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Perception on Climate Change of the Constituents in Coastal Communities in a Developing Country: Knowledge Survey

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Abstract: ***Climate change is one of the most prevalent environmental issues facing the world today. Having a better knowledge on climate change adaptation strategies or plans is already a one significant step that constituents could take to prepare for a disaster. Climate change is noticeable from the extreme and unexplainable climatic conditions in recent years among the constituents in coastal communities who are at the forefront of a disaster. It is imperative that each constituent should learn certain climate change adaptation strategy to better manage the potential impacts of a disaster. The study was conducted to investigate the constituents' perceived knowledge on climate change impacts in a coastal communities in the Philippines. A survey involving (n=566 respondents was conducted from September - October 2017 by using a climate change adaptation protocol. Most of the respondents are within the working age group, without job, having a basic education, below the poverty threshold, having a big family, and living in the area for more than 30 years. They also appeared to have known more than one climate change adaptation strategies. The study could help the local government to target its climate change adaptation and disaster risk reduction and management efforts, and therefore help its constituents prepare for a climate change and disaster.***

Keywords: climate change impacts, coastal communities, developing country, knowledge survey

1. Introduction

The Philippines reported that it is top - 3 countries in Southeast Asia as most vulnerable to climate change affected by climate hazards including floods, droughts, cyclones, and landslides. **(***Yusuf and Francisco 2010*). Considering that the country's location in the 'Pacific Ring of Fire' at the junction of two large tectonic plates, the Philippine Sea Pacific Plates and the Eurasian Plate, facing the Pacific Ocean and one of the most active typhoon belts in the world. That's the reason why the Philippines was recognized as one of the most disaster - prone countries in Asia Pacific Region, and the world. And it was found globally to have the highest expected annual mortality, affected population, and loss in gross domestics product (GDP) relative to climatic hazards. The count by the dependence of the Philippine economy on climate sensitive sectors such as agriculture, fisheries, and forestry. The government must have adequate capacity to carry out its task for climate change adaptation. *Mendoza M. E. T. et. al. (2014).*

The country is also highly exposed to tropical depressions, storms and typhoons that form from the Pacific Ocean with an average of 20 typhoons entering the Philippine area of ray's vulnerability is compounded responsibility (PAR) Mendoza M. E. T. et. Al. (2014). The enactment of Republic Act 9729 otherwise known as Climate Change Act of 2009 shows that the government were given these climate change as national priority. The participatory approaches can be integrated in social learning process in the implementation of climate change policy in local and regional development. The policy must responsive in the issue on climate because the catalysts for sustainable development are programs imbedded in the policy. The impact of climate Change affects many lives throughout; Hence, this phenomenon not only the responsibility of the government, but is everyone concern. Wherein human can offer the best solution to address this global challenges. Bondoc, K. P. (2015) Reducing negative impacts of climate induced events such as flood and typhoon is not only the responsibility of the community, but is also largely the responsibility of the government to carry out its mandate to be at the forefront of disaster and climate risk management. Mendoza M. E. T. et. al. (2014) and the local government unit should create more urgent capacity building needs that have been clearly identified, planned climate change adaptations program anchored on adequate vulnerability assessment and economic analysis of adaptation measures. This necessitates demonstration of an assessment of communities and household vulnerabilities that can be adopted by LGUs for their planning and implementation of adaptations to climate change - related events.

Thus, this encourages the researcher to conduct this study to investigate the perception on climate change in coastal communities in Partido area: a knowledge survey.

Thus, this encourages the researcher to conduct this study to investigate the perception on climate change in coastal communities and upland tourism sites in Partido area: a knowledge survey, and to

Purpose of this study

1) To assess the perception on climate change impacts in coastal communities in Partido area.
2) To investigate sources of knowledge on climate change impacts in coastal communities in Partido area.
3) To create baseline data on the perception on climate change impacts in coastal communities.

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2. Methodology

a) The Study Site

This study site of this research will cover the coastal communities in Partido area the 4th congressional districts of Camarines Sur, Philippines (Figure 1). It has a land area of 197, 306 has. which is 37.46% more than a third of the province land area. The total population is 341, 487 in 2015, which is expected to increase annually at a rate of 2.11% (PSA, 2010) representing 22 % of the population of the province spread in the ten (10) covered municipalities. It is predominantly an agricultural area richly endowed with natural resources. These natural resources are just waiting to be appropriately tapped and developed to help its constituents improve their quality of life. There are many constraints, though, in pushing for the development of the area to its full potential. As the term Partido connotes (coined from the Spanish word " *Partir* " which means separate), the district is not within the development highway. Its municipalities are not easily accessible by land and mostly falling under 5th and 6th class. This condition puts the study on assessing the perception on climate change in coastal communities in this area an important activity in the study site.

