

**Disaster Risk Reduction and Climate Change Adaptation:
A Comparative Analysis for the Provinces of Albay and Pangasinan**

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Abstract – *It is an alarming truth that disasters inevitably undermine all the Philippines' efforts towards achieving a sustained national development. Since this country is considered one of the most disaster-prone countries in the world, it is the primary responsibility of the government to bring forth relevant policies, programs, and activities on disaster prevention, mitigation, response, and rehabilitation. This paper, therefore, aims to look into the current response of the government, particularly the provinces of Albay and Pangasinan, along disaster risk reduction (DRR) and climate change adaptation (CCA).*

The study utilized a descriptive case study method of research to determine the DRR-CCA measures adopted and practiced by the said provinces. Through documentary analysis, the study primarily involved a comparative analysis of the two provinces through the use of the Hyogo Framework for Action. The data gathered was substantiated through the conduct of interviews with key informants such as the heads of the provincial/municipal disaster risk reduction and management council, and other local officials or employees. The observations of the local residents were also considered in validating the results of the analysis.

The study found out, among others, that Albay has long adopted DRR and CCA in its development strategies whereas Pangasinan's DRR and CCA efforts are only incipient. Further, Albay has been successful in achieving zero casualty as well as in making disaster preparedness a culture among the people with the help of permanent institutions and other partner institutions. The province of Pangasinan, on the other hand, relies heavily on the Local DRRMC in the management of disasters. The non-government organizations, private organizations, community organizations, and academic institutions have limited involvement in the DRR-CCA initiatives of the province.

Keywords – calamities, mitigation, provinces

INTRODUCTION

There is certainly an ounce of wisdom behind the oft-quoted adage that “change is the only permanent thing in this world.” Many civilizations have passed and the formerly primitive societies have metamorphosed into highly industrialized, modernized, and “borderless” societies at present. The vast selection of gadgets, high-technology equipment and machineries which were once sketches in the inventors' minds have now become so ubiquitous and considered necessities in life.

Corollary to this, the field of public administration is no exemption to the dynamics of the times. The traditional role of the state to provide services to the people “from womb to tomb” have shifted into a redefinition of the state where the government must work in partnership with the private organizations and the civil society to deliver services. These developments in the “governance era” are considered necessary to ensure a more effective and efficient response to the problems of the changing world such as terrorism, human trafficking, dreaded diseases, climate change, and more.

More specifically, the so-called paradigm shift from disaster response and rehabilitation to disaster risk reduction (DRR) and climate change adaptation (CCA) has been gaining currency around the world and has become part of the agenda of all nations. This new development approach is now considered as a more important strategy to mitigate disaster

risks and promote adaptive capacities of communities in response to the devastating impacts of climate change.

Responding to this challenge, the Philippine government has enacted two important legislations: Climate Change Act of 2009 (RA 9729) and the Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121). These laws aim to mainstream climate change into government policies as well as enhance the disaster risk reduction and management system in the country.

OBJECTIVES OF THE STUDY

This study aims to critically assess how the DRR and CCA policies and programs have so far been adopted and implemented particularly by the local government units which are closest to the people. In particular, this paper aims to make a comparative analysis of the implementation of DRR and CCA policies in the provinces of Albay and Pangasinan which are both highly susceptible to various forms of natural calamities.

MATERIALS AND METHODS

The study made use of a descriptive, case study method of research to determine the DRR-CCA measures adopted and practiced by the provinces of Albay and Pangasinan. Through documentary analysis, the study primarily involved a comparative analysis of the two provinces through the use of

the Hyogo Framework for Action. The data gathered were substantiated through the conduct of interviews with key informants such as the heads of the provincial/municipal disaster risk reduction and management council, and other local officials or employees. The observations of the local residents were also considered in validating the results of the analysis.

RESULTS AND DISCUSSION

Understanding DRR and CCA as Development Approaches

In a highly globalized world where the benefits of economic development and technological advances seem to be challenged by disasters and climate change, the need for a viable and effective development approach is imperative.

