COPING MECHANISMS AND DETERMINANTS OF PERCEIVED STATUS OF MEN AND WOMEN FARMER BENEFICIARIES OF THE YOLANDA REHABILITATION AND RECONSTRUCTION PROGRAM (YRRP) IN REGION VIII

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The Yolanda Rehabilitation and Reconstruction Program (YRRP) is a comprehensive program spearheaded by the Department of Agriculture in Region VIII, Philippines aiming to restore the livelihood farmers and households affected by the super typhoon incident. The program aims to help the farming communities build back better from damages brought by the super typhoon Yolanda in 2013. Anchored on the general objective of the YRRP program, this study aims to document the differences in the coping mechanism between men and women farmers affected by the super typhoon. Specifically, it seeks to describe the socio-demographic and farm characteristics of the YRRP beneficiaries; assess whether men and women farmers have differences in coping mechanisms; and determine the perceived status of the farmers about their current conditions. The study provides a general picture of how men and women handled the disruptions and damages brought by the super typhoon. The determinants of coping better were investigated using different regression models. Results show that income, education, relationship status and farm ownership significantly influence the status of the farmer beneficiaries. Findings show that majority of men and women established farmer's organizations after the typhoon. Meanwhile, the study revealed that farmers in both sexes need additional financial assistance to purchase farm inputs such as fertilizers and

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gardening tools which will be used in carrying out their agricultural activities. Based on the results, the YRRP beneficiaries are encouraged to continue strengthening farmers associations as one of the mechanisms to reduce vulnerability and risks to disasters like super typhoons.

Keywords: super typhoon damages, small scale farming, assessment, coping mechanisms, sex disaggregated

1.   INTRODUCTION

Super typhoon Yolanda (internationally known as Haiyan) brought destruction to Central Philippines, especially Eastern Visayas on November 8, 2013. It was registered as the most robust cyclone with wind speeds of more than 300 kilometres per hour (km/h) and even triggered a storm surge of more than 4 meters (Mori et al., 2014; Yi et al., 2015). The super typhoon that hit central Philippines caused massive damages in properties, livelihoods and thousand of lives were lost (National Disaster Risk Reduction Management Council [NDRRMC], 2015). There were severe destruction to public and private infrastructure as well as sustained heavy losses to the agricultural sector. According to the Department of Agriculture (2014), the estimated damage to livestock, crops, and infrastructure amounts to PhP 28.86 billion. There were massive damages in fishing and coastal communities (Seriño et al., 2017). In addition, the coconut sector suffered the most significant loss followed by rice, banana and livestock at PhP 17.72 billion, PhP 1.29 billion, PhP 1 billion and PhP 817.62 million, respectively (NDRRMC, 2015).

In response to the damages brought by the typhoon, President Benigno S. Aquino III declared a State of National Calamity on November 11, 2013, which focuses in price control for necessities and prime commodities, granting of non-interest loans, the appropriation for calamity funds, and importations and foreign donations. Office of the Presidential Assistant for Rehabilitation and Recovery (OPARR) was established. It was mandated to put together an overall-strategic vision, integrated plans and programs for Yolanda affected areas (Reyes et al., 2018).

The current status of the typhoon Yolanda victims is yet to be fully understood. The pieces of literature provide only a few updated studies that determine the needs and coping mechanisms of the survivors. Bernardo et al. (2015) investigated the demand for premium agri-fisheries for the disaster-affected

areas of Leyte. They found out that mono-cropping is unsustainable and not resilient to climate change; agriculture systems should be developed; fisherfolk and coastal communities need holistic programs and to establish premium fisheries program to diversify their income sources. Ruales et al. (2020) suggested that small scale farmers should consider adopting climate smart agricultural practices to cope with changing climate. Ravago and Mapa (2015) studied household coping and recovery from the wrath of typhoon Yolanda. Ravago and Mapa (2015) used the Philippine Center for Economic Development Social Protection Survey conducted six months after the disaster. They found out that 36% of the households have yet to experience even partial recovery. They also investigated the various coping mechanisms that the affected families employed to aid in their recovery using logit regression analysis and found out that taking precautionary measures and asset disposal is the most prominent coping activity. Government assistance positively aided in the rescue but only to the poor and the probability of recovery is lower for those that are located in the badly-hit Leyte relative to the other provinces (Ravago and Mapa, 2015). Recently, Seriño et al. (2020) estimated the impact of the super typhoon to the livelihood of small scale coconut farmers documenting tremendous losses in livelihood and household income associated with the super typhoon. However, there is limited evidence whether the Yolanda-affected families have already recovered.