The Municipality, i.e, municipality of san jose, from which the study will cover has a total population of 40, 623 people distributed across its even per barangay.

Prior to data collection, permission to conduct the study was sought from all concerned officials such as the municipal mayor, barangay officials, DRRM officials, and the like. Consent of the respondents was also sought, where they were given the choice to participate or not in the survey. They were given the full information about the study including its objectives, the utility of the information, and the treatment for the confidentiality of data. Data were presented as aggregate in forms of percentages and means to maintain the confidentiality of the respondents.

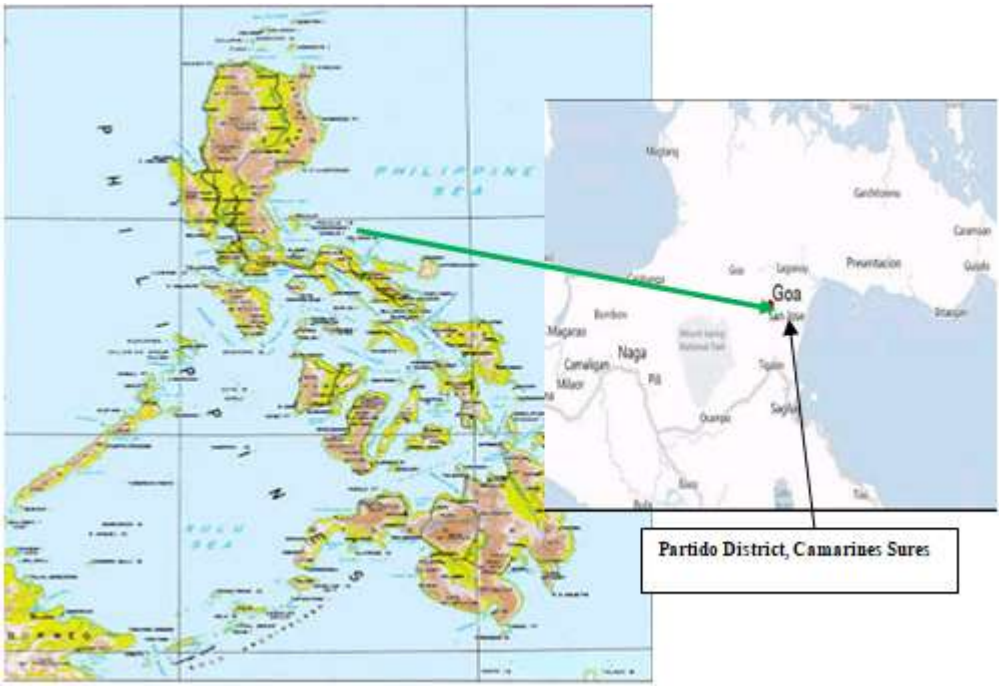

Figure 1: Study Site Partido District, Camarines Sur, Philippines
(Source: Global Security. org Philippine Outline Map, Philippine Relief Map)

a) Research Design and Sample

The study involved about (n=566) respondents from seven out of its 29 barangays using a purposive research design. Respondents were identified through the help of barangay officials while their participation depended on their willingness to be interviewed. The researcher made a courtesy call with the municipal mayor, administrative officer, and some barangay officials where an orientation about the study and its protocol was conducted. The respondents were distributed as follows: more than 24.38% were farmer, 62.19% was female, 89.57% in the working age bracket, and (85%) only elementary, high school and vocational graduates. The interview was conducted from Sept to October 2017.

b) Instrument and Data Collection

The instrument, a 5 - point Likert–type scale, was modified from Agboola & Emmanuel (2016), and consisted of two parts. The first part on data collection on profile of the respondents such as gender, age, education, household income, occupation and length of stay while the second collection of data on respondents' perception on climate change and the sources of information about climate change.

c) Data analysis

Collected data were subjected to descriptive and inferential statistical analysis to address the objectives or research questions of the study.