Disaster management, as a development approach, focuses on a holistic approach where disaster management is treated as “a cycle with different phases, from preparedness through response, from prevention, mitigation and readiness, through relief, recovery and rehabilitation”. However, recent initiatives focus more on disaster risk reduction that integrates development-oriented strategies such as vulnerability and risk reduction in the context of sustainable development and long-term socio-economic development strategies. [1]

As defined by the United Nations International Strategy for Disaster Reduction (UNISDR), DRR is the “systematic development and application of policies, strategies and practices to minimize vulnerabilities, hazards and the unfolding of disaster impacts throughout a society, in the broad context of sustainable development. [2] DRR expands the focus of disaster management from mere disaster response to important aspects of vulnerability and risk assessment, knowledge creation and sharing, developing public commitment, establishing supportive institutional frameworks, better resource management and improving early warning and response capacities. [3]

These components are explicitly advanced by the Hyogo Framework for Action (2005-2015) which was adopted by 168 nations during the UN World Conference on Disaster Reduction. It recognizes five major challenges to ensure systematic action in DRR, to wit: (1) ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; (2) identify, assess and monitor disaster risks and enhance early warning; (3) use knowledge, innovation and education to build a culture of safety and resilience at all levels; (4) reduce the underlying risk factors; and (5) strengthen disaster preparedness for effective response at all levels.

Meanwhile, the Intergovernmental Panel on Climate Change (IPCC) has defined CCA as “an adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits benefit opportunities” [4]. A simpler definition of CCA is that

it “is about reducing the risks posed by climate change to people’s lives and livelihoods [5].

The DRR and CCA may have stirred debates among scholars about their similarities and differences but what is important is that there is a general consensus that both should be integrated in wider development planning [6]. The two approaches are closely interlinked and that an improved DRR capacity is the first important step towards adaptation to long term impacts of climate change [7].

Disasters at a Glance: The Cases of Albay and Pangasinan

The Philippines, despite of its richness in terms of natural resources and the highly remarkable ingenuity and talent of its workforce, has been constantly battling against disasters or calamities as its age-old enemy. The country, being one of the disaster-prone countries in the world, has been regarded as the “third most disaster-prone country in the world [8], one among the top five countries in the world frequently hit by natural disasters, and also one among the top ten countries in terms of disaster mortality in 2013 [9].

At the local level, most of the country’s provinces have been plagued by the natural calamities which are aggravated by the impact of climate change. In particular, the provinces of Albay (Region V) and Pangasinan (Region I) are faced with the daunting task of reducing the risks brought about by typhoons, consequent flooding and landslide, and the threats of earthquake and tsunami. Hence, DRR and CCA strategies have to be implemented by these provinces in order to respond to these challenges.

The Province of Albay

Albay is a province located at the southern tip of Luzon island, facing the Philippine Sea and the Pacific Ocean. Considered as the second largest province in the Bicol region, it boasts of a total land area of 2,552 square kilometres. Politically subdivided into three cities and 15 municipalities, its population as of August 2010 had reached 1,233,432 inhabitants thereby making it the 20th most populous province in the country. The province’s economy largely relies on agriculture with major products of coconut, rice, sugar, and abaca (Manila hemp) while handicrafts are the major source of rural income. Tourism is also the current major focus of the provincial government [10].

The province, being “located in the eastern seaboard of the country and subjected to pressures and consequent effects of the Pacific Jinx” [11] has been dubbed as the “Vatican of Disasters in the Philippines”. Its location at the Pacific Ring of Fire makes it vulnerable to earthquake, tsunami and volcanic hazards while its location along the Western Pacific Basin makes it susceptible to various climatic conditions such as typhoons, monsoon rains, and thunderstorms.