The Yolanda Rehabilitation and Reconstruction Program (YRRP) is spearheaded by the Department of Agriculture – Regional Field Office VIII (DA-RFO8) and implemented by the Visayas State University (VSU) and local government units (LGUs). The YRRP program aims to "build-back-better" the farming communities damaged by super typhoon Yolanda. It envisions to empower farmers and farmer organizations by providing capacity building and support services to boost their livelihoods.

The research and extension project entitled "Enhancing the Restoration of Farming Livelihoods in Yolanda Affected Areas in Region 8" under the YRRP funded by the Department of Agriculture aimed to enhance the provision of agricultural education, extension, training and research services to fast track the restoration of farming livelihoods in the region. The project has two sub-components, namely; (1) enhanced extension support, education and training services, and (2) conduct of participatory action on-farm research. This study is conducted in 2019, six years after the destruction of the super typhoon Yolanda.

This study focuses on the conduct of farm and home visits under the first component (i.e. enhanced extension support, education and training services). The paper highlights farmer members of farmer associations that are recipients of the

YRRP. This study generally aims to determine the coping mechanisms of men and women farmer-beneficiaries of the YRRP. Specifically, this study is conducted to (1) describe the socio-demographic and farm characteristics of the YRRP beneficiaries; (2) assess whether men and women farmers have differences in coping mechanisms and (3) determine the current status of the farmers about their current conditions. Region 8 is located in an area where farmers and households constantly face economic shock from frequent and stronger typhoons (Seriño, 2014). Investigating the determinants of coping and looking at the differences between men and women can provide input to policy makers in developing recovery plan in case of similar typhoons or other disastrous incident that will happen in the future.

2. METHODOLOGY

The researchers used a descriptive and quantitative research design in collecting the data from respondents such as their socio-demographic characteristics, economic factors, general characteristics of their farm, and how they deal with the damages brought by the super typhoon. The data were disaggregated by sex, and the study is carefully designed to ensure that all data needed are gathered. Bias is minimized in the data collection to reduce errors in interpreting the information collected.

Location of the Study

The participants in the study are farmers from Region VIII especially from Leyte and Samar islands who experienced the wrath of typhoon Yolanda in the year 2013. Figure 1 shows the location of the study.

Data Collection

The researchers coordinated with the local government units (LGU) to identify farmers that are suited for the study. At least three (3) farmers in different farmers' associations in each municipality were selected to be interviewed. In the selection of respondents, proportionate sampling was utilized. It was based on areas where VSU has YRRP beneficiaries.

A pre-tested survey questionnaire was used to gather information from the selected farmers. It is used to acquire the desired information needed for the study. The collected data were then aggregated and cleaned before the analysis.
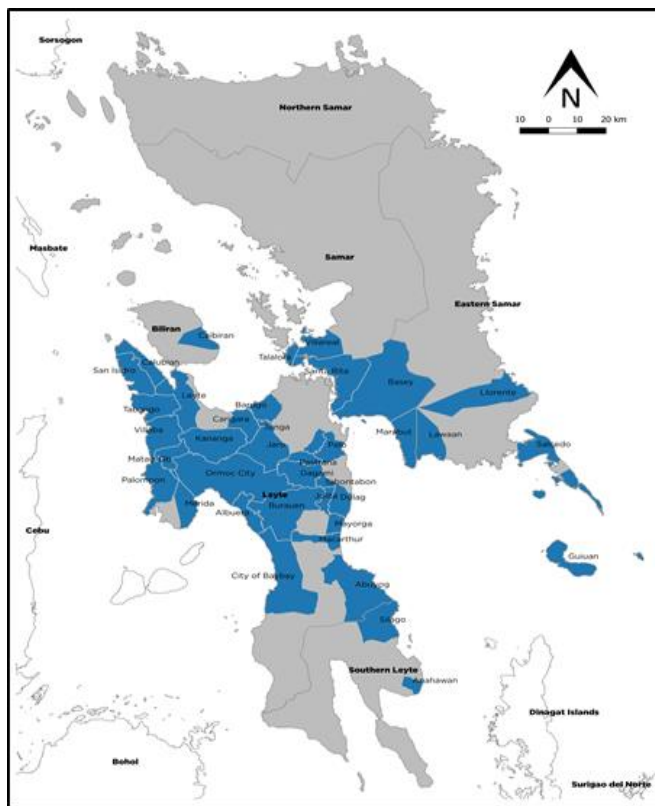
Figure 1. Location of the Study (Source: NAMRIA, 2020)

