Natural Calamity, its impact and level of Preparations: Significance and Implications to the Community

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Abstract
The purpose of the study is to analyze the knowledge of natural calamity, its impact and level of preparations of respondents in Central Luzon, Philippines. This study employed a descriptive-correlation design. 125 respondents participated in the survey with the use of convenience sampling technique. We drafted a questionnaire and subjected it to validity and reliability test which yielded an overall Cronbach alpha score of .969. After the survey, We analyzed the data using SPSS 20 and the following statistical tools: frequency, percentage, means, t-test, ANOVA, Pearson-r and Regression Analysis.

The study found that the respondents are knowledgeable on natural calamities and its impacts. They are also prepared when a calamity occurs. There are significant differences on the knowledge of natural calamity and impact of natural calamity in terms of community and family members. There is also a significant relationship observed between community, knowledge of natural calamity and impact of natural calamity. The same is observed between knowledge of natural calamity, impact of natural calamity and level of preparations of respondents. The community is a significant determinant of knowledge on natural calamity and impact of natural calamity and age is a significant determinant of knowledge on natural calamity.

Keywords: Natural calamity, impact of natural calamity, level of preparation, significance, implication to community.

Introduction

Our world is full of unexpected events and surprises that can happen anytime, anywhere and anyhow. We cannot escape the harsh reality that one day it is going to be our time. Natural calamity is made by nature. It is a cycle of destruction and rebuilding of the ecosystem which was once prosperous and lively and then it will be again changed to adapt with the everchanging tides of time.

Accordingly, climate change is a defining concern of today's world which greatly reshapes earth's ecosystem[1]. It is an amicable concern since natural calamity does not just happen locally. To prove this point, a study indicated that some communities have already been observing substantial changes in temperature, weather and seasons for the past decades[8]. However, on the other side of the coin, calamity is not always pleasant as it would seem since it is a negative connotation for everyone just like what another study indicated that catastrophic events have no impact on a 15 day event window[14]. It means that the worse is yet to come.

Considering the impact of a natural calamity, one should have a basic grasp or knowledge of his surroundings. It is important to gain significant data or information so as to cope with the everchanging environment we have. To justify such claim Raska et al[19] discussed the uncertainties from the use of written data on community understanding of a hazard. Although literature described how rural people and climactic sensation relate critically, this is essential on the context of passing it down to the next generation[17]. This is so because just like that climate change is a reality and has intensified the sufferings of people[15]. The notion of natural calamity is basically due to its impact to the community. Hosen et al[9] also stipulated that drought, wildfires and uncertain weather conditions are the primary concern of a certain community. We are now in the era of great environmental changes due to mankind's abuse to nature.

With regards to impact, studies have shown remarkable results for the past years. Although natural calamity is not a singular event, it is categorical in nature like earthquakes, volcanic eruption, flooding, storm/ hurricanes etc. In relation to this, a Chouhan et al[5] discussed major natural and anthropogenic factors responsible for forest degradation. It is not new to the communities about forest degradation and its causes and soon to impact them. In addition, a team of researchers proved that water knowledge, water emotion and water responsibility have significant effect on water behavior of individuals, thus, it is important to consider this matter essential since we cannot live without water in our lives[27].

On the other aspect of natural calamity impact, crop which is equally essential for communities to thrive is largely affected when a calamity occurs[20,25]. The same sentiment is shared by Vishnu et al[26] wherein they explored the effects of flood on supply chain distributions in major industrial sectors. We cannot predict calamities occurrence, even the degree of its intensity and capacity of destruction and impact to the community.

So how do we deal with it? That is a very challenging question since, it is not only local in nature but problem is global. A team of researchers considered that proper disaster risk management measures are necessary to mitigate adverse effect of disaster[7]. We can use a lot of resources that entail

possible relationship to predict natural calamity. For instance, the establishment of both task requirements and IoT technology have significant impact on the IoT task-technology fit in the disaster management scenario[24].

If we have deep knowledge of natural calamity and how can it affect us, we can prepare for mitigation processes. For example, it is necessary to install early warning systems as a tool of disaster prevention and exploration of different solutions for the management of drought[13,16]. In the same context, it is essential to examine the state of knowledge in relation to the asset management recovery after a disaster[22].

