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Do Adaptation and Coping Mechanisms to Extreme Climate Events Differ by Gender? The Case of Flood-Affected Households in Dumangas, Iloilo, Philippines

FARISAL U. BAGSIT[1*], JEE GRACE B. SUYO[2], RODELIO F. SUBADE[3] and JOSEFA T. BASCO[4]

[1]Institute of Fisheries Policy and Development Studies, CFOS, UP Visayas, Miagao, Iloilo, Philippines
[2]Southeast Asian Fisheries and Development Center/AQD, Tigbauan, Iloilo, Philippines
[3]Division of Social Sciences, CAS, UP Visayas, Miagao, Iloilo, Philippines
[4]BIDANI, UP Visayas, Iloilo City, Philippines

Abstract

This study was conducted to identify and analyse gender-differentiated adaptation measures and coping mechanisms formulated and implemented by households during Typhoon Frank (international name *Fengshen*), in barangays Cayos and Bantud Fabrica, Municipality of Dumangas, in the Province of Iloilo, Philippines. The survey was conducted among 120 respondents who were randomly selected from the barangay local government unit. Key informant interviews, focus group discussions and secondary sources were also used to supplement information obtained from the household surveys. Results show that although women and men worked in complementary ways to secure their family assets, gender differences were observed in their preferred adaptation and coping responses. However, statistical analysis shows no significant difference in the responses of women and men relative to the flooding.

Introduction

The geographical location of the Philippines makes it one of the countries that is prone to various climatic hazards, particularly typhoons. An average of 20 typhoons enter the Philippines Area of Responsibility (PAR) annually (Casals 2013). In 2008, eight tropical cyclones affected 98 provinces in the Philippines resulting in a total damage amounting to almost PhP 20 billion (USD 1 = PhP 41) in agriculture and infrastructure (Republic of the Philippines 2009). Of the eight tropical cyclones, Typhoon Frank (international code *Fengshen)* caused the worst flooding in Western Visayas (Burgos 2010) and registered the maximum damage nationwide with more than PhP 13.5 billion (Republic of the Philippines 2009). The worst hit were the provinces of Iloilo, Aklan, Capiz and Antique (IFRCRCS 2008).

* Corresponding author. Email address: farisalungkakay@yahoo.com

The severity of impacts of these catastrophic events required integrated relief and rehabilitation effort across the regions. More recently, there has been an upsurge in interest and concern about adaptation linked to current climate variability and the context has been broadened to include other environmental and social stressors and changes in socio-economic conditions and sustainable development (UNFCCC 2008). Adaptation at an accelerated and more targeted pace is seen as critical for the secure development of vulnerable populations, taking into account the adaptation strategies, the differences between men's and women's vulnerabilities and resources for it to succeed (FAO 2008).

This study attempts to fill in some of the knowledge gaps that are obstacles to achieving adaptation by providing gender perspectives in the adaptation and coping strategies of coastal communities in response to Typhoon Frank and the consequent flooding that occurred in 2008 in Dumangas, Iloilo, Philippines. The objective was to identify and analyse gender-differentiated adaptation measures and coping mechanisms formulated and implemented by households to mitigate the impacts of flooding. In this study, *adaptation* is defined as the change in activities to become suitable to a certain situation, usually oriented towards the long-term while *coping* refers to short-term and immediate activities oriented towards survival.

Materials and Methods

A total of 120 households (60 per barangay) were randomly selected from the household list obtained from the barangay[†] local government unit (BLGU) in Cayos and Bantud Fabrica in Dumangas, Iloilo. The household survey instrument (adopted from Predo et al. 2009) captured information on the demographic and socio-economic characteristics of the sampled households, their awareness, perception and preparedness on climate-induced hazards and their adaptation strategies and coping mechanisms to recover and mitigate impacts of previous and future disasters. Focus group discussions (FGD) on the changes in the gender roles within and outside the households, before and after the typhoon and flooding, was also carried out. Key informant interviews (KII) and secondary sources were used to supplement information obtained from the household surveys. Statistical tools (mean, standard deviation, frequency distribution, Mann-Whitney 2-tailed test) were employed to describe, analyse and summarise the data obtained.

