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Disaster Preparedness and Resiliency of the Local Government Unit of Compostela

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Abstract

Constant typhoons and floods have exposed the vulnerability of the disaster risk and reduction management of local government units and such untold miseries are an inescapable effect of ill-preparedness. While disaster cannot be prevented, measures can be taken to reduce the possibility of trouble. Data from the Office of the Department of Interior and Local Government (DILG) revealed that in 2014, the Municipality of Compostela has been awarded the "Seal of Disaster Preparedness" (SDP) on flood. Thus, this captures the interest of the researcher to determine indicators of the local government unit's disaster preparedness that predict disaster resiliency to the major natural disasters occurring in the Municipality of Compostela for the last five years which include flooding and typhoon. This study employed the descriptive correlation design as the overall scheme in the conduct of the study. Specifically, Regression Analysis was utilized using disaster resiliency as the outcome variable and disaster preparedness in terms of technical competency, community awareness, and contingency planning as predictors. Results reveal that technical competency and community awareness significantly influence LGU's resiliency towards flooding while technical competency, community awareness, and contingency planning significantly influence LGU's resiliency towards typhoon.

Keywords: Disaster preparedness; disaster resiliency; Regression Analysis; Philippines.

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1. Introduction

The world continues to experience dramatic sufferings and loss of life due to natural hazards. Disasters caused by natural hazards seriously undermine the result of development gains [1] and investment, remains a major impediment to sustainable development.

As various scholars [2] discussed, increasing losses in development gains from disasters prompted a global movement toward risk reduction. Thus, a paradigm shift in the development sector – from income poverty to human poverty– has been paralleled in the disaster management sector recently by a shift from seeing disasters as extreme events created by natural forces, to viewing them as manifestations of unresolved development problems.

The Asia Pacific region is the most disaster prone and most disaster affected in the world [3]. The region also bares the largest portion of disaster losses globally. For the last several years, Disaster Risk Reduction (DRR) has gained its strong recognition due to the increased loss and damages of human lives and economic assets caused by impact of natural hazards.

In the Philippines, the Philippine National Risk Reduction and Management Plan 2011-2028 (NDRRMP) mentions the enactment of the Republic Act 10121 otherwise known as the Philippines Disaster Risk and Reduction Act of 2010. Further, this Act recognizes local risk patterns across the country and directs the strengthening of local government capacities on disaster risk reduction and management through decentralized powers, responsibilities and resources.

On December 4, 2012, Typhoon Bopha, hit 32 provinces in Southern Mindanao including Compostela Valley. The typhoon traversed affecting 249 barangays and 140,552 families in the province. The typhoon costs so much damage specifically when flashfloods ravaged hardly in the Municipalities of New Bataan, Compostela and Monkayo. The total costs of damages for infrastructure, livelihood, social and settlements amounted to Php 27,459,000.00 (PDRRMC, COMVAL). A year after Typhoon Pablo, Compostela Valley was again flooded heavily after long continuous rain that made thousands to flee their homes brought by Tropical Depression Lingling (TD Agaton) that hit its strength in the province [4].

The flood had exposed the vulnerability of the disaster risk and reduction management of the province including the Municipality of Compostela and such untold miseries is an inescapable effect of ill preparedness. While disaster cannot be prevented, measures can be taken to reduce the possibility of trouble. Thus, it is incumbent upon the local government to scale up performance in the context of disaster management *vis a vis* with the disaster resiliency of the municipality.

Apparently, data from the Office of the Department of Interior and Local Government (DILG) revealed that in 2014, the Municipality of Compostela had been awarded with the “Seal of Good Local Governance: Disaster Preparedness” (SDP). Henceforth, this captures the interest of the researcher to substantiate such information and further support whether or not such data are truly reflected to the local government unit’s disaster preparedness. Further, this study sought to determine indicators of the local government unit’s disaster

preparedness that predict disaster resiliency to the major natural disasters occurred in the municipality for the last five (5) years, which are flooding and typhoon.

