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ADAPTIVE CAPACITY AND ADAPTATION PRACTICES TO CLIMATE CHANGE IMPACTS OF FEMALE-HEADED HOUSEHOLDS IN THE PHILIPPINES

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Abstract

Climate change does not only affect the global and national settings but also significantly disturbs households and individuals in the community, particularly the female-headed households. Consequently, this study aimed to analyse the adaptive capacity and adaptation practices to climate change impacts of female-headed households in the coastal communities of Lagonoy, Camarines Sur, Philippines. A quantitative method following causal-comparative and correlational research designs was employed in this study. Applying the multi-stage sampling technique, 162 out of 281female-headed households from the east and north coastal communities of Lagonoy comprised the study respondents. Results revealed that the female-headed households' capacities are moderately to highly adaptive as far as their economic and social resources are concerned. However, they are less to moderately adaptive in terms of their institutional and human resources. Further, the respondents have well strategised local adaptation practices or knowledge before, during and after the onslaught of natural calamities. This study also revealed a significant relationship between the respondents' adaptive capacity and adaptation practices from the two remote coastal communities. The adaptation practices during and after the onslaught of the natural disaster, educational attainment, and number of working household members are some of the factors that affect their adaptive capacity to climate change impacts. It is highly recommended that the national government, through the directive of policy makers, establish specific social protection programs by integrating the ecological and gender-sensitive framework.

Keywords: adaptive capacity index, adaptation practices, female-headed households, single mother, women, Lagonoy, Camarines Sur, Philippines.

Introduction

Climate change is one of the most significant environmental challenges of our time, and it indeed demands scientific undertakings for security, economic development, and human rights (Alam, Bhatia, & Mawby, 2015). It affects not only the global and national environments, but also disturbs community households and individuals, especially female-headed households (FHHs). Studies suggested that female-headed households are more vulnerable and sensitive to the impacts of climate change (Omolo & Mafongoya, 2019; Alhassan, Kuwornu, & Osei-Asare, 2019; Sujakhu et al., 2019; Delfino et al., 2019; Sellers, 2016). Thus, assessing and understanding the level of adaptive capacity (AdCa) of FHHs will help them become more receptive to and sentient about climate related disasters. This research focuses primarily on the analysis of FHHs' adaptive capacity and adaptation practices (AdPrac) in two remote coastal communities of Lagonoy, Camarines Sur, where typhoons and other devastating natural calamities frequently occur.

In the Philippines, most of the climate-related devastations are felt in Region V (Bicol Region), considered the gateway to powerful blowing typhoons from the Pacific Ocean, with high risk of heavy winds, heavy rainfall, and flooding (Balalo, 2013). As a result, the region is highly vulnerable to natural disasters (Food and Agriculture Organization of the United Nations [FAO], 2010), and Filipinos, particularly the FHHs, are economically and socially vulnerable due to the devastating climate changes that may contest their adaptive capacity. The capacity to cope of individuals or groups within the community is contested by the shifting in weather conditions, especially rural communities that are dependent on coastal resources (Rance & Funfgeld, 2014). Such is the municipality of Lagonoy in Partido District, Camarines Sur, Philippines, where the east and north coast communities are remotely located. The natural calamities such as typhoons, storm surges, floods, and landslides may affect the level of the FHHs' adaptive capacity. Their family duties can also adversely disturb their ability to adapt when disasters occur.

Typically, due to their limited access to political and economic benefits, women around the world are regarded as marginalised sectors (Bradshaw, Chant, & Linneker, 2017; Chant, 2014), that make them vulnerable (Alam et al., 2015), and entrapped in the poverty gamut. Feminising accountability for women-oriented families kept them responsible for resolving the problems of poverty in their households (Chant, 2008; Ramalho, 2018). In rural communes, Yabaki (2006) identifies women as the most disadvantaged group due to lack of resources and power to discuss their needs and challenges. With this, FHHs, as a whole, are at greater risk than their male-headed households (MHHs) counterparts when it

comes to the impacts of climate change. Hence, this study highlights the analysis of FHHs' adaptive capacity and AdPrac in coastal communities.

Women play a major role in formulating policies for climate change prevention, adaptation, and mitigation (Bousquet, Coutelle, & Jouanno, 2015). Their sections stretch from family units to the community level, where they contribute to all of the village's key spontaneous and expected interventions in response to a changing environment among other disasters (Muthoni & Wangui, 2013). In spite of the limitations, women still manage their role through a variety of beneficial responses to intensify adaptation to climate change (Patt, Daze, & Suarez, 2009; Muthoni & Wangui, 2013). They are currently developing creative and decentralised methods for building sustainable communities (Alam et al., 2015).

Empowering and investing on adaptive potential of women is not just a secret to addressing the impact of weather-related events. It can also pave the way for poverty alleviation in the least developing countries in the world. Nonetheless, women's response and their ability to cope with climate change issues depend on the robustness of their underlying family responsibilities, health and well-being, and the broadness of their social networks (Dapilah, Nielsen, & Friis, 2020). According to CARE International Climate Change, it is important to develop effective responses to climate change impacts (CCIs) and integrate knowledge about women, gender, and climate change from the home to the national level of society (Solar, 2010). Thus, although women have always been in a vulnerable situation and are regarded as secondary stakeholders, they are vital sustainable development actors whose contributions to the fight against climate change and other socio-environmental related issues need to be recognised and strengthened (Bousquet et al., 2015).

In general, some studies (Bradshaw et al., 2017; Alam et al., 2015; Bousquet et al., 2015; Ogra & Badola, 2014; Muthoni & Wangui, 2013; Solar, 2010) have specifically examined women or gender adaptability, however, there is a dearth of relevant literature focusing on FHHs' adaptive capacity and practices. This study attempts to fill that gap by analysing the degree of female AdCa as family heads by answering the following questions: a) What is the level of FHHs' adaptive capacity to CCIs in these remote coastal communities?; b) What are the FHHs' adaptation practices on climate change impacts in these remote coastal communities?; c) Is there a relationship between the AdCa and adaptation practices to climate change impacts of FHHs in the two remote coastal communities?; and d) What are the factors affecting the adaptive capacity of female-headed households in these communities?

Literature Review

Global and local perspectives on climate change and its impacts

The term 'climate change' is defined by various scholars in different views depending on how this issue affects specific societal and ecological system. In a broad sense, the Intergovernmental Panel on Climate Change [IPCC] (2007), as cited in Junio, Gonzales, and Montaño (2015, p. 737) viewed this as "any change in climate over time, whether due to natural variability or because of human activity." The climatic alterations pose the proliferation probability in expected and unimagined impacts on natural resources and societal systems that might inundate, degrade and change the interaction and compositions of the Earth (Karl, Melillo, & Peterson, 2009).