Data Analysis

The study used descriptive statistics to summarize the data and present frequency and percentage of the variables. To identify the factors that could influence the respondents' better status after the onslaught of super typhoon Yolanda, three methods of regression namely; linear probability model (LPM), logit model and probit regression were used. These methods were utilized since the dependent variable is dichotomous or binary. The LPM is a multiple regression analysis with a binary dependent variable; however, one of its limitations is that the predicted probability of the coefficients can be outside 0 and 1. This limitation can be overcome with the use of the logit and probit models. These two non-linear probability models practically give identical results and can be used depending on the researcher's choice. As both models are non-linear, the logit and probit models predict the log-odds ratio and z-score of an outcome, respectively. The marginal effects are then determined to obtain the average impact of the explanatory

variables to the change in the probability of the result. Taking the marginal effect is useful since it provides a direct interpretation of the variable in interest. The data analysis is done in IBM SPSS Statistics and Stata 15.

Econometric Model

In identifying the factors that could influence the respondents' better status after the onslaught of super typhoon Yolanda, an econometric model is examined. The econometric model is as follows:

$better = \beta_0 + \beta_1 age + \beta_2\ female + \beta_3 household\_size + \beta_4 years\_farming + \beta_5 logincome + \beta_6 assistance + \beta_7 high\_school + \beta_8 college + \beta_9 cocational + \beta_{10} married + \beta_{11} widowed + \beta_{12} separated + \beta_{13} live\text{-}in + \beta_{14} rent + \beta_{15} partly\_owned + \beta_{16} tenant + e$

where:

better = dummy variable for status after super typhoon Yolanda (1 for better, 0 for no change)

β_0 = intercept/constant

β_i = regression coefficients

age = age in years

female = dummy variable for sexes (1 for female, 0 for male)

household_size = number of members in the household

years_farming = years in farming

logincome = logarithmic form of household's income (i.e. on farm and off farm income)

assistance= dummy variable for having received cash/non-cash assistance (1 for received, 0 for not received)

high_school = dummy variable for high school education (1 for high school, 0 otherwise

college = dummy variable for college education (1 for college, 0 otherwise)

vocational = dummy variable for vocational education (1 for vocational, 0 otherwise)

married = dummy variable for married (1 for married, 0 otherwise)

widowed = dummy variable for widowed (1 for widowed, 0 otherwise)

separated = dummy variable for separated (1 for separated, 0 otherwise)

live-in = dummy variable for live-in relationship/cohabitation (1 for live-in, 0 otherwise)
rent = land tenure for those who are renting
partly_owned = land tenure for those who partly owned the farm land
tenant = land tenure for tenants
e = remaining error term

3. RESULTS AND DISCUSSION

Socio-demographic characteristics

Table 1 presents the socio-demographic characteristics of the respondents disaggregated by sex. Of the 294 respondents, 63.27% are females and 36.73% are males. Most of the respondents are married; 77.8% for male and 74.2% for female. The average age of the respondents is 56 for male and 52 for female. It implies that our farmers are relatively old. According to Baladad (2013), Filipino farmers are almost at retirement age, and will soon join the ranks of the senior citizen. The Philippines might experience a "critical" shortage of farmers in 15 years. There is an average of 5 household members for both sexes, which is common in a typical Filipino family. In terms of educational attainment, most of the respondents have only reached elementary level; 24.1% for males and 24.2% for females. Also, male farmers have an average of 25 years of experience in farming, while female farmers have an average of 22.

