

Disaster Vulnerability Assessment in the Coastal Villages of Cortes, Surigao del Sur, Philippines

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Abstract

Climate change has currently taken various forms that are considered alarming and devastating. Such phenomenon invites people's attention to be resilient and be prepared for its catastrophic effect. Thus, this study is conducted to assess the disaster vulnerability and extent of occurrences of the natural disaster on the coastal villages of Cortes, Surigao del Sur. The study also aims to identify the coping mechanisms of the inhabitants when disasters hit the area. Sixty respondents across 3 villages in Cortes are considered using purposive sampling. Descriptive statistics are used to analyse the data. Among the natural calamities, typhoons associated with strong wind, heavy rains, and drought are the regular catastrophes that hit the villages leading to serious economic instability and health risk. Coping mechanisms of the inhabitants vary depending on the type of calamity that besets them. The damage brought about by climate change is eminent which indicates that risk reduction program and management is imperative.

Keywords: coping mechanisms, disaster susceptibility, natural calamities, and resilient

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1.0 Introduction

Climate change is already beginning to transform life on earth. Seasons are shifting; temperatures are escalating, and sea levels are rising. These lead to the increase in both number and ferocity of droughts, dust storms, floods, heat waves, hurricanes, tropical storms, tornados, wild fires, typhoons and other forms of natural calamities. Globally, these aforementioned catastrophes have been noted in the early 2014. Khan (2017) reported that the vast land of Siberia was swept by a wildfire in 2014. Conversely, Australia and Pakistan had experienced massive floods that cost millions of dollars of damages (Greer, 2011; Horrocks, 2010) and over 100 countries are currently affected by desertification, which is very notable in the countries of Africa, Asia, and Latin America (Dahir, 2017; Cotthem, 2007). On the other hand, Burton *et al.* (2006) in their study revealed that the Philippines is one of the most vulnerable countries in the world when it comes to typhoons and its adverse effects. This is in consonance to the report of the DOST-PAGASA (2011) that the country experiences an average of 22 typhoons annually. This was further proven when the country was hit by the strongest tropical typhoon in the modern history in the year 2013 which brought widespread landslides, heavy rain and wind, and storm surge which resulted to a total of 36,711 casualties and P39,821,497,852 worth of property damages (Briones, 2014). These tragic incidents indicate that the world have been vulnerable to the impact of climate change regardless of what is the country's socio-economic status.

The damages and impact are mitigated depending on its resiliency and level of preparation to succumb the impact of climate change. Vulnerability assessment of climate change is imperative if only to alleviate its impact to human and the entire ecosystem. Meanwhile, Prasad *et al.* (2009) stated that the World Bank encourages the Philippines to improve its climate resilience and develop its adaptive capacity to alleviate the risk of catastrophic economic and humanitarian impacts. Effective planning for climate change adaptation programming requires an assessment of local vulnerabilities so as to bridge the gap between community's needs and priorities at the local level and

policy processes with the authorities (Kuriakose *et al.*, 2009).

Mortejo (2014) reported that the coastal areas in Mindanao are prone to natural calamities. The study aimed at identifying the vulnerability and extent of the occurrence of the natural disaster on the coastal areas of Surigao del Sur as well as their coping mechanisms when struck with a force majeure.

2.0 Research Methodology

The study was conducted at the 3 coastal villages in the municipality of Cortes, Surigao del Sur. A total of 60 people or 9.83% of the total population from the different households of the 3 villages were considered as respondents with a distribution of 20 respondents per village using purposive sampling through snowball method. An adapted survey questionnaire from Royal Society for Protection of Nature (2012) was used as the research instrument to gather information on respondents' profile, the natural calamities occurring in their locality and its extent of occurrences, and the coping mechanisms of the locals. As for the analysis, the data were treated using simple percentage for the respondents' profile, weighted mean for the occurrence of the natural calamities and the coping mechanism adopted by the respondents; while Pearson Product Moment Correlation Coefficient (Pearson *r*) was applied to determine the significant relationship between the respondents' profile and their coping mechanisms.

3.0 Results and Discussion

Figure 1 shows that the most surveyed respondents were female (78.33%), between the age bracket 46-60 years old. Thirty percent (30%) were high school graduates with 46.67% working as housekeeper. It can be inferred from the findings that most if not all respondents' belonged to destitute households for they were not able to acquire enough education to afford them decent jobs.

