

# Gender-Differentiated Impacts of Extreme Events at Selected Households in Coastal Areas, Philippines

Rosanna D. Gonzales

Pangasinan State University, Philippines

Received: 03 Sep 2021; Received in revised form: 26 Sep 2021; Accepted: 04 Oct 2021; Available online: 10 Oct 2021

©2021 The Author(s). Published by AI Publications. This is an open access article under the CC BY license

(<https://creativecommons.org/licenses/by/4.0/>)

**Abstract**— Nowadays, the unpredictable circumstances which include the occurrence of natural disasters which can be categorized as extreme events in human life is significant for everybody to address since it poses great danger to all regardless of life status, age bracket and gender. The focus of the study is to determine the most recent and extreme hazard that affected the selected coastal areas and its impacts on asset/income, leisure time, and intra-household health. Three hundred household respondents were selected from the three study sites facing West Philippine Sea that were classified as vulnerable to coastal hazards. Said respondents were identified through stratified random sampling and structured household survey questionnaires for men and women were administered. Results revealed that typhoon was the most recent and extreme event that affected the sites wherein both typhoon and flooding brought the highest mean value level of damages to assets and income for men over women. After extreme events, men prioritize cleaning the surroundings while women spent higher number of hours on household activities over other identified activities. Further, it was recorded that men have lesser sleep time after such hazard. Intra-household health impacts include “dengue” and waterborne-diseases wherein higher expenses was computed in treating dengue patients, however; higher time spent for child-care who suffered from waterborne-diseases was observed.

**Keywords**—Coastal areas, extreme events, gender, impacts, Philippines

## I. INTRODUCTION

Philippines is known to be rich in natural resources, however; is vulnerable to risk-disaster calamities like the extreme weather events brought about by climate change which is now calling the attention of all regardless of socio-economic status and gender in life. Such study may help prevent physical harm, reduce damages to livelihood, and provide authority officials functional risk mitigation strategies to protect the areas within their jurisdiction (Franta, et al. 2016). As stated in the paper of Allen (2006) one of the most common climate-related hazard experienced in the country (Philippines) is extreme storm aside from the extreme intensity and frequency of rainfall (Balay, 2015). Along this vein, Birkmann, et al. (2010) mentioned that tropical storms and cyclones which are often accompanied by storm surges, strong winds, flooding (Boyd and Folke, 2012) including landslides (Burgos, 2015) have directly and indirectly affected the food production and natural resources of households

particularly in the coastal areas (Assan, 2015). Experiences of men and women in terms of the impacts of extreme events vary which is brought about by their differentiated socially constructed roles and responsibilities (FAO, 2013). Hence, such study.

### 1.1 Objectives of the Study

This study determined the most extreme and recent climate-related hazard being experienced by men and women living near the coastal areas specifically those that are facing the West Philippine Sea and its gender differentiated impacts along asset and income, leisure time and its intra-household health impacts.

## II. METHODOLOGY

### 2.1 Research Design

The study used quantitative research design wherein the stratified random sampling was utilized in determining its respondents.

## 2.2 Respondents

The respondents of the study were three hundred respondents composed of men and women who answered sets of structured questionnaires through an interview mode

## 2.3 Location of the Study

The study was conducted in the three municipalities of Western Pangasinan, Philippines. These include Agno particularly in Barangays Baruan, and Boboy, Barangays Petal and Eguia of Dasol, and Infanta specifically at barangay Cato and Patima.

### III. RESULTS AND DISCUSSION

#### 3.1 Most recent and extreme event

Typhoon is the most pressing hazard that affected more than 90% of the households, followed by flooding with 58.33%. This affirms the result of the historical timeline and combined hazard ranking done by men and women during the Focus Group Discussion (FGD) wherein participants claimed that with the occurrence of typhoon, flooding follows. This further supports the status of Pangasinan as a typhoon belt area in the Philippines.

Table 1. Distribution of affected households, whole sample

Damage	Whole Sample
% Households Affected by Flooding	58.33
% Households Affected by Typhoon	91.67
% Households Affected by Coastal Erosion/ Sea Level Rise	6.33
% Households Affected by Saltwater Intrusion	37.67

Typhoon and flooding caused higher mean value damages to house (PhP 14,439) followed by the loss in fishing income amounting to PhP 10,673. This can be attributed to the participants' response during the interview and historical timeline activity wherein it was found out that most of the households' house types are made of low-cost materials and typhoon intensity that usually hit the place is as high as 10 so when typhoons occur this particular damage is very evident and due to not being able to go out for fishing as a source of men's livelihood, they incur loss on income.

Table 2. Mean value of household level damages from typhoons and flooding, whole sample

Damages	Whole Sample
Damage / Loss to House	14439.49
Loss in Agricultural Production	536.30
Loss in Fishing Income	10673.06
Damages of appliances	2186.62

House damage due to coastal erosion/sea level rise received the highest mean value with PhP 3,894.74 compared to other damages. This implies that most of the damaged houses were built near the seashore as affirmed during the resource and hazards mapping activity in the study sites wherein most of the affected resources are residential areas located near the coastal area.