The vulnerability of Albay to natural hazards has to be dealt with great effort mainly due to risks and damages that it might incur to the lives and property of the people. In terms of

geologic hazards, Albay experiences tectonic earthquakes as well as volcanic earthquakes primarily due to the Mayon Volcano. Hence, an estimate of 42,500 households or 5.3 percent of the total population of the province are considered at risk from earthquakes whereas a total of 1,675 families are considered at risk to volcanic hazards specifically within the 6-kilometers danger zone. Meanwhile, in terms of hydrometeorologic hazards, the province experiences an average of 20 tropical cyclones each year where two are considered destructive. Consequently, there are 396 out of the total 720 barangays which are continually suffering from flood hazards during heavy rain. About three cities and five municipalities located around the volcano are consistently being threatened by mudflows and lahar. Likewise, tsunami and storm surges threaten approximately 24,700 families in 149 barangays while landslide threatens about 11,000 to 12,000 families located within the high-risk area in 127 barangays. [12]

Table 1 chronicles the major disasters which have affected Albay for the past 16 years.

Table 1. Major Disaster Events in Albay Province, 1995-2010

Calamities	Date	Classification	Casualty	Damage Cost (P)
1. Typhoon Rosing	Nov. 3, 1995	Destructive	Zero	1.7 B
2. Typhoon Loleng	Nov, 2, 1998	Destructive	Zero	7.1 B
3. Mayon Eruption	Feb. 2000	Explosive	Zero	284 M
4. Mayon Eruption	June 2001	Explosive	Zero	300 M
5. Mayon Eruption	July 2006	Explosive	Zero	50.5 M
6. Typhoon Milenyo	Sept. 27, 2006	Destructive	14 dead	1.3 B
7. Typhoon Reming	Nov. 30, 2006	Destructive	604 dead 419 missing	3.7 B

8. Typhoon Mina, Lando and Nonoy	Nov. 2007	Destructive	Zero	
9. TECF, Monsoon Rains	Feb. 2008	Destructive	Zero	
10. Typhoon Dante	April 2009	Destructive	Zero	
11. Typhoon Ondoy	Sept. 2009	Destructive	Zero	
12. Typhoon Peping	Oct. 2009	Destructive	Zero	
13. Mayon Eruption	Dec. 14, 2009 to Jan. 2, 2010	Explosive	Zero	

Source: CIRCA, Province of Albay as cited in Espinas 2012: 21

The data reveals that the province have suffered from various typhoons and volcanic eruptions which have resulted to loss of lives as well as destruction to property and sources of livelihood amounting to billions of pesos. However, it is noteworthy that the province has been successful in its goal of zero casualty in 16 years except in 2006 where Typhoons Milenyo and Reming claimed the lives of hundreds of people and destroyed major sources of livelihood. It is likewise significant to note that there is a reduction in the casualties over the years whenever there are occurrences of Mayon Volcano eruptions. These are proofs of a more systematic and effective way of disaster risk reduction and management by the province which shall be thoroughly explained later.

The Province of Pangasinan

Pangasinan is a province located at the western area of the Luzon island along the Lingayen Gulf and the China Sea.

Considered as the third biggest province in the country, its 536,818 hectares of land area constitutes almost one-half (41. percent) of the total land area of Region 1 and 1.8 percent of the total area of the Philippines. It is composed of 4 cities and 44 municipalities, and a home to 2.78 million Pangasinenses as of 2010 census. Its economy is primarily based on agriculture (rice, yellow corn, and vegetables) and fishery. [13]

The province is also highly susceptible to natural disasters both geologic and hydrometeorological. The project, Mapping Philippine Vulnerability to Environmental Disasters (2005), listed the province as the 4th among top ten provinces that are at risk to geologic hazards such as earthquakes due to the Manila Trench. The occurrences of shallow and left-lateral strike-slip earthquakes in Eastern Pangasinan are attributable to its location along the Philippine Fault Zone.

