Disaster management program compliance and problems encountered in two provinces in Central Luzon, Philippines

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Abstract

Disaster management is one area in the field that comes with a heavy burden of administrative functions and compliances. Thus, it is vital to consider among managers to put the best man in the field. The purpose of this study is to find out the disaster management program compliance of participants in two provinces in Central Luzon, Philippines. At the same time, identify the problems encountered during the implementation of the programs. This study used a descriptive design with the survey as a primary instrument in data gathering. 110 participants took part in the survey which came from the two selected provinces. The researcher created a questionnaire for the study which underwent validity and reliability test. This study analyzed the gathered data using SPSS 20 and employed the following statistical tools: frequency, percentage, rank, means, t-test, ANOVA, and Pearson-r. The study found that the respondents "moderately complied" with disaster prevention and mitigation programs and disaster preparedness programs. On the other hand, respondents "complied" with the disaster response programs and disaster recovery and rehabilitation programs. There were no statistical differences in the responses of respondents with different disaster management programs. However, there is a significant relationship between the number of family members and disaster response programs. Based on the results of the study, the researcher recommended pertinent suggestions for the community, policy-makers, and local government units.

Keywords: disaster management, programs compliance, problems encountered, Central Luzon, Philippines

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1. Introduction

A disaster is an inevitable event that can occur anytime, anywhere, and anyplace. Depending on its type and its destructive capacity, it brings great havoc to everyone living in a particular place and condition. Being aware of different types and kinds of disasters can contribute to better and more efficient preparation for the unaccountable and unpredictable changes within the realm of the environment we are living in. In a study about natural hazards knowledge and risk perception, the respondents were worried but prepared to some extent [1]. They also highlighted from a study the important understanding of the risk perceptions and responses of individuals to climate change and natural disasters [2]. Other studies focused on the awareness and perception of disaster [3], estimating the risk of disasters [4] and the relationship between the perception of climate change and socio-demographic characteristics [5].

It is important to understand that preparing for a disaster or any form of calamity is all year round and not a single event occurrence. There are different aspects to consider in risk reduction strategies [6 – 8] and this includes different perspectives and factors to facilitate varied services from the government and other concerned agencies to the community affected by a disaster. Traditional knowledge about a disaster is an important ingredient for social communication and preparation and such knowledge is very particular on how the community sets up for preparations and management when disaster comes [8 – 12]. We cannot ignore the fact that although not proven, methods in predicting changes in the climate were observed through time.

With the ideas and concepts that pertain to disaster risk reduction and management programs, climate change adaptation, and climate-related disaster risk reduction policies should be brought to light [13]. Another study also discussed risk perception and communication for disaster risk management [14]. Participation is also a must-have in every community vulnerable to the disaster, that is why a framework for measuring social participation among vulnerable groups should be created and implemented [15]. However, sometimes there is a dilemma that a commu-

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Table 1. Profile of the respondents.

Profile	Frequency	Percentage
Provinces		
Province 1	55	50
Province 2	55	50
Sex		
Male	37	34
Female	73	66
Age		
20-30 years old	35	32
31-40 years old	28	25
41-50 years old	24	22
51 above years old	23	21
	Mean: 39.74	SD: 13.00
Number of Family Members		
1-3 members	33	30
4-6 members	65	59
7-9 members	12	11
	Mean: 4.48	SD: 1.71
Total	**110**	**100**

nity encounters, in terms of disaster management; community members do not share uniform perceptions [16]. Information from data analysis, indigenous knowledge, and emergency management practices help outline the disaster risk reduction and management schemes of diverse agencies of the government [17]. There are also related studies that discussed the idea of integration, which is also essential in disaster risk reduction management [18, 19]. Community participation is vital for the survival of each individual thus, integration of disaster management programs is important.

This study finds out the disaster management program compliance of respondents in the two provinces of Central Luzon Philippines. The study would like also to find out the distinct problems encountered in implementing the different disaster management programs. From this perspective, the study intends to provide essential recommendations for policy-makers, local government agencies, and non-government organizations.

