 for economic, 4.20 for institutional, and 3.15 for natural, and an overall CDRI of 3.77.

Figure 2. Overall climate disaster resilience score of Metro Manila, 2010



Source: Shaw et al. (2010)

needs to be done and quickly before they can be resilient places for people to live in.

Philippine research on resilience

Philippine framework for urban resilience of households

There are existing locally developed frameworks for studying urban resilience in the Philippines. A framework or model for studying the urban resilience of households to natural disasters, in particular, is that of Gotangco et al. (2014). This model (Figure 3) focuses on household assets as the key stock, and adverse impacts and adaptive capacity are quantified in terms of losses or expenditures and income, respectively.² The model is based on data from surveys of low-income households. The authors explained that because it is possible for a natural disaster like flooding to affect low-income, middle-income, and high-income households, three versions of the model can be developed to depict representative households for the three income groups. Resilience indices

² Gotangco et al. (2014) have a detailed discussion of the model.

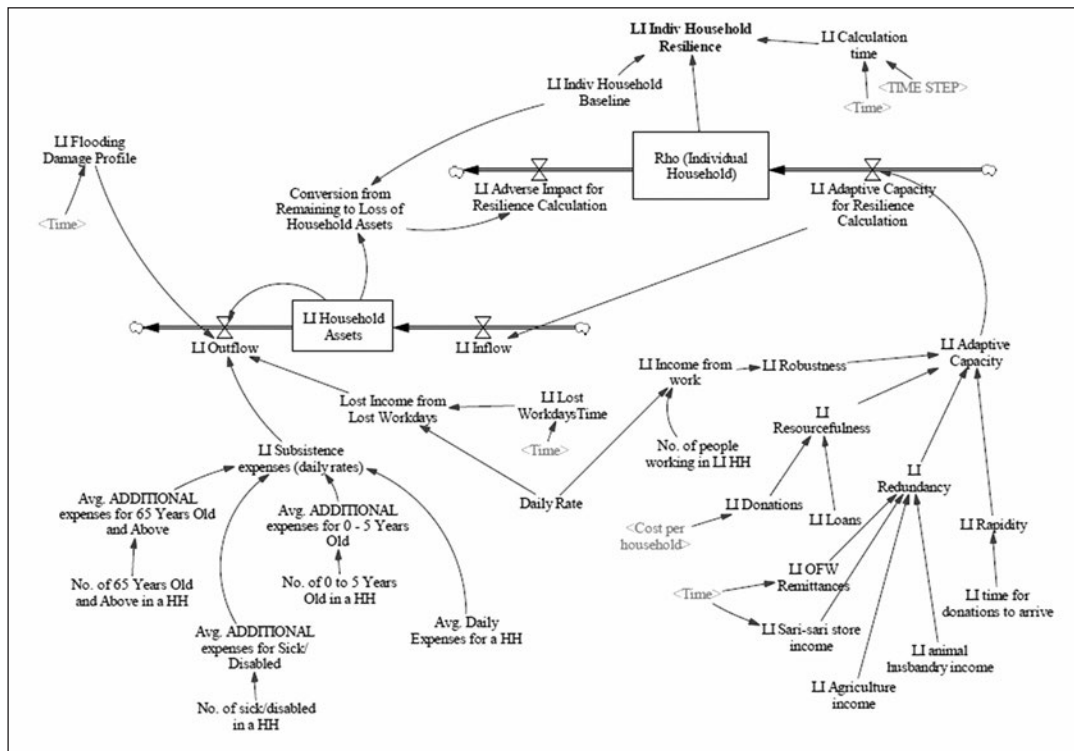
from the three models can then be aggregated and weighted according to the exposure fractions to produce the final quantitative socioeconomic household resilience index.

Philippine framework for urban resilience of firms

A framework for urban resilience of firms in the Philippines is that used by Ballesteros and Domingo (2015) in studying small and medium enterprises (SMEs) (Figure 4). In this framework, building SME resilience is viewed in the context of the business and policy environment in which they operate.³ SMEs operate within the domestic and global supply chain linked with organizations that make up the value chain and logistics. In the value chain, they are interfaced with big organizations from raw material to finished products and to the market/buyers. Meanwhile, the flow of funds, goods, and services from all nodes of the value chain comprises the logistics of which infrastructure, utilities, and communications are considered the most critical aspects. The framework shows further

³ A detailed discussion of the framework is contained in Ballesteros and Domingo (2015).

Figure 3. System dynamics diagram of a low-income (LI) household resilience model



Source: Gotangco et al. (2014)

that SMEs' vulnerabilities and role in the supply chain imply that their ability to manage risks and to continue and recover on their business operations amid a disaster event can be defined by how the firm, in particular, and the supply chain, in general, address predisaster and postdisaster imperatives.

Philippine framework for urban resilience of communities

A framework that was used to study the urban resilience of communities in the Philippines is that of Florano (2014) presented in Figure 5. This framework defines community governance as the aggregate decision, plans, and actions of the community in response to disasters brought about by a hazard or hazards.⁴ Members or residents of the community get involved in governance by (1) informing co-residents about the dangers of impending hazards; (2) consulting with one another and other external stakeholders/actors on

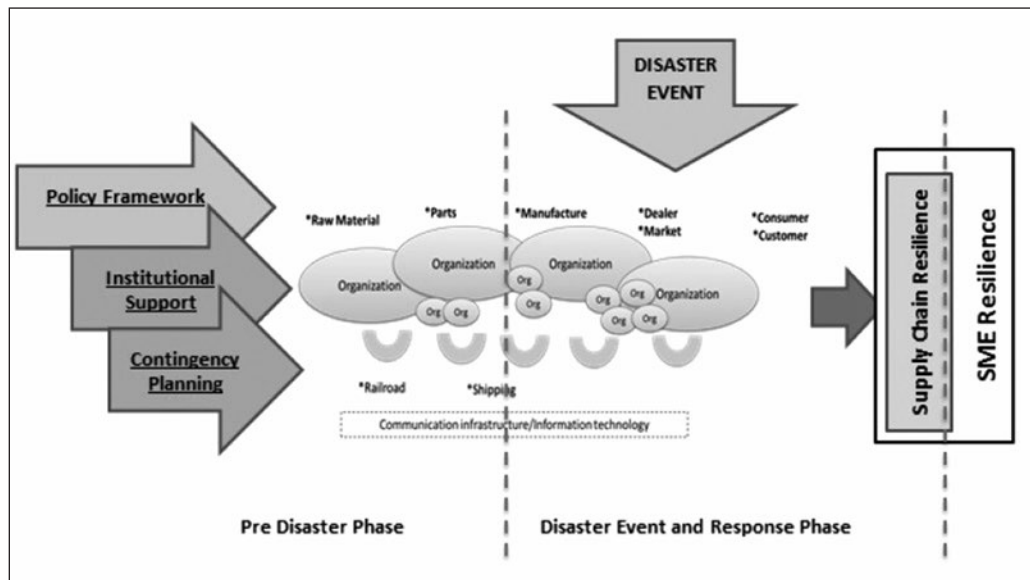
how to best deal with the hazards and the disasters that they will bring to the community; (3) making decisions; and (4) implementing those decisions through local policies, plans, programs, projects, and activities, which include local disaster recovery plans, strategies, and actions that are normally designed within the framework of the community's local disaster risk reduction and management (DRRM) plan. These are all incorporated in the local DRRM plans and/or local disaster recovery plans. With the participation of other stakeholders, recovery efforts proceed guided by these plans. These may or may not lead to the recovery of the community, which is usually measured through the restoration of the predisaster conditions and building back better.

Urban resilience studies in the Philippines

There are a number of socioeconomic studies that are related to the urban resilience of households,

⁴ A detailed discussion of the framework is contained in Florano (2014).

Figure 4. Conceptual framework for resilience of firms



Source: Ballesteros and Domingo (2015)

firms, and communities in the Philippines. These works generally considered natural disasters as the issue of interest, while other forms of disaster were covered in one case. These studies are summarized below.⁵

Resilience of households

Israel and Briones (2013) examined the correlation between natural disasters and household poverty in the Philippines. Their study (1) reviewed past studies on adaptation and coping strategies in the Philippines and analyzed the DRRM system in the country and (2) employed descriptive statistics and regression analysis to study the relationship between national disasters and poverty using data from the 2011 community-based monitoring system dataset for Pasay City, Metro Manila, which covered 70,326 households. The methodology, main finding, and main recommendation are summarized in Table 3.

Gotangco et al. (2014) studied how the systems resilience approach can be applied to describe the interaction between households and local governments in the Philippines (Table 3).

⁵ Only those undertaken since 2010 up to this writing were covered. There may have been other studies missed due to time and access limitations.