Results

Dumangas is a third class[‡] municipality in the south-east part of Panay Island, Philippines which is composed of 45 barangays, 17 of which are along the coast. It is basically a farming and fishing community with a significant portion of its land allocated for agriculture (48%) and aquaculture (35%) activities. Jalaur River is the major source of irrigation water for Dumangas and three other municipalities. Cayos and Bantud Fabrica (Fig. 1) are two adjacent barangays located at 7 and 8.5 km, respectively, from the town center. These areas are largely coastal and

[†]The *barangay* is the basic administrative unit in the Philippines and it serves as the primary planning and implementing unit of government policies, plans, programs, projects, and activities in the community.

[‡] Municipalities in the Philippines are classified according to the average annual income of the local units. A third class municipality like Dumangas obtains average total revenue of PhP 1 million or more but less than PhP 1.5 million per annum.

estuarine and are heavily dependent on fishing and aquaculture. However the predominant livelihood activities of the respondents were casual labour (18.3%), agriculture (17.5%) and fishing/fishing-related (11.7%).

The majority of the respondents were females (54%), married (79%) and belonged to 21-60 years old age group. Twenty-five percent of the women respondents were household heads and 48 (75%) were dependents (wives, or sister in one case). Twenty-one percent of the women were into farming while 20% of the men were engaged in casual labour. The average monthly income of the respondents was PhP 3,512 (~USD 1028 annually). The respondents have been residents of the area for an average of 36 years.

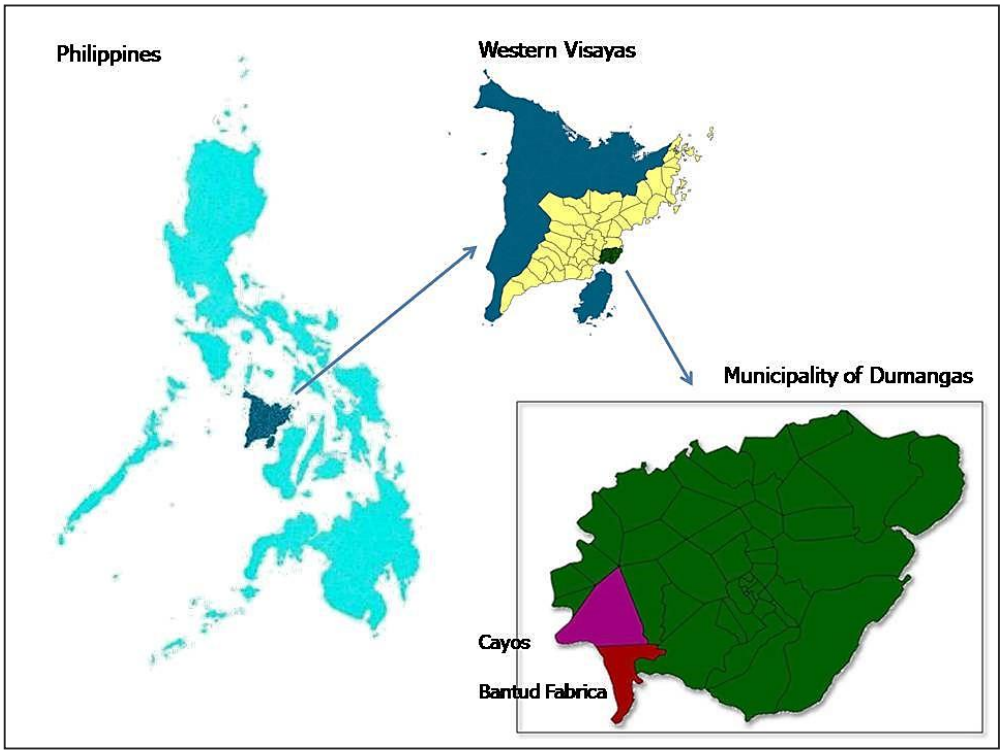

Fig.1.The study sites: Barangays Cayos and Bantud Fabrica, Dumangas, Iloilo, Philippines. Source: www.philgis.org.

Fifty nine percent of the households in Cayos and 81% in Bantud Fabrica were heavily affected by the flood brought about by Typhoon Frank (Municipality of Dumangas, unpubl. data).

As adaptation strategies, more than 20% of the women and men respondents cited strengthening of dwelling units and transfer of household members to evacuation area. On the other hand, more women than men did tree planting (19% and 11% respectively) (Table 1).