Table 1 indicates the natural disasters and the extent of occurrences with warning signals they received in the areas under survey. The findings revealed that respondents were more

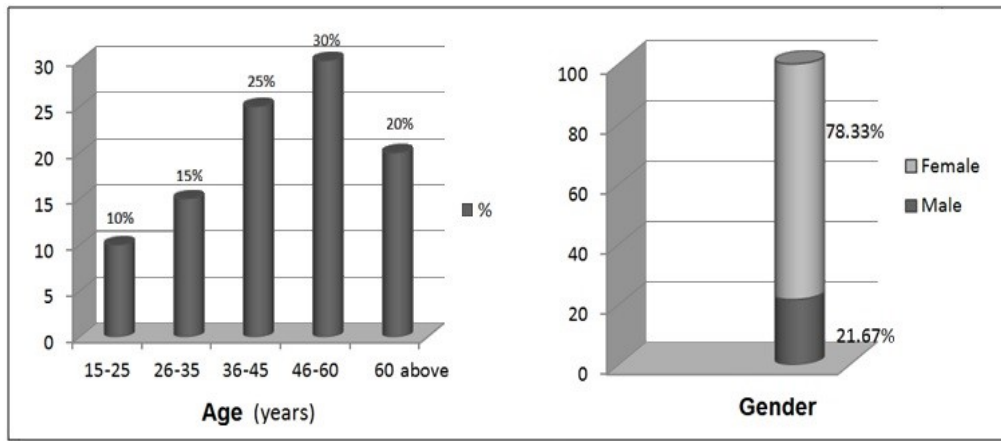


Figure 1. Profile of the respondents

exposed to a typhoon (98.33%) and strong wind with rain (96.67%). The severe storms that struck the village come from the tropical seas in the region. Respondents further reported the severity of strong wind with rain reflecting a great extent. The most serious typhoon they experienced was typhoon Pablo in 2014. It caused vast destruction with their communities. Drought is another calamity that they often experience especially during summer season. The result implies the

unpredictability of the rains. Few reported having experienced the Tidal Wave (20%) and Landslide/Erosion (13%). With respect on the warning signals, they received from concerned agencies, the respondents disclosed receiving warnings only during the occurrence of the typhoon, strong wind with rain, prolonged rain and flood, tidal wave and landslide/erosion. At the onslaught of the disaster, the communities resorted to certain coping mechanism.

Table 1. Extent of occurrences of natural calamities as experienced

Calamities	Experienced (%)		Warning (%)		Extent of Occurrences	
	Yes	No	Yes	No	Weighted Mean	Verbal Description
Drought	86.67	13.33	32.69	67.31	2.47	High
Prolonged rain and flood	65.00	35.00	53.85	46.15	2.18	Moderate
Strong wind with rain	96.67	3.33	64.41	35.59	2.28	Moderate
Early onset of rainy season	61.67	38.33	27.78	72.22	1.72	Moderate
Delay onset of rainy season	61.67	38.33	25.00	75.00	1.67	Moderate
Landslide/Erosion	13.33	86.67	88.89	11.11	2.10	Moderate
Typhoon	98.33	1.67	94.92	5.08	2.56	High
Tidal Wave	20.00	80.00	75.00	25.00	2.33	Moderate

As shown in table 2, the respondents are dependent on fishing (44.44%) for their livelihood when there is drought in the area. Being in the coastal areas, most residents rely on fishing as their means of income. Conversely, fishing followed with 44.44%. To further augment the income of the family, wage labor also becomes an option as additional source for the family.

Table 3 shows that most of the respondents borrowed money (35.09%) and buy food for credit (33.33%) to provide their basic necessities. This is in association with their main source of livelihood which is fishing. During lean season where there is scarcity of catch, families borrow money to buy foods and for their other survival needs. When challenged with floods, evacuation becomes a preventive measure to minimize vulnerability. Being within the tropical seas, heavy rains and strong winds frequently occur in the study area. Minimizing house expenses becomes an option with 62.67%.

Table 2. Coping mechanism of the respondents during drought

Coping Mechanisms	Percentage Distribution	Rank
Selling Chilly Foods	12.50	3
Wage labor	22.22	2
Fishing	44.44	1
Selling Copra	6.94	4
Gardening	1.39	8.5
Sari-sari store	4.17	5.5
Selling Firewood	1.39	8.5
Farming	4.17	5.5
Masonry	1.39	8.5
Borrow money from neighbors	1.39	8.5

Table 3. Coping mechanisms of the respondents during prolonged rain and flood

Coping Mechanisms	Percentage Distribution	Rank
Selling Warm Foods	1.75	5.5
Borrow money from friends/relatives	35.09	1
Buy food on credit	33.33	2
Migrate	24.57	3
Stay inside	3.51	4
Utilized root crops as meal	1.75	5.5

Table 4. Coping Mechanisms of the respondents during strong wind with rain

Coping Mechanisms	Percentage Distribution	Rank
Minimize day-to-day expenses	62.67	1
Borrow money from neighbors	28.00	2
Reduce spending on clothes	1.33	6
Masonry	1.34	4
Migrate	1.33	6
Wage Labor	4.00	3
Borrow money from relatives	1.33	6

At the onset of the rainy season, the respondents used to minimize their daily expenses (42.86%) to save money for any forthcoming water-related catastrophe. The heavy rains also compromise their main source of income which is fishing. Thus, to provide financial stability and compensate the loss of income from fishing; the respondents seek for alternative jobs through wage labor.