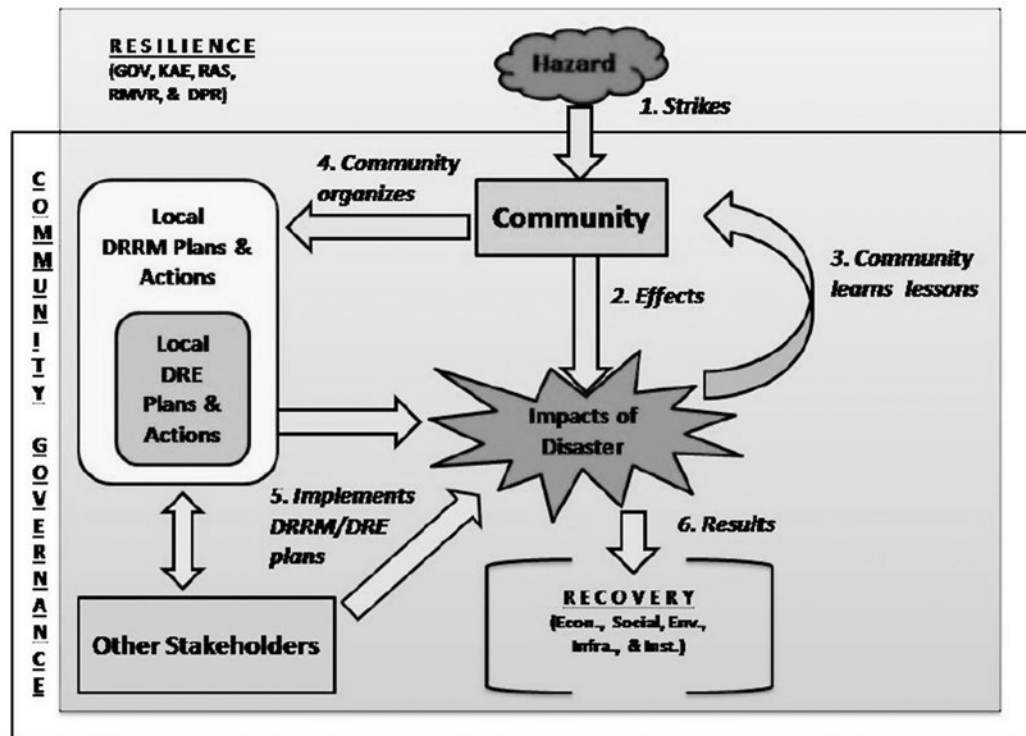
The main objective was to develop a tool that will capture the physical, socioeconomic, and organizational factors that affect resilience, and how it changes over time for the local governments, particularly in the National Capital Region. It used the system dynamics modeling that allows for a system to be built virtually in terms of stocks, flows, input information, and feedback loops. The authors explained that the purpose of system dynamics modeling is to explore the behavior of a particular system structure and provide insight into the underlying causes of such behavior.

Francisco (2013) studied the coping strategies of households in Marikina City in response to extreme floods (Table 3). The main objective was to understand the kinds of coping strategies that households used. The study surveyed 402 households to identify the measures they took in preparation for the rainy season of 2012 and the preparations they had made for the monsoon season of 2013. The study used household survey and descriptive and regression analyses.

Resilience of firms

Mendoza et al. (2014) assessed the resilience of the Philippine SMEs during economic and

Figure 5. Community governance and resilience framework



GOV = governance; KAE = knowledge and education; RAS = risk assessment; RMVR = risk management and vulnerability reduction; DPR = disaster preparedness and response; DRRM = disaster reduction and management; DRE = disaster recovery; Econ. = economic; Env. = environmental; Infra. = infrastructural; Inst. = institutional
Source: Florano (2014)

environmental shocks by analyzing their coping strategies (Table 4). This study used data on firms' crisis coping strategies drawn from the 2012 Asian Institute of Management-Asian Development Bank enterprise survey that covered 2,037 micro, small, and medium enterprises (MSME) in 34 cities in the Philippines. The calamities considered include typhoon, flood, drought, earthquake, volcanic eruption, armed conflict, and fire, among others.

Ballesteros and Domingo (2015) assessed SME resilience in the Philippines by reviewing the policy frameworks on Philippine DRRM and SMEs (Table 4). It used secondary data and information from the existing literature on resilience in its analysis and the development of conceptual framework already discussed here earlier.

The Asian Disaster Preparedness Center (2016) analyzed the current framework for disaster resilience of MSMEs in the Philippines in

order to propose issues for consideration in the development of a roadmap for MSME disaster resilience (Table 4). The study presented the results of the Philippine SME Resilience Survey that was conducted among 513 MSME respondents from 17 of 18 regions in 2015. The survey aimed to identify MSMEs' perceptions of disaster risk, their experience of disasters that disrupted business, and their exposure to and practice concerning business continuity management, including the use of business continuity plans.

Resilience of communities

The Climate and Disaster Resilience Initiative (2010) examined disaster resilience in Metro Manila using CDRI (Table 5). This study covered 16 cities and one municipality in Metro Manila, wherein survey respondents were the planning officers for each locality. In this study, five dimensions were considered: physical, social, economic, institutional,

Table 3. Natural disaster resilience-related studies on urban households in the Philippines

Authors/ Year	Methodology	Main Finding	Main Recommendation
Israel and Briones (2013)	<ul style="list-style-type: none"> Pasay City Typhoons and floods CBMS 2011 survey data Descriptive and regression analyses 	Households lost 7% of their per capita income due to typhoons and floods.	Government can be more accurate in the level of financial assistance to be provided to households affected by natural disasters.
Gotangco et al. (2014)	<ul style="list-style-type: none"> Metro Manila Floods Survey data General systems Dynamic model, household resilience index 	Preliminary results indicated that the household resilience index decreased as a response to shocks and was followed by slow recovery.	Once the household resilience model has been finalized, it will be combined with models of other sectors into an overall resilience model with an aggregated resilience index.
Francisco (2013)	<ul style="list-style-type: none"> Marikina City Floods Household survey Descriptive and regression analyses 	Many households learned from their recent experience of flooding, and more households have now implemented measures in preparation for the next rainy season.	Proactive adaptation measures should be encouraged and enhanced by providing vulnerable households with better access to information, training on disaster management and adaptation, and other important forms of support.

CBMS = community-based monitoring system

Source: Authors' compilation

Table 4. Natural disaster resilience-related studies on urban firms in the Philippines

Authors/ Year	Methodology	Main Finding	Main Recommendation
Mendoza et al. (2014)	<ul style="list-style-type: none"> Marikina City, Iligan City, and Cagayan de Oro City Floods 2012 AIM-ADB enterprise survey Descriptive and regression analyses 	Larger and more productive firms are better able to cope, and might even see crises as opportunities for expansion and finding new markets. Firms that are smaller and less productive may face additional challenges to survive, and they may turn to crisis-coping mechanisms that have negative implications on their long-run competitiveness.	Stronger urban planning is necessary and should not discriminate across firms. Financing mechanisms to invest in resilience and innovative risk management mechanisms could be useful.
Ballesteros and Domingo (2015)	<ul style="list-style-type: none"> Philippines Typhoons Secondary data Descriptive analysis 	There is an apparent lack of disaggregation or sectoral focus on the policy framework that drives DRRM among the different stakeholders. There is no single policy that details SMEs' disaster mitigation, preparedness, response, and recovery.	There is a need to review and translate national frameworks and development plans into workable subnational and sectoral action plans. DRRM strategies should be targeted specifically for business resiliency among SMEs.
Asian Disaster Preparedness Center (2016)	<ul style="list-style-type: none"> Philippines Natural and man-made hazards 2015 SME Resilience Survey Descriptive analysis 	There is low awareness of business continuity management as a risk reduction mechanism, and low uptake of external risk financing or other formal coping mechanisms.	A key challenge for an MSME disaster-resilience road map is to disaggregate the global question of "MSME disaster-resilience" into a series of policy bundles or activities that are implementable.

AIM = Asian Institute of Management; ADB = Asian Development Bank; DRRM = disaster risk reduction and management; SME = small and medium enterprise;

MSME = micro, small, and medium enterprise

Source: Authors' compilation

and natural. Resilience dimensions were scored between 1 and 5 and the value for each dimension was calculated by summing the index of each variable and dividing the whole by the number of variables in each dimension. The overall CDRI values are then obtained after averaging each of the five dimensions' resilience values. Higher CDRI values indicate high resilience, which means better

preparedness to cope with climate and disasters and vice versa.