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3. Results and Discussion

a) Socio - demographic Profile of the respondents

Table 1 reflected that thought about 89.57% of the respondents is within the working age group (20 - 60 years old), only 81% is actually working probably of them (85%) are only elementary, high school and vocational graduates. Only 13.24% had finish higher education, which is necessary currently to get job in the Philippines. This condition is very much critical specially most of them have bigger hold size but with low income (Table 1). The estimated mean household income is only PhP5, 542.46, which is far below than the estimated poverty threshold of PhP19, 137 for the region (PSA, 2012). With meager income, it may be difficult for these households to prepare for any disaster. Most of their income might be spent for their basic necessities, and none may be used for disaster preparedness. Interestingly, the respondents have lived in the study site for more than 30 years already, and therefore, they might have developed strategies that can address the problems associated with climate change though this concern is beyond the scope of the study.

Table 1: Socio - demographic Profile of the respondents *(N=566)*

Variable	Frequency	Percentage
Age		
13 - 19 years old	23	4.06%
20 - 30 years old	123	21.73%
31 - 40 years old	137	24.20%
41 - 50 years old	128	22.61%
51 - 65 years old	119	21.02%
66 years old and above	36	6.36%
Gender		
Male	214	37.80%
Female	352	62.19%
Education		
None	8	1.41%
Elementary	194	34.27%
High School	236	41.69%
Vocational	53	9.36%
College	70	12.36%
Graduate	5	0.88%
Occupation		
None	106	18.72%
Laborer	58	8.83%
Skilled Worker	47	8.30%
Famer	138	24.38%
Fishermen	114	20.14%
Professionals	24	4.24%
Others	79	13.95%
Household Income		
0 - 5.500	386	68.19%
5.501 - 10.000	129	22.79%
10.001 - 20.000	31	5.47%
20.001 - 40.000	12	2.12%
40.001 and above	8	1.41%
Household size		
0 - 5	356	62.89%
9 - 10	195	34.45%
11 and above	15	2.65%
Length of Residence		
0 - 10	51	9.01%
11 - 20	74	13.07%
21 - 30	127	22.43%
31 - 40	96	16.96%
41 and above	218	38.51%

Trend implies that these patterns confirm what Asian Development Bank (2009) reported that poverty incidence in the Philippines is higher in coastal communities than in upland tourism areas though urban poor households are rapidly growing in recent years. Especially for income, educational attainment, and household size, the observed patterns are important in developing a community disaster preparedness plan in the study site. Empirical studies (Woersching & Snyder, 2003; Woersching & Snyder, 2004) indicated that coastal communities were generally vulnerable to climate change impacts and had a higher likelihood of receiving inadequate support for housing and chronic ailment after a disaster. The local government officials at the municipality and barangay levels should be able to provide support, financial or otherwise, to residents so that the capacity of the community to respond to a climatic change would be enhanced. Interestingly, perception within the same individual could also differ from one occasion to another (Epstein &Dember, 2017). For instance, McKinley et al. (2016) reported that they observed dissimilarity between male and female respondents' perception on the impact of climate change on household members. They observed that male respondents perceived more health problems for both male and female household members while female respondents perceived increased anxiety of male and female household members. Epstein and December (2017) have also noted that there exists a differing perceptual learning across age groups and cultural contexts.

b) Respondents' Knowledge Perception on Climate Change

Table 2 presents knowledge perception on climate change by the residents in coastal communities in the Philippines. In general most of the respondents knew the impacts of climate change during the interview. Only Increases surface temperature, Leads to longer and more drought appeared to be relatively uncommon among the respondents with only (n=321 or 56.71%) respondents reported that they have knowledge about it. Because the study site belongs to type II climate characterized by the absence of a dry season and very pronounced maximum rainfall from November to December. It is during these months that the Northeast monsoon season occurs and the tropical cyclones contribute to the increased rainfall in the area.