Nowadays, weather-related shifting will have a huge impact on human society by affecting basic needs (e.g., water, energy, housing, transportation, food, natural ecosystems, and health), and pollution, poverty, and an aging and increasing population that can exacerbate climate consequences (Karl et al., 2009). Climate change impacts are expected to bring added pressure on the urban and rural environment concerning sustainable land use, infrastructure, access to potable water, health services, and waste management, which eventually households and individual levels could be excessively affected (Mamonong & Flores, 2008). Thus, this is projected to be more complicated and will affect the overall vulnerability of specific areas through rising sea levels, more frequent and stronger weather events, inland flooding, among other challenges (Mamonong & Flores, 2008). The considerable challenges and uncertainties for adaptation, the climate changes that are now taking place will continue and may shift destructively in the future (Lynn, Mackendrick, & Donoghue, 2011).

Global environmental changes have been established in the scientific community as one of the most significant threats to human well-being (Urich, Quirog, & Granert, 2009). Cooley, Moore, Heberger, and Allen (2012, p. 1) mention that "global climate changes including increases in extreme heat, wildfire, coastal flooding and erosion changes are likely to occur in air quality, water availability, and the spread of infectious diseases." Further, as projected in late 1990, the continued global rise in greenhouse gas emissions will ensure that global climate change will be inevitable (Wigley, Richels, & Edmonds, 1996; Adger, 1999). With this, the U.S. Climate Change Science Program stressed the importance of considering climate impacts on human society in combination with non-climatic factors including existing issues and conditions such as pollution, increasing immigrants and elderly populations, overburdened infrastructure, growing population in urban areas, geography, demographics, and complex social systems and links (Gamble, Ebi, Grambsch, Sussman, Wilbanks , 2008). Therefore, the

world is now committed to adapting to a changed climate system in all its manifestations. Making the understanding of adaptation and coping mechanisms, as one of the most critical research issues within the area of global environmental change and the human impacts on the worldwide climate system are significant (Adger, 1999).

In fact, last 2015 in Paris, France, the governments of 37 industrialised countries (developed and developing nations) agreed to contain global warming to below 2°C (relative to pre-industrial levels), with the hope of reducing the warming much closer to 1.5°C through Kyoto and Post-Kyoto International Agreements. The agreement *per se* also known as the Paris Agreement describes the way in which they can build on the national climate action plans to achieve the 2 degrees goal (Robinson & Dutton, 2017). Locally, as a tropical archipelagic nation, the Philippines is particularly susceptible to coastal hazards which are likely to be aggravated by climate change (Friedman, Christie, & Miles, 2012). Its vulnerability to climate change is amplified by its physiographic and geophysical characteristics, and being a developing country (Junio et al., 2015; Mamonong & Flores, 2008). Based on the 2003 official statistics, the national government estimates show that 82.5% of the entire population of the Philippines is at risk due to natural hazards (tropical cyclones, flooding and storm surges), and about 14.9 million families are vulnerable to the impact of climate change as they have houses with roofs and/or walls that are either make-shift or made of sub-standard materials (Mamonong & Flores, 2008).

Also, the World Bank estimated that the Philippines loses ₱15 billion (U$ 367 million) annually to disasters caused by typhoons and floods, representing about 0.7 percent of its Gross National Product (GNP) (Porio, 2014). Damages from the floods and storms in the Philippines have increased 18 times since the 1970s (Velasquez, 2012), while their occurrences have gone beyond the regular typhoon season from June to November to throughout the year (Porio, 2014). According to the studies in the country (Junio et al., 2015; Friedman et al., 2012; Allen, 2006), the observed irregularities in climate in the Philippines in 1951-2006 are as follows:

- increase of 0.6104°C in observed annual mean temperature;
- rise of 0.3742°C in observed yearly maximum temperature;
- rise of 0.8940°C in observed minimum temp: increased number of hot days and warm nights;
- decreased number of cold days and cold nights; an increase of annual mean rainfall and rainy days;
- increase in inter-annual variability of onset rainfall); and

- an average of 20 cyclones crosses the Philippine Area of Responsibility with 8-9 reaching land each year- an increase of 4.2 in frequency for the period of 1990-2003.

Moreover, according to Mamonong and Flores (2008) the Philippine Atmospheric, Geophysical and Astronomical Service Administration (PAGASA) using the PRECIS modeling system of the Hadley Center issued the following climate change projections for the Philippines for 2020 and 2050:

- the mean seasonal temperatures are expected to rise by about 0.9°C to 1.4°C by 2020 and 1.7°C to 2.4°C by 2050;
- projection of seasonal temporal rainfall variation is most significant (-35% to +45%) during the six-month period from March to August;
- forecast of seasonal temporal rainfall variation is less (-0.5% to +25%) during six months from September to February;
- the highest increase in rainfall during the southwest monsoon season (June to August) is likely in Region 1 (44%), Cordillera Autonomous Region (29%), Region 3 (34%), Region 4 (24%), and Region 5 (24%) in 2050;
- the model indicated that climate change would probably lead to an active southwest monsoon in Luzon and Visayas as evident in future increases in rainfall which is more pronounced in June to August and becoming greater with time; and
- the drier season of March-April-May will become drier still, while the wetter seasons of June-August and September-November will become wetter.

Thus, the Philippine government mainstreamed climate change and disaster risk reduction into the local development plan to lessen the impacts of natural hazards through Republic Act 9729 or the Climate Change Act of the Philippines, and Republic Act 10121 or also known as Philippine Disaster Risk Reduction and Management Act of 2010. These laws serve as the national response to the global issues and provide policy directions for the country's response to climatic alterations, and establish policies for the local government units to take the lead in disaster risk reduction through their respective local disaster coordinating council (Mendoza et al., 2014).

Climate change impacts on female-headed households

Female-headed households or lone mother units are classified in most national and international data sources as "a unit where an adult woman (usually with

children) resides without a male partner" (Chant, 1997, p. 27). Commonly, they are "the head of household in the absence of a co-resident legal or common-law spouse (or in some cases, another adult male such as a father or brother)" (p. 27). It is a generic term which covers other sub-groups such as grandmother-headed households, female-headed extended arrangement and lone female units (Chant, 1997).

The climatic alterations in the environment ultimately cause the susceptibility of the FHHs who are more vulnerable to climatic hazards due to their physical characteristics; limited skills and opportunity but more responsibilities in safeguarding their family members (Mendoza et al., 2014). They can also have more difficulty during recovery from the onslaught of climate-related catastrophes because of their low employment opportunity, lower wages and family care responsibilities (Cutter, Boruff, & Shirly, 2003) as well as their geographical locations.