Table 1. Socio-demographic characteristics of respondents

		Male			Female			Total		
		n	%	mean	n	%	mean	n	%	mean
Civil Status	Single	11	10.2		8	4.3		19	6.5	
	Married	84	77.8		138	74.2		222	75.5	
	Widowed	4	3.7		26	14..0		30	10.2	
	Separated	1	0.9		1	0.5		2	0.7	
	Live-in	8	7.4		13	7.0		21	7.1	
	Total	108	100.0		186	100.0		294	100.0	
Age (in years)				56			52			54
Household Size				5			5			5
Educational Attainment	No Education	0	0		0	0		0	0	
	Elementary Level	26	24.1		45	24.2		71	24.1	
	Elementary Graduate	17	15.7		38	20.4		55	18.7	
	High School Level	14	13		27	14.5		41	13.9	
	High School Graduate	25	23.1		38	20.4		63	21.4	
	College Level	7	6.5		18	9.7		25	8.5	
	College Graduate	13	12		18	9.7		31	10.5	
	Graduate Studies	1	0.9		0	0		1	0.3	
	Vocational	5	4.6		2	1.1		7	2.4	
Years in Farming				25			22			23

In terms of farm characteristics, the average land area is 1.54 hectares for male farmers and 1.25 hectares for female farmers (Table 2). Most of the male respondents are tenants (43.5%), and 38.1% of female farmers are farm owners. Around 80% for both sexes have flat farmlands.

Table 2. Farm Characteristics of the respondents

		Male			Female			Total		
		n	%	mean	n	%	mean	n	%	mean
Land Area				1.54			1.25			1.35
Land Tenure	tenant	47	43.5		73	39.2		120	40.8	
	owned	38	35.2		74	39.8		112	38.1	
	part-owned	17	15.7		23	12.4		40	13.6	
	rent	6	5.6		16	8.6		22	7.5	
Land Topography	flat	87	80.6		148	79.6		235	79.9	
	sloping	16	14.8		23	12.4		39	13.3	
	hilly	5	4.6		15	8.1		20	6.8	

After the typhoon, there were lots of donations in kind and cash from the government and non-government organizations. The major Yolanda donors are the United Nations (UN), foreign governments (the United Kingdom, United States of America, Australia, etc.), the International Federation of Red Cross, Red Crescent movement and faith-based non-government organizations (Cabigao & Lirio, 2015). Majority of male and female respondents were able to receive cash (82.40%, 89.80% respectively) and non-cash assistance (87%, 96.20% respectively) such as relief goods, housing materials and gardening tools from government and non-government agencies during typhoon Yolanda.

Coping Mechanisms

Farmers indicate several coping mechanisms after the typhoon Yolanda (Table 3). The majority of the respondents, for both sexes, answered that the establishment of farmers' organization helped them cope better from the devastation brought by the super typhoon. According to farmers, they learned to practice group farming to lessen their vulnerability to risks in farming and to get more economic benefits. It is efficient to work in a group to reduce the production cost, and more funds can be gathered from the members if big plans are proposed (Pujara, 2016). The second is through praying (82.30%). It tells us that most farmers are spiritually resilient. Praying is a common coping mechanism for individuals experiencing distress (Wachholtz & Sambamoorthi, 2011, Seriño et al., 2020). The third is participation in community activities or projects to address problems

associated with the typhoon (63.30%). The coping mechanisms adopted by both male and female respondents are relatively the same.

Table 3. Coping mechanisms of men and women after typhoon Yolanda

	Percentage		
	Male*	Female*	Combined*
Establishment of farmers organization	92.60	91.90	92.20
Praying	81.50	82.80	82.30
Participation in community activities	63.90	62.90	63.30
Intercropping	51.90	52.20	52.00
Joined cooperatives	50.00	50.50	50.30
Access to credit	41.70	45.70	44.20
Practice group farming	38.00	45.20	42.50
Adapting new farming practices	42.60	40.90	41.50
Set up personal savings	25.00	36.00	32.00
Multiple cropping	15.70	28.00	23.50

*multiple response

Farmers were also asked regarding problems encountered in their respective farms and associations after Yolanda. Figure 2 shows that both men and women have the same ranking as most of the issues indicated. Out of all the problems listed, pests and disease infestation rank as the most concerning problem for both sexes (58.30% male and 55.40% female). According to them, numerous kinds of unfamiliar pests and diseases that are more difficult to control emerged after the super typhoon that dramatically affects their production. Another major problem is the conflict among members of the association (29.30%). Besides, several farmers admitted that they are experiencing disagreement with other members of the association regarding several issues such as association's profit

transparency, inactive members, and the division of labour among members which sometimes affects their unity. About 24.10% of the farmers also expressed a lack of capital.