1.1. Research Questions

This study purportedly answered the following questions:

1. What is the level of achievement of Disaster Preparedness of LGU-Compostela in terms of:

2.1 Technical Competency;
2.2 Community Awareness; and
2.3 Contingency Planning?

2. What is the level of disaster resiliency of LGU-Compostela in terms of:

3.1 Flooding; and
3.2 Typhoon?

3. Which of the disaster preparedness indicators best predict disaster resiliency?

2. Methodology and Treatment of Data

2.1 Method Used

This study employed the descriptive correlation design as the over-all scheme in the conduct of the study Regression Analysis was utilized using disaster resiliency as the outcome variable and disaster preparedness in terms of technical competency, community awareness, and contingency planning as predictors. Hence, this method was utilized to come up with models as indicated in the LGU's areas of disaster preparedness that predict disaster resiliency towards flooding and typhoon. Questionnaire was utilized as the main instrument to gather the primary data. Secondary data such as the list of members of the Local Disaster Risk Reduction Management Council (LDRRMC), hazard maps among the 16 barangays were taken from the Municipal Planning Development Office (MPDO).

The respondents were coming from different households among the 16 barangays who provided ample knowledge of the study. The study involved 425 respondents. The researcher sought permission from the Local Government Unit of Compostela for the conduct of the study. Informed Consent was also considered from the respondents to be part of the study through formal correspondence and others through face-to-face encounter. The main purpose of the study was explained to them thoroughly and has been expounded by the enumerators using vernacular should the respondents needed more clarifications. The researcher taken into service 16 enumerators. They were briefed thoroughly before the administration of the questionnaire, such that the researcher was assured that ethical standard of data gathering was adhered.

The survey questionnaire applied a five-point Likert Scale, where the degree to which respondents agree or

disagree to the statements was measured. This five-point Likert Scale was applied to make it possible to ascribe quantitative value to qualitative variables.The responses of the respondents in all statement indicators of the questionnaires used the following: scale (5, 4, 3, 2, 1), descriptive equivalent (very high, high, moderate, low and very low) which are further interpreted as reflected in Table 1.

Table 1: Table of Interpretation of Disaster Preparedness and Resiliency

LEVEL	Interpretation	DESCRIPTIVE EQUIVALENT
5	Very High	Comprehensive achievement has been attained, with the commitment and capacities to sustain efforts at all levels.
4	High	Substantial achievement has been attained, but with some recognized deficiencies in commitment, financial resources or operational capacities.
3	Moderate	There is some institutional commitment and capacities to achieving DRR, but progress is not comprehensive or substantial.
2	Low	Achievements have been made but are incomplete, and while improvements are planned, the commitment and capacities are limited.
1	Very Low	Achievements are minor and there are few signs of planning or forward action to improve the situation.

The responses of each item statement were interpreted accordingly. Scale stated was the basis of responses in all items of each indicator. This would provide a typical index of the item statements in every questionnaire as indicated in the table below:

Table 2: Table of Interpretation of Item Statements

SCALE	Interpretation	DESCRIPTIVE EQUIVALENT
4.50-5.0	Very High	Comprehensive achievement has been attained, with the commitment and capacities to sustain efforts at all levels.
3.50-4.49	High	Substantial achievement has been attained, but with some recognized deficiencies in commitment, financial resources or operational capacities.
2.5 - 3.49	Moderate	There is some institutional commitment and capacities to achieving DRR, but progress is not comprehensive or substantial.
1.5-2.49	Low	Achievements have been made but are incomplete, and while improvements are planned, the commitment and capacities are limited.
0.00-1.49	Very Low	Achievements are minor and there are few signs of planning or forward action to improve the situation.

Sources: [5]

2.2 Statistical Treatment

The following statistical tools were utilized for the statistical treatment of data: Slovin Formula**.** This was utilized to determine the sampling size of the study; Weighted Mean**.** This was used in the analysis of the Likert-Type Questionnaire and the quantitative description of data generated from the respondents; and Stepwise Regression Analysis. This was utilized to determine the constant exploratory variables and indicators that affect the disaster resiliency variable. This also served as basis in coming up with the model predictors for disaster resiliency towards flooding and typhoon.

3. Results and Discussions

3.1 Technical Competency

Shown in Table 3 is the level of achievement of disaster preparedness in terms of Technical Competency of LGU-Compostela. In the conduct of simulation exercises and following protocols, duties and responsibilities as stipulated in the emergency response guide respectively indicate high descriptive equivalent (M=3.79, SD=0.6077; M=3.50, SD=0.71372). The result can be interpreted that substantial achievement has been attained by LGU in these areas but with some recognized deficiencies in commitment or operational capacities. Such deficiencies can be attributed to the moderate level of descriptive equivalent in consideration of the presence of sufficient number of members of the emergency response team that will proportionate to the needs of the community, and the availability of emergency response guide that is widely disseminated (M=3.23, SD=0.87193; M=3.45, SD=0.79002).