The outcome of this study is deemed important in policy making and at the same time in strategic management programs of the local government units of the two provinces. Furthermore, the information that can be extracted from this study can also be used as a benchmark for other future studies involving disaster management and other related contexts.

2. Methodology

2.1 Research design

This particular study used a descriptive correlational design with a survey as the major instrument for data gathering. Since the study particularly tries to analyze or describe a certain type of phenomenon or event, the abovementioned design is appropriate.

2.2 Respondents

There were 110 participants who took part in this study. There were two provinces identified by the researcher and determined one community for each province. Then, the researcher used the Slovin's formula to determine the appropriate sample per community. However, because of some unforeseen circumstances and the availability of the respondents, it was difficult to achieve the necessary sample population for the study. This study also used a convenience sampling technique in data gathering. The researcher used this sampling technique for the following reasons: (a) the availability of the respondents during the survey, (b) the area covered by the researcher is mountainous and difficult to navigate, and (c) time constraints. The individuals involved in the study lived within the two chosen provinces in Central Luzon and experienced several types of disasters for the past years.

2.3 Instrument of the study

The researcher created a self-made questionnaire which has been based in the National Disaster Risk Reduction Management Council (NDRRMC) Preparedness Plan of 2015 – 2028. The questionnaire underwent professional critiquing from a panel that is composed of a University Vice President, a University Professor, a college professor, a retired university professor, a professional data analyst, a seasoned researcher, and a grammar expert. It also went into a validity test for internal consistency (Cronbach alpha test) and yielded an overall score of .809, which is above the acceptable level of .70. Furthermore, it also went into a pilot test to individuals who are not part of the survey to test its clarity and for any ambiguous or misunderstood words or terminologies.

2.4 Statistical analysis

This study analyzed the gathered data using SPSS 20. The statistical tools used in this study were: frequency, percentage, rank, means, t-test, ANOVA, and Pearson-r. The alpha significance level of .05 is the benchmark score to accept or reject the null hypothesis for this study. This study also used a Four-point Likert scale for the responses of the respondents. A Likert scale is a rating used to measure the attitude or opinion of an individual. The researcher asked respondents to rate items on the level of their agreement. In this study, the respondents rate unique items on a survey regarding disaster management program compliance.

3. Results

This study finds out the compliance levels of respondents in the different disaster management programs in the two provinces in Central Luzon Philippines. At the same time, find out the distinct problems encountered in the implementations of the disas-

Table 2. Level of compliance on disaster prevention and mitigation programs.

Item	WM	Interpretation
1) Conduct of several risk assessment	2.25	Moderately Complied
2) Development and establishment of several early warning systems	2.61	Complied
3) Development of tools on risk assessment	2.40	Moderately Complied
4) Increasing the involvement of communities and LGUs in disaster risk management	2.03	Moderately Complied
Average	**2.40**	**Moderately Complied**

Table 3. Level of compliance on disaster preparedness programs.

Indicators	WM	Interpretation
1) Conduct of disaster reduction and risk researches	2.53	Complied
2) Development and regular review of contingency plans	2.23	Moderately Complied
3) Development of IEC materials	2.16	Moderately Complied
4) Existence of procedures on disaster communication	2.30	Moderately Complied
Average	**2.30**	**Moderately Complied**

ter management programs. The following tables below provided a glimpse of the results that this study got.

Table 1 shows the profile of the respondents for this study. As seen, there were equal numbers of respondents from the two provinces. However, there are more female respondents than their counterparts. Most of the respondents were also young adults who belong to the age bracket of 20 – 30 years old. Last, the number of family members falls between 4 – 6 members. The abovementioned information shows the typical respondents that can provide essential information for this study which involves households that voluntarily participated in the data gathering.

Table 2 shows the level of compliance on disaster prevention and mitigation programs. As observed, item 2 got the highest weighted mean with 2.61 which corresponds to the Likert scale interpretation of *complied*. However, item 4 got the lowest weighted mean score of 2.03 which has a corresponding Likert scale interpretation of *moderately complied*. Overall, the average weighted mean is 2.40 with a Likert scale interpretation of *moderately complied*. The information shows that in terms of disaster prevention and mitigation programs, the respondents observe the abovementioned items rarely or infrequently, thus leading them to the idea of moderate compliance.