Furthermore, FHHs have a high rate of vulnerability because women typically engage in vulnerable livelihood activities and non-productive work (e.g., household chores, caregiving tasks), health and sanitation conscious, and have limited access to off-farm livelihood options as well as the physical demands of coping with hazards (Mendoza, 2013). Women, in general, who live in rural communities, face significant challenges, shifting from their sustainable way of life towards the more difficult interconnected and interdependent current market economy (Yabaki, 2006). These challenges are further compounded by the effects of climate change, mainly as the incidence of extreme climate change events increases.

Adaptive capacity and adaptation

The IPCC Third Assessment Report (cited in McCarthy et al., 2001, p. 982) defines adaptive capacity as "the ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences". In addition, Adger and Vincent (2005) and Smith et al. (2010) describe adaptive capacity as the domain within which adaptation decisions are feasible. Considering the adaptive capacity, the time scale is also an essential factor, whereby the response to CCIs may require combinations of short, medium and long-term adaptive variables to facilitate adequate adaptation (Brooks, Adger, & Kelly, 2005). Additionally, the spatial scales are also crucial because AdCa may require combinations of responses at local, regional, national, and global scales to facilitate adequate adaptation (Smith et al., 2010).

To further discuss the understanding of AdCa, Yohe and Tol (2002) developed its genetic determinants. These are: 1) the range of available

technological options for adaptation; 2) the availability of resources and their distribution; 3) the structure of critical institutions; 4) the stocks of human and social capital; 5) access to risk spreading mechanism; 6) the ability of decision-makers to manage risk and information; and 7) the public's perceived attribution of the source of stress and the significance of climate change exposure to its local manifestations. Similarly, Byrne (2014) presented household adaptive capacity index (AdCaI) structures, composed of the following determinants: a) presence of alternative economic activities, b) access to information, c) access to technologies, d) social capital, e) knowledge and skills, and f) access to infrastructure. These components were utilised in this study to determine and assess the AdCa levels of the female-headed households.

Table 1: Determinants of adaptive capacity

COMPONENTS	DETERMINANTS
Economic Resources	Greater economic resources increase adaptive capacity. Lack of financial resources limits adaptation options.
Technology	Lack of technology limits range of potential adaptation options. Less technologically advanced households are less likely to develop and implement technological adaptations.
Information skills & management	Lack of informed, skilled and trained personnel reduces adaptive capacity. Greater access to information increases the likelihood of timely and appropriate adaptation.
Infrastructure	A more significant variety of infrastructure can enhance adaptive capacity since it provides more options. Characteristics and location of infrastructure also affect adaptive capacity.
Institutions and networks	Well-developed social networks increase adaptive capacity. Policies and regulations may constrain or enhance adaptive capacity.
Equity	Equitable distribution of resources increases adaptive capacity. Both availability of and entitlements to resources are essential.

Source: Smit and Pilifosova (2001).

Moreover, the characteristics of systems that influence their ability to adapt are referred to as determinants of adaptation (Adger et al., 2007; Richard & Douglas, 2014). These are further discussed in Table 1. The AdCa assessments may

benefit from an appraisal broken into contextual, structural, procedural and outcome influence, which build on regional natural resource planning assessments (Smith et al., 2008; Bellamy et al., 2005). However, Brooks et al. (2005) described a new approach to determining critical variables of adaptive capacity. As adaptive capability is enhanced through learning, the authors contend that a proactive and participatory co-learning approach is needed to ensure that learning occurs in the critical areas of all social systems that are affected by climate change. But Smith et al. (2010) proposed that climate change adaptation is best informed by an integrated research approach through a participatory and transformative method to understand and enhance AdCa. Moreover, Adger (1999) mentioned that there is a critical need to understand the processes by which adaptation to global environmental changes come about and the implications of these processes for present-day vulnerability to these changes.

Measuring AdCa is difficult since it is essentially measuring the 'potential' to respond to changes in climate or climate-related disasters. An asset-based approach is often taken as a way to measure the potential. Nevertheless, despite the uncertainty in assessing AdCa, there remains a policy need for empirical assessment so that policymakers can turn assessment into practical measures (Vincent, 2007). Much of the work done on the AdCa to date, has favored national level assessment that utilises indicators and indices (Brooks et al., 2005; Yohe & Tol, 2002), but there is a dearth of literature assessing adaptive capacity focusing on the FHHs.

Gender, adaptive capacity and adaptation

There are several studies conducted that discuss women, gender, and climate change. Women are affected more adverse by climate change than men in countries in South Asia, but the men in northern Europe pollute more than their female counterpart. They are considered more sensitive to risk, more prepared for behavioral changes and more likely to support radical policies and measures on climate change (Jonsson, 2011). The study of Jianjun, Xiaomin, and Yirei (2015) determined that male and female are not significantly different in their knowledge and perceptions of climate change, but there is a gender difference in adopting climate change adaptation measures. It also indicated that the adaptation decisions of male and female are influenced by different sets of factors. The FHHs are less likely to adjust in a particular environmental scenario and it was revealed in the agricultural sector; however, indirectly it might contribute substantial input in the discussion of this study.

Existing studies on adaptation to climate change mainly focus on a comparison of male-headed and female-headed households, but the study of

Ngigi, Mueller, and Birner (2017) examined how husbands and wives within the same family in rural Kenya perceive climate risks and use group-based approaches as coping strategies. The findings indicate that options for adapting to climate change closely interplay with husbands' and wives' roles and responsibilities, social norms, risk perceptions and access to resources. On the other hand, Aelst and Holvoet (2016) revealed that women's marital status is a vital factor in determining their access to adaptive strategies, while it is a less key factor in the case of men. Compared with other women, widows and female divorcees are disadvantaged in the field of agricultural water management, and divorced women assume relatively more income-earning activities outside the farming sector.

Thus, Lee, McCollum, and Eschoo (2009) encouraged the use of the gender-sensitive framework in developing policies to address climate change which accounts for the specific impacts of climate change on women. However, the gender-specific climate change information needs trust in news and preferred channels of information dissemination (Ngigi et al., 2017). To better understand the factors that influence the male and female-headed households' climate change adaptation decisions, as well as the strategic interventions that are required for effective adaptation (Jianjun et al., 2015), a World Bank study found that men and women have different adaptation strategies, with men focusing on large-scale interventions, while women place greater emphasis on concrete and community improvement (Bousquet et al., 2015). Not surprisingly, in discourses around climate changes that have hardly any attention to gender, there are few mentions of policymakers who have chosen to take up AdCa and adaptation practices.