Meanwhile, the results generally project a relatively high level of achievement (M=3.52, SD=0.60310). This is naturally elemental considering that it is part of the assessment criteria upon local governments to scale up performance in the context of institutionalizing disaster preparedness to get the entitlement of “Seal of Good Local Governance on Disaster Preparedness”.

More so, the result manifests that the local government unit is aware of the needed competencies and capacities as mandated by law [6]. However, the LGU needs to figure out more specifically in the sufficiency of members in the emergency response team and the fully disseminated emergency response guide for everybody’s consumption which enticed functionality. This area has to be contemplated by the LGU counting on the critical role of the emergency response team in times of disaster.

In support to, the result of the Commission on Audit Assessment of the Disaster Management Practices in the Philippines [7] emphasizes that the ability to carry out specific tasks under particular conditions with desired results is built upon the appropriate combination of people, skills, processes and assets. Disasters of wide impact place a wide ranging demand for the government’s emergency response capabilities. Whenever several agencies are expected to deliver a desired goal, it is important that these agencies collaborate, coordinate and communicate significant information to decision makers, in order to achieve a common goal.

In addition, as claimed [8] disaster preparedness and risk reduction are essentials in achieving sustainable development goals and in building resilience to extreme natural hazards through technical competencies. This is because sustainability and disaster risk are complementary to the extent that policies and plans are sought to increase sustainability and reduce risk.

Disaster risk reduction should be based on firm scientific knowledge and technical competencies, vast information/data, and the systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society.

This will result in avoiding (prevention) or in limiting (mitigation and preparedness) adverse impact of hazards, within the broad context of sustainable development.

Table 3: Level of Achievement of Disaster Preparedness in terms of Technical Competency

Item Statements	N	Mean	Std. Deviation	Descriptive Equivalent
1. LGU conducted simulation exercises as part of the skills training for emergency response teams.	425	3.79	.60777	High
2. Percentage of members of emergency response team is sufficient.	425	3.23	.87193	Moderate
3. LGU has an emergency response guide and is fully disseminated.	425	3.45	.79002	Moderate
4. Emergency response team is following protocols, duties and responsibilities stipulated in the emergency response guide.	425	3.50	.71372	High
OVERALL	**425**	**3.52**	**.60310**	**High**

3.2 Community Awareness

Reflected in Table 4 is the level of disaster preparedness of LGU-Compostela in terms of Community Awareness.

The result projects a moderate level of community awareness (M=3.44, SD=0.71411) which can be interpreted that there is some institutional commitment and capacities of the LGU in institutionalizing its crusade of strengthening evacuation systems yet substantial achievement has not been attained.Based on the results, availability of evacuation guide for disaster of all types (M=3.27, SD=0.82466) and its widest dissemination (M=2.97, SD=0.73190) necessitate more attention from the LGU.

This is so because proper guidance will lead to a more timely evacuation of the people and unnecessary panic can be avoided.

Notwithstanding these institutional improvements, in practice there are still much efforts needed in helping the people understand disaster preparedness that if disregarded, could be a possible threat to development.

Repeated training to train and maintain public awareness, skills and knowledge in evacuation systems are essentials particularly in the flood prone barangays of the municipality.

Table 4: Level of Achievement of Disaster Preparedness in terms of Community Awareness

Item Statements	N	Mean	Std. Deviation	Descriptive Equivalent
1. Availability of Evacuation Guide for disaster of all types.	425	3.27	.82466	Moderate
2. Evacuation guide is widely disseminated.	425	2.97	.73190	Moderate
3. Precautionary measures are widely disseminated thru all modes of disseminations available.	425	3.43	.86045	Moderate
4. There is a strong community involvement in sustained public education campaigns at all levels of society for disaster of all types.	425	3.45	.75982	Moderate
OVERALL	**425**	**3.44**	**.71411**	**Moderate**

3.3 Contingency Planning

Table 5 is the level of achievement of disaster preparedness in terms of Contingency Planning. The result generally manifests a high descriptive equivalent (M=3.55, SD=0.77011) which illustrates that substantial achievement has been attained by LGU in terms of contingency mechanisms of disaster preparedness. Specifically, evacuation alert system is available (M=3.51, SD=0.66583) and financial reserves are in placed (M=3.61, SD=0.80023) which is worth noting to support effective response and recovery when required. However, there are some recognized deficiencies specifically in the LGU's operational capacities which can be noticed in its moderate level in terms of early warning system and audio signaling devices (M=3.19, SD=0.87155) and the availability of disaster equipage (M=3.49, SD=0.92860). While forecasting and warning of disaster risks are moderately institutionalized, LGU needs to streamline observation systems that can accurately detect disaster risks and establish early warning systems, supporting the early evacuation of residents, and response activities of disaster management organizations thereby reducing disaster damage. Likewise, disaster equipage such us but not limited to goods, items and equipment needed should at all times be readily available.