Figure 3 shows the list of farmers' needs which they believe can address their encountered problems. Based on the graph, both men and women also have the same rankings in suggestions. About 43.50% of male and 32.80% female respondents expressed their need for additional financial assistance to purchase farm inputs such as fertilizers and gardening tools which will be used in carrying out their agricultural activities. Around 14% male and 12% female answered that they need more training and seminars to learn new techniques and to acquire additional technical knowledge about farming. Most of them reported that their agricultural practices are mostly traditional and have limited idea on how to operate the machinery provided by government programs. However, only a few of the farmers expressed their need for availing of farm insurance (0.5% male, 0.9% female). It is because small-scale farmers cannot afford to avail insurance for their farms since sometimes they barely gain profit. It also coincides with the development research published by the Philippine Institute for Development Studies (PIDS, 2018) that although farmers consider having agricultural insurance as advantageous but most of them find it hard to afford its high premium rates.
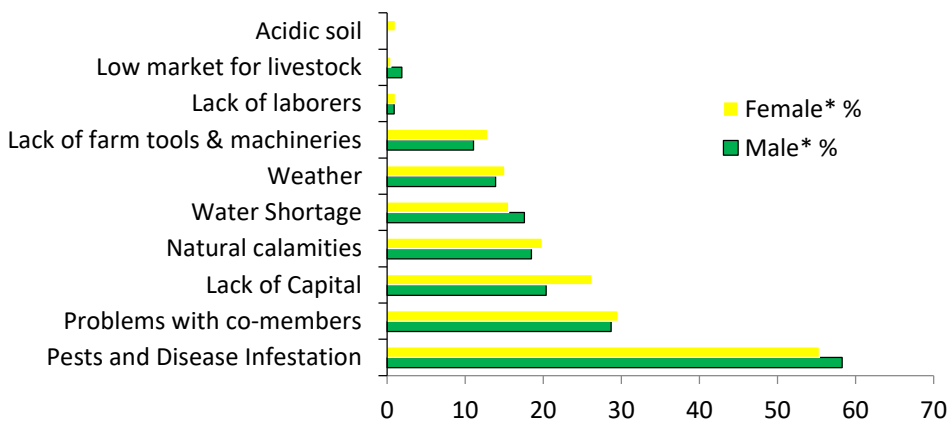

Figure 2. General problems / issues encountered by the respondents in farming (multiple response)
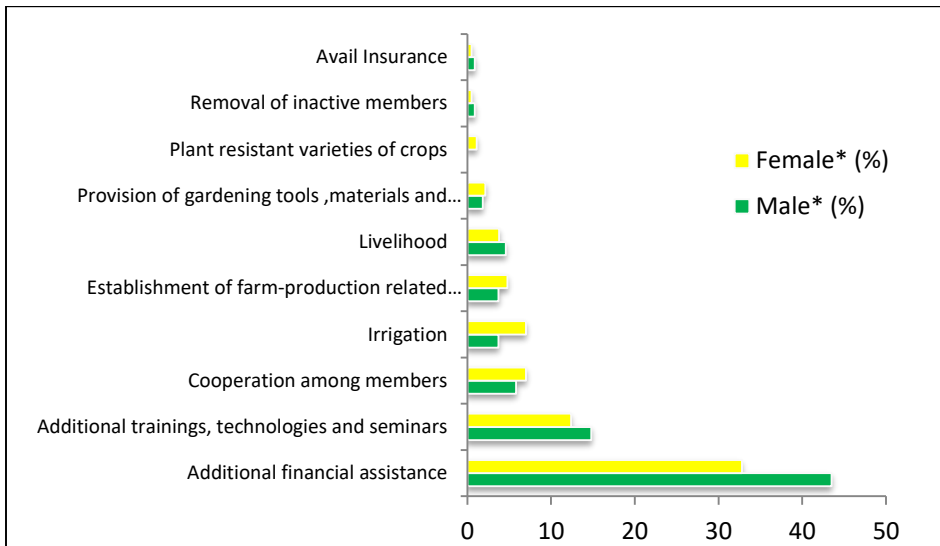
Figure 3. Farmers' suggestions / actions in dealing with their problems / issues (multiple response)