Getting a loan to meet immediate needs was the coping mechanism (Table 2) most cited by both female and male respondents (21%), and women respondents (22%) were more likely to seek financial assistance from money lenders compared to the men (13%). Other coping mechanisms cited include adjustments in meals (1-2 meals instead of 3 meals a day) and restructuring diets (respondents eat root crops, banana, etc. as alternate to rice) adjustment. Livelihood/income diversification was another notable coping mechanism identified by the respondents (Table 3).

Table 1. Adaptation measures implemented by respondents after the flooding, Dumangas, Iloilo, 2009.

Do households have any adaptation measures?	**Female**	**Male**	**All**
Yes	50 (76.9)	44 (80.0)	94 (78.3)
No	15 (23.1)	11 (20.0)	26 (21.7)
Total	65 (100.0)	55 (100.0)	120 (100.0)
Variable			n
Restructuring/strengthening dwelling units or house	18 (27.7)	11 (20.0)	29 (24.2)
Transfer household members to evacuation area	14 (21.5)	13 (23.7)	27 (22.5)
Planting more trees	12 (18.5)	6 (10.9)	18 (15.0)
Relocating to safe place permanently	4 (6.2)	7 (12.7)	11 (9.2)
Change livelihood or income sources	4 (6.2)	6 (10.9)	10 (8.3)
Praying/trusting in God	3 (4.6)	2 (3.6)	5 (4.2)
Prepare important things/belongings	3 (4.6)	1 (1.8)	4 (3.3)
Improving dike/canal system in the community	0 (0.0)	3 (5.5)	3 (2.5)
Being alert always	0 (0.0)	3 (5.5)	3 (2.5)

Almost three times more men (15%) go for fishing for income than women (5%) whereas more women (6%) than men (4%) did small businesses. Farming (41%) and backyard livestock raising (26%) are the primary income strategies adopted by both women and men respondents.

Table 2. Coping mechanisms reported by respondents, Dumangas, Iloilo, 2009.

Variable	**Female**	**Male**	**All**
Got loan from relatives or friends	11 (16.9)	14 (25.4)	25 (20.8)
Got loan from money lender	14 (21.5)	7 (12.7)	21 (17.5)
Through hard work	10 (15.4)	12 (21.8)	22 (18.3)
Resorting to other income sources	6 (9.2)	7 (12.7)	13 (9.2)
Selling livestock	6 (9.2)	3 (5.5)	9 (7.5)
Asking assistance from parents/relatives	2 (3.1)	5 (9.1)	7 (4.9)
Asking assistance from children	5 (7.7)	1 (1.8)	6 (5.0)

FGD results show that women were more engaged in the household chores compared to the men. The daily routine of both women and men respondents were disrupted by the typhoon and the resulting flood. Statistical analysis shows no significant difference in the adaptation ($p=0.090$) and coping ($p=0.635$) mechanisms employed by women and men respondents.

Table 3. Common livelihood and income strategies adopted, after the flooding, by the respondents, Dumangas, Iloilo, 2009.

Do you have other income source/s?	**Females**	**Males**	**All**
Yes	61 (93.8)	51 (92.7)	112 (93.3)
No	4 (6.2)	4 (7.3)	19 (15.8)
Total	65 (100.0)	55 (100.0)	120 (100.0)
Other income source/s			
Farming	26 (40.0)	23 (41.8)	49 (40.8)
Livestock raising	17 (26.2)	14 (25.5)	31 (25.8)
Employee	7 (10.8)	8 (14.5)	15 (12.5)
Casual labour (*pamugon*)	7 (10.8)	4 (7.3)	11 (9.2)
Fishing/fishing-related	3 (4.6)	8 (14.5)	11 (9.2)
Business-related (i.e. *sari-sari* store, food vending)	4 (6.2)	2 (3.6)	6 (5.0)
Carpentry	0 (0.0)	3 (5.5)	3 (2.5)

Discussion

Typhoon Frank that ravaged the Iloilo province in the Philippines in 2008 caused huge economic losses. The amount of damage reported by the respondents was approximately 14% of the average annual household income in the area. The Asia Disaster Preparedness Center (ADPC 2003) estimated a 75-100% financial loss in fishing and agriculture communities traversed by the Jalaur River due to the frequent occurrence of climate-induced hazards. Among these communities are Cayos and Bantud Fabrica (DENR-MGB VI 2012).