Table 3 shows the level of compliance on disaster preparedness programs. As indicated, item 1 got the highest weighted mean with a score of 2.53 which is interpreted as *complied* on the Likert scale. Conversely, item 3 got the lowest weighted mean average with 2.16 which corresponds to *moderately complied* on the Likert scale. The average weighted mean for disaster preparedness is 2.30, interpreted as *moderately complied* on the Likert scale. The results show that the respondents deem such a notion since they have little idea or do not observe such a program exist in their neighborhood or community.

Table 4 shows the level of compliance of respondents in disaster response programs. As shown, the

two items got weighted means interpreted as *complied* on the Likert scale. The average weighted mean, which is 2.83 likewise has an interpretation of *complied* on the Likert scale. This means that the respondents observe that when it comes to disaster response, we can assume that they observe the visibility or presence of such a program in their community.

Table 5 shows the level of compliance of respondents in disaster recovery and rehabilitation. As presented, item 2 got the highest weighted mean with 2.72 which corresponds to *complied* on the Likert scale. But item 4 got the lowest weighted mean score which has the same Likert scale interpretation of *complied*. All in all, the average weighted mean is 2.65 which also has an interpretation of *complied*. This means that in terms of disaster recovery and rehabilitation, the respondents can justify their presence and obligation for the community.

Table 6 indicated the independent t-test to compare the compliance level on disaster risk reduction and management programs of respondents and location. As shown, there are no significant differences in the t-computed results of all the four variables based on the Alpha significance value set at .05. The disaster prevention and mitigation program compliance level of the respondents in Province 1 (M = 2.33; SD = 0.95) and Province 2 (M = 2.45; SD = 0.74) do not vary that much, since $t(108) = -0.729$, $p = .468$. The disaster preparedness program also got the same result wherein the compliance level of Province 1 (M = 2.42; SD = 1.02) do not differ that much with Province 2 (M = 2.19; SD = 0.89), since $t(108) = 1.244$, $p = .216$. For disaster response program, it also has the same outcome for Province 1 (M = 2.77; SD = 0.93) and Province 2 (M = 2.89; SD = 0.91) wherein their scores do not deviate too much, since $t(108) = -0.674$, $p = .502$. And for the disaster recovery and rehabilitation program, we observe the same result on Province 1 (M=2.59; SD=0.98) to Province 2 (M = 2.70; SD = 0.83) where the scores do not contrast too much since $t(108) = -0.654$, $p = .514$. All of the mentioned prob-

Table 4. Level of compliance on disaster response programs.

Indicators	WM	Interpretation
1) Establish an institutional mechanism for disaster response operations	2.85	Complied
2) Improve skills in search, rescue, and retrieval operations	2.81	Complied
Average	**2.83**	**Complied**

Table 5. Level of compliance on disaster recovery and rehabilitation programs.

Indicators	WM	Interpretation
1) Conduct of post-disaster assessments	2.65	Complied
2) Integration of DRR into post-disaster recovery and rehabilitation processes	2.72	Complied
3) Incorporating DRR elements in the planning and management of human settlements	2.65	Complied
4) Mainstreaming of DRR in social, economic, and human settlements development plan	2.56	Complied
Average	**2.65**	**Complied**

Table 6. Comparison of the compliance level on disaster risk reduction and management programs of respondents when grouped according to location.

	Province 1 (n=55)		Province 2 (n=55)		t-computed	p-value
	M	**SD**	**M**	**SD**		
Disaster Prevention and Mitigation	2.33	0.95	2.45	0.74	-0.729	.468
Disaster Preparedness	2.42	1.02	2.19	0.89	1.244	.216
Disaster Response	2.77	0.93	2.89	0.91	-0.674	.502
Disaster Recovery and Rehabilitation	2.59	0.98	2.70	0.83	-0.654	.514

$p > .05$

ability values were higher than the Alpha significance level of .05, thus, there are no significant differences in the compliance level scores of the respondents in the disaster risk and reduction management programs when grouped according to their location.