Women's role in climate change adaptation

The literature about women, gender, climate change, and its impact highlight the role of women in climate change adaptation. Dealing successfully with risk management, disaster preparedness, and climate change-induced-weather challenges require resources beyond those that are available to meet the day-to-day needs of individuals and households. Considerably, in the formulation of prevention, adaptation and mitigation strategies in the face of climate change, women play an essential role (Bousquet et al., 2015). Their parts extend from family units to the community level where they contribute to all the primary spontaneous and planned strategies that the village has taken up in response to a changing climate among other disasters (Muthoni & Wangui, 2013).

In fact, they use their traditional know-how in various fields such as seeking new and alternative sources of water, planting new varieties of crops, promoting biodiversity, and setting in place diversified productive activities to

increase household income (Bousquet et al., 2015)They also create innovative and localised solutions to build resilient communities (Alam et al., 2015) that when combined with modern techniques and technologies can contribute to a more active adaptation response (Bousquet et al., 2015). In many regions of the world, women contribute to adaptation and mitigation efforts, despite being systematically excluded from decision-making mechanisms, denied agency in selecting when and how to overcome vulnerability, and having unequal representation in policy and program designs (Alam et al., 2015).

Theoretical Framework

Reducing the FHHs' vulnerability necessarily requires analysing their AdCa and AdPrac before, during, and after the occurrence of catastrophic events. Thus, this study applied the adaptation-based approach as basis in supporting the conceptual perspective of this investigation. An adaptation-based approach aims at moderating the adverse effects of climate change through a wide variety of actions and adjustments in ecological, social, or economic systems and seeks to create benefits from opportunities associated with climate change (Fussel & Klein, 2006; Ogra & Badola, 2014). Because adaptation has multiple and interlinking dimensions that touch on ecological, economic, political, physical and social aspects, the AdCa of local communities is governed both by internal, culturally-specific characteristics as well as by larger external social, economic and political structures that empower or constrain action.

In this view, capacity-building in adaptation is predicted on the privilege of choice: a community or a person who lacks options or alternatives in any situation has no real power. Thus, strengthening the adaptive capacity of FHHs is central to the challenge of addressing local vulnerability to the impacts of climate change and to the goal of empowering communities to be able to make a meaningful and viable choice about adaptation, *per se*. In applying this approach, several variables have been identified and were used in this endeavor. These are economic, social, human capital and institutional resources (Byrne, 2014). The notion of examining the AdCa through the FHHs' components is based on the principle adopted from Adger et al. (2007).

Further, the resource-based theory was used in this study to confirm the indicators in the AdCa assessment of the FHHs in the two remote coastal communities of Lagonoy. The theory is usually related and applied to entrepreneurial approach. However, it can be used in this study as basis for the adaptive capacity assessment, which focused on the economic, human, social and institutional resources. In resource-based theory, access to resources is an essential predictor of opportunity and stresses the importance of financial, social, and

human resources (Alvarez & Busenitz, 2001; Aldrich, 1999). Moreover, access to resources enhances the individual's ability to detect and act upon discovered opportunities (Davidsson & Honig, 2003). However, applying this theory in this study, access to resources of FHHs could increase their adaptive capacity to CCIs if they could eventually discover the potential opportunities that they need to cope with the hazardous environmental catastrophes.

The resource-based theory has three classes of approaches, namely; financial capital theory, social capital or social networks theory, and human capital theory. The financial capital theory implies that the people with financial capital are more able to acquire resources to exploit potential opportunities effectively. In addition, the social capital theory indicates that an individual may have an ability to recognise the given opportunity and access to some more extensive networks that might help to overcome specific problems like CCIs (Eckhardt & Shane, 2003). The human capital theory, on the other hand, consists of two factors, i.e., education and experience. In this theory, the knowledge gained in training and experience represents the resources that are diversely distributed across individuals and in effect central to understanding differences in opportunity identification and exploitation (Gartner, Shaven, Carter, & Reynolds, 2004).

Consequently, the resource-based theory explains how the FHHs can acquire potential opportunities that they could exploit and apply to help them eradicate their vulnerability and boost their adaptive capacity. To increase the adaptive capacity of female-headed households to CCIs, local government units may consider potential policy recommendations which they might be able to formulate through this undertaking.

Research Methodology

Research Design and Study Sites

This study followed the causal-comparative and correlational research designs using the quantitative research method. This design was used to examine the adaptive capacity levels and adaptation practices of FHHs in the two remote coastal communities of Lagonoy, Camarines Sur. In addition, it was applied to compare and analyse the concept, relationship between variables and the factors that influence the respondents' AdCa. The study sites were the east and north shore communities of Lagonoy, Partido District, Camarines Sur (Figure 1). These communities have been purposefully selected because of their geographic location and where female-headed households are more vulnerable to climate change impacts (Singh, Eghdami, & Singh, 2014).

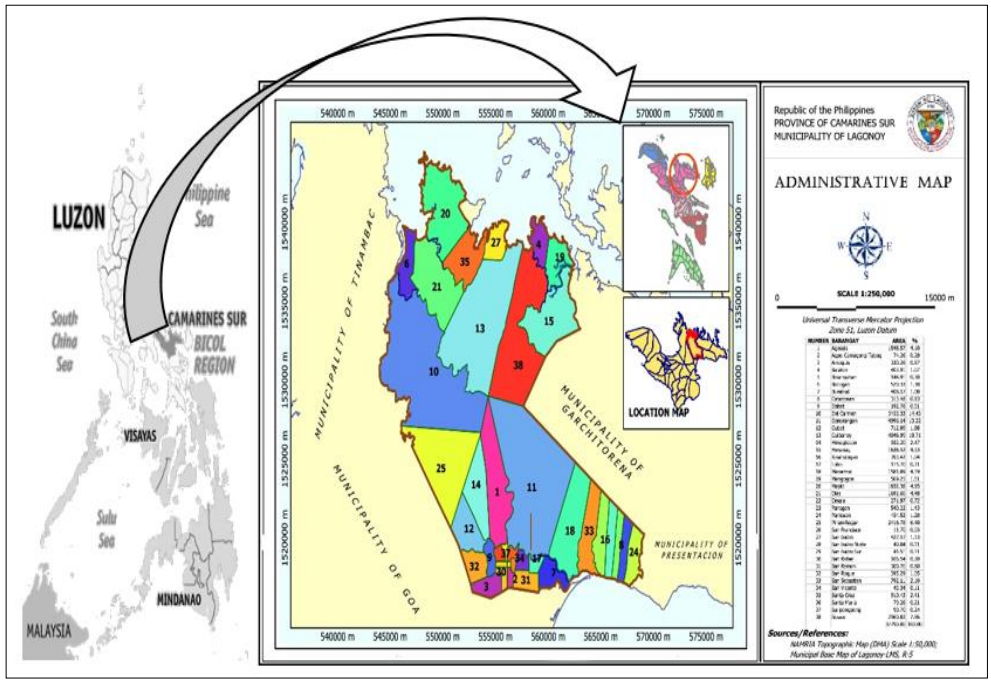

Figure 1: Map of Lagonoy, Partido District, Camarines Sur, Philippines
(Source: Local Government Unit of Lagonoy [2019].)