Pellini et al. (2013) studied the initiatives of local government units to reduce the negative effects of natural disasters, as well as the use of knowledge and research evidence in designing urban resilience policies in urban areas (Table 5). It examined whether the processes in policy and

Table 5. Natural disaster resilience-related studies on urban communities in the Philippines

Authors/ Year	Methodology	Main Finding	Main Recommendation
Climate and Disaster Resilience Initiative (2010)	<ul style="list-style-type: none"> • Metro Manila • Climate change • CDRI questionnaire surveys • Descriptive analysis • Climate Disaster Resilience Index 	Metro Manila has a high physical, institutional, and social resilience, and moderate natural economic resilience. Its overall resilience index is 3.77 out of a perfect 5.0.	Metro Manila cities must have a stake in protecting themselves and not just leave the job to the national government.
Pellini et al. (2013)	<ul style="list-style-type: none"> • Tabaco City, Baguio City, and Marikina City in Luzon; Iloilo City and Cebu City in Central Visayas; and Davao City and Cagayan de Oro City in Mindanao • Typhoons, floods, landslides, and volcanic eruptions • Focus group discussion (FGD) and semistructured interviews • Descriptive analysis 	<p>A history of being a disaster-prone area means a higher level of awareness among people of the risks associated with natural disasters.</p> <p>Meanwhile, perception of low risk could lead to the absence of policy action.</p>	Local government units must engage academic institutions in natural disasters and DRRM policy research. This will greatly improve the creation of policies and programs on disaster management as the data employed will be research based.
Florano (2014)	<ul style="list-style-type: none"> • Tacloban City, Iligan City, Dagupan City, and Marikina City • Typhoons, floods • Key informant interviews, FGDs • Descriptive analysis • Disaster-Resilient Community Index 	Community governance for disaster recovery seems to be stuck in the pre-National Disaster Risk Reduction and Management Council years because recovery planning is still passive and reactive. There is no early recovery planning and government has been relying on postdisaster needs assessment.	RA 10121 (Philippine Disaster Risk Reduction and Management Act of 2010) should be amended to include predisaster recovery planning. In addition, relocation from dangerous areas to safer places and provision of alternative source of livelihood for the poor most affected during disasters are recommended.

DRRM = disaster risk reduction and management; RA = Republic Act
Source: Authors' compilation

decisionmaking on resilience to natural disaster use scientific knowledge and research evidence in the design and implementation of urban resilience measures. The study adopted a political economy analysis to create an analytical framework that focuses on policy decisionmaking processes. Data were gathered through focus group discussions (FGDs) and semistructured interviews in seven local government units: Albay, Baguio City, Marikina City, Iloilo City, Cebu City, Davao City, and Cagayan de Oro City.

Florano (2014) examined the role of community governance in disaster recovery and resilience by looking into selected barangays in the cities of Tacloban, Iligan, Dagupan, and Marikina (Table 5). The study conducted several key informant interviews and FGDs, and used a Disaster-Resilient Community Index to measure resilience of the affected communities. This index covers five thematic areas: governance, knowledge and education, risk assessment, risk management and vulnerability reduction, and disaster preparedness and response. The study sites were

chosen based on three criteria: (1) they had been hit by strong typhoons or tropical storms within the last five years; (2) they are major cities/urban areas; and (3) for geographical representation, there must be representative cities from Luzon, Visayas, and Mindanao.

Research gaps

While the above review may not be comprehensive, some gaps can already be identified in terms of socioeconomic research on urban resilience of households, firms, and communities in the Philippines. These are the following:

1. Related researches conducted in recent years have been limited with those undertaken in the 2000s, numbering less than 10 based on this review.
2. The studies generally centered on climate change and natural disasters as the issues of interest and exclude man-made and other disasters.

3. The studies are site specific and cover selected cities and urban areas.
 4. The studies used cross-section data and information and excluded time-series analysis.
 5. Locally developed frameworks, in general, can still stand further development and refinement.
 6. The analyses conducted can also be made more detailed to look into specific issues of interests.
 7. There is not much work done on the valuation of the socioeconomic costs of specific disasters (including the cost of relief and rehabilitation) and the expected benefits that can be generated from resilience-related activities.
2. Resilience between types of natural disasters (e.g., typhoons, floods, earthquakes, landslides, and even epidemic diseases) individually and as a whole among poor urban households
 3. Efficiency and effectiveness of different types of relief and recovery operations for poor households to determine the most desirable cost-effective programs that should be implemented
 4. Efficiency and effectiveness of different types of formal and informal financial services that can be made accessible to poor urban households during times of natural calamities
 5. Average durations and livelihood losses of disaster-affected households and their determinants, by type of livelihood, household, and disaster

Summary and recommendations

This paper reviewed the frameworks, methodologies, and empirical studies already available on the urban resilience of households, firms, and communities in the Philippines. It showed that there are locally developed analytical frameworks and methodologies on urban resilience that have been used in research. Furthermore, it found that there are a number of empirical studies covering resilience of households, firms, and communities particularly to natural disasters that have been conducted in specific urban areas like Metro Manila and other Philippine cities. From the review, the paper identified some gaps in current research. Based on this, the studies and related activities that can be undertaken in the future based on existing literature and interviews with fellow researchers and other key informants are as follows:

Studies on households

1. Resilience between types of poor urban households and environments (e.g., below and above poverty line households, coastal and upland households, riverine and nonriverine households, and other relevant comparisons)

Studies on firms

1. Resilience of SMEs across different stages of their supply chain to determine specifically which points in the chain are most vulnerable and needing the most attention
2. Identification and cost-benefit analysis of potential resilience-oriented public-private projects that the government can promote and implement not only with SMEs but with the whole business sector
3. Identification and detailed analysis of resilience-related best practices among firms that can be disseminated among the entire business sector and identification of industry champions that can serve as example
4. Analysis of appropriate financial and other incentives that can be provided to SMEs in order to motivate them to practice resilience-oriented practices in their business operations
5. Average shutdown durations disaster-affected MSMEs and their determinants, by type of entrepreneur, sector, and disaster

Studies on communities

1. Analysis of how social capital and multisectoral partnerships can be enhanced

- among and between urban communities to improve their resilience to natural disasters
2. Study of the appropriate infrastructure that the national and local governments can put up in order to enhance natural disaster resilience among the most vulnerable urban communities
 3. Identification and analysis of best practices and champion communities that can be disseminated and promoted to improve resilience to natural disasters at the community level
 4. Roles of community support in facilitating disaster relief and recovery and their determinants

Other research-related activities

1. Firming up the frameworks and methodologies that are appropriate for the study of resilience of urban households, firms, and communities in the case of the Philippines
2. Inclusion of the collection of critical resilience-related data and information in relevant annual or periodic socioeconomic surveys conducted by the national government
3. Expansion of research attention from just covering natural disasters to also include man-made and other forms of risks, shocks, and disasters that significantly affect the lives particularly of the poor members of the population
4. Development in government-funded research institutions of formal research programs on resilience that identify and conduct critical resilience-related studies, including cost-benefit analysis

References

- Asian Development Bank (ADB). 2013. *Investing in resilience: Ensuring a disaster-resistant future*. Mandaluyong City, Philippines: ADB.
- Asian Disaster Preparedness Center (ADPC). 2016. *Disaster-resilience of micro, small and medium enterprises (MSME) in the Philippines: Policy environment and SME survey results*. Bangkok, Thailand: ADPC.
- Ballesteros, M.M. and S.N. Domingo. 2015. Building Philippine SME resilience to natural disasters. PIDS Discussion Paper No. 2015-20. Makati City, Philippines: Philippine Institute for Development Studies.
- Cavallo, E., S. Galiani, I. Noy, and J. Pantano. 2010. *Catastrophic natural disasters and economic growth*. Washington, D.C.: Inter-American Development Bank.
- Climate and Disaster Resilience Initiative (CDRI). 2010. *Metro Manila City profile: Climate and disaster resilience*. Kyoto, Japan: Kyoto University.
- Florano, E.R. 2014. Community governance for disaster recovery and resilience: Four case studies in the Philippines. PIDS Discussion Paper No. 2014-38. Makati City, Philippines: Philippine Institute for Development Studies.
- FM Global. 2016. Resilience index annual report 2016. *Oxford Metrica*. http://www.fmglobal.com/~media/Files/FMGlobal/Resilience%20Index/Resilience_Methodology.pdf?la=en (accessed on July 28, 2016).
- Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), and World Food Programme (WFP). 2012. Resilience of individuals, households, communities and institution in protracted cities. Presented during the High-Level Expert Forum on Food Insecurity in Protracted Crises, September 13–14, Rome, Italy.
- Francisco, J.P. 2013. Property damage recovery and coping behavior of households affected by an extreme flood event in Marikina City, Metro Manila, Philippines. EADN Working Paper No. 81. Makati City, Philippines: East Asian Development Network.
- Gotangco, C.K., J. See, J.P. Dalupang et al. 2014. Quantifying resilience to flooding among households and local government units using system dynamics: The case of Metro Manila. Paper presented at the 6th International Conference on Flood Management, September 16–18, São Paulo, Brazil. <http://www.abrh.org.br/icfm6/proceedings/papers/PAP016240.pdf>.