In terms of hydrometeorological hazards, the Department of Environment and Natural Resources Mines and Geo-Science Bureau (DENR-MGB) ranked Pangasinan as third most flood-prone and landslide-prone province in the Philippines as of 2011. Also, in a statement of the Regional Disaster Risk Reduction and Coordinating Council (RDRRMC), the province has been considered the most flood-prone province in Region I. At the global scenario, a World Bank report (2013) entitled, "Getting a Grip of Climate Change in the Philippines", listed Pangasinan as one among those provinces which are very high risk for typhoons with strong winds and heavy rainfall and consequently, with very high risk to flooding.

Looking back at the major disaster events which have happened in the province, the only major earthquake which have affected the province was the infamous July 16, 1990 earthquake (7.7. magnitude), which affected Pangasinan and severely damaged Dagupan City and the Gulf of Lingayen. Liquefaction occurred in a 70-km long and 20-km wide strip in Pangasinan and Tarlac provinces (www.iris.edu/data/reports). The catastrophic earthquake left 2,412 people dead and led to damages amounting to US \$ 369 million [14].

In terms of typhoon and flooding, the province has continually suffered and incurred huge damages to infrastructure and agricultural crops. In the absence of a comprehensive chronicling of the major typhoons which occurred in the province, the research attempted to collate the data gathered about major typhoons which visited the province in the recent years.

Table 2. Major Typhoons in Pangasinan Province, 2011-2015

Typhoon	Date	No. of Affected Families/ Persons	Casualty	Damage Cost (P)

Falcon	June 28, 2011	16,347 families or 94,848 persons	zero	157 M
Pedring and Quiel	Sept. 27 and Oct. 1, 2011	2,909 families or 13,056 persons	zero	717 M
Maring	Aug. 15-22, 2013	36,224 families	zero	26 M
Luis	Sept. 14-15, 2014	16,347 families or 94,848 persons	3	290 M
Lando	Oct. 17-19, 2015	491, 525 persons	zero	3.5 B

Sources: www.pangasinan.gov.ph, http://newsinfo.inquirer.net/, and www.gmanetwork.com

The data reveals a gloomy picture of the devastating impact of typhoons and flooding particularly to agricultural crops which are the major sources of livelihood by the Pangasinenses. Also, the consequent flooding especially in low-lying areas have since been affecting many residents, paralyzing businesses and classes as well.

A Comparative Analysis of DRR and CCA between Albay and Pangasinan

Table 3 offers a comparative analysis of DRR activities of the two provinces using the Hyogo Framework of Action which recognizes major challenges to be addressed by the states in achieving a systematic DRR.

Good governance in the UNISDR framework is considered an important factor in achieving greater capacity to manage risks. It can be observed that both provinces have integrated DRR and CCA in their development plans though Albay has done this for more than 20 years now while Pangasinan has only incorporated DRR and CCA in its development strategies in 2014.

Table 3
A Comparison of DRR and CCA Initiatives of
Albay and Pangasinan
Thematic Area 1: Political Obligation and Institutional
Development (Governance)

Thematic Areas/Components	Albay	Pangasinan
1. Policy and Planning	<ul style="list-style-type: none"> * Integration of DRR and CCA in development planning * Disaster risk mapping as a tool in land use planning (CLUP) 	<ul style="list-style-type: none"> * Mainstreaming DRR and CCA in the enhanced Provincial Development and Physical Framework Plan (PDPFP, 2014)
2. Legal and Regulatory Framework	<ul style="list-style-type: none"> * RA 10121 or PDRRM Act of 2010 * RA 9720 of Climate Change Act of 2009 * Local Government Code of 1991 * SP Resolution 2007-04 	<ul style="list-style-type: none"> * RA 10121 or PDRRM Act of 2010 * RA 9720 of Climate Change Act of 2009 * Local Government Code of 1991 * SP Resolution 529-2014
3. Resources	<ul style="list-style-type: none"> * Local DRRM and Recovery Fund Fund (70%) * Internal Revenue Allotments (5%) * Public-Private Partnership Initiatives in DRR/CCA 	<ul style="list-style-type: none"> * Local DRRM and Recovery Fund Fund (70%) * Internal Revenue Allotments (5%) * Public-Private Partnership Initiatives in DRR/CCA