Respondents and Sampling Technique

Female household heads are the mothers who carry both the responsibility of being a mother and a father. The term also refers to single mothers (widowed or legally/non-legally separated) who solely provide for daily household necessities, elevate the standard living of the family, and are exposed to and sensitive to the impacts of climate change. Using Cochran's formula for multi-stage sampling, 162 out of 281 female-headed households were selected as study respondents in the east and north coastal communities (NCCs). Eighty-one FHHs were equally allocated in the east and north coastal communities to serve as respondents. Simple random sampling was used in selecting the 81 respondents from each community to give the subjects equal opportunity to be selected to avoid subjectivity in collecting information. Single mothers who are under their parents' custody, and widows who are supported by their children were not included as respondents of this study.

Data Gathering Instruments

The data were collected through a household survey using a standardised questionnaire, which was subjected to content validation by expert professors from the University of the Philippine Los Baños. The instrument was pre-tested among qualified but not the actual female-headed household respondents in the coastal communities of Lagonoy to ensure the validity of its contents. To check its reliability, Cronbach's alpha was computed using the Statistical Package for the Social Sciences (SPSSv23) and an acceptable value of 0.90 was obtained. It was translated into the vernacular language (Bicol dialect) so the respondents could clearly understand. In addition, triangulation via field observations and key informant interviews (KIIs) was used to verify some of the respondents' answers. The KII was used to interview each community's *Punong Barangay* (Village Chief) from the East and North Coastal areas in order to validate the information generated from the survey specifically regarding their community social status.

Data Analysis/ Statistical Tools

Descriptive statistics (weighted mean) was used to measure the FHHs' adaptation practices and Pearson product moment correlation coefficient was used to analyse the relationship between adaptive capacity and adaptation practices to CCIs of the respondents using the SPSS software v. 23. Adaptive Capacity Index was used to assess the extent of female-headed households' potential for adaptation. On the other hand, the first step in indexing was to standardise the scores, following the equation below:

$$\text{Index}_{sd} = \frac{s_d - s_{min}}{s_{max} - s_{min}}$$

where:
sd = is the original sub-component of each of the major components,
s_{min} = the minimum (lowest) value among all the respondents, and
s_{max}= the maximum (highest) value among all the respondents.

This study used the SPSS v23 for standardisation to determine the AdCaI with the unweighted index where all the indicators have equal weights. The AdCaI ranged from 0 (less adaptive) to 1 (highly adaptive), with the following scale: 0.00-0.49 Less Adaptive, 0.50-0.79 Moderately Adaptive, and 0.80-1.00 Highly Adaptive. A higher value of the index indicates a higher adaptive capacity. However, a negative value of the index does not mean that the household has no adaptive capacity at all, as the index does not give the absolute measurement of

adaptive capacity. It is a relative measure and hence gives rather a comparative ranking of adaptive capacity among the sampled FHHs.

Multiple linear regression was used to determine the factors affecting the respondents' adaptive capacity to CCIs, following the equation below:

$$Yij = a + \beta X1ij + \beta X2ij + \beta X3ij + \beta X4ij + \varepsilon ij$$

where Y_{ij} = adaptive capacity index; X_1 =mean of adaptation practices before a disaster; X_2 = mean of adaptation practices during a disaster; X_3 = mean of adaptation practices after a disaster; X_4 = educational attainment; X_5 = occupation; X_6 = number of working household members; and X_7 = number of household members participating in at least one community organisation or NGO.

Results and Discussion

Level of adaptive capacity of female-headed households to climate change impacts

The female household heads in both east and north coastal communities have moderate adaptive capacity in terms of economic resources like monthly income, and access to technologies (e.g., smartphones, televisions) (Table 2). Also, they are highly adaptive when it comes to means of transportation (like motorcycles). Nevertheless, their sources of income and the value of equipment used in livelihood activities greatly vary. Wherefore, FHHs in the east coastal communities (ECCs) are moderately adaptive compared to their counterparts from the NCCs with 0.83 component scores, indicating a highly adaptive approach. However, a disparity of results can be gleaned in terms of their alternative livelihood activities, where NCC respondents are less adaptive compared to the highly adaptive women household heads from the ECCS because of the limited employment opportunities in their location.

Results for institutional resources (conceptualised in terms of accessibility of resources) showed that the respondents from the NCCs are less adaptive in terms of transportation access compared to those from the ECCs. The negative figure sign indicates that the FHHs from the ECCs are not concerned about this due to their ease of access to major or national roads. The household heads from the ECCs are highly adaptive relative to their counterparts when it comes to the presence of health services. In the meantime, it can be observed that the women heads are moderately adaptive in terms of the presence of primary schools in both coastal communities. However, the two remote coastal communities greatly differ in AdCa in terms of access to drinking water, that is, FHHs from the NCCs are highly adaptive compared to those from the ECCs.

Table 2: Female-headed households' level of adaptive capacity to climate change impacts, Lagonoy, Partido District, Camarines Sur, Philippines

Indicators	Component Scores	
	East Coastal Communities	North Coastal Communities
Economic resources		
Monthly household income (in peso)	0.75**	0.69**
Number of sources of income (livelihood-related activities of the household head)	0.76**	0.83***
Number of alternative livelihood activities of the household head	0.87***	0.45*
Number of TVs, radios, computers/laptops	0.63**	0.63**
Number of smartphones in the household	0.75**	0.69**
Total value of equipment used in livelihood-related activities (fishing vessels and paraphernalia, etc.)	0.94***	0.59**
Number of vehicles	0.93***	0.90***
Institutional resources		
Distance to the nearest major road (in meters)	-0.41*	0.14*
Distance to nearest health facility (in meters)	0.80***	0.49*
Distance to nearest primary school (in meters)	0.64**	0.73**
Distance to clean drinking water (in meters)	0.43*	0.80***
Social resources		
Number of household members participating in at least one community organisation or NGO	0.84***	0.68**
Number of working household members	0.77**	0.80***
Human resources		
Number of years spent in school by the household head	0.79**	0.65**
Number of training and seminars attended by household head regarding climate change impacts	0.42*	0.73**

*Legend: *0.00-0.49 Less Adaptive, **0.50-0.79 Moderately Adaptive, ***0.80-1.00 Highly Adaptive*

Likewise, in terms of social resources, the respondents from both remote coastal communities are moderately to highly adaptive. Therefore, FHHs in both communities engage actively in enhancing their social capital because of the number of household members who engaged in the society's workforce. Willis (1993) suggests that household members with a wide variety of social networks can help them use their job resources for everyday purposes. The respondents from both coastal communities have modest adaptive potential for human capital,

due to their years of education. The FHHs from the ECCs, though, have less adaptive potential as compared to those from the NCCs when it comes to seminars and training activities attended.