Furthermore, Jon[11] demonstrated how resilience theory can be related with the notion of "technicity" and its repercussions for the making and use of knowledge in disaster planning. With these basic concepts in mind, we must prepare ourselves always because we never know when the next natural calamity will happen.

A latest study shared that the unique indigenous knowledge identified in the three islands in the Philippines is still utilized until today[21]. On the other hand, another study proposed some important ways on how indigenous and scientific knowledges can be integrated meaningfully[3]. It is essential nowadays to consider the old school ideas of the past which have been tried and tested through time and combine it with the latest scientific and technological advances.

They also concluded the possibilities and constraints of bringing indigenous and scientific knowledge together to facilitate better and more empowering disaster risk reduction outcomes. Another related context explained how indigenous knowledge is connected to climate change resiliency[10].

A survey indicated that respondents have knowledge of more than one disaster preparedness strategy[2]. This is a good perspective so that planning in the community level will be beneficial and productive.

The purpose of this study is to assess the knowledge of respondents towards natural calamity, its impact and the level of preparations that they do before, during and after a natural calamity strikes. The study also intends to look for significant relationships among the three variables mentioned and what factors affect the knowledge of natural calamity, its impact and the level of preparations that respondents do.

This particular study intends to promote further understanding and promotion of concepts regarding natural calamity and its impact to the community. Furthermore, significant individuals like local leaders and higher can use the result of this study for the legislative capacity to strengthen the preparation of the communities which are vulnerable to natural calamity all year round.

Material and Methods

This study is a descriptive design with survey as the primary instrument of data gathering. A descriptive study sought to analyze or describe a characteristic or a phenomenon in the field. Since this study aims to assess the knowledge of respondents with natural calamity, its impact and the household preparations, the said research design fits.

A total of 125 individuals volunteered to take part in the survey. These individuals came from the three different communities identified by us in calamity-prone areas in Central Luzon, Philippines.

The questionnaire was divided into different parts: (1) basic information of the respondents (2) the knowledge on natural calamity (3) knowledge of calamity impacts and (4) household preparations of the respondents. The instrument underwent reliability and validity test using Cronbach Alpha test, which yielded an overall result of .969. The reliability test is better that the benchmark score of .70. To further test its validity, we tested the instrument to students who were not part of the study for ambiguities and misunderstood word(s) or term(s).

In this study, we used MS Excel for the data tabulation and SPSS 20 for the analysis of the data. The study used frequency and percentage for the basic information of the respondents and mean for the responses of the respondents. We used t-test and ANOVA for the significant differences in the responses and Pearson-r for the relationship among variables. This study used a four (4) point Likert scale with designated interpretations to analyze the answers of the respondents.

Results and Discussion

Table 1 shows the profile of the respondents of the study. As observed, community 2 got more respondents than community 1 and 3. In terms of sex, the female dominated the male counterpart. There are also more respondents belonging to 20-30 years old bracket. Lastly, there are more respondents with 4-6 family members than the rest.

Table 2 shows the knowledge of respondents in natural calamity. As seen, "big storms" got the highest mean with 3.38 with a Likert scale interpretation of "knowledgeable". However, the lowest mean belongs to "existence of a calamity reduction priority in the area" with 2.10 and corresponds with "slightly knowledgeable" in the Likert scale.

The overall mean is 2.68 which correspond to "knowledgeable" in the Likert scale. In related discussion, a study revealed a myriad of indigenous knowledge pertaining to disaster risk which can contribute to disaster preparedness[21]. Another one reported that respondents were familiar to climate, climate variability and change along with extreme events[20]. In addition, another study enumerated some climactic events that respondents knew like a change

in temperature and rainfall patterns, landslide, soil erosion and flash floods[18]. Furthermore, another study also discoursed that an earthquake is a disaster which is unpredictable[23].