Such finding supports the claim [9]that the absence of a contingency plan, when a risk/disaster event occurs, can cause a delay or postpone the decision to implement a remedy.

Contingency planning evaluates alternative remedies for possible foreseen and unforeseen events before the risk events occur and select the best action among alternatives.

The premise presented in the study as evidenced in the result is, if appropriate mitigation measures are in place, then the level of preparedness of the LGU against risks and disasters can be manifested to a highest extent.

Disaster preparedness is just one element of a holistic approach to the reduction of risk associated with natural hazards. However, an adequate level of preparedness can be particularly essential to saving lives and livelihoods in the face of a natural hazard event as stressed in the Hyogo Framework for Action 2005-2015 [10].

Table 5: Level of Achievement of Disaster Preparedness in terms of Contingency Planning

Item Statements	N	Mean	Std. Deviation	Descriptive Equivalent
1. Early warning system and audio signaling devices are operational.	425	3.19	.87155	Moderate
2. LGU has an evacuation alert system.	425	3.51	.66583	High
3. Disaster equipage, available.	425	3.49	.92860	Moderate
4. Financial reserves and contingency mechanisms *(availability of non-perishable goods and beddings)* are in placed to support effective response and recovery when required.	425	3.61	.80023	High
OVERALL	**425**	**3.55**	**.77011**	**High**

3.4 Level of Disaster Resiliency of LGU-Compostela towards Flooding and Typhoon

Indicated in Table 6 is the level of disaster resiliency of LGU-Compostela towards flooding and typhoon. Both flooding and typhoon has the same moderate descriptive results (M=3.26, SD=0.60079) and (M=3.10, SD=0.57967) respectively. This implies that the LGU has some institutional commitment and capacities to achieving disaster risk reduction towards flooding and typhoon, but progress is not comprehensive or substantial.

As defined in the Republic Act 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010, "Community-Based Disaster Risk Reduction and Management" or "CBDRRM" is a process of disaster risk reduction and management in which at risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities, and where the people are at the heart of decision-making and implementation of disaster risk reduction and management activities. As such, the result manifests that the LGU have already tried its participation specifically the local disaster risk reduction and management council (LDRRMCs) who have a direct coordination with the barangays or the grassroots level together with the people themselves and the rest of the key players at the local levels however more efforts are still needed in creating a disaster resilient LGU and enabling them to the path of sustainable development.

As postulated [11] building and maintaining disaster resilience depends on the ability of the community to monitor change and then modify plans and activities appropriately to accommodate the observed change. In considering disaster resilience, a community cannot be defined solely by jurisdictional boundaries because disasters do not fail neatly within geographical limits. A well-planned and participatory rebuilding process is essential in rebuilding a city, its economy and community after a devastated disaster [12].

In this context, such moderate level of resiliency challenged the disaster management efforts of LGU-Compostela that shall be constantly reviewed as deemed necessary in order to ensure its relevance to the times and based on the felt needs of the people. That the disaster risk reduction and management related activities shall always be integrated in the development plan that shall be based on a sound and scientific analysis of the different underlying factors which contribute to the vulnerability of the people of Compostela and eventually, their risks and exposure to hazards and disasters. In this manner, the policies, budget and institutional

mechanisms established in the area disaster preparedness be further enhanced through capacity building activities, and development of coordination mechanisms to attain its maximum level of resiliency.

Thus, it is noteworthy to take into account what [13] remarked, that appropriate governance is fundamental if risk considerations are to be factored into development planning and if existing risks are to be successfully mitigated. Development needs to be regulated in terms of its impact on disaster risk. Perhaps the greatest challenges for mainstreaming disaster risk into development planning are political will and geographical equity.