Table 7 shows the independent t-test to compare the compliance level on disaster risk reduction and management programs of respondents and sex. As displayed there are no significant differences in the t-computed results of all the four variables based on the Alpha significance value set at .05. For the disaster prevention and mitigation program compliance level of the respondents, the score of male (M = 2.35; SD = 0.92) do not vary that much with the female (M = 2.42; SD = 0.85), since $t(108) = -0.387, p = .700$. For the disaster preparedness program, it also got the same result wherein the compliance level of males (M = 2.30; SD = 1.06) do not differ that much with the females (M = 2.30; SD = 0.91), since $t(108) = -0.004, p = .997$. For the disaster response program, it also has the same outcome for males (M = 2.92; SD = 0.99) and females (M = 2.79; SD = 0.88) wherein their scores do not deviate too much, since $t(108) = 0.708, p = .481$. And for the disaster recovery and rehabilitation program, we observe the same outcome for males (M = 2.78; SD = 0.94) and for the females (M = 2.58; SD = 0.89) where the scores do not contrast too much since $t(108) = 1.120, p = .265$. All of the mentioned probability values were higher than the Alpha significance level of .05, thus, there are no significant differences in the compliance level scores of the respondents in the disaster risk and reduction management programs regardless of their sex.

Table 8 shows the Analysis of Variance for significant differences in the compliance levels on disaster risk reduction and management programs of respondents when grouped according to age. (Please see to Table 1 for the age range for each group). We observe that there are no significant differences in the F values of the different disaster risk reduction and management program variables. This is so because for disaster prevention and mitigation programs the computed result includes $F(3, 106) = 0.518, p = .671$. The F value is higher than the Alpha significance level of .05 which means there is no significant difference in the level of compliance of the respondents. For the disaster preparedness program, the result is $F(3, 106) = 0.791, p = .501$, wherein the F value is also higher than the Alpha significance level of .05. For the disaster response program, we have $F(3, 106) = 1.103, p = .351$, where the F value is higher than the .05 Alpha significance level. And for the disaster recovery and rehabilitation program, we have $F(3, 106) = 1.454, p = .231$, wherein the F value is also higher than the .05 Alpha significance level. This only means that there are no significant differences in scores of the respondents regardless of the age bracket that they belonged to.

Table 9 shows the Analysis of Variance for significant differences in the compliance levels on disaster risk reduction and management programs of respondents when grouped according to the number of family members. (Please see to Table 1 for the age range for each group). We discerned that there are no significant differences in the F values for the different disaster risk reduction and management pro-

Table 7. Comparison of the compliance level on disaster risk reduction and management programs of respondents when grouped according to sex.

	Male (n=37)		Female (n=73)		t-computed	p-value
	M	SD	M	SD		
Disaster Prevention and Mitigation	2.35	0.92	2.42	0.82	-0.387	.700
Disaster Preparedness	2.30	1.06	2.30	0.91	-0.004	.997
Disaster Response	2.92	0.99	2.79	0.88	0.708	.481
Disaster Recovery and Rehabilitation	2.78	0.94	2.58	0.89	1.120	.265

$p > .05$

Table 8. Comparison of the compliance levels on disaster risk reduction and management programs of respondents when grouped according to age.

		SS	Df	MS	F computed	p-value
Disaster Prevention and Mitigation	Between Groups	1.133	3	0.378	0.518	.671
	Within	77.290	106	0.729		
	Total	78.423	109			
Disaster Preparedness	Between Groups	2.202	3	0.734	0.791	.501
	Within	98.346	106	0.928		
	Total	100.548	109			
Disaster Response	Between Groups	2.774	3	0.925	1.103	.351
	Within	88.865	106	0.838		
	Total	91.639	109			
Disaster Recovery and Rehabilitation	Between Groups	3.553	3	1.184	1.454	.231
	Within	86.359	106	0.815		
	Total	89.912	109			