- Grosvenor. 2014. Resilient cities - A Grosvenor research report. *Grosvenor*. <http://www.grosvenor.com/getattachment/194bb2f9-d778-4701-a0ed-5cb451044ab1/ResilientCitiesResearchReport.pdf> (accessed on June 30, 2016).
- Hallegatte, S. and V. Przyluski. 2010. The economics of natural disasters. Policy Research Working Paper 5507. Washington, D.C.: World Bank. <http://www.cesifo-group.de/pls/guestci/download/CESifo%20Forum%202010/CESifo%20Forum%202/2010/forum2-10-focus2.pdf> (accessed on June 30, 2016).
- Israel, D.C. and R.M. Briones. 2013. The impact of natural disasters on income and poverty: Framework and some evidence from Philippine household. PIDS Policy Notes No. 2013-14. Makati City, Philippines: Philippine Institute for Development Studies.
- Llanto, G.M. 2016. Risks, shocks, building resilience: Philippines. PIDS Discussion Paper No. 2016-09. Quezon City, Philippines: Philippine Institute for Development Studies.
- Meerow, S., J.P. Newell, and M. Stults. 2016. Defining urban resilience: A review. *Landscape and Urban Planning* 147:38–46.
- Mendoza, R.U., J.P. Francisco, and A.S. Lau. 2014. Resilience of firms to economic and climate shocks: Initial insights from Philippine SMEs. AIM Working Paper 14-013. Makati City, Philippines: Asian Institute of Management.
- Organisation for Economic Co-operation and Development (OECD). 2013. *What does resilience mean for donors?* Paris, France: OECD.
- Pellini, A., A. Contreras, M. Jabar, M.T. Guzman, M. Era, D. Erasga, and R.J. Jr. 2013. *Towards policy-relevant science and scientifically informed policy: Political economy of the use of knowledge and research evidence in urban resilience interventions in the Philippines*. London, United Kingdom: Overseas Development Institute.
- Republic Act No. 10121. An act strengthening the Philippine disaster risk reduction and management system, providing for the national disaster risk reduction and management framework and institutionalizing the national disaster risk reduction and management plan, appropriating funds therefor and for other purposes. Manila City, Philippines: Congress of the Philippines.
- Shaw, R., Y. Takeuchi, and G. Fernandez. 2010. *Metro Manila city profile: Climate and disaster resilience*. Kyoto, Japan: Kyoto University.
- Sivakumar, M.V. 2005. Impacts of natural disaster in agriculture, rangeland and forestry: An overview. In *Natural disasters and extreme events in agriculture: Impacts and mitigation*, edited by M.V. Sivakuma, R.P. Motha, and H.P. Das. Berlin, Germany: Springer Science and Business Media.
- United Nations Development Programme-Drylands Development Centre (UNDP-DDC). 2013. *Community based resilience assessment (CoBRA) conceptual framework and methodology*. New York, NY: UNDP.



Risk and Resilience: Interrogating Prosperity, Inequality, and Climate Disasters in Metro Manila*

Emma E. Porio

I would phrase the intellectual questions of our time - which are the moral questions of our time - as follows: (1) Why is there hunger amidst plenty, and poverty amidst prosperity? (2) Why the many who are afflicted do not rise up against the few who are privileged, and smite them?

--Immanuel Wallerstein (1979, p. 119)

Three decades ago, Wallerstein (1979, p. 119) posed these intellectual/moral questions that are still relevant today.

In an article by Reuters (2014), the World Economic Forum (WEF) announced that “the chronic gap between rich and poor is yawning wider, posing the biggest single risk to the world.” Further, WEF also claimed that issues of “income disparity and attendant social unrest” will have the biggest impact to the economy in the next decade (Reuters 2014). In the same vein, Piketty (2014) asserted that the levels of income inequality today are at its highest. Reinforcing these alarming social prognosis, Burawoy (2015),

in his presidential address at the 2014 World Congress of Sociology in Yokohama, said that the neoliberal economy further intensified social exclusion and inequality globally.

Today, several Asian cities face the persistence of poverty and inequality and its contradictions—including Metro Manila. This chapter argues that neoliberal reforms in Metro Manila, particularly in social housing and local development, pose negative consequences that are further exacerbated by the weak governance systems, as well as the regular flooding disasters hitting the metropolis.

Persistent poverty and rising inequality are partly due to an economy heavily anchored on services, real estate, and commercial development and very poorly on industrial and agricultural growth. The democratic and decentralization

* This paper is gleaned from the following research projects: 1) Coastal Cities at Risk: International Research Initiative on Climate Change with support from the International Development Research Center and 2) Climate Change Adaptation to Medium- and Long-Term Planning with support from the Asia Pacific Network: Global Environmental Change.

reforms in the 1990s attempted to enable the social housing sector and local governments to be more responsive to the housing and basic services needs of the urban population, especially the poor. The success of these reforms in social housing, however, has been eroded by the need of the government to promote economic development through incentives and privileges to the private sector.

This paper highlights the impacts of these processes to local development and the erosion of the housing security of urban poor communities, especially those living in flood-prone areas of the metropolis. Divided into four parts, this paper 1) outlines the expansion of economic growth and rising income inequality in the Philippines; 2) describes the urban governance reforms in the early 1990s, especially in local development and social housing; 3) illustrates the contradictions of growth, inequality, and governance reforms by highlighting two case studies of social housing programs in Metro Manila's two cities, namely, a) Marikina City's highly successful in-city relocation program—whose gains are being threatened by the recurring flood disasters and commercial development along the river and b) the Pansol Social Housing Site—which is undergoing rapid gentrification in Quezon City because of intense capitalist development of the neighborhood through public-private partnership (PPP) schemes; and 4) reflects on the contradictions of urban development, inequality, flood disasters, and governance reforms under the “new normal” climate conditions.

Economic growth, urban development, and disaster risk

During the past two decades or so, many Asian cities have experienced rapid growth and expansion amid transitions in their socioeconomic systems and political ecologies. While continued economic growth and rising prosperity have led to poverty reduction, social inequality has widened within and across income groups/classes, and compromised

the integrity of ecological/environmental systems. Moreover, earlier social housing reform gains made by urban poor communities have been eroded by intensive capitalist development projects between the local/national governments and the private sector.

Complicating the above social/economic/political challenges are the increasing climate risks and disasters in the Philippines. Such had heightened the failure of governance systems to address these issues. Environmental degradation and flooding disasters add another layer of complexity and difficulty in managing the uneven consequences of urban development and climate-related disasters to vulnerable and marginalized urban poor communities.

Bernabe et al. (2015, p. 1) emphasized how income inequality increases the vulnerability of communities to natural disasters and climate change:

“Asia's high level of inequality leaves the majority of its people at great risk of death or injury, or loss of livelihood and home, in the event of a natural disaster. People in poverty often live in substandard housing or in dangerous locations, such as floodplains, riverbanks, or steep slopes, and are less able to escape disaster zones. They are also less likely to have savings, insurance, or other safeguards to help them recover from shocks. Rising inequality poses a dire threat to continued prosperity in Asia, where an estimated 500 million people remain trapped in extreme poverty, most of them women and girls. The huge gap between rich and poor hinders economic growth, undermines democratic institutions, and can trigger conflict. A determined effort to combat discrimination, combined with improved policies on taxation and social spending, is needed now if the region is to secure a stable and prosperous future.”

The story of Asian cities above is no different from that of Metro Manila having demonstrated an impressive economic growth

during the past five years and a remarkable fight against poverty. This urban growth, however, has also led to a sharp widening of the gap between the rich and the poor. This is apparent in the growth of many high-end residential and commercial development projects alongside the proliferation of informal settlements—where most residents have no access to basic services and are highly exposed to disaster risks like floods, subsidence, and sea level rise (SLR). Moreover, Bernabe et al. (2015) cite that between 1980 and 2009, Asia accounted for nearly half of all natural disasters worldwide, while in 2013 alone, disasters accounted for 85 percent of people killed in the region. Other climate change impacts, such as increasing temperature and SLR, have increased the vulnerability of marginalized groups already suffering from hunger and poverty. Climate-related disasters like floods often push people further into poverty and deepen inequalities in access to resources and basic services.

The *Global Risks Report 2015* ranked the Philippines as the third highest country at risk to critical environmental, geopolitical, economic, societal, and technological changes (WEF 2015). Like other Asian coastal megacities, Metro Manila's environmental risks include floods, subsidence, landslides, and coastal inundation brought about by SLR and the increasing intensity and irregularity of typhoons, storm surge, and monsoon rains. The impacts of these hazards have heightened the environmental risks faced by the residents. As mentioned earlier, compounding the effects of these natural and human-induced risks are governance-related factors like deficits in urban planning regulations and fiscal reforms, infrastructure, and delivery of social services. Ironically, the government's efforts toward enhancing the economic and social security of its cities also pose contradictory challenges to the environmental security of informal settlements and the human security needs of its most vulnerable population—the urban poor (Porio 2014).

For the past six years, several flooding disasters (e.g., 2009 Ketsana floods in Metro

Manila, 2011 Bangkok floods, 2013 Haiyan Superstorm in Central Philippines) have resulted in severe losses and damages to infrastructure, property, agriculture, and human lives. No doubt, the challenges of rehabilitation and recovery have been a major issue for all, but those below the poverty line and are highly at risk to climate disasters suffer a great deal.