Table 2: Distributions of Respondents Knowledge Perception on Climate Change (N=566)

Indicator	With Knowledge		Without Knowledge	
	Frequency	Percentage	Frequency	Percentage
Climate change is happening	551	97.34%	15	2.65%
Climate change manifests in diverse ways in the world	453	80.03%	113	19.96%
We are already experiencing the impacts of climate change	548	96.81%	18	3.18%
I see climate change to be of immediate	389	68.72%	177	31.27%

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and urgent concern				
Climate change is a threat to sustainable development	456	80.56%	110	19.43%
Is more harmful than beneficial	434	76.67%	132	23.32%
Its caused mostly by human activities, not natural changes in the environment	418	73.85%	148	26.14%
Increases surface temperature	321	56.71%	245	43.28%
Its causes sea level rise	373	65.90%	193	34.09%
Causes increase in intensity of extreme weather events like heat waves, tsunami, flush flood, and heavy rainfalls	462	81.62%	104	18.37%
Leads to longer and more drought	321	56.71%	245	43.28%
Leads to Coastal Erosion	459	81.09%	107	18.90%
Influences agricultural yield negatively	332	58.65%	234	41.34%
Poses threats to food security	457	80.74%	109	19.25%
Causes economic depression	429	75.79%	137	23.67%

In January and February, the effect of these air masses on rainfall is considerably radical. In addition to the north - east monsoon during the months of February and March, the trail winds traveling from east to west do not give significant increase of rainfall. Likely, the month of May is the transition period between the monsoon that is prevalent from June to September. During the south - west monsoon season, the linear system called the Inter tropical Convergence Zone (ITZ), brings the largest amount of rainfall to the study area. In October, which is the transitive period between the south - west and north - east monsoons, the tropical cyclone brings considerable amount of rain. The typhoon and storm surges, tropical cyclone is a climatic control that contributes largely to the rainfall from June to December. Many respondents knew (n=551 or 97%) that climate change is happening and some of them already experiencing the impact of climate change (n=548 or 96.81%). Still other Causes increase in intensity of extreme weather events like heat waves, tsunami, flush flood, and heavy rain falls and Leads to coastal erosion (n=459 or 81.09%). Likewise climate change is a threat to sustainable development, poses threats to food security appears to common knowledge among the respondents with (n=457 or 80.74%) reported having knowledge on it. The human activities, in particular those involving the combustion of fossil fuels for industrial or domestic usage, and biomass burning, produce greenhouse gases and aerosols which affect the composition of the atmosphere are reported that influence on climate system Many consider the prospect of human - induced climate change as a matter of concern. The IPCC Second Assessment Report (IPCC, 1996) (hereafter SAR) presented scientific evidence that human activities may already be influencing the climate. If one wishes to understand, detect and eventually predict the human influence on climate, one needs to understand the system that determines the climate of the Earth and of the processes that lead to climate change. . In 2016. Agboola &Emmanuel results of his investigation that the human activity increasingly influences in climate change and as of today the level of awareness of the residents in coastal communities it has lots of implications for the survival of mankind. An increase in understanding of coastal communities' perception of climate change could enhance policy action as climate policy is influenced by perceptions of the dangers of climate change impacts (Leiserowitz, 2006)

The residents in coastal communities of this study had been experience to several typhoons, strong wind, soil erosion, flood occurrences given their length of residence and the frequency of occurrence of these disasters in the study site. The coastal communities are expected to suffer from the impacts of sea level rise and storm surges. They are also expected to experience permanent inundation, increasing flood, and greater erosion rates, which would affect beaches and cliffs (Nicholls & Cazenave, 2010). To cite, about five (4) worst typhoons had passed the study site since 1970, which wreaked havoc among the households, agricultural farms, and other structural and non - structural resources in the area. The extent and duration of flood occurrences are affected by the amount of rainfall, the condition of the shoreline and its surrounding watersheds, increased population in the region and the proliferation of communities in coastal areas.

c) Sources of Perceived knowledge on Climate Change Impacts

Table 3 shows the respondents' sources of perceived knowledge on climate change. As indicated in Table 3, there is much difference on the computed weighted mean of the identified sources, which the constituents in coastal communities. Majority of the respondents knew that personal experience (wm =4.53) is very much important sources of knowledge when we speak about climate change, since the respondents have lived in the study site for more than 30 years already, and therefore, they might have developed strategies that can address the problems associated with climate change though this concern is beyond the scope of the study. While some of them uncommon that training and seminar workshops (wm =1.47) is not important sources of knowledge. Likewise, internet social media (wm =4.48) and education (wm =4.15) are much important. In addition public sources /social media and family (wm =3.36) identified as important, and government action/s, program/s, intervention/s reported as less important. Mbwambo et al, (2014) show that majority of the coastal communities are aware of the climate change and they perceive it in relation to unusual rainfall, drought, floods and increased incidence of pests and diseases. The farmers were also coping with food insecurity as a result of declining food stocks and they have also developed adaptation strategies related to farming operations and livelihoods Withana and Auch (2014) the perceived effectiveness of adaptation strategies for climate change and the challenges for adaptation and lack of public awareness was perceived as the major limitation for climate change

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adaptation. Grothman and Patt (2005) purported that misconception about climate change and its associated risks may result in no adaptation or maladaptation, and therefore, increase the negative impacts of climate change.