Table 1
Profile of the Respondents

Community	Frequency	Percentage
1	45	36
2	50	40
3	30	24
Sex		
Male	44	35
Female	81	65
Age		
20-30 years old	37	30
31-40 years old	30	24
41-50 years old	29	23
51 years old above	29	23
	Mean=41.50 SD=14.13	
Family Members		
1-3 members	41	33
4-6 members	71	57
7 members above	13	10
	Mean=4.4 SD=1.81	
Total	**125**	**100**

Table 2
Knowledge of Natural Calamity of Respondents

Statements	Mean	Interpretation
1) Awareness of different kinds/ types of natural calamity	2.81	Knowledgeable
2) Familiarity of the following types of calamity	2.87	Knowledgeable
a) Big storms	3.38	Knowledgeable
b) Flooding	3.27	Knowledgeable
c) Earthquake	3.07	Knowledgeable
d) Tsunami	2.18	Slightly Knowledgeable
e) Fire	2.98	Knowledgeable
f) Landslide	2.99	Knowledgeable
g) Drought	2.82	Knowledgeable
h) Disease (s)	2.27	Slightly Knowledgeable
3) The main cause of calamity	2.93	Knowledgeable
a) Nature	3.22	Knowledgeable
b) God	2.46	Knowledgeable
c) Climate	2.98	Knowledgeable
d) Deforestation	3.15	Knowledgeable
e) Poverty	3.01	Knowledgeable
f) Lack of development	2.80	Knowledgeable
4) Do the above mentioned main causes affect your area?	2.69	Knowledgeable
5) Existence of a calamity reduction priority in the area	2.10	Slightly Knowledgeable
Overall Mean	**2.68**	**Knowledgeable**

Legend: 1.00-1.49=No idea; 1.50-2.49=Slightly Knowledgeable; 2.50-3.49= Knowledgeable; 3.50-4.00= Highly Knowledgeable

Table 3
Knowledge of Impacts on Natural Calamity of Respondents

Statements	Mean	Interpretation
1) Effects of natural calamity in your area	2.62	Knowledgeable
a) Injury or death	2.35	Slightly Knowledgeable
b) Damage to houses	3.01	Knowledgeable
c) Damage to infrastructure	2.56	Knowledgeable
d) Loss of productive assets	2.73	Knowledgeable
e) Loss of crops	3.04	Knowledgeable
f) Loss of livestock	2.82	Knowledgeable
g) Debt	2.42	Slightly Knowledgeable
h) Disease	2.70	Knowledgeable
i) Psychological effects	1.97	Slightly Knowledgeable
2) Parts of your area's infrastructure or environment you think will be more affected by natural calamity	2.67	Knowledgeable
a) House	3.29	Knowledgeable
b) Farmlands	3.14	Knowledgeable
c) Fishing resources	2.53	Knowledgeable
d) Trees/ forests/ orchards	2.98	Knowledgeable
e) Schools	2.52	Knowledgeable
f) Health facilities	2.34	Slightly Knowledgeable
g) Water and sanitation facilities	2.58	Knowledgeable
h) Roads	2.45	Slightly Knowledgeable
i) Bridges	2.25	Slightly Knowledgeable
3) Kinds of job or work in the area that are affected by natural calamity	2.47	Slightly Knowledgeable
a) Fisherman	2.51	Knowledgeable
b) Livestock herders	2.66	Knowledgeable
c) Farmers	3.02	Knowledgeable
d) Wage laborers	2.39	Slightly Knowledgeable
e) Shopkeeper/ businessman	2.36	Slightly Knowledgeable
f) Government employee	2.21	Slightly Knowledgeable
g) Police/ army	2.10	Slightly Knowledgeable
4) Individuals in the area who will be more affected by natural calamity	2.76	Knowledgeable
a) Older people	3.12	Knowledgeable
b) Adults	3.26	Knowledgeable
c) Children	2.88	Knowledgeable
d) Men	2.71	Knowledgeable
e) Women	2.77	Knowledgeable
f) People with disability	2.54	Knowledgeable
g) Richer people	2.30	Slightly Knowledgeable
h) Poor people	2.75	Knowledgeable
i) People living in certain areas	2.46	Slightly Knowledgeable
5) Changes that happened in your area which might make the effects of natural calamity worse in the past years	2.56	Knowledgeable
a) Deforestation	3.27	Knowledgeable
b) Mangrove degradation	2.12	Slightly Knowledgeable
c) Increased population	2.72	Knowledgeable
d) Increased poverty	2.81	Knowledgeable
e) Bad government	2.68	Knowledgeable
f) Worse community relations	2.59	Knowledgeable
g) Conflict	2.47	Slightly Knowledgeable
h) Poor construction	2.35	Slightly Knowledgeable
i) Building or farming in unsafe places	2.42	Slightly Knowledgeable
j) Bad farming practices	2.42	Slightly Knowledgeable
k) Worse infrastructure	2.31	Slightly Knowledgeable
Overall Mean	**2.62**	**Knowledgeable**