Table 5. Coping mechanisms of the respondents during early onset of rainy season

Coping Mechanisms	Percentage Distribution	Rank
Selling jewelries	2.04	6
Selling farmland	2.04	6
Wage labor	32.65	2
Minimize buying	42.86	1
Fishing	14.29	3
Fish Vending	2.04	6
Buy food on credit	2.04	6
Selling Copra	2.04	6

Aside from flooding, those who reside in the sloped areas

are also vulnerable to landslides and soil erosion. During soil erosion, families who are economically-deprived tend to save for their food consumption.

Table 6. Coping mechanisms of the respondents during delay onset of rainy season

Coping Mechanisms	Percentage Distribution	Rank
Selling Copra	2.04	7
Borrow money from neighbors	2.04	7
Engaged in Handicraft's making	2.04	7
Fishing	14.29	3
Buy and Sell	4.08	4.5
Wage Labor	32.65	2
Move children to less expensive school	4.08	4.5
Reduce proportion of meals	38.78	1

Table 7. Coping mechanism of the respondents during typhoon

Coping Mechanisms	Percentage Distribution	Rank
Minimize changing clothes	8.33	3
Spent savings on food	43.06	1
Reduce spending on education	1.39	7
Borrow money from relatives	6.94	4
Migrate	31.94	2
Ask government's assistance	5.56	5
Utilize root crops as meal	1.39	7
Reduce proportion of meals	1.39	7

In days where there is an upcoming typhoon, the respondents tend to use their savings to buy and stock foods (43.06%) such as rice, canned goods, and noodles in preparation for the unpredictable event. Families also evacuate to safer areas as part of their preventive measures from any damage brought about by the ravaging typhoon that beset the area.

Table 8 shows the coping mechanisms of the respondents in case there are tidal waves. Most of the respondents seek for assistance from the government (58.83%) particularly those people who are at the poverty line and their source of income is solely dependent on fishing. On the other hand, some people migrate to a much safer area to avoid the possible direct damage. Not to mention that is one of the executive orders of the province to transfer to higher lands in case there are warnings on tsunamis and tidal waves to avoid casualties.

These results corroborate to the precepts of the United Nations Framework Convention on Climate Change (UNFCCC,

2009). It contends that rural communities in the developing countries are expected to be affected more due to their extensive dependence on climate change sensitive livelihood option. They also have and limited adaptive capacity to adapt to the changes, with its fragile geography, predominantly natural resources based livelihoods, and meager level of adaptive capacity. It can be attributed to higher incidence of poverty, placing the locals among the most vulnerable sector to climate change.

Table 8. Coping mechanism of the respondents during tidal wave

Coping Mechanisms	Percentage Distribution	Rank
Migrate to upland area	35.29	2
Rely on less expensive foods	5.88	3
Seek assistance from government	58.83	1

Table 9. Correlation of coping mechanisms to the demographic profile of the respondents

Variable Tested	Computed <i>r</i>	<i>p</i> -value	Decision	Conclusion
Coping Mechanism vs age	-0.182	0.164	Accept	Not significant
Coping Mechanism vs gender	0.167	0.203	Accept	Not significant
Coping Mechanism vs educational attainment	-0.127	0.334	Accept	Not significant
Coping Mechanism vs occupation	-0.027	0.835	Accept	Not significant

As shown in the tables 9 above, all the *p*-values are more than the 0.05 level of significance. That means there is no significant relationship between the respondents' profile and the coping mechanisms they have adopted. Thus, the null hypothesis was accepted. The result indicates that the present condition of the respondents did not matter with the coping mechanisms they have adopted. The result may not be surprising because their socio-economic status reveals how they address their condition during catastrophes.

4.0 Conclusion

The locals reside highly at risk since they are much exposed to areas prone to climate-related calamities such as typhoons, strong wind, rain, flood, and drought making them highly susceptible. The coping mechanisms of the respondents vary depending on the type of disasters that occur. The coping mechanism also reflects their socio-demographic profile. The study calls for climate change plans, and risk reduction program and management making the communities more prepared and

resilient when beset with natural calamities.

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