$p > .05$

gram variables. This is so since the disaster prevention and mitigation program has the computed result of $F(2, 107) = 1.259, p = .288$. The F value is higher than the Alpha significance level of .05 which means there is no significant difference in the level of compliance on the different disaster risk reduction and management programs. For the disaster preparedness program, the result is $F(2, 107) = 1.261, p = .287$, wherein the F value is also higher than the Alpha significance level of .05. For the disaster response program, we have $F(2, 107) = 2.958, p = .056$, where the F value is higher than the .05 Alpha significance level. And for the disaster recovery and rehabilitation program, we have $F(2, 107) = 2.510, p = .086$, wherein the F value is also higher than the .05 Alpha significance level. This only means that there are no significant differences in the scores provided by the respondents regardless of the number of family members.

Table 10 shows the correlation matrix between the profile of the respondents and the disaster risk reduction and management program level of compliance. For the profile of the respondents, the input data were location, sex, age, and the number of family members. On the other hand, the input data for disaster risk reduction and management programs were disaster prevention and mitigation disaster preparedness, disaster response, and disaster recovery and rehabilitation. As seen from the table, there was a low-negative relationship between the number of family members and disaster response, r = -.213, n = 110, $p = .026$. This means that the higher the number of family members,

the lower the disaster response and vice versa. Other variables like location, sex, and age in the study did not produce a substantial result that will correlate with other disaster risk reduction management programs.

Table 11 shows the top five (5) problems encountered by the respondents in the implementation of disaster risk reduction and management programs. Based on the responses, delayed program/project and low compliance got the highest number of answers with 66 each. The search and rescue units/team are not full-mission capable followed next with 64 responses and insufficient information dissemination and limited capacity in terms of staff, equipment, and other logistics tied at 62 responses which complete the top five (5) problems encountered in the implementation of disaster risk reduction and management programs as perceived by the respondents.

4. Discussion

This study finds out the disaster management program compliance of respondents in the two provinces of Central Luzon Philippines. At the same time, the study would like also to find out the distinct problems encountered in implementing the different disaster management programs.

The overall findings of this study found moderate compliance with disaster prevention and mitigation and disaster preparedness. On the other hand, respondents complied with disaster response and disaster recovery and rehabilitation.

Table 9. ANOVA for significant difference in the compliance levels of respondents when grouped according to the number of family members.

		SS	Df	MS	*F computed*	*p*-value
Disaster Prevention and Mitigation	Between Groups	1.803	2	0.902	1.259	.288
	Within	76.620	107	0.716		
	Total	78.423	109			
Disaster Preparedness	Between Groups	2.316	2	1.158	1.261	287
	Within	98.232	107	0.918		
	Total	100.548	109			
Disaster Response	Between Groups	4.801	2	2.401	2.958	.056
	Within	86.837	107	0.812		
	Total	91.639	109			
Disaster Recovery and Rehabilitation	Between Groups	4.029	2	2.015	2.510	.086
	Within	85.883	107	0.803		
	Total	89.912	109			

$p > .05$

Table 10. Correlation between the profile and the disaster risk reduction and management programs compliance levels.

	1	2	3	4	5	6	7	8
Location	1							
Sex	.019	1						
	(.842)							
Age	-.202*	-.021	1					
	(.035)	(.828)						
Number of Family Members	-.223*	-.097	.154	1				
	(.019)	(.316)	(.108)					
Disaster Prevention & Mitigation	.070	.037	.073	-.140	1			
	(.468)	(.700)	(.448)	(.144)				
Disaster Preparedness	-.119	.000	.127	-.083	.733**	1		
	(.216)	(.997)	(.185)	(.386)	(.000)			
Disaster Response	.065	-.068	.056	-.213*	.563**	.600**	1	
	(.502)	(.481)	(.558)	(.026)	(.000)	(.000)		
Disaster Recovery & Rehabilitation	.063	-.107	.123	-.184	.564**	.706**	.748**	1
	(.514)	(.265)	(.265)	(.055)	(.000)	(.000)	(.000)	