Legend: 1.00-1.49=No idea; 1.50-2.49=Slightly Knowledgeable; 2.50-3.49= Knowledgeable; 3.50-4.00= Highly Knowledgeable

Table 3 shows the knowledge of respondents on natural calamity impacts. As observed, "house" got the highest mean with 3.29 with a Likert interpretation of "knowledgeable". "Psychological effects" got the lowest mean score with 1.97 which corresponds to "slightly knowledgeable" in the Likert scale. The overall mean for this concept is 2.62 which corresponds to "knowledgeable" in the scale. Contrary to the current study, Vishnu et al[26] raised issues of various supply chain risks. Another study also pointed out that there is a positive relationship between disaster risk and the rate of uncontrolled rural to urban migration in most of countries[7]. In addition, some problems emanating from climactic events like drying up of streams and wells, irregular rainfall, pests, diseases etc[18] also need to be given priority or attention also.

Consequently, a particular survey stated that 80% of disaster victims are not satisfied with the support from the provincial government[16]. Analysis of the various impacts of drought into the ecosystems, environment and communities also needs particular attention[13]. Kabir et al[12] find that farmers have perceptions regarding temperature rise, timely rainfall and shifting of crop production seasons. Chauhan et al[5] proposed that variations in climactic conditions and natural disasters trigger the degrading of forests.

Table 4 shows the household preparations of the respondents. As seen, two items got the same mean score of 3.22 which corresponds to Likert scale interpretation of "prepared". The lowest mean score belongs to "storm shelter" with a corresponding mean of 2.18 which relates to "slightly prepared" in the scale. The overall mean for this table is 2.75 which has a Likert scale interpretation of "prepared". Accordingly, a socioeconomic study revealed a substantial increase in profitability and production associating with severity ranking model of natural calamities[25]. Further, it was insisted that recognizing local knowledge and people's resilience help to understand all over the climate change scenarios[17]. On the other hand, Singh et al[23] explained that we can only prepare our self, take preventive and preparedness measures so that there is less damage to infrastructures and loss of life.

Table 5 presents the t-test for significant differences in knowledge of natural calamity, its impact and household preparations when we grouped the respondents into sex. We deduce that there are no significant differences in the responses of the respondents in the three mentioned variables of the studies. In terms of knowledge of natural calamity, the male (M=2.74, SD 0.71) and the female (M=2.64, SD=0.74) have almost the same responses and did not vary that much, since $t(123)= 0.757$, $p= .450$.

In terms of impact of natural calamity, the male (M=2.77, SD=0.66) response did not vary much with the female (M=2.53, SD=0.71) counterpart, since $t(123)=1.804$, $p= .074$. Lastly, for the household preparations, the male (M=2.87, SD=0.74) response is almost the same with female (M=2.69, SD=0.72), since $t(123)=1.302$, $p= .195$. To sum up, all the three variables did not yield substantial results to have significant differences since their p-values are higher than the Alpha .05 significance level. However, a related literature established that women are more vulnerable in the absence of social security and lack of basic necessities for survival[15].

Table 6 shows the analysis of variance for significant differences in knowledge of natural calamity, its impact and household preparations when we grouped them according to community, age and family members. We inferred that there is a significant difference in terms of knowledge of natural calamity since $F (2, 122) = 8.443$, $p= .000$ and impact of natural calamity, since $F (2, 122) = 5.271$, $p= .006$ when grouped according to community. There is also a significant difference found on the impact of natural calamity, since $F (2, 122) = 4.653$, $p= .011$ when grouped according to family members. This means that different community got a unique perspective and awareness about natural calamity. We infer the same for the impact of natural calamity. Further, the family members can also have a significant level of differences depending on the number of members in the family.

Other variables in the study did not produce sufficient result to provide significant differences since their F values are higher than the Alpha significance level of .05. Contrary to the current study, a tribe from another particular study demonstrated adaptation strategies through the use of traditional ecological knowledge[9]. Subsequently another study indicated adaptation measures followed by the local people as increasing their capability to fight with climate change problems[12].