Results of this study show that there is no out-migration in the study sites, only in-migration, which is contradictory to the study by Barrameda (2010) which states that the risk of natural disaster and pressure for survival causes out-migration. It was noted however, that some respondents were engaged in *pamugon*, which means to work for a daily wage in other places, usually in nearby towns. It includes a variety of services (usually in a rice or sugarcane farm) such as planting of seedlings, broadcasting of seeds, weeding, tilling of land, fertilizer application, *pamatdan* (cutting sugarcane tops as planting material), harvesting, etc. *Pamugon* is usually associated with agriculture, rather than other livelihood activities like fishing, because those who engage in *pamugon* are contracted as labour on a per hectare of land basis hence, remuneration is more certain as compared to fishing, wherein operations are usually small-scale. But due to the temporary nature of the work, people who are engaged in *pamugon* return to their community when the work is done. This may be due to their adverse socio-economic situations, which, according to ADPC and FAO (2006) lead people to inhabit high risk areas and engage in unsustainable and dangerous livelihoods.

The respondents' average income (USD 1,030 annually) is only 68% of the average annual income of a poor Filipino household (USD 1,512 annually). This finding is not surprising as some of the respondents are either tenants of the farm they cultivate or caretaker/technician of the fish

pond they operate. Six out of the nine respondents involved in aquaculture were fish pond labourers and only 2 respondents said they operate their own fish ponds, but on a backyard scale (~0.15 ha).

Mobility is a key factor in accessing information such as weather forecasts and advisories. According to Abarquez and Murshed (2004), in many contexts, men are better connected with early warning mechanisms due to their movement in public space and access to formal and informal channels of communication. This is evident in this study also as men were more involved in coordinating with community leaders with respect to the announcements and weather forecasts. Women on the other hand, were focused in securing the household's physical and financial safety. Weather-related shocks exacerbate the seasonal and income gaps which are often bridged by loans from different sources with varying interests (ADPC 2003). This is affirmed by the respondents as lending groups served as good sources of credit for them in financing unexpected expenses such as house repairs, medical expenses, and purchase of seedlings.

Despite the occurrence of floods, economic activities in the area have not changed because the municipality largely depends on agriculture (second largest producer of rice in Iloilo) and fisheries (top producer of milkfish in Iloilo) for its revenue (Golez unpubl. data). This was also reflected in the choice of strategies with 49% falling back on agriculture and only 9.2% looking at fishing/fishing-related activities. The respondents' confidence is apparently drawn from their local leadership which intensified their disaster mitigation programs, and established the Dumangas Agro-Meteorological (Agromet) Station and Climate Field School (CFS) program, to enhance the capacity of extension workers and farmers to understand climate information and reduce risks in agriculture (Golez unpubl. data). Overall, in spite of the observed preferences of women and men respondents in their adaptation, coping and alternative livelihood choices, statistical analysis show no significant difference in their responses.

Conclusions and Recommendations

This study recognises that women and men can work in complementary ways in responding to the impacts of extreme events like typhoon and flooding. Although there is an observed preference in the adaptation, coping and alternative livelihood choices between women and men respondents in this study, statistical analysis show no significant difference in their responses.

The significant role of lending institutions in the aftermath of a calamity is particularly highlighted. The LGU of Dumangas should come up with appropriate mechanisms for providing credit to facilitate faster recovery in areas that frequently experience calamities. The local leadership also needs to revisit their recovery programs and ensure that most vulnerable groups are prioritised in the assistance allocation. Women's involvement in disaster risk reduction and management (DRRM) should be promoted through participation in training, seminars and conferences in relation to DRRM. Further, local leadership should adopt strategies that will enhance women's participation in increasing awareness and vulnerability assessment activities so that women will not be too reliant on men during disasters. On considering the future aspects of further studies in the area, adaptation strategies before the typhoon can be considered for an

effective comparison and also differences in tenure can also be incorporated. The study was, however, limited in its scope to understand the adaptation and coping mechanisms. The villagers engaged in other livelihood activities have also lead to the same biases in understanding of coping mechanism and adaptation strategies.

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