Table 3. Mean value of household level damages from coastal erosion/ sea level rise, whole sample

Damages	Whole Sample
Damage / Loss to House	3894.74
Damages/ Loss to Appliances (Stereos, TV, Cellphones, Sofa sets, etc.)	105.26
Damage to Assets (Boats, Motorcycles, etc.)	789.47
Loss in Fishing Income	105.26

Household members get sick of diarrhea with a mean value of PhP 442.92 due to saltwater intrusion; however, barangay Eguia is highly affected. This means that most of the households' source of drinking water is contaminated and not safe in that barangay. This confirms the information from the FGD participants (both men and women) who mentioned that the water is salty and not safe to drink.

Table 4. Mean value of household level damages from saltwater intrusion, whole sample

Damages	Whole Sample
Death/ Loss of Livestock	13.27
Household members got sick of Diarrhea	442.92
Lack of freshwater for family routines	27.35
Disappearance of Fish Species	0.71
Damages to appliances	86.73

### 3.2 Gender Differentiated Asset and Income Impacts from Extreme Events

Since men are responsible in earning income for them to provide the basic needs and wants of the family, they are expected to be more involved in productive activities such as fishing and farming, naturally when extreme events happen, they are more affected than their wives wherein their loss on income is PhP 545 compared to women with PhP 116. This can be attributed to stoppage of husbands' work, which resulted into non-source of income and shows that women are dependent on their husband's income.

On the other hand, in terms of assets loss, damage to husband-owned assets (PhP 139,846) is higher over women (PhP 18,083.33). Certainly, due to high value of capital goods (like boats, fishing gears and other equipment) and investments used by husbands in their productive/livelihood activities to earn an income and provide the basic needs of their families.

Table 5. Income and asset losses on wife and husband due to extreme events, whole sample

Damages	Whole Sample
Wife's Income Loss from other sources due to work stoppage	115.85
Husband's Income Loss from other sources due to work stoppage	545.49
Damage to Wife-owned appliances (TV, Stereos, Cellphone, etc.)	6010.77
Damage to Wife-owned livestock	6900
Damage to Wife-owned assets	

Damages	Whole Sample
(Boat, motorcycles, etc.)	18083.33
Damage to Husband-owned appliances (TV, Stereos, Cellphone, etc.)	3697.54
Damage to Husband-owned livestock	20000
Damage to Husband-owned assets (Boat, motorcycles, etc.)	139845.7

### 3.3 Gender Differentiated Impacts on Leisure Time

Table 6 shows that men prioritize cleaning the surroundings to put back into place the destroyed resources and maintain the sanitation of the environment while in most of the women prefer cleaning the house so that family members will get free from any health problem and make the household properties be organized. This supports the idea that men are responsible in doing outside work like cutting uprooted trees, dredging canals, repairing fence and putting up damaged house's surroundings while women give more value in cleaning the house over other activities. This implies that women spent higher number of hours on household activities than men.

On the other hand, it is interesting to note that men have lesser time of sleep than women after an extreme event. This can be associated to the fact that men are more affected than women because most of their resources which serve as their source of income are affected and much of their assets are also damaged.

Table 6. Mean number of hours spent on unpaid household activities and leisure time before and after an extreme event

ACTIVITIES	Men		Difference	Women		Difference
	Normal Days	After an Extreme Event		Normal Days	After an Extreme Event	
	(Hours)	(Hours)		(Hours)	(Hours)	
Cleaning the House	0.53	1.46	0.93***	1.31	11.5	10.19***
Cleaning the House's surroundings	0.91	5.41	4.50***	1.15	11.47	10.32***
Washing Clothes	1.03	1.55	0.51***	2.82	12.54	9.72***
Cooking	0.72	0.92	0.20***	0.67	1.00	0.33
Fetching Water	0.53	0.59	0.06	0.35	0.40	0.05**

Taking Care of the Children	2.58	2.56	(0.02)	5.44	6.06	0.62***
Feeding pets/ house animals	0.22	0.20	(0.01)	0.08	0.14	0.06
Watching TV/ Listening to the Radio	1.60	0.56	(1.04)***	1.86	0.78	(1.08)
Personal Hygiene	0.30	0.31	0.01	0.51	0.58	0.07
Sleeping	7.87	3.22	(4.65)***	7.73	4.25	(3.49)***

\*significant at 10%      \*\*significant at 5%      \*\*\*significant at 1%

### 3.4 Intra Household Health Impacts After Flooding/Typhoon

The age brackets 0-7 (41.67%), 16-25 (16.25%) and 46-65 (25%) are highly affected with diarrhea, which means that water contamination is usually observed after flooding.