Table 7 shows the correlation matrix between profile, knowledge of natural calamity, its impact and household preparations of the respondents. As seen, only community correlates with knowledge of natural calamity (r= .283) and impact of natural calamity (r= .282). the rest of the profile variables did not yield a significant result to correlate with knowledge of natural calamity, impact of natural calamity and household preparations. This means that the community has a particular perception in terms of knowledge of natural calamity and impact of natural calamity in their respective areas or locations. In terms of relationships between knowledge of natural calamity, its impact and household preparations, knowledge of natural calamity correlates with impacts of natural calamity (since is r= .717).

In relation, household preparations correlates with knowledge of natural calamity (r= .479) and impact of natural calamity (r= .723). This means it is vital to have knowledge about natural calamity and its impact so that individuals can prepare in their households. On the contrary, age, education, household income, occupation and length of residence have a relationship with respondents' knowledge on natural disaster preparedness[2].

Table 4
Level of Preparations of Respondents

Statements	Mean	Interpretation
1) Steps that the family take if there is a calamity forecast	2.94	Prepared
a) Evacuation of everybody to the nearest safe zone	3.22	Prepared
b) Evacuation of some people but leave some people behind	2.84	Prepared
c) Securing of important documents	2.79	Prepared
d) Securing of valuables	3.14	Prepared
e) Securing of productive assets	2.86	Prepared
f) Bring livestock to a safe place	2.97	Prepared
g) Preparing of emergency supplies	2.84	Prepared
h) Strengthening off the house against wind/ rain	2.84	Prepared
2) Household emergency supplies	2.74	Prepared
a) Food supply	3.51	Prepared
b) Bag with clothing, cash and other supplies for each member	3.22	Prepared
c) List of important contact individuals	2.32	Prepared
d) Documents stored in one place	2.46	Prepared
e) Disaster insurance policy	2.21	Slightly Prepared
3) Designated Evacuation place	2.58	Prepared
a) Storm Shelter	2.18	Slightly Prepared
b) Monastery/ Church	3.03	Prepared
c) Big house	2.27	Slightly Prepared
d) High Grounds	2.86	Prepared
e) Barangay covered court/ plaza	2.58	Prepared
f) Nearest School in the area	2.58	Prepared
4) Reasons for non-evacuation after a calamity forecast	2.75	Prepared
a) Safe enough inside the homestead	3.14	Prepared
b) Too expensive to evacuate	2.66	Prepared
c) Time consuming to evacuate	2.62	Prepared
d) Afraid to leave	2.85	Prepared
e) Need to stay to look after the property	2.71	Prepared
f) Forecasts are not reliable	2.54	Prepared
5) Possible individual(s) / group(s) to reach out for help	2.76	Prepared
a) Friends	3.13	Prepared
b) Neighbors	3.01	Prepared
c) Relatives	3.03	Prepared
d) Rich people in the area	2.49	Slightly Prepared
e) Religious leaders	3.05	Prepared
f) Barangay or Barrio Health Workers	2.51	Prepared
g) NGO/ Government authorities	2.53	Prepared
h) Saving(s) groups / self-help groups	2.30	Slightly Prepared
Overall Mean	**2.75**	**Prepared**

Legend: 1.00-1.49=Not Prepared; 1.50-2.49=Slightly Prepared; 2.50-3.49=Prepared; 3.50-4.00 Totally Prepared

Table 5
T-Test for Significant Differences in Knowledge of Natural Calamity, its impact and level of Preparations

Variable	N	M	SD	*t*-value
Knowledge of Natural Calamity	44 (male)	2.74	0.71	0.757
	81 (female)	2.64	0.74	(.450)
Impact of Natural Calamity	44 (male)	2.77	0.66	1.804
	81 (female)	2.53	0.71	(.074)
Household Preparations	44 (male)	2.87	0.74	1.302
	81 (female)	2.69	0.72	(.195)

df= 123
$p > .05$

Table 6
ANOVA for Significant Differences in Knowledge of Natural Calamity, its impact and level of Preparations

Variables	Knowledge of Natural Calamity	Impact of Natural Calamity	Household Preparation
Community (*df*=2, 122)	8.443* (.000)	5.271* (.006)	0.206 (.814)
Age (*df*= 4, 120)	1.226 (.304)	0.128 (.972)	0.372 (.828)
Family Members (*df*= 2, 122)	1.173 (.313)	4.653* (.011)	1.793 (.171)