4. Organizational Structures	<ul style="list-style-type: none"> * NDRRMC, OCD and other GAs * APSEMO * CIRCA * Active participation of academic institutions such as Bicol University * Active participation of NGOs (i.e. Social Action Center, Diocese of Legazpi) * International Organizations (i.e. AECID, JICA, Oxfam, UNDP) 	<ul style="list-style-type: none"> * NDRRMC, OCD and other GAs * Pangasinan PDRRMC * Task Force Kalikasan * Minimal participation of academic institutions * Minimal involvement of NGOs (Pangasinan Federation of Disaster Officers, 2015) * International organizations (i.e. JICA)
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In the case of Albay, a permanent disaster risk management office (DRMO) called the Albay Public Safety and Emergency Management Office (APSEMO) has been already in place since 1994 which introduced a paradigm shift and focused on preventing or minimizing the effects of disasters. This action was said to be influenced by the declaration of the International Decade for Natural Disaster Reduction (IDNR) Yokohama Message in 1994 which called for a paradigm shift from disaster response to disaster risk reduction. Nowadays, the provincial government has been considered as the country's role model in DRR and CCA initiatives through "disaster proofing of development" which includes integration of DRR in Regional Master Plan, Comprehensive Land Use Plan (CLUP), and other development plans (IRP 2012). Noteworthy is the GUICADALE (Guinobatan, Camalig, Daraga, and Legazpi City) economic platform, a geo-strategic integration approach, which seeks to encourage new economic activities in safer areas of the province.

In the case of Pangasinan, mainstreaming DRR and CCA in development plans is only a recent initiative with the approval of Provincial Resolution No. 529-2014 on December 1, 2014. The said resolution adopted the DRR+CCA Enhanced Provincial Development and Physical Framework Plan (PDPFP) covering the period from 2013-2018. The enhanced

PDPFP “shall serve as a guide to the province in responding to the problems of climate change and disaster occurrence for efficacy and long-term benefits.”

As to their legal and regulatory framework, both provinces are guided by the Philippine Disaster Risk Reduction and Management Act (PDRRM) of 2010 which shifted the country’s focus on disaster response and recovery to disaster risk reduction or mitigation, prevention and preparedness activities. The Climate Change Act of 2009 as well as provisions in the Local Government Code of 2009 (RA 7160) both recognize the crucial role of local government units as frontline agencies in mainstreaming climate change in policies and programs. However, between the two provinces, it is only Albay which has local legislations on enjoining government agencies and private entities to cooperate in CCA measures of the province like the Sangguniang Panlalawigan Resolution 2007-04.

In terms of resources, RA 10121 provides funding for the entire DRRM program, known as the Local DRM and Recovery Fund (LDRMRF). Seventy percent (70%) of the said fund can now be used for disaster risk reduction or mitigation, prevention and preparedness activities. Also, the LGUs can still use the five percent (5%) of their respective internal revenue allotments or IRA to finance their own disaster management programs or activities. However, the extent to which these funds have been efficiently and effectively used by the two provinces is not covered in this paper. Nevertheless, Albay, for instance, has initiated a lot of highly commendable programs and projects which have gained not only national recognition (Galing Pook awardee) but international recognition as well. The province of Pangasinan, on the other hand, has also been commended by the national government in terms of disaster preparedness. Most of the pre-disaster activities conducted by the province are establishment of permanent evacuation centers, stockpiling of goods, conduct of information campaign, and periodic drills and exercises [15].

With regards to organizational structure, Albay seems to be far ahead the province of Pangasinan for its institutionalization of a permanent disaster management office called the APSEMO. The office has four-fold functions ranging from disaster preparedness and response to recovery, public safety and administrative functions. In terms of DRR, it conducts risk and hazard assessment based on information obtained from PAGASA and PHIVOLCS.