Socioeconomic performance, poverty, and inequality

The socioeconomic and political characteristics of the Philippines, in general, and the National Capital Region (NCR), Metro Manila, in particular, allow us to appreciate the dynamics of the erosion of social housing gains by the urban poor and the challenges they are facing under the current conditions of economic expansion and rising inequality. In the last five to six years, the Philippine economy has been experiencing high growth rates relative to its poor economic performance in the previous decade. In 2012, the country's gross domestic product (GDP) reached 6.6 percent and a year later further expanded to 7.2 percent. In the fourth quarter of 2014, despite the losses incurred from super typhoon Haiyan (local name, Yolanda) and other killer typhoons and floods, the economy rebounded more strongly than expected, posting a 6.9-percent GDP growth rate. Thus, the Philippine economy continues to soar, beating market expectations and the Aquino administration's own target, making it among Asia's best-performing economies. But despite the country's outstanding economic performance, the government's record of reducing the poverty incidence has been quite dismal.¹

In the November 2015 Asia-Pacific Economic Forum website, the World Bank's country director was quoted telling President Aquino's economic planning ministers: "The

¹ In September 2011, President Aquino reported before the United Nations Millennium Development Goals Summit, that it has reduced the poverty incidence of the Philippines from 31 percent to 28 percent. But six months before that meeting, the National Statistical and Coordination Board redefined what constituted the poverty food basket by eliminating meat and oil from it, in effect, reducing the amount of money needed to fulfill the poverty threshold.

Philippines is no longer the sick man of East Asia, but a rising tiger.” But the same website also quoted the country’s former planning director, Cielito Habito, saying that his 2011 data showed that the 40 richest families on the Forbes wealth list accounted for 76 percent of the country’s GDP growth. He declared that is the highest in Asia because the Philippines when compared to Thailand, the latter’s top 40 families only accounted for 33.7 percent of wealth growth, 5.6 percent in Malaysia, and 2.8 percent in Japan (AFP 2013). According to Habito, about 25 million people, or a quarter of the population, lived on USD 1 a day or less in 2009. This has changed very little from the figures of a decade earlier according to the government’s most recent data. Meanwhile, Loyzaga and Porio (2015) highlighted social inequality in the Philippines: the net worth of top 20 Filipino families is about USD 15.6 billion while 70 percent of the people subsist on less than USD 2 per day. Thus, most of these economic gains in the past five years have mainly accrued to the top income group.

The dynamics of democratization and decentralization of urban governance in the 1990s that allowed the housing and community development gains among urban poor communities were examined within the context of poverty and inequality. But as argued earlier, these gains are now being eroded both by the intensification of capitalist development through PPP schemes and the flooding disasters in Metro Manila over the years.

Metro Manila: Growth, governance, and disaster risk

Metro Manila, or the NCR, has a population of 13.9 million (UN Habitat 2015) but supports a daytime population of 16–18 million people. In 2015, the extended metropolitan region has over 25 million people and a population density of 18,000 per square kilometer (Loyzaga and Porio 2015). Metro Manila enjoys urban and economic primacy over other Philippine cities—with a population 12

times that of Cebu or Davao. While the metropolis accounts for 37 percent of the country’s GDP, it is also home to about half a million informal settler families (ISFs) (Porio 2012). Meanwhile, the World Bank (2013) found that informal workers comprise about 75 percent of total employment of the Philippine economy. Thus, informal settlements proliferate the urban landscape.

Comprised of 17 local governments, Metro Manila’s governance system is highly decentralized and fragmented to 16 cities and one municipality. Rapid urbanization and weak regulatory systems have exacerbated the problems of traffic congestion, inadequate basic social services, and flooding. Meanwhile, the Pasig-Marikina River System partly drains into the Manila Bay and the Laguna Lake, with no outlet, while an earthquake fault runs across the whole metropolitan area. Alongside the lack of appropriate planning and development frameworks for a rapidly expanding metropolis, these factors have intensified the disastrous impacts of flooding, especially on the urban poor communities.

Sociopolitical reforms in urban governance, civil society, and social housing

The 1986 EDSA People Power in the Philippines spawned major political-economic reforms in urban governance, which allowed the lower social strata of society like the urban poor to gain access to social housing. The post-Martial Law period saw that the decentralization of local governance and democratization of civil society engagements led to increased access of the urban poor communities to housing, security of tenure, and delivery of basic services (Porio 1997; Karaos and Porio 2015). The creation of the Presidential Commission for the Urban Poor and the unveiling of a social housing program, through the Community Mortgage Program (CMP), by President Cory Aquino in 1989 marked a clear departure from the previous decade where squatting in both public and private lands was a criminal act, punishable under

Marcos' Presidential Decree No. 772.² In 1992, the Philippine Congress passed two landmark legislations, namely, the Local Government Code and the Urban Development and Housing Act. This was capped with the "Social Reform Agenda" that marked President Ramos' administration from 1992 to 1998.

While these legislations, alongside the Social Reform Agenda, empowered local governments to plan and develop their cities, it also devolved huge responsibilities which the local units found hard to implement due to lack of financial and technical resources. These responsibilities include, among others, land use planning, delivery of basic services such as water, sanitation, health and the provision of housing, and relocation for ISFs. Meanwhile, civil society organizations (CSOs), particularly urban poor housing associations, assumed greater roles in the acquisition of housing and land tenure for the poor, with support from nongovernmental organizations (NGOs) in mobilizing both public and private resources.

As mentioned earlier, the decentralization of governance in the 1990s granted local governments a range of powers from fiscal functions to local development. However, there was not much resources devolved from the central government to fulfill these functions. So, local officials have to create incentives for the business sector to invest in the commercial and industrial development of their cities. PPP schemes with multilateral institutions like the World Bank, for instance, became the solution for cash-strapped local government units (LGUs) to jump-start the financing of large development projects in infrastructure, public utilities, and commercial development of neighborhoods.

These partnerships with the private sector become high-priority programs of the government and therefore become exempt from the usual regulations while enjoying tax privileges and the

like. These large projects often run through lands or alongside communities settled by informal settlers and, thus, collide with the aspirations of the poor for security of tenure in their housing through the government's social housing programs. The following section highlights the coalition of interests among local officials and private sector actors that led to the displacement of the poor's housing and security of tenure aspirations. Compounding these displacements are the negative impacts of climate-related hazards like typhoons and floods.

The 1990s neoliberal reforms in urban governance, particularly the promotion of social housing, made great strides in providing access to housing and basic services for the CMP urban poor beneficiaries. But the gains made by local governments and CSOs in regularizing informal settlements are currently threatened by the increasing capitalist development projects and the recurring flooding disasters in Metro Manila. This is illustrated by examining the social housing and community development gains made by urban poor organizations with support from partner NGOs through the CMP in the 1990s–2000s. The first case study highlights Marikina City's highly successful in-city relocation program while the second one describes an urban renewal program in Pansol, Quezon City. These two cities comprise two of Metro Manila's 17 cities and one municipality.

Democratization–decentralization of urban governance and the financing of local development

Since the 1990s, the neoliberal economy has seen the emergence of few large companies increasingly becoming dominant in real estate and urban development, in the process, defining the landscapes of Metro Manila and other Philippine cities. PPPs have leased forces that have intensified the competition of land and housing resources both by the commercial sector and the marginalized groups. This has occurred alongside the privatization of public services and

² Mobilization by nongovernmental organizations and civil society organizations led to the decriminalization of unauthorized occupation of lands through the enactment of Republic Act No. 8368 of 1997, repealing Presidential Decree No. 772.

the widening gap between rich and poor in terms of access to basic services, housing, employment, and other economic opportunities. In financing urban development in Asian cities, PPPs have been promoted by multilateral institutions and by many national and local governments, with the private sector increasingly becoming dominant in financing infrastructure and public services hit by financial crises.

The Philippine national government and local governments are no exception. Presumably to fast-track urban development, the PPP mechanisms have been propagated by both the Arroyo and Aquino administrations through overseas development assistance loans to finance large infrastructure and commercial-industrial projects. Most of these projects are regulated by the Philippine Economic Zone Authority, often bypassing local planning development authorities or, at most, consulting the latter who are expected to act as rubber stamps to the decisions made by the national agency. This or the local government negotiates as much concessions to increase its own revenue base and to finance its own elections, which perpetuates their control over the local political economy. These schemes often provide long-term state guarantees for profits to the private sector partners.