However, the FHHs in the NCCs are less adaptive to the impacts of climate change due to limited economic activities (alternative livelihood activities) and opportunities in the area, similar to the study of Mendoza at al. (2014). This is due to the NCC respondents' proximity to the Partido District trade center. This position is important to the respondents for potential jobs and economic opportunities that could help them improve their battle against the adverse impacts of climate change. Therefore, this scenario made the various sectors in the society, particularly the vulnerable FHHs, exhibit lower AdCa to climate variations (Singh et al., 2014). In contrast, households with high acquired assets are relatively less affected, and have a better AdCa because of their economic resources (Boakye, Bawakyillenuo, & Agbelie, 2018).

Furthermore, the FHHs in the NCCs are less adaptive to climate change impacts due to their limited access to the national road and limited availability of health facilities. This setup highlights women's challenges in facilitating and promoting their own family's effective health care system that could affect their adaptive capacity. Richard and Douglas (2014) argued that a location with significant infrastructure variation could enhance an individual's adaptive capacity as it provides more adaptation options. Well-established infrastructure such as health facilities, schools and the like can create further opportunities for the FHHs to improve their well-being. The availability of strong institutions and entitlements to key resources contribute better than knowledge and information on climate-related issues and adaptation strategies, as well as innovation (Mesfin, Simane, Belay, Recha, & Schmiedel, 2020). Therefore, though knowledge of the problem is vital, it does not guarantee a solution for it (Boakye et al., 2018), it must always be combined with the power of actions.

While the ECCs have easy access to a variety of infrastructures provided by the local government unit, they have difficulties accessing potable water because of limited natural water sources. This in turn reduces their capacity to adapt to CCIs. Hence, FHHs' limited access to drinking water could have an impact not only on their livelihood but also on their livelihoods, which could provide them with additional economic benefits to combat the climate change risks. Richard and Douglas (2014) emphasised that the existence, characteristics, and location of infrastructure have a major impact in building some households' adaptive capability.

Female-headed households' adaptation practices to climate change impacts

Perceived adaptation practices to CCIs in the two remote coastal communities of Lagonoy, Camarines Sur are presented in Tables 3, 4 and 5. The weighted mean indicated whether the respondents always, often, sometimes, or never perform the listed practices.

Female-headed households' adaptation practices before a disaster

In both coastal communities, prior to the blitz of calamities, FHHs often seek spiritual aid through protective prayers and prepare food and drinking water sources (Table 3). They also secure relevant documentation and continue to transfer their goods storage, valuable and irreplaceable objects to a higher location so that these would not get wet or damaged. FHHs always prepare packed clothes or toiletries and supplies for emergencies. They keep their houses safe, and they track the weather closely through the radio and television.

The respondents often secure emergency evacuation locations, travel to the evacuation center if needed, and appear to obtain life, property, and medical insurance. In addition, the floors and foundations of their homes are often adjusted and strengthened. They store in a safe place the goods or items used in their livelihood activities, and often keep close watch over the early warning system installed for preparation and evacuation purposes. The respondents in both communities sometimes keep their fishing paraphernalia and other equipment in a safe storage area that they use for agricultural activities. Results thus emphasise that both coastal communities have collective and the same adaptation activities (p-value of 0.30 > 0.05) practiced in order to protect their families and properties before the natural calamities occur.

Table 3: Female-headed households' adaptation practices before a disaster, Lagonoy, Partido District, Camarines Sur, Philippines

Practices	Weighted Mean	
	East Coastal Communities	North Coastal Communities
Prayed to God to protect them.	4.00	3.86
Prepared supply of food and drinking water.	3.80	3.74
Secured pertinent documents (e.g., birth certificate, marriage contracts and others)	3.68	3.67
Moved the storage of goods, valuable and irreplaceable items to a higher level so that these would not get wet or damaged	3.65	3.51
Prepared packed clothes/toiletries and emergency supplies (e.g., flashlights and headlamps,	3.62	3.52

medicines)		
Kept safe the roof of the house by putting sandbag or by knotting the rope to the tree or a strong thing.	3.53	3.64
Closely monitored the weather through radio and TV.	3.27	3.41
Trimmed the trees around the dwelling unit.	3.16	3.28
Secured emergency evacuation places with relatives and friends.	2.93	2.96
Evacuated to the evacuation center.	2.89	2.80
Stored the appliances in the safest place of the house.	2.88	3.22
Acquired life, property, and medical insurance.	2.86	2.81
Checked the health and physical conditions of family members, especially those who have disabilities.	2.77	3.57
Adjusted the floor level and strengthened the foundation of their house.	2.74	2.79
Stored in a safe place the goods or items used in livelihood activities.	2.57	3.07
Kept a close watch on the early warning system installed by the local government that alerts them of rising water level in the river or storm surge and directs them to prepare and evacuate.	2.52	2.74
Kept the fishing paraphernalia and other equipment used in agricultural activities in a safe storage area.	2.01	2.42
Harvested the possible agricultural products like palay, fish in the fish ponds, root crops, coconut, and others.	1.86	2.67
Kept safe the bancas or fishing vessels to the place where these could not be damaged by floods or storm surge.	1.80	2.51

t= -1.06, P= 0.30, significance level at <0.05.

Legend: 3.25-4.00 Always; 2.50-3.24 Often; 1.75-2.49 Sometimes; 1.00-1.74 Never

Female-headed households' adaptation practices during a disaster

In both coastal communities, the FHHs still pray to God for safety during a disaster. They also prepare food and drinking water and move their products storage and important and irreplaceable objects to a higher place to keep them safe (Table 4). The respondents from both communities often keep a close watch on the early warning system installed for them to be prepared for possible evacuation during the occurrence of calamities. They store their products and items for livelihood activities, evacuate if necessary and keep their appliances secure.