*p < .05

Table 7
Correlation Matrix between Profile, Knowledge of Natural Calamity, its impact and level of Preparations of Respondents

	1	2	3	4	5	6	7
1) Community	1						
2) Sex	-.006 (.946)	1					
3) Age	.146 (.103)	.061 (.496)	1				
4) Family Members	-.125 (.166)	.031 (.731)	-.078 (.388)	1			
5) Knowledge of Natural Calamity	.283* (.001)	-.068 (.450)	-.148 (.100)	.026 (.771)	1		
6) Impact of Natural Calamity	.282* (.001)	-.161 (.074)	-.021 (.817)	-.027 (.767)	.717* (.000)	1	
7) Household Preparations	-.041 (.652)	-.110 (.222)	-.116 (.196)	.007 (.939	.479* (.000)	.723* (.000)	1

p < .05

Conversely, a strong positive linkage between a country's exposure to disaster risk and the rate of urbanization indicates particular point of interest[7]. In addition, another study also reported that production cost increased because of climate change and variability[20].

To determine the extent of influence of the demographic profiles on the knowledge of natural calamity, its impact and level of preparations of respondents, the researcher subjected the data to regression analysis. The result of the regression analysis can be seen in table 8. Results of the regression analysis revealed that the community and age recorded B coefficients with associated probability lower than the significance set at .05. This means that the community is a significant determinant of natural calamity knowledge and its impact. The same can be said to age which is considered a significant determinant of natural calamity knowledge.

A closer look at the obtained B coefficients deduces that every unit increase in the community could generate .298 and .264 increase in the knowledge of natural calamity and its impact. The same can be said to age wherein every unit increase in age could generate -.038 increase in the knowledge of natural calamity. In general, the other

demographic profiles are also correlated with the three variables but not to a significant extent. This means that sex and family members likewise exert differential effects on the knowledge of natural calamity, its impact and level of preparations of the respondents.

However, a related study indicated that drought and wildfires substantially impacted community livelihood[8]. In addition, a particular article on the other hand stated that people derive resiliency by clinging to their old belief systems[10]. Furthermore, a group of researchers also mentioned four important factors in a natural calamity: awareness, preparedness, initiative and acceptance[4].

Conclusion
Based on the results and discussions of the study, we concluded that the respondents belong to community 2, with more females than males belonging to age bracket 20-30 years old and have family members between 4-6. The respondents of the study are also knowledgeable about the natural calamities and its impact in the community. The study also revealed that respondents are prepared when a natural calamity comes.

Table 8
Regression Analysis for Respondents' Profile Affecting Knowledge of Natural Calamity,
its impact and level of Preparations

Variable	Knowledge of Natural Calamity*		Impact of Natural Calamity**		Household Preparation***	
	B Coefficient	*t*-value	B Coefficient	*t*-value	B Coefficient	*t*-value
Community	0.298	3.633* (.000)	0.264	3.305* (.001)	0.079	0.909 (.365)
Sex	-0.085	-0.658 (.512)	-0.227	-1.802 (.074)	-0.169	-1.224 (.223)
Age	-0.038	-2.147* (.034)	-0.010	-.606 (.546)	-0.020	-1.076 (.284)
Family Members	0.062	0.612 (.541)	0.011	0.116 (.908)	0.015	0.138 (.891)

*Constants=2.250, $F(4, 120)= 4.174$, $p < .05$, $R^2= .122$
**Constants=2.502, $F(4, 120)= 3.619$, $p < .05$, $R^2= .108$
***Constants=2.913, $F(4, 120)= 0.859$, $p > .05$, $R^2= .028$

In addition, significant differences are found in the knowledge of natural calamity and its impact when grouped according to community. The same is observed in the impacts of natural calamity when grouped according to family members. Furthermore, there are significant relationships found between knowledge of natural calamity, impact of natural calamity and community. The same can be observed between knowledge of natural calamity, impacts of calamity and household preparations. Lastly, the community predicts the knowledge of natural calamity and impacts of natural calamity. Age also predicts the knowledge of natural calamity of the respondents.

Acknowledgement

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