Another significant institutional creation within the province was the establishment of the Centre for Initiatives and Research on Climate Adaptation (CIRCA) in 2007 to promote climate risk adaptation and its mainstreaming in the educational programs of the various academic institutions in the province [16]. The province can also boast of its partnership with NGOs, international organizations and academic institutions. The

Bicol University has been very active in disaster education, training, and research while the Social Action Center of the Diocese of Legazpi is a local NGO which has also been supportive of disaster preparedness and relief programs of the provincial government. Also, international organizations such as Japan International Cooperation Agency (JICA) and Agencia Espanola de Cooperacion Internacional para Desarrollo (AECID) have helped establish evacuation centers in the province while the United Nations Development Programme (UNDP) have supported Albay’s MDGs.

Meanwhile, Pangasinan has the Provincial PDRRMC as its primary agency in promoting public awareness, managing natural hazards, and adapting to climate change, with a vision of creating better prepared and proactive disaster resilient communities. Further, the Task Force Kalikasan, which is a unit of the PDRRMC, conducts massive river clean-up and other activities to reduce risks of flooding. Also, just recently, the Pangasinan Federation of Disaster Officers was formed mainly to serve as vehicle for frequent exchange of information and technology, and ensure closer coordination among LGUs in the province (Sunstar 2015). There is no active participation of academic institutions and NGOs in DRR and CCA except for some tree planting and mangrove reforestation activities and information dissemination programs.

Another equally important area to measure DRR initiatives is identification and assessment of risk vulnerabilities as shown in Table 4. The data shows that both provinces have available risk assessments (i.e. REDAS or Rapid Earthquake Damage Assessment System software) and rely on GIS based maps to determine possible extent of damages that can also be used as important development planning instruments. However, it is only the province of Albay which engages its people in coming up with their own hazards and vulnerabilities assessment through small-scale mapping. In the case of Pangasinan, hazard maps of all towns are available for use by local officials in development planning but these are not commonly known by the people.

Table 4
A Comparison of DRR and CCA Initiatives of
Albay and Pangasinan
Thematic Area 2: Risk Identification and Assessment

Thematic Areas/ Components	Albay	Pangasinan
1. Risk Assessment and Data Quality	* Mapping of earthquake, Mayon Volcano mudflow (lahar), typhoon hazards	* Mapping hazards and risks for flood, earthquakes, liquefaction, erosion, landslide,

	<p>as well as combined risk to climate disasters</p> <p>*Participatory hazards, capacities and vulnerabilities assessment of barangays (small-scale mapping)</p> <p>*Rapid Earthquake Damage Assessment System (REDAS)</p>	<p>tsunami, and storm surge prone area</p> <p>* Geocloud Integrated Geographical Information System (JICA)</p> <p>*Rapid Earthquake Damage Assessment System (REDAS)</p>		<p>Detection and Warning System (2012) by DOST</p>	<p>System (2012) by DOST</p> <p>*Radio communications set up by NAPOCOR as early warning system during dam spill-over operations</p> <p>*Use of “kanungkong” as an indigenous flood warning system</p>
2.Early warning systems	<p>* PHIVOLCS (to monitor seismic and volcanic activity)</p> <p>*PAGASA (to forecast flooding)</p> <p>*LDRRMC (to organize warning services)</p> <p>*INFOBOARD (SMS broadcast facility for early warning)</p> <p>*Installation of a Community Tsunami</p>	<p>* PHIVOLCS (to monitor seismic and volcanic activity)</p> <p>*PAGASA (to forecast flooding)</p> <p>*LDRRMC (to organize warning services)</p> <p>* Agno River Basin Flood Forecasting and Warning System (ARBFFWS)</p> <p>*Installation of a Community Tsunami Detection and Warning</p>			

In terms of early warning systems, the two provinces rely heavily on primary warning agencies of the government such as PHIVOLCS and PAGASA for volcanic and seismic activities and flooding forecasts, respectively. Also, in 2012, the PHIVOLCS and Advanced Science and Technology Institute (ASTI) have installed a Community Detection and Warning Systems that provide real-time and warning signals in high-risk coastal communities in both provinces. It is part of a grant-in-aid project of the DOST known as “Establishment of a Cost-Effective Local Tsunami Early Warning System for Selected High-Risk Coastal Communities of the Philippines” or TeWS.