The massive infusion of capital in large commercial and infrastructural projects often “gentrify”³ the area and the neighborhoods surrounding it. High-end commercial and residential places often sprout along the “development corridors”⁴ of these projects, in the process, increasing exponentially land prices and services—both for long-time residents and newcomers to the area. Thus, it intensifies competition for affordable land that would have been accessible for social housing for the poor. These so-called “megaprojects of the

government”, are planned and implemented with overseas development assistance, i.e., loans and multinational companies, without proper consultations with the residents that will be affected by these projects. For example, the light rail transit Santolan–Marikina–Recto route was constructed with loans from development agencies and their allied construction and engineering companies.⁵ Many ISFs were displaced by the construction of this light railway system. This is just one example of the many large megaprojects in Philippine cities that have displaced many urban poor residents. These large projects are central to the increasing evictions and displacement of communities living along these so-called development corridors.

Box 1 describes the urban renewal and gentrification of the Pansol Social Housing Site, located along the Katipunan corridor in Quezon City. A beneficiary of the CMP in the 1990s, the community is located next door to a large commercial and retail center, developed under a PPP between the local government, the state university-landowner, and the Alran Corporation.⁶ This large project led to the second wave of gentrification of this nearby social housing site.

The decentralization of land use planning and development has also resulted in compromises for local governments and the poor. Local government often failed to control and balance land use planning and the development of their cities and neighborhoods, especially those with high percentage of informal settlers like Quezon City. But local autonomy allowed local governments to build PPP schemes that demanded rezoning or conversion of residential, educational, and public areas for commercial use. When deemed a priority project of the government, often it will not be subjected to the usual regulations. This is what happened in the Pansol Social Housing Site. Box 1 shows that while the CMP allowed security

³ Large real estate development projects often lead to the gentrification of the place.

⁴ Development corridors according to the National Economic and Development Authority is a response to the call for an innovative strategy for spatial development to support the goal of inclusive growth of the Philippine government (NEDA 2015).

⁵ For example, the Japan Bank for International Cooperation provided loans to the Philippine government but built in partnership with Japanese construction and engineering companies.

⁶ For privacy, the author chose to disguise the name of the company.

Box 1. Urban renewal and gentrification of the Pansol Social Housing Site in Quezon City, Metro Manila

The community of Pansol used to be a government property, belonging to the Metro Manila Waterworks and Sewerage Agency and occupied informally by the families of former employees and contractual service workers of the company. In the 1970s–1980s, they organized themselves to comprise the Pansol Residents and Housing Association (PRHA). Through decades of community organizing, the urban poor members of PRHA were able to acquire their home lot in 1992 through government's social housing program, the Community Mortgage Program. At that time, the cost of the land was at a subsidized rate of PHP 250 per square meter. But not all beneficiaries could afford the monthly payments. About one-third of the association members sold out their housing rights to better-off outsiders: lower middle-class salaried employees or overseas Filipino workers working abroad as engineers, technicians, or domestic helpers.

This selling of rights kicked off the first wave of gentrification of the social housing community, when the original urban poor beneficiaries were replaced by buyers who had higher incomes, who started renovating and improving their properties for lease or rental spaces. This process represented a leakage of the program benefits to undeserving beneficiaries.

Since the social housing site was located near public and private universities, colleges, and high-end gated communities, the demand for rental spaces for students, employees, and informal sector workers was quite high. This gentrification process intensified when the nearby area was developed through a public-private partnership (PPP) scheme. In 2012, the Alran Corporation, a major corporation listed in the Philippine Stock Exchange, entered into a development partnership with the state university—who owned the land—and the local government of Quezon City. The Philippine Economic Zone Authority facilitated the PPP arrangement with the corporation, the state university, and the local government of Quezon City in developing the huge commercial and service centers for business process outsourcing (BPO) companies in what previously was a government school site. Several student demonstrations opposing the project resulted only in the arrest of its leaders and did not stop the development project. The competition for economic development among local governments is in part responsible for the latter giving attractive tax breaks and other incentives to the private sector.

Often these large projects do not undergo the usual community consultation process and hearing. The PPP is a major strategy utilized by national-local government agencies in mobilizing capital for local investment and development in infrastructure (e.g., roads and bridges), utilities (e.g., privatization of water and energy), and mining explorations, to mention the most common.

The immediate impact of these huge development projects to the area is the escalation of land prices, fueled by the competition among different real estate developers and business companies. Land prices, then, become unaffordable for low-income groups heightening the housing shortage for this sector. Land prices have increased a thousand fold since the social housing reform occurred in Pansol in 1992. A rapid gentrification is occurring with the original residents moving out to distant areas and the displacement of low-income renters by those working in nearby BPOs and commercial centers.

Source: Author

of tenure for the poor, it also displaced those in the bottom segment of the urban population.

Meanwhile, the informal settlers relocated along the banks of the Marikina-Pasig River Flood Basin started gaining security of housing tenure in the late 1990s. Because these lands were not highly desirable as residential places, these were the remaining areas available for relocation in the early 2000s when the Marikina local government was trying its best to make in-city relocation really work (Box 2). In fact, the city got an excellence in local governance award for this achievement. Ironically, the 2009 Ketsana (local name *Ondoy*) floods devastated these relocation sites. The residents had no choice but to rebuild their homes only to be again subjected

to flooding from typhoons (~10) that regularly visit the metropolis during the monsoon season.

The case studies highlighted how urban governance reforms provided spaces for the urban poor to claim social housing benefits, with the support of CSOs and several local and national government agencies. But the decentralization of governance also increased the pressure to local governments to mobilize resources for financing local development. To attract business and other large development projects, it must offer incentives and privileges to the private sector, including access to choice properties, to the detriment of the poor's suitable residential land claims. Meanwhile, intensive commercial and real estate development displaced urban

Box 2. A local government's highly successful in-city relocation eroded by flood disasters and increased commercial development

In mid-2000s, the local government unit (LGU) of Marikina City was recognized as having the most successful in-city relocation program—in partnership with landowners, urban poor organizations, and the national governments' Community Mortgage Program (CMP). Under the leadership of Mayor Bayani Fernando from 1992 to 2001, LGU-Marikina embarked on a bold urban development plan that included the in-city relocation program of its informal settler families (ISFs).

Through partnerships with the private sector, civil society, and the national government, it was able to relocate all of its informal settlers within their city, unlike other LGUs who would 'throw' them to distant relocation sites outside the metropolis. This was possible because the 1992 Local Government Code empowered local governments to plan and develop the city according to the development needs of its population, especially those in informal settlements. Through its land use and development programs, it tackled the proliferation of informal settlements by implementing the provisions of the 1992 Urban Development and Housing Act.

In 1996, when Marikina became a chartered city, it massively relocated informal settlers along the riverine communities of Tumana, Nangka, and Malanday, among others. It also developed and restored the degraded riverbanks through the "Save the Marikina River" program. By 2006, it had successfully relocated 30,000 ISFs, leading to the Marikina City Settlement Office to get a national award for excellence in local governance from the Department of the Interior and Local Government and the *Galing Pook* Foundation for this successful in-city relocation program. This was a feat that could hardly be duplicated by other local governments who always relocated their so-called squatter population outside the city, far from their livelihood, employment, and basic services. The CMP allowed urban poor households to acquire the land at affordable price (PHP 250–300 per square meter or about USD 6–10 at that time).

But the 2009 Ketsana floods, which inundated three-fourths of the city's land area, devastated the city's gains in social housing and the development of urban poor communities along the Marikina-Pasig River System. The resettled families along the system suffered badly, incurring great losses and damages as floodwaters rose to their ceiling and filled their houses with mud. Since then, several flooding disasters have hit the city and the whole metropolis (e.g., 2012–2014 *Habagat* or monsoon floods, 2015 Super Typhoon Koppu/*Lando* floods), repeatedly flooding the relocated urban poor families along the river lines. The severe devastation among the river lines' urban poor communities showed how social housing reform gains in the early 1990s–2000s have been highly eroded by climate disasters and the intense economic development of the city and the surrounding upland areas. The in-city relocation program of Marikina City also illustrates the benefits of a decentralized and democratized governance through social housing provision for the poor. But by late 2009 onwards, these gains got whittled down both by flooding and the escalation of commercial development along the riverbanks of the Marikina River. The rapid expansion of economic development activities had intensified the costs of land and rental along the riverbanks.

This case also illustrates that degraded and flood-prone lands along the river which should not be developed for habitation were the only ones available for resettlement of urban poor households. Yet despite these flooding disasters, the price of land is rapidly going up. Currently, the land in this flood-prone area is pegged at PHP 4,000–PHP 5,000 per square meter (about USD 80–100) or about 10 times more than the price of land when residents first acquired it through the national social housing program. Those who have defaulted on their monthly amortization payments have sold out their housing rights to better-off in-migrants. In part, the escalation of land prices along this flood zone has been the result of intensified commercial development down the lower part of the Marikina River promoted by the local government. The latter includes the Riverbank Mall, SM Department Store, and other commercial–industrial development in this area, which is highly at risk to flooding. The decentralization strongly pushed LGUs to raise their revenues by crafting their own development plans and attracting businesses and other urban development projects through tax incentives and privileges for the private sector.