Table 4: Female-headed households' adaptation practices during a disaster, Lagonoy, Partido District, Camarines Sur, Philippines

Practices	Weighted Mean	
	East Coastal Communities	North Coastal Communities
Prayed to God to protect them.	4.00	3.85
Prepared for any supply of food and drinking water.	3.81	3.69
Moved the storage of goods and valuable and irreplaceable items to a higher place so that these would not get wet or damaged	3.40	3.46
Prepared readily packed clothes/toiletries and emergency supplies (e.g., flashlights and headlamps, medicines)	3.09	3.51
Closely monitored the weather through the radio and TV.	3.00	3.31
Secured pertinent documents (e.g., birth certificate, marriage contracts and others)	2.95	3.58
Checked the health and physical conditions of family members, especially those who have disabilities.	2.83	3.60
Kept a close watch on the early warning system installed by the local government that alerts them of rising water level in the river or storm surge and directs them to prepare and evacuate.	2.46	2.94
Stored in the safe place the goods or items used in livelihood activities.	2.27	3.09
Evacuated to the evacuation center.	2.20	2.93
Stored the appliances in the safest place of the house.	2.09	3.21
Kept the fishing paraphernalia and other equipment used in agricultural activities in the safe storage area.	1.70	2.28

t= -1.98, P= 0.06, significance level at <0.05.

Legend: 3.25-4.00 Always; 2.50-3.24 Often; 1.75-2.49 Sometimes; 1.00-1.74 Never

The FHHs from the NCCs always prepare ready packed clothes and emergency supplies, monitor the weather through the radio and television, secure their important documents, and usually check their disabled family members' health and physical conditions. The respondents from the ECCs often perform these AdPrac but they never retain their fishing paraphernalia and other equipment used in agricultural activities because they tend to keep these things ahead of the fusillade of calamity like typhoon.

This implies that even during the onslaught of extreme natural hazards, the female heads of households always think about their families and properties'

safety. Therefore, in both coastal communities, FHHs have similar behaviors during the calamity assault (p-value 0.06> 0.05).

Female-headed households' adaptation practices after a disaster

The female household heads often offer thanksgiving to God for His protection after calamities occur (Table 5). They fix their houses' damaged stuff resulting from the burst of disasters. In their surroundings, the respondents conduct general clean-up drives; prepare a supply of food and drinking water and restore the logistics of the home. The FHHs from the ECCs also test the farm equipment or livelihood equipment used in income generating activities. They track the weather closely via the radio or television and check the health status of disabled family members. After the climatic events occur, the respondents from the NCCs also always practice these activities.

Results suggested that in the two remote coastal communities of Lagonoy, FHHs have well-strategised local practices or information when it comes to adaptation options before, during, and after the onslaught of natural calamities and they perform well in managing their responsibilities (Handayani, Ananda, Esariti, & Anggraeni, 2017). Being located in areas vulnerable to weather-related disasters coming from the Pacific Ocean, of the FHHs have developed the expertise in dealing with typhoons and are well-organised with these activities. With these well-organised local adaptation practices or knowledge, the female heads of households can somehow eradicate the increasing effect of vulnerability in both coastal communities (Tambo, 2016). The study's findings with respect to AdPrac are similar to Porio (2014). Women, therefore, have the local environmental knowledge which can contribute to a more active adaptation activity when combined with modern techniques and mechanisms (Bousquet et al., 2015).

Table 5: Female-headed households' adaptation practices after a disaster, Lagonoy, Partido District, Camarines Sur, Philippines

Practices	Weighted Mean	
	East Coastal Communities	North Coastal Communities
Thanked God for the protection.	3.98	3.85
Repaired the damaged part of the house.	3.95	3.64
Conducted general clean-up drive in the surroundings as well as in the entire dwelling unit.	3.91	3.67
Prepared supply of food and drinking water.	3.75	3.68

Restored the household logistics.	3.52	3.49
Checked the agricultural or livelihood equipment used in income-generating activities.	3.19	3.25
Closely monitored the weather through the radio and TV.	3.03	3.39
Checked the health and physical conditions of family members, especially those who have disabilities.	2.79	3.57
Visited the agricultural land areas where the respondents usually went farming or fishing.	2.25	3.04
Restored the fishing vessels and bancas for transportation purposes.	1.64	2.54

t= -0.76, P= 0.46, significance level at <0.05.
Legend: 3.25-4.00 Always; 2.50-3.24 Often; 1.75-2.49 Sometimes; 1.00-1.74 Never

Relationship of female-headed households' adaptive capacity and adaptation practices to climate change impacts

Studies on vulnerability and adaptation to climate change assumes that increasing amount of adaptive capacity upsurge the likelihood of actions to adapt to climate change. In this study, this assumption is applied at the FHHs as one of its objectives (Table 6). The adaptation practices before, during and after the blitz of natural disasters have always had something to do with the adaptive capacity of an individual particularly in the context of FHHs. In fact, the result is evident that there is a significant relationship between adaptive capacity and adaptation practices to CCIs. The data showed that there is a negative moderate correlation between variables in the ECCs, while a positive weak correlation from NCCs. However, a significant relationship between variables revealed during and after the onslaught of natural disaster with the p-value of less than 0.05, which is different from the study results conducted by Mortreux, O'Neill, and Barnett (2020), where the AdCa does not provide significant explanation on adaptation actions. This conclusion demonstrates that the connection framework of adaptive capacity and adaptation practices may differ from one place or scale to another depending on the extent of CCIs in the locations.

Consequently, this finding implies that having an organised and well-strategised indigenous or local knowledge of AdPrac in the household and within the community has a tendency to enhance the adaptive capacity of FHHs and may help lessen the shocks and risks, especially during and after the prevalence of natural disasters. Because a single adaptation practice can serve more than one particular risk and indeed it is difficult to isolate the adaptation practices devised

solely in response to climate risks (Piya, Maharjan, Joshi, 2012). Thus, awareness and skills on adaptation practices during and after the onslaught of natural disasters contribute significantly in increasing the adaptation opportunities of the respondents against climate change impacts.

Table 6: Relationship of female-headed households' adaptive capacity and adaptation practices to climate change impacts.

Adaptive Capacity Index	Adaptation Practices					
	East Coastal Communities			North Coastal Communities		
	Before	During	After	Before	During	After
r (Pearson correlation)	-0.180	-0.463	0.057	0.157	0.227	0.223
p-value (sig. 2-tailed)	0.107	0.000*	0.610	0.163	0.042*	0.045*

**correlation is significant at the 0.05 level (2-tailed)*

Factors affecting the adaptive capacity of female-headed households to climate change impacts

The factors that could affect the adaptive capacity of the FHHs in the two remote coastal communities were tested using the index or the standardised set of data (Table 7). The crucial factors that could influence the adaptive capacity of female-headed households in the ECCs are their adaptation practices during and after the onslaught of natural disasters, educational attainment, and the number of working household members. Standardised beta coefficient scores were -0.556, 0.286, 0.314, and 0.280, respectively.