Table 6: Level of Resiliency of LGU-Compostela towards Disaster

Indicators	N	Mean	Std. Deviation	Descriptive Equivalent
FLOODING	425	3.26	0.60079	Moderate
TYPHOON	425	3.10	0.57967	Moderate

3.5 Extent of Influence of Disaster Preparedness to LGU's Flood Disaster Resiliency

Shown in Table 7 is the stepwise regression analysis on the extent of influence of disaster preparedness to LGU's flood disaster resiliency. The result reveals that the two (2) predictor variables of disaster preparedness such as technical competency (DP_1) and community awareness (DP_2) significantly influence LGU's resiliency towards flooding. Approximately, 43.3 percent of the variation in the LGU's disaster resiliency towards flooding can be explained by the indicators technical competency and community awareness. The remaining 56.7 percent of the variation maybe attributed by factors not covered in the study. The remaining beta coefficients of 0.386 for technical competency, and 0.283 for community awareness suggest that these variables have significant positive relationship with the LGU's level of disaster resiliency towards flooding. This means that for every point increase in the LGU's disaster management on technical competency and community awareness, LGU's level of flood disaster resiliency will increase by 0.386, and 0.283. Furthermore, the regression model is significant as indicated by the F-value of 107.32, with the corresponding probability value of 0.000.

Technical Competency (DP_1) and Community Awareness (DP_2) are identified to be the predictor variables of disaster preparedness to LGU's disaster resiliency towards flooding. In the area of technical competency, it has been noted that the local government conducted simulation exercises as part of the training for the emergency response teams. That the percentage of the response team trained is sufficient to meet the basic condition to satisfy the mandate of the law. Such predictor is backed up with another predictor variable, community awareness. To raise the level of disaster awareness of the people in the municipality, the functional guide is developed for the response teams and disseminated to the people to let them aware of the hazard that might affect them as well as the procedure to follow during and after disaster. This is likewise in way of letting the people know of their vulnerabilities and risks.

Apparently, such finding supports to what has been laid down in the National Risk Reduction Management Plan on how to address underlying causes of vulnerabilities.

In this context, the LGU has already framed up its hazard maps among the 16 barangays which are useful for their development interventions in relation to disaster preparedness for the consumption of the people specifically those living in identified areas that are at risks.

Table 7: Extent of Disaster Preparedness to Flood Disaster Resiliency

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.811	.144		5.615	.000
	Technical Competency	.386	.054	.365	7.161	.000
	Community Awareness	.283	.051	.337	5.608	.000
	Contingency Planning	.016	.044	.021	.375	.708

Dependent Variable: DR on Flooding F-value : 107.32

R^2 : 0.433 P-value : 0.000

3.6 Extent of Influence of Disaster Preparedness Typhoon Disaster Resiliency

Indicated in Table 8 is the stepwise regression analysis on the extent of influence of disaster preparedness to LGU's disaster resiliency towards typhoon.

The result reveals that the three (3) predictor variables of disaster preparedness such as technical competency (DP_1), community awareness (DP_2), and contingency planning (DP_3) significantly influence LGU's resiliency towards typhoon.

The beta coefficients of 0.445 for technical competency, 0.307 for contingency planning, and 0.136 for community awareness suggest that these variables have a significant relationship with the LGU's level of disaster resiliency towards typhoon.

This further means that for every point increase in the LGU's disaster preparedness on technical competency, contingency planning, and community awareness, LGU's level of disaster resiliency towards typhoon will increase by 0.445, 0.307 and 0.136, respectively.

Furthermore, the regression model is significant as indicated by the F-value of 94.865, with the corresponding probability value of 0.000.

The local government in this context is compliant regarding the fundamental areas to look through in terms of disaster preparedness towards typhoon.

This is further manifested on the high descriptive level of resiliency as reflected in Tables 3 and 5. Meanwhile, the three (3) predictors, technical competency, community awareness, and contingency planning are singled out by the LGU as model predictors for disaster resiliency towards typhoon.

Table 8: Extent of Disaster Preparedness to Typhoon Disaster Resiliency

Model		Unstandardized Coefficients	Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.852	.143		5.959	.000
	Technical Competency	.445	.053	.437	8.339	.000
	Community Awareness	.136	.050	.167	2.715	.007
	Contingency Planning	.307	.043	.408	7.118	.000

Dependent Variable: DR on Typhoon F-value : 94.865

R^2 : 0.403 P-value : 0.000

4. Conclusion

Based on the implications of the data gathered, LGU-Compostela has a high-level achievement of disaster preparedness. Specifically, a high level is detected for technical competency and contingency planning. On the other hand, community awareness is found to be moderately rated. This further implicates that the local government needs to vary strategies and indulge more the community when it comes to public education and dissemination on the fundamentals of disaster preparedness to become more resilient towards disaster. The level of achievement of Disaster Resiliency of LGU-Compostela towards flooding and typhoon are respectively rated as moderate. This implies that more programs and interventions have to be undertaken by the local government to scale up the community and its people's capacity to be more resilient in the face of disaster, either flood or typhoon.

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