The above experience shows the intended and unintended consequences of democratization and decentralization of urban governance. While the neoliberal reforms increased the urban poor's access to housing and basic services, the increased development of the riverbanks also increased the disaster risk faced by resettled urban poor families and middle/upper-income class residents.

Source: Author

poor from their communities. Coupled with the recurring flooding disasters, the intensive urban development as exemplified by large commercial and infrastructural projects have widened the gap between the rich and the poor families, as well as persistence of poverty.

Reflections and concluding comments

During the past decade or so, Asian cities have undergone rapid economic expansion and growth. Alongside seemingly prosperous spaces, however, are also "brown spaces" or settlements of the poor which have inadequate access to employment,

livelihood, services, and other basic necessities. In response, local and national governments have attempted to implement resettlement and social housing schemes for the poor. But these resettlements or upgraded sites, especially those of the earlier decades, have now become sites of investments by the better-off segments of the larger population, displacing those in the bottom segment—the original beneficiaries of the program. So, the latter, joined by new migrants from the rural areas, have to again look for affordable space (not suited for habitation) in the urban peripheries. And the cycle continues. In this light, it is understandable why despite the growth and expansion of our cities, the Asia-Pacific region houses 60 percent of the world's slum population.

Metro Manila clearly illustrates the above processes also experienced by other cities in the region. While the earlier governance reforms allowed local governments to provide increased access to housing and basic services for the urban poor, these gains are threatened by the rapid growth and expansion of commercial and infrastructural development in their midst. It illustrates that community development gains generated by the prodemocratic movements of civil society and urban poor organizations, in partnership with local governments, are being eroded by large capitalist development initiatives with the private sector.

In retrospect, the gains of participatory and decentralized governance in social housing for the poor have been overtaken by the rapid increases in the cost of urban land and housing due to the large real estate, commercial, and infrastructural development projects promoted by both local and national governments. In the process, unequal access to housing and basic services has widened and ensured that the unequal structures of power remain strongly entrenched. The gains of the urban poor from the governance reforms in the 1990s–2000s continue to be eroded by the impacts of intense capitalist development projects, aggravated by climate-related disasters. The complexity of these challenges calls for innovative

solutions toward inclusive growth and prosperity for the majority, especially those in coastal cities in the Philippines and the Asia-Pacific region. Over the years, these economies have been hit by the impacts of climate change and natural disasters amid challenges of government legitimacy, accountability, and allegations of corruption. Thus, more than ever, the challenges for the political and economic institutions to deliver the social goods more equitably are much higher.

To conclude, our cities today are faced with huge challenges ranging from the contradictions of urban growth and rising inequality, climate disasters, and loss of trust in our governance institutions to the global crisis emanating from war, drought, famine, displacement, and massive migration. With its origins and impacts seemingly having seamless boundaries, these fundamental issues appear insurmountable for our nation-state's politically and territorially bounded governance systems. Citizen mobilizations have pressured governments and the ruling elites for meaningful reforms, but these have not been forthcoming. For our institutions and governance systems to reclaim the trust of its citizen or constituencies, the former must respond and demonstrate effectively with solutions that work for the majority of the population, especially those from the most vulnerable sectors—the poor, elderly, street children, and the marginalized sector of the society.

References

- Agence France Presse (AFP). 2013. Philippines' elite swallow country's new wealth. *Inquirer.net*. <http://business.inquirer.net/110413/philippines-elite-swallow-countrys-new-wealth> (accessed on June 9, 2016).
- Bernabe, M.D., J. Hammer, and M. Fried. 2015. Asia at the crossroads: Why the region must address inequality now. Oxfam Briefing Note. London, United Kingdom: Oxfam International.
- Burawoy, M. 2015. Facing an unequal world. *Current Sociology* 63(1):5–34.

- Karaos, A.M. and E. Porio. 2015. Transforming the housing process in the Philippines: The role of local-global networks by the urban poor. In *From local action to global networks: Housing the urban poor*, edited by P. Herrle, A. Ley, and J. Fokdal. London, United Kingdom: Ashgate Publications.
- Loyzaga, A. and E. Porio. 2015. Disaster risk and human development in Asia and the Philippines: Implications for MO's knowledge production/mobilization for resilience. Paper presented at the Strategic Planning Conference 2015, April 9, Manila Observatory, SEAMEO-Innotech, Quezon City, Philippines.
- National Economic and Development Authority (NEDA). 2015. Supporting the Mindanao Development Corridors. Regional Development X, Resolution Council No. 13, Series of 2015.
- Piketty, T. 2014. *Capital in the twenty-first century*. Translated by A. Goldhammer. Cambridge, MA: The Belknap Press of Harvard University Press.
- Porio, E. 1997. Urban governance and poverty alleviation in Southeast Asia: Trends and prospects, Global Urban Research Initiative (GURI) in Southeast Asia. Quezon City, Philippines: Center for Social Policy, Ateneo de Manila University.
- . 2012. Decentralization, power, and networked governance practices in Metro Manila. *Space and Polity* 6(Issue 1):7–27.
- . 2014. Climate change vulnerability and adaptation in Metro Manila: Challenging governance and human security needs of urban poor communities. *Asian Journal of Social Science* 42:75–102.
- Reuters Staff. 2014. World Economic Forum warns of dangers in growing inequality. *Reuters.com*. <http://www.reuters.com/article/davos-risks-idUSL5N0KP0QO20140116> (accessed on June 9, 2016).
- United Nations Habitat. 2015. *State of Asian and Pacific cities 2015*. Bangkok, Thailand: UN Habitat.
- Wallerstein, I. 1979. *The capitalist world economy: Essays by Immanuel Wallerstein*. Cambridge, United Kingdom: Cambridge University Press.
- World Bank (WB). 2013. *Philippine Development Report: Creating more and better jobs*. Pasig City, Philippines: WB Philippine Office.
- World Economic Forum (WEF). 2015. *Global Risks Report 2015*. Geneva, Switzerland: WEF.



Session Synthesis

Policymakers must push for an integrated approach to urban environment resilience.

This was how session moderator Dr. Marife Ballesteros of the Philippine Institute for Development Studies summarized the discussion on urban environment resilience.

“When we look at resilience, we should not merely be concerned with the sectoral aspects but also with the integrated policy approach,” she explained.

Ballesteros said that a clear understanding of the nature of resilience must first be addressed before policy recommendations can be made.

“Risks are complex, but so is resilience,” she explained.

To target urban resilience specifically, studies should focus on the metropolitan areas, such as Manila, where urban environment problems are “most glaring”, she added.

As such, the parallel session on urban resilience covered key issues affecting urban areas, namely, infrastructure and settlements; climate impacts and governance; energy and water efficiency and sustainability; and disaster resilience, mitigation, and adaptation.

Building resilient infrastructure and settlements

In terms of resilience in infrastructure and settlements, Dr. Arturo Corpuz discussed location

strategies as possible solution to address Metro Manila’s vulnerability to various environmental risks, such as severe traffic congestion, chronic flooding, and poor air quality. Such strategies include the building of new urban areas, for instance, where the government can relocate the country’s major functions.

Another strategy is the strengthening of local and regional economies, which, according to Corpuz, is more effective than land use planning. He explained that a strong economic base provides the government with sufficient capacity to implement the necessary risk reduction strategies that will lead to resilience.

Intersecting climate impacts and governance

On her part, Dr. Emma Porio challenged the current manner of looking at socioecological and political development in governance in understanding urban environment.

“Floods do not recognize political boundaries, but we always make planning and data analysis according to political administrative boundaries,” she explained.

Porio also raised the need for an integration of disciplines, where social sciences must be combined with the natural sciences to maximize their strengths in crafting policy solutions.

“We are so trained as specialists, economists, political scientists, physicists, but the reality is that the problems we are facing are all interconnected,” she added.

“In a sense, when you think of urban resilience in the city, you have to think of the city as a system,” she explained.

As such, Porio urged the policymakers to look at the interaction of the geophysical, political, economic, and social aspects so as to understand vulnerability and the potentials of building resilience in Metro Manila.

Ensuring sustainability in the Metro

Meanwhile, Dr. Alvaro Pereira Artigas looked into the current approach of the water and energy sector in addressing the sustainability and resiliency planning in Metro Manila. He argued that the environmental degradation in urban areas due to traffic congestion and proliferation of informal settlements has now resulted to deterioration of transport system and poor housing conditions with low coverage of waste water treatment.

Unfortunately, the said degradation also promotes low quality of life in Metro Manila, which undermined the productivity and mobility of urban residents, Artigas explained.

The French scholar recommended the adoption of development initiatives based on the principle of sustainable development and long-term integrated planning. He also encouraged policymakers to shift the focus of the country’s capacity-building initiatives to enhancing disaster resiliency and addressing the impacts of climate change at every level.