Distinct to the province of Albay is the INFOBOARD where over 15,000 free SMART sim cards were issued to the officials of the Disaster and Climate Risk Monitoring System. It is a SMS broadcast facility for early warning system which is critical in quick response during calamities (IRP 2012). Meanwhile, unique also to the province of Pangasinan is the dam early warning system operated by NAPOCOR. This warning system is important especially to get the public ready for any spill-over operations of Binga and Ambuklao dams in Benguet and San Roque dam in Pangasinan. It can be recalled that the 2009 massive flooding in the province caused by the spilling of the San Roque dam killed 60 people and destroyed about P4 billion worth of property, crops and fish [17]. Complementing the dam warning system is the Agno River Basin Flood Forecasting and Warning System (ARBFFWS) which provides timely, reliable and understandable flood warnings in the province. This project was funded by the Japanese government through the JICA. Lastly, an indigenous flood warning system was developed in Dagupan City which is prone to flooding. The kanungkong, which is made of bamboo and produces a “kung kung kung” sound when hit with a stick,

serves as a local relay and communication device. To monitor flooding, and as basis for relaying of messages, flood markers were established and monitored in strategic areas in the villages [18].

The last area to measure DRR and CCA initiatives is knowledge management. This aspect includes disaster education, research initiatives, capacity building or training, and enhancing public awareness. Table 5 shows that Albay has a much more systematic and institutionalized information management and communication system with the presence of APSEMO, CIRCA, as well as active involvement of the Bicol University; whereas in Pangasinan, the province's PDRRMC is the sole institution performing this gargantuan task. There is minimal involvement of the academic institutions in the province along this aspect.

In terms of education and training, it is apparent that both provinces conduct regular capacity building or training to local officials, rescuers, key persons, and other stakeholders. Periodic drills are also held to enhance disaster preparedness. However, worth noting is that it is the Albay province which pioneered the integration of DRR and CCA in primary and secondary education and even in the undergraduate and graduate courses in schools within the province. Meanwhile, Pangasinan only includes DRR and CCA discussions in the enhanced curriculum of the K-12 program as mandated by RA 10533.

In the aspect of public awareness, both provinces conduct information dissemination to enhance the public's understanding as well as disaster preparedness. The two provinces are involved in DILG's "Operation Listo", a disaster preparedness program that seeks to enhance the capacities of LGUs in mitigating the adverse impacts of disasters and climate change. It specifically includes providing disaster preparedness manuals which are downloadable as well as forging commitments, partnership and networking between and among the LGUs, civil society organizations, private sector, academe and media in disaster-related activities. Another commonality is that in both provinces, the role of the media in enhancing public awareness is recognized.

Table 5
A Comparison of DRR and CCA Initiatives of
Albay and Pangasinan
Thematic Area 3: Knowledge Management

Thematic Areas/ Components	Albay	Pangasinan
1. Information management	*APSEMO and CIRCA maintains	*The PDRRMC maintains database

and communication	hazards and risk databases *Bicol University assists in propagating knowledge and practice of DRR and CCA	on hazards and risks assessment. *The PDRRMC annually conducts a public information drive as part of the activities in the National Consciousness Month (July) with minimal role of the academic institutions
2. Education and Training	* REDAS Training (PHIVOLCS) * Bicol University extension services in educating communities *Pioneering in mainstreaming DRR and CCA in the school curricula (from primary to graduate level)	*REDAS Training (PHIVOLCS) *Pangasinan State University focuses on enhancing awareness of the people on disasters * Integration of discussions on DRR and CCA based on the enhanced K-12 curriculum (RA 10533); Inclusion of DRR in school curricula based on Rule 10, RA 10121 *Regular capacity building workshops for local officials,