Table 3: Respondents Sources of knowledge on Climate Change Impacts as Important (*N=566)*

Indicators	Weighted Mean	Verbal Interpretation
Education	4.15	Much Important
Public sources /Social Media and Family	3.36	Important
Personal Experience	4.53	Very Much Important
Government Action/s, Program/s, Intervention/s	2.37	Less Important
Training and Seminar workshops	1.47	Not Important
Internet and Social Media	4.48	Much Important
General Average Weighted Mean	3.39	Important

Legend: 4.51 - 5.00 - Very Much Important; **3.51 - 4.50 -** Much Important; **2.51 - 3.50** - Important; **1.51 - 2.50 -** Less Important; **1.00 - 1.50** - Not Important

The results highlight the importance of these sources in enhancing the perceived knowledge of the constituents in the study site on climate change. For instance, Devkota and Phuyal (2017) emphasize the important the role the local government in conducting training and seminars to enhance the adaptive capacity of the communities on the issue of climate change, and the role of university as a knowledge hub of the community to create programs, and projects in increasing the level of understanding of climate change impacts and risks. Spence, A., et. al., (2011) The developing countries which are mostly dependent in agricultural sectors that's why the government should provide program intended to enhance the capacity focusing on climate change issues and create an innovative solution to address the natural catastrophic problem. The dependency of most developing countries to agriculture will mean a breakdown to its economy and therefore among those things which are posed at risk. They also reported the importance of the use of information education campaign materials as reference materials that could improve the community perceived knowledge on climate change. Grothmann and Patt (2005) also argued that integrating climate change into universities' curriculum and programs could help improve the cognitive adaptive capacity of students and the communities on climate change, which in turn, could improve efforts of attaining the goals of current and future adaptation strategies. This is possible because "improving human cognitive adaptive capacity will contribute in addressing the shortcomings of limiting the determinants of adaptive capacity to only 'economic, social, institutional, and technological situation" (Grothmann & Patt, 2005). Corollary to this, a continued neglect of the cognitive adaptive capacity of individual actors on climate change will undermine current and future efforts of climate change adaptation.

4. Conclusion

The study conducted to determine the body of knowledge by the constituents on climate change in s investigating the perception on climate change impacts in coastal communities in developing country. Using a descriptive research design, the study surveyed about (n=566) using a purposive research design. Respondents were identified through the help of barangay officials while their participation depended on their willingness to be interviewed. The respondents were distributed as follows: more than 24.38% were farmer, 62.19% was female, 89.57% in the working age bracket, and (85%) only elementary, high school and vocational graduates. Having a better knowledge on climate change the can developed strategies or plans is already a one significant step that a coastal communities could adapt the climate change. In recent years is one of the most important environmental issues facing the world today is climate change. It is imperative that each constituents should learn certain climate change adaptation strategy to better response to a disaster or minimize its impacts.

Trends implies that majority of the respondents have knowledge in more than one climate change is happening and they already experience the impacts of climate change. Except for having an climate change increases surface temperature, leads to longer drought, and all other climatic impacts are a common knowledge among the respondents as indicated in the number of respondents who have reported of having known them. The local government unit should be able to address this concern, and integrate certain livelihood programs in their disaster risk reduction management action plans and climate change adaptation program. It is also recommended that an empirical study at the national level be conducted to assess the perceived knowledge of the coastal communities especially in areas that are highly vulnerable to natural disasters. The information could help facilitate the national government focused its information, education, and communication activities in order to create more disaster - resilient communities.

However, any use of the information in this study should be done with care. At the very least, further analysis of the data should consider the limitations of the study especially in the representation of income classes and sex. As noted, more respondents came from the low income households and females, respectively because of the unavailability of their counterparts during the conduct of the survey. Likewise, since the study utilized a face - to - face interview, it could be possible that respondents have over - reported their knowledge on climate change adaptation plans so that the interviewers may view them favorably. The study could however be used as inputs in any local government's planning activities especially in enhancing its constituents' awareness on certain climate change Adaptation plans.

5. Declarations

The authors declare that there is no conflicting interest in this manuscript.

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