Promoting disaster resilience, mitigation, and adaptation in the Philippines

Lastly, Dr. Danilo Israel reviewed the existing socioeconomic research on disasters in the

Philippines. He found that despite numerous studies on resilience that have been conducted in the country, issues such as the valuation of the socioeconomic costs of specific disasters and the expected benefits that can be generated from resilience-related activities have remained uncovered.

As such, he recommended the conduct of studies on disaster, especially on the quantified potential costs and benefits of promoting resilience among households, firms, and communities, and the country overall. He also urged the government to continue the coordinated buildup of macro and micro databases and information for the analysis of resilience among individuals and integrated urban units.

Ways forward

Clearly, the Philippines still has a lot to do in terms of building resilience.

“There is a significant policy gap in terms of structures, laws, and mindsets,” Ballesteros said.

The session called for the review of Republic Act No. 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010, which Ballesteros considered “not adequate”. Porio added that the present governance system only reacts to the current needs of this generation. “It does not think whether your grandchildren will have resources in the future,” she explained.

In terms of climate adaptation, Porio said the government should come up with convergent and integrative ways of addressing the issue. “Right now, what we have is a fragmented system of governance at different levels,” she added.

Porio explained that “policymakers continue to put ourselves in an increasingly risky situation because of their decisions.”

Manila is considered the most exposed city to natural disasters in the world, according to the 2016 Natural Hazards Vulnerability Index from the United Kingdom-based risk analyst, Verisk Maplecroft.

The Authors

Michael R.M. Abrigo is a research fellow at the Philippine Institute for Development Studies (PIDS). He obtained his PhD in Economics from the University of Hawaii (UH) at Manoa. He was a postdoctoral fellow at the East-West Center in Honolulu, Hawaii. His areas of specialization are in health, labor, and population economics.

Alvaro P. Artigas is a lecturer at the Paris School of International Affairs and at the Governing the Large Metropolis Master track at Sciences Po in Paris. He holds a PhD in Political Science from the Paris Institute of Political Studies (Sciences Po). He specializes in development issues in the Global South and the transformation of infrastructural programs across urban and regional levels on both shores of the Pacific Rim.

Arlan Z.I. Brucal was a postdoctoral fellow at the UH Economic Research Organization. He obtained his PhD in Economics from the UH at Manoa, where he received the Burnham O. Campbell Dissertation Award and the Seiji Naya Award for Outstanding Third-Year Research Paper. His fields of specialization include environmental economics, energy economics, and international trade.

David Feliks M. Bunao was a research analyst at PIDS. He obtained a Bachelor of Science in Development Studies degree from the University of the Philippines (UP) Manila. His research interests include poverty, social protection, and monitoring systems.

Ramon S. Clarete is a professor and former dean of the UP School of Economics (UPSE). He has a PhD in Economics from the University of Hawaii. His research interests are on trade, tax and public spending, agriculture, and food policies. He led a team of experts who did the technical background studies for the National Economic and Development Authority's long-term vision of the Philippine economy, *Ambisyon 2040*.

Arturo G. Corpuz is an urban-regional planner. He holds a PhD in Architecture from Cornell University. He has worked as a consultant on urban-regional policies, local economic development, land use/environmental planning, and disaster risk reduction. He was a senior vice president at the Ayala Land, Inc. and associate professor at the UP School of Urban and Regional Planning.

Madeleine de Rosas-Valera is the director of the TAO Corporation. She obtained her medical degree from the De La Salle University (DLSU). She was undersecretary of the Department of Health (DOH) for Health Policy, Finance, and Research in 2012–2013. She has authored articles and papers on primary health care, health devolution, women's health, and health technology assessment.

Reneli Ann B. Gloria was a supervising research specialist at PIDS and is currently a research associate at the Economic Research and Regional Cooperation Department of the Asian Development Bank. She has masteral units in Economics and Finance from UP Diliman. Her research interests are development finance, agriculture, poverty, and microcredit.

Alejandro N. Herrin is a professorial lecturer at the UPSE. He obtained his PhD in Economics from the University of South Carolina. He specializes in population, health, human resource, and development economics. Dr. Herrin was a recipient of the Outstanding Young Scientist Award by the National Academy of Science and Technology for researches in demographic economics (1982), and the Rafael M. Salas Population and Development Award for work in population and development (1996).

Danilo C. Israel was a senior research fellow at PIDS. He has a PhD in Applied Economics from Clemson University and a postdoctoral degree from the University of British Columbia. He specializes in resource and environmental economics and fisheries economics.

Ronald P. Law is the chief of the Preparedness Division of the Health Emergency Management Bureau of the DOH. He is responsible for policy development, program management, capacity building,

and research on disaster risk reduction and management for health. He obtained his medical degree from the University of the East Ramon Magsaysay Memorial Medical Center. He attended a fellowship on public health and emergency management at Griffith University in Australia.

Gilberto M. Llanto is the president of PIDS. He was deputy director-general (undersecretary) of the National Economic and Development Authority, vice president of PIDS, and president of the Philippine Economic Society. He has a PhD in Economics from the University of the Philippines. He has written and published papers on financial markets, public economics, local governance, institutional economics, and infrastructure regulation.

Christian D. Mina was a supervising research specialist at PIDS and is currently a bank officer at the Department of Economic Statistics of the *Bangko Sentral ng Pilipinas* (BSP). He holds a Master's Degree in Statistics from UP Diliman and Master's Degree in Economics and Econometrics from the University of Manchester. His research interests include econometric modeling, poverty dynamics, labor and employment, disability, climate variability and agriculture, and nonparametric statistics.

Marjorie S. Muyrong is a lecturer at the Ateneo De Manila University (ADMU). She earned her Master's Degree in Economics from the same university. Her research interests include environmental economics, disaster economics, international development, industrial policy, and competitiveness.

Emma E. Porio is a professor of Sociology and former chair of the Department of Sociology and Anthropology at the ADMU. She represents the International Sociological Association in the Global Development Network Executive Board and the Paris-based International Council for Science. Her research interests include poverty and social inequality, governance, civil society, gender, and urban and local development.

Johnny Noe E. Ravalo is an assistant governor of the Financial Supervision Research and Consumer Protection Subsector within the BSP Supervision and Examination Sector. He also manages the initiatives of the BSP in the critical areas of financial stability, capital market development, as well as for financial literacy and consumer protection. He has a PhD in Economics from the Boston University.

Celia M. Reyes is a senior research fellow at PIDS. She obtained her PhD in Economics from the University of Pennsylvania, specializing in econometric modeling. She is one of the acknowledged experts in the field of poverty and has published numerous articles on poverty measurement, monitoring, and analysis. Her research interests include poverty, social protection, and monitoring systems.

Agnes C. Rola is a professor at the College of Public Affairs and Development at UP Los Baños (UPLB), where she teaches methods courses to graduate students. She obtained her PhD in Agricultural Economics from the University of Wisconsin-Madison. She has a summer program certificate in Environmental Leadership from the University of California-Berkeley. Her research revolves around the economics, policy, and institutional aspects of sustainable agriculture and natural resources management.

Orville Jose C. Solon is the dean of the UPSE. He obtained his PhD in Economics from UP and was a postdoctoral student at the Harvard University as a Takemi fellow. He contributed to the formulation of the National Health Insurance Act, Health Sector Reform Agenda, Fourmula 1, and *Kalusugan Pangkalabatan*. He has extensive experience in research-based formulation of policies and programs on health sector reform.

Marites M. Tiongco is an associate professor and the dean of the School of Economics at DLSU in Manila. She received her PhD in Agricultural Economics from the UPLB. Her research work is focused on human capital development including gender issues, poverty, and inequality, the economics of agricultural development, and natural resources, climate change, and environmental sustainability.

Philip Arnold P. Tuaño is an assistant professor at the Department of Economics at the ADMU. He finished his PhD in Economics from UP. He is also project coordinator at the Human Development Network and is part of the Coastal Cities At Risk project of the Manila Observatory, for which he cowrote the paper on the economic effects of flooding in Metro Manila cities.

RISKS, SHOCKS, BUILDING RESILIENCE

Proceedings of the Second Annual Public Policy Conference 2016

In view of the country's increasing vulnerability and exposure to risks and shocks, the Philippine Institute for Development Studies dedicated the Second Annual Public Policy Conference (APPC) to the discussion of building resilient systems in the Philippines under the theme, "Risks, Shocks, Building Resilience". The APPC convened experts to share their views on the formulation of appropriate and timely policy interventions to build resilience in the country from various socioeconomic perspectives. It specifically covered issues affecting the macroeconomic, agriculture, urban environment, and health sectors to underscore the need for a multidisciplinary approach in resilience building.

These conference proceedings present the evidence-based policy research studies discussed during the APPC. The Institute hopes that the recommendations raised in this publication may inspire further discussions and actions on building resilience that can lead to an economic growth that is both sustainable and inclusive.



Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, 1100 Quezon City, Philippines
Telephone Numbers: (632) 877-4000, 372-1291 to 92
Website: www.pids.gov.ph
Email: publications@mail.pids.gov.ph