$*p < .05$; $** p < .01$

Concerning the current study, a related study pointed out that incorporating local knowledge in disaster risk reduction programs can be a daunting task [20]. However, another study justified the result of the current study and showed that the non-response behavior of individuals can affect the overall perception of safety to disaster [21]. Another literature also exposed that several factors can prevent effective institutional preparedness and response to emergencies [3]. Another study also showed agreement and support to the result stating that the community can facilitate emergency management, risk reduction, and community resilience [22]. Furthermore, disaster education at school contributes to constant learning and makes the children and students be effective agents to share the information with the family and communities [8]. Nevertheless, another conflicted result, and against this the study, showed the necessity to delineate strategies of risk communication as a core of disaster risk reduction and management [14]. However, the reluctance of individuals in disaster recovery and rehabilitation needs validation since the procedures and functions in the disaster risk management system leads to problems in associating information and transfer to the local level [18].

On the other hand, inferential statistics reveal that the responses of the participants are uniform regardless of the profiles designated in the study. The result of the current study at hand is almost parallel to the context of another study that revealed no statistical difference in gender-based disaster knowledge, readiness, awareness, and risk perception [23]. However, there is one interesting finding in the study, a low-negative relationship between the number of family members and the disaster response program. In contrast, another study presented that demographic profiles associates with climate change and climate hazard perception [5]. It was further verified that risk perception, the experience of severe disaster, and community disaster preparedness predict the participants' disaster preparedness behavior [7].

Based on the survey, there are five (5) identified problems encountered in implementing disaster risk reduction and management programs, namely: delayed program/project; low compliance; search and rescue units/team are not full-mission capable; insufficient information dissemination; and limited capacity in terms of staff, equipment, and other logistics.

Table 11. Problems encountered in the implementation of disaster risk reduction and management programs.

Problems	Frequency	Rank
Delayed program/ project	66	1
Low compliance	66	1
Search and rescue units/ team are not full-mission capable	64	2
Insufficient information dissemination	62	3
Limited capacity in terms of staff, equipment, and other logistics	62	3

A study from the country of Cameroon found out that there was no national disaster management structure and a national platform for disaster risk reduction [24]. This disagrees with our current national situation wherein the government provided a strong national platform and law for disaster management for the country. Mindfulness and discernment, financial and technical resources, policy, institutional arrangements, leadership, and human resources avert effective and timely institutional preparedness and responses to disaster [3]. These ideas complement the context of policy-making and possible community participation from such innovative and legal parameters of disaster management.

5. Conclusion

Based on the aforementioned results of the study, the researcher concludes the following ideas:

1. For the disaster prevention and mitigation program and disaster preparedness program, they got a moderately complied answer from the respondents.

2. For the disaster response program and disaster recovery and rehabilitation programs, they got a complied answer from the respondents.

3. There are no significant differences in the different disaster risk reduction and management programs when grouped according to the profile of the respondents.

4. There is a low-negative correlation between the number of family members and the disaster preparedness programs.

5. The top five (5) problems encountered in the implementation of disaster risk reduction and management programs include: delayed program/ project; low compliance; search and rescue units/ team are not full-mission capable; insufficient information dissemination; and limited capacity in terms of staff, equipment, and other logistics.

6. Recommendations

Based on the findings and conclusion of the study, the following recommendations are hereby submitted:

1. Further, increase/ raise the level of awareness of individuals through consistent enhancement seminars, training, and drills.

2. Raise the compliance level of the community on disaster awareness programs of the government since the majority of the indicators have moderately complied to complied rate. This can be done through constant monitoring, monthly visitation, and performance evaluations in the area.

3. Active participation of key players and stakeholders through proper coordination and collaboration to enhance the relationship and community involvement.

4. Active involvement of the key players like the LGUs and NGOs in the process of monitoring and evaluating the compliance levels.

5. Leadership training and seminars pertinent to disaster management to key core groups through capability enhancement and development.

6. Monthly disaster drills in the community participated by all including the young and old.

7. Transparency in the project/ program proposals especially in the financial aspect. Auditing is a must.

8. The researcher also endorses possible future researches to follow up previously studied concepts regarding this area of research and at the same time gather more substantial data for future use.

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