	<p>*Continuous training, education and workshops for key stakeholders and key persons in the barangay</p> <p>*Conduct of quarterly drills and exercises in the communities by the Barangay DRRMC.</p>	<p>Regular training of rescuers</p> <p>*Conduct of regular earthquake drill and flood evacuation drill (low-lying areas) in partnership with DepEd, Philippine Red Cross and other GAs.</p>
3. Public awareness	<p>*Increased public awareness and public participation</p> <p>*DILG's "Operation Listo"</p> <p>*Significant role of media in raising awareness</p>	<p>*Distribution of information-education materials and limited public participation in DRR and CCA activities</p> <p>*DILG's "Operation Listo"</p> <p>*Media plays an important role in enhancing public awareness</p>
4. Research	<p>*There are permanent institutions which focuses on researches related to DRR and CCA (i.e. CIRCA and</p>	<p>*There are no permanent institutions in charge of formulating and conducting a comprehensive</p>

	<p>the Institute for Disaster Evaluation and Analysis (IDEA).</p> <p>*Bicol University provides research services to the province.</p>	<p>research agenda for DRR and CCA.</p> <p>*The academe has limited role in DRR research activities.</p>
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However, the difference lies in terms of intensity and duration of information campaign. In Albay, Governor Joey Salceda claims that "disaster preparedness is now a way of life among Albayanos" because the people are already aware and very much familiar with disaster preparations. Disaster preparedness is anchored on "capacity building for all elements of the community, from its smallest unit, the family; to the state of mind of the entire community itself" [19]. Meanwhile, in the case of Pangasinan, the PDRRC usually intensifies public information drive (streamers, leaflets and brochures) during the month of July which is the National Disaster Consciousness Month in order to enhance awareness of the people on natural hazards as well as provide them critical information on some measures to mitigate the adverse effects of such hazards.

In terms of research programs and institutions for DRR and CCA, the province of Albay benefits from the disaster-related research undertakings of CIRCA as well as Bicol University. Further, the Institute for Disaster Evaluation and Analysis (IDEA) conducts analysis of the impact of existing and proposed projects on the environment. Whereas in Pangasinan, there is apparently lack of research organizations and academic institutions that engage in DRR and CCA research activities.

CONCLUSIONS AND RECOMMENDATIONS

Challenged by the occurrences of many natural hazards and with the aim of enhancing their coping capacities to disasters, the provinces of Albay and Pangasinan were prompted to make a paradigm shift from mere disaster response, relief and rehabilitation efforts to DRR and CCA. However, it is to be noted that Albay has long adopted DRR and CCA in its development strategies whereas Pangasinan's DRR and CCA efforts are only incipient. Hence, as a recommendation, Albay has to sustain its commitment, political will and partnership with government agencies, international and local organizations and the civil society. Whereas, on the part of Pangasinan, there is a need for a more coordinated and intensified effort to

mainstream DRR and CCA in all development plans and strategies.

Also, Albay has been successful in achieving zero casualty and well as in making disaster preparedness a culture among the people with the help of permanent institutions such as APSEMO, CIRCA, and other partner institutions. However, there is a need to cascade these excellent DRRM efforts in the provincial level down to the barangay level. The officials and residents in the barangay can organize themselves and formulate locally developed plans and programs to develop a sense of ownership and ensure greater participation [21]. Pangasinan, on the other hand, relies heavily on the Local DRRMC in the management of disasters. Hence, there is a need to develop a viable approach that will ensure greater participation of the NGOs, private organizations, community organizations, academic institutions and all other stakeholders in mainstreaming DRR and CCA in all its plans, policies and programs.

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