*Table 7. Incidence of waterborne diseases after flooding event, by age bracket in whole sample*

Waterborne Disease	Age Bracket					
	0-7	8- 15	16-25	26-45	46-65	> 65
Diarrhea	41.67	0	16.67	-	25	-
Dengue	-	100	-	-	-	-
Other Problems (Chikungunya)	25	-	-	33.33	-	-

Mean health expenditure for treating sick household members after flooding is higher for dengue with PhP10,000 but only observed in one barangay, however, diarrhea received the higher time allocations wherein wives spent 72 hours. This means that higher amount is needed in treating sick members who suffer from dengue, but more time is allocated in attending the sick members affected by diarrhea. Thus, women are more engaged in taking care of sick members of the family compared to husbands because they are more engaged in livelihood activities. This conforms the result of the study conducted by Dube, et al. (2017) wherein it was cited that while it is true that both men and women are affected by climate change, women's amount of work relative to such is disproportionate (McCarthy, 2020).

*Table 8. Mean health expenditure and time allocated for treating sick household members after a flooding event, by waterborne disease (whole sample)*

Waterborne Disease	Mean Health Expenditure	Hours Spent Caring for Sick Members		
		Husband	Wife	Other Relatives
Diarrhea	766.5	66	72	0.5
Dengue	10000	8	8	-
Other (Chikungunya)	3355	7.33	8	2

## IV. CONCLUSION

Undeniably coastal areas are of high vulnerability in terms of hazards that are known to be extreme events as they happen that brought negative impacts in one's life if experienced directly. These extreme events include typhoon, flooding, coastal erosion/sea level rise and saltwater intrusion which creates great damages much on the men's assets and income. It even affects their leisure time and caused health-related problems that led to death if not properly addressed.

## V. RECOMMENDATION

Strengthening the available household-resiliency plans and taking proactive measures in addressing impacts of extreme events is of utmost help.

## ACKNOWLEDGMENT

This study was funded by DA-BAR implemented by Worldfish (PCO) thru the project lead initiative of Dr. Asa Jose U. Sajise of UPLB and Dr. Paul Joseph B. Ramirez a research fellow of Worldfish (Philippine Country Office) and to the study leader - Engr. Manolito E. Bernabe with the assistance of Ms. Jheanna Marie T. Herbosa and support of PSU-Infanta Teacher Education Graduates: Dwihrose

Mertola (research-assistant), enumerators: Rosalyn Marabe, Rolline Joy Mila, Grace Mascarina, Kristine Morano, Ann Shellica Mendigorin and Jay-zel Ann Molano.

## REFERENCES

- [1] B. Franta, H. A. Roa-Quiaoit, D. Lo, & G. Narisma, *Climate Disasters in the Philippines: A Case Study of Immediate Causes and Root Drivers from Cagayan de Oro, Mindanao and Tropical Storm Sendong/Washi*. Cambridge, Environment & Natural Resources Program. Belfer Center for Science and International Affairs. (2016).  
<https://www.belfercenter.org/sites/default/files/files/publication/Philippines%20Climate%20Disasters%20-%20final.pdf>
- [2] K. M. Allen. "Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines." *Disasters*. 2006, 30(1): 81-101.
- [3] M. Balay "The Balay Mindanaw Group of NGOs." (2015). from <https://balaymindanawgroup.wordpress.com>.
- [4] J. Birkmann, P. Buckle, J. Jaeger, M. Pelling, N. Setiadi, M. Garschagen, N. Fernando & J. Kropp. "Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters." *Natural Hazards*. (2010). 55(3): 637-655.
- [5] E. Boyd, E. and C. Folke. *Adapting institutions: governance, complexity, and social-ecological resilience*. Cambridge; New York. Cambridge University Press. (2012).
- [6] N. P. Burgos and J. A. Gabieta. Greedy politicians get in the way of 'Yolanda' relief. *Philippine Daily Inquirer*. 2015
- [7] N. Assan. Gender differentiated climate change discourse in rural communities in developing countries. *Scientific Journal of Pure and Applied Science* (2015) 4(2) 34-38 doi: 10.14196/sjpas.v4i2.1824
- [8] FAO. *Climate-smart Agriculture Sourcebook*. Rome. (2013). Available at <http://www.fao.org/climate-smart-agriculture-sourcebook/enabling-frameworks/module-c6-gender/c6-references/en/>
- [9] T. Dube, S. Intauno, P. Moyo & K. Phiri. The Gender-differentiated Impacts of Climate Change on Rural Livelihoods Labour Requirements in Southern Zimbabwe, *Journal of Human Ecology*, (2017) 58:1-2, 48- 56, DOI: 10.1080/09709274.2017.1316958
- [10] J. McCarthy. *Understanding Why Climate Change Impacts Women More Than Men*. (2020).  
<https://www.globalcitizen.org/en/content/how-climate-change-affects-women/>