Current Perceived Status of the Farmers

Figure 4 shows that 47.20% of male and 49.50% of female respondents perceived to be in better status while 35.20% of male and 28% female farmers said that their current situations are still the same as before. With this, we can say that almost half of the respondents are currently in good condition. However, 17.60% male and 22.60% female respondents perceived to be in worse conditions. It is because their significant sources of livelihood have not fully recovered from the destruction brought by the super typhoon. For instance, coconut productions of some farmers have thoroughly washed out during Yolanda. Those who have replanted said that their coconuts are still not earning since it takes an average of 9 years for it to develop to bear fruit (Ruales et al, 2020). Moreover, farmers have also pointed out that pests and diseases become more prevalent after the super typhoon.
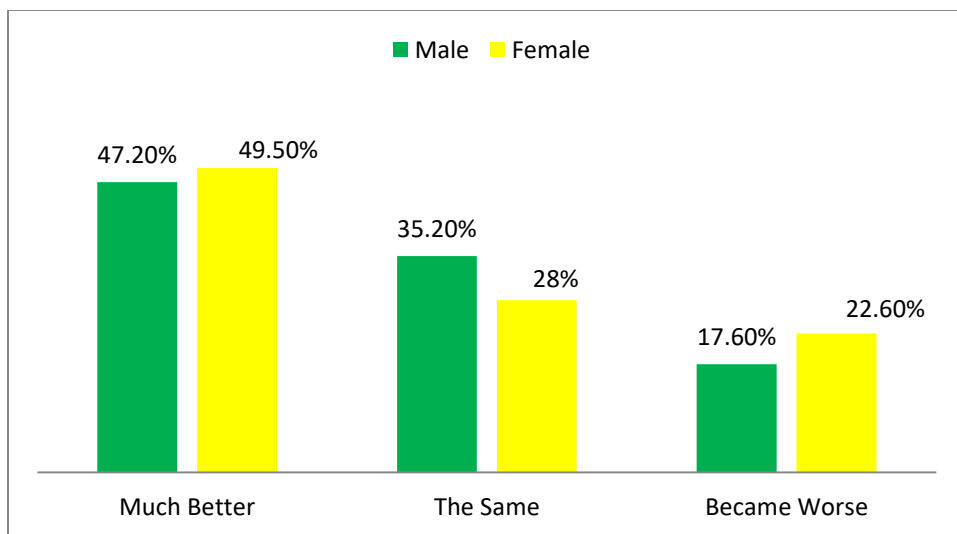
Figure 4. Perceived status of the respondents after the super typhoon incident

The regression results show that the different models showed consistent results in terms of the associated relationship of the explanatory variables. Table 4 shows that income and education are the main determinants of better outcomes or status after the devastation of super typhoon. Table 4 shows that a percent increase in income significantly increases the probability of having a better status after Yolanda by 5%. It is significant at 10% level with LPM and 5% level with logit and probit models. They tend to recover better since their income can support their needs (e.g. food consumption, utilities, medical expenses, housing repairs, etc.) to live their day to day lives after Yolanda.

Moreover, having attained higher education (i.e. college/graduate studies) increases the probability of having a better status after Yolanda by 30% than those who only reached elementary education (p-value<0.01). Knowledgeable individuals tend to be well-informed, making them more aware of how to deal effectively with the crisis. Having high education means having higher qualifications than those who only reached or graduated elementary. These qualifications allow an individual to find other sources of income other than farming, which is extremely vulnerable during calamities. It could aid in his/her better recovery after Yolanda. This coincides with one of the results of Ravaga & Mapa (2015).

Table 4. Regression results of the determinants of respondent's status after the super typhoon Yolanda with better status as the dependent variable.