On the other hand, the factors that could influence the adaptive capacity of the respondents residing in the NCCs are: educational attainment and number of working household members, with standardised beta coefficient scores of 0.306 and 0.313, respectively. The standardised beta coefficient results were those outputs of the predictor variables which determine whether the particular indicator influences FHHs' adaptive capacity. With this, the zero or near zero t-value implies acceptance of the null hypothesis with no meaningful tests. These data explain how these identified variables vary with the adaptive capacity of female-headed households to respond to the impacts of climate change. It can be gleaned that these significant factors have been established because the p-value is less than 0.05. Thus, the null hypothesis was rejected, indicating that in the two remote coastal communities of Lagonoy, there is at least one important factor that affects the adaptive capacity of FHHs.

The female household heads with certain characteristics can affect their potential for adaptation because of their educational attainment, adaptation practices during and after the occurrence of natural disasters, and the number of working members in the household. Highly educated people (with tertiary education) have higher awareness capacity than fairly educated ones (elementary or vocational school education) and uneducated respondents (Boakye et al., 2018). However, in this research most of the respondents were less adaptive with regard to their educational attainment that could adversely affect their adaptive capacity against the impacts of climate change. Indeed, highly educated people may have higher ability to cope up with challenging demands of climate change, but it does not guarantee to solve this issue. Thus, a combined effect of knowledge and actions is a powerful mechanism for them to be able to adapt triumphantly against the variations of the climate (Jamshidi et al., 2020).

Moreover, establishing capacity and adaptation practices is an essential step in preparing adaptation strategies (Grambsch & Menne, 2003). However, a household without specific or organised local adaptation practices definitely may have a lower adaptive capacity. It is common for the household members to practice specific approaches before, during and after the manifestation of natural disasters particularly when there is a typhoon. But, the AdPrac in a household specifically for female-headed households is a much important factor during and after the blitz of natural disasters to increase their adaptive capacity.

On the other hand, the number of working household members is considered as one of the significant factors that influence the FHHs' adaptive capacity in the two remote coastal communities of Lagonoy. A collective household income of family members may increase their opportunity to strengthen their capacity to adapt against the gradual or drastic effects of climate change. Household with numerous members working regardless of sectors and employment status contribute tremendously in securing household resources such as food and non-food assets. Combined salaries of working members may help to send the other household members to reputable schools or universities for them to acquire more knowledge and skills that can help them boost their adaptation decisions. Education awareness raising enables people to take well-informed and long-term sustainable decisions (Grambsch & Menne, 2003). The households with more working members have higher potential for adaptation due to available family support, which makes the family more adaptive to climate change (Asmare, Burso, Taye, & Yirga, 2018).

Table 7: Factors influencing the adaptive capacity of female-headed households to climate change impacts in the east and north coastal communities, Lagonoy, Camarines Sur, Philippines

Adaptive Capacity Indicators	East Coastal Communities			North Coastal Communities		
	Standardised Coefficient Beta	*t*	*Sig. (2-tailed)*	*Standardised Coefficient Beta*	*t*	*Sig. (2-tailed)*
(Constant)		2.094	0.040		-3.155	0.002
Adaptation Practices before the Disaster	-0.184	-1.471	0.145	-0.039	-0.215	0.830
Adaptation Practices during the Disaster	-0.556	-4.970	0.000*	0.085	0.348	0.729
Adaptation Practices after the Disaster	0.286	2.343	0.022*	0.172	0.792	0.431
Educational Attainment	0.314	3.177	0.002*	0.306	2.739	0.008*
Occupation	-0.039	-0.379	0.706	0.065	0.610	0.544
Number of Working Household Members	0.280	2.806	0.006*	0.313	2.904	0.005*
Number of Household Members Participating in at least One Community Organisation or NGO	-0.148	-1.546	0.126	0.111	1.003	0.319

**Significant factors at <0.05 (2 tailed).* *East Coastal Communities (R=0.64, R^2= 0.35 or 35%)*
**Significant factor at <0.10 (2 tailed).* *North Coastal Communities (R=0.50, R^2= 0.18 or 18%)*

Conclusions and Recommendations

The FHHs in the east and north coast communities are both moderately adaptive in terms of economic resources. Results for institutional resources have shown that the respondents from the NCCs are less adaptive in terms of transportation access compared to those from the ECCs. In addition, the results indicated that in terms of their social resources, the respondents from both remote coastal communities are moderately to highly adaptive. In other words, households led by female in both societies engaged actively in their social capital due to the number of the household members participating in the workforce. The respondents from both coastal communities have modest adaptive potential in terms of human capital, due to their years of education. Although the female-headed households from the ECCs have less adaptive ability relative to those from NCCs when it comes to seminars and training activities attended.

Despite of the latter, the FHHs in these two remote coastal communities have well-strategised practices when it comes to adaptation options before, during, and after the onslaught of natural calamities. Because of their long experience in coping with typhoons, they have well-organised practices. In these two remote

coastal communities, more so, there is a significant relationship between the adaptive capacity and adaptation practices of the respondents during and after the onslaught of natural disasters. Meanwhile, the variables that significantly influence the respondents' AdCa from both coastal communities include adaptation practices during and after the occurrence of natural disasters, educational attainment, and number of working household members.

Consequently, this study offers some recommendations to enhance the FHHs' adaptive capacity. By applying cooperative management and community organising, household heads must educate and expose themselves in exploiting entrepreneurial opportunities which they could activate as other sources of income. In addition, the Lagonoy North area has its huge potential to become one of the country's tourist destinations. The LGU Lagonoy must exploit and make use of the existence of the untapped natural resources in the area, as it could provide the respondents with livelihood opportunities. With this, the latter could be able to elevate their economic conditions to increase their capacity for adaptation to the impacts of climate change. Further, Lagonoy's LGU should continue to build national roads in the NCCs so that they can reduce the travel time. The FHHs from the NCCs could eventually increase their adaptive capacity in pursuing this project, because they can have easy means of transportation to business and job opportunities.

The Municipal Disaster Risk Reduction Management Council (MDRRMC) must introduce comprehensive and intensive training activities on adaptive capacity to CCIs of FHHs in the coastal communities of Lagonoy, as the respondents are less adaptive when it comes to awareness of the impacts of climate change. The MDRRMC must identify, improve and leverage the residents' local or indigenous knowledge and skills and practices to mitigate climate change problems. In addition, as a holistic solution, the national government must conduct comprehensive nationwide investigation into the adaptive capacity of female-headed households compared with their counterparts through the policy makers' directive. It is highly recommended to establish specific social protection programs (about mitigating the impacts of climate change) by implementing an environmentally- and gender-sensitive framework. This framework could help to understand how the government can increase FHHs' adaptive capacity without exploiting or harming the natural environment and sustainable development for future generations.

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