VARIABLES	(1) LPM	(2) Logit (log-odds)	(3) Logit (Marginal Effects)	(4) Probit (z-score)	(5) Probit (Marginal Effects)
Age	0.00162	0.00707	0.00159	0.00466	0.00170
	(0.00323)	(0.0140)	(0.00315)	(0.00867)	(0.00316)
Female	0.0139	0.0539	0.0121	0.0378	0.0138
	(0.0628)	(0.273)	(0.0613)	(0.169)	(0.0617)
Household size	0.00785	0.0334	0.00750	0.0205	0.00749
	(0.0142)	(0.0620)	(0.0139)	(0.0385)	(0.0140)
Years farming	0.000296	0.00152	0.000342	0.000769	0.000281
	(0.00238)	(0.0105)	(0.00235)	(0.00643)	(0.00235)
Log hh income	0.0500*	0.224*	0.0504*	0.136*	0.0497*
	(0.0284)	(0.126)	(0.0276)	(0.0764)	(0.0275)
Assistance	0.227	1.010	0.227	0.620	0.227
	(0.183)	(0.801)	(0.178)	(0.481)	(0.174)
High school	0.0777	0.336	0.0773	0.205	0.0764
	(0.0684)	(0.293)	(0.0670)	(0.181)	(0.0672)
College/Graduate	0.298***	1.328***	0.298***	0.824***	0.301***
	(0.0890)	(0.402)	(0.0822)	(0.245)	(0.0826)
Vocational	0.0599	0.257	0.0589	0.149	0.0555
	(0.198)	(0.844)	(0.195)	(0.529)	(0.199)
Married	0.135	0.624	0.138	0.400	0.144
	(0.123)	(0.546)	(0.115)	(0.336)	(0.116)
Widowed	0.0219	0.106	0.0225	0.0923	0.0322
	(0.151)	(0.673)	(0.142)	(0.409)	(0.142)
Separated	-0.308				
	(0.367)				
Live-in	0.260	1.158	0.257*	0.734	0.265*
	(0.165)	(0.724)	(0.153)	(0.449)	(0.155)
Renting land	0.265**	1.189**	0.263**	0.744**	0.268**
	(0.117)	(0.530)	(0.108)	(0.327)	(0.109)
Partly owned land	0.142	0.626	0.142	0.390	0.144
	(0.0941)	(0.408)	(0.0911)	(0.250)	(0.0911)

Table 4. *Continuation…*

	(1)	(2)	(3)	(4)	(5)
			Logit		Probit
		Logit (log-	(Marginal	Probit	(Marginal
VARIABLES	LPM	odds)	Effects)	(z-score)	Effects)
Tenant	0.0669	0.304	0.0684	0.183	0.0671
	(0.0692)	(0.301)	(0.0674)	(0.185)	(0.0673)
Constant	-0.593	-4.870***		-3.004***	
	(0.373)	(1.671)		(1.016)	
Observations	289	287	287	287	287
R-squared	0.107				

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Being in a live-in relationship as compared to singles tends to have a 26% probability of being much better after Yolanda. This is significant at 10% for logit and probit models but is not consistent with the significance of LPM. Furthermore, farmers who rent their land tend to have a 26% chance of recovering better after Yolanda than landowners. This is significant at 5% level across all models. This is because renters strive to become productive to pay the cost of rent as compared to landowners who may not be pressured to do so.

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The findings show that majority of the respondents are married and has an average household size of 5 members. Male respondents are four years older than female, and they have long experience in farming. Additionally, the majority of the respondents are also land tenants and have flat farmlands. In terms of educational attainment, most of them have only reached an elementary level.

The findings also reveal that both men and women have similar coping mechanisms employed after typhoon Yolanda. The majority of them came up with the establishment of farmer associations to lessen their vulnerability to risks in farming. It also enables them to receive assistance from government projects since most of these projects are given per farmer associations and not individually.

It also shows that almost half only of the respondents perceived to be in a better status after six (6) years of the wrath of the super typhoon which means that the establishment of the farmer associations was not that effective in helping them to cope up from the devastation brought by the super typhoon.

During the interviews farmers indicated positive gains in establishing farmers' associations. As an association, they can collectively engage in livelihood projects/programs which could be their sources of additional income aside from farming. Similar with Gravoso et al. (2011), establishing farmer association can forge better relationship and encourage better economic outcomes. Moreover, officials of the associations should also improve their management to minimize issues among members somehow. Better management could prevent problems which can significantly affect the association's productivity, hence, profitability. Also, the government, specifically the Department of Agriculture, should emphasize providing assistance such as essential practical pieces of training rather than theoretical training alone especially on pests and diseases management which is very beneficial for farmer associations. If pests and diseases are managed, the quality and yield of agricultural produce will also improve, which could suggest higher profitability. Machinery operation training programs are also beneficial for farmers since they will be able to utilize those machinery interventions from government programs. It can improve their efficiency and minimize their expenses, primarily labour expenses and expenses incurred for farm machinery rental. However, to achieve optimum results with this suggestion, immediate yet proper implementation of these training and seminars should be done for an effective and better outcome to happen.

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