COPING MECHANISMS OF FARMERS ON THE EFFECTS OF NATURAL DISASTERS

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ABSTRACT: *The Philippines is a tropical country and oftentimes experiences natural disasters like typhoons causing floodings, among others. Likewise, the country is agricultural where farmers get beset every time typhoons hit the country. This study aimed to assess the nature and process of coping mechanism of farmers on the effects of natural disasters. It made use of a qualitative research where a case study was conducted among small-scale farmers. A case study is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context. The selection is based on the fact that these agricultural villages and they experience the effects of these disasters. Findings reveal that farmers seek for medication in case of injury; do more on-farm work to manage farming activities after the disaster like replanting, making canals, sharing seedlings to fellow farmers; and they help one another in the clearing operation of village roads and rice paddies. Some farmers divert to tricycle driving after the typhoon. The husband and wife talk about poor harvest and just move on. The family prays that they were spared from the wrath of the typhoon. It is concluded that farmers' coping strategies for both on-site and off-site are technical and scientific., they go for socialization, acceptance, stretching the available financial resources, support of family and faith in God. From the findings of the result, it is recommended that farmers need to sustain and strengthen their coping strategies needed in farming.*

Keywords: farmers, effects of disasters, strategies, agriculture

1. INTRODUCTION

Farmers identified environmental risks as the most severe risks to their agricultural production and their main adaptation strategies, including changes to planting dates and crop varieties and increasing the use of fertilizers and pesticides. Following protection motivation theory and structural equation modeling, we found that farmers' risk perception and adaptation behavior in response to three specific hazards (floods, heat waves, and cold spell [1]. These, in turn, mediated affected farmers' intended flood adaptation strategies.

Agriculture is greatly influenced by climate change, especially in developing countries. Farmers are both the basic executors of agricultural adaptation and among the most vulnerable groups to climate change.

Natural disasters disrupt the future of farmers. Typhoons that caused severe flooding that passed some parts of the Philippines they were Lawin, Mario, Ompong, Ramon, and Domeng [2]. These beset farmers, but they are still into farming.

Coping refers to the ability of societies to lessen the adverse impacts of natural hazards. Adaptation is a long-term process that involves structural changes and strategies to better deal with the negative impacts of natural hazards [3]. As the risk of natural hazards increases, there is a tendency for exposure, vulnerability, and susceptibility to increase as well.

Farmers are always vulnerable to natural disasters but remain to move on and become a resilient sector continuously.

. The long rainy season destroys the quality of farm products. The hot weather induced the fast proliferation of insects that produce black sticky excreta that destroy both flowers and young fruits of high-value cash crops. The strong winds during the cold season blow off the flowers and young fruits from the trees. Cold and foggy mornings followed by hot sunny daytime destroy the leaves and flowers of vegetables [4].

Recent years show increasing extremities in weather patterns in our country. With diverse climate on one hand and species and their habitats dwindling, chances for ecosystems to adapt naturally are diminishing. Climate change experts anticipate more extreme weather events, but their severity and location are difficult to predict. Increases are expected in flash flooding, landslides resulting from intense rainfall or flood water; storm surges; artificial floods, such as breaches of embankments; and areas not previously prone to flooding, such as urban areas Its adverse effects are fast becoming a common concern of government units.

Filipino farmers have no choice but to pave the way for a natural disaster coping mechanism and a resilient future within their means. Farmers adapt to the most challenging scenarios that typhoons, hot summer months, and cold, windy seasons that come their way [4]. Ex-post coping strategies adopted by farmers depend on stress attached to it. Low stress coping strategies could include Modify consumption patterns.

The agricultural practices in the area are sensitive to atypical changes in weather pattern. Its main products like rice, corn, vegetables and Aquaculture products like tilapia, bangus, grouper, shrimp, and crabs are dependent on suitable weather conditions. The strong winds during the cold season blow off the flowers and young fruits from the tree. The long rainy season destroy the quality of dragon fruits [4]

Farmers are always vulnerable to natural disasters but remain a resilient sector.

Objectives of the Study:

This study aimed to assess the nature and process of coping mechanism of farmers in a village in the Philippines on the effects of natural disasters. Specifically, it sought to gather the following:

1. Determine the ex-ante coping strategies adopted by farmers in terms of on-farm strategy and off-farm strategy
2. Determine the ex-post coping strategies adopted by farmers in terms of low stress; middle stress ; and high stress

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Conceptual Framework:

The research was guided by the schematic diagram below.

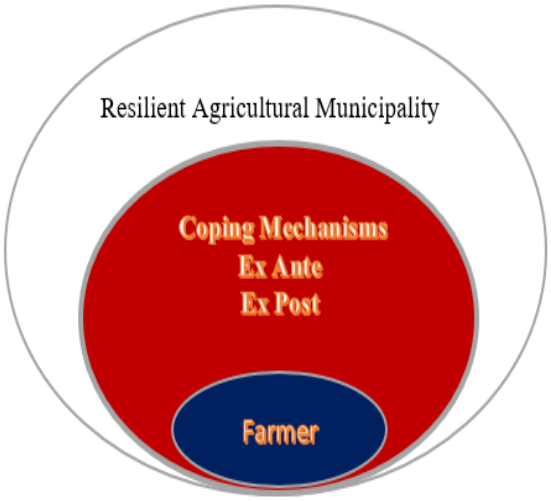

Figure 1: Paradigm Showing the Resiliency of a Municipality and the Coping Mechanism of its Farmers

A schematic representation of a typical cross-sectional study on how farmers make use of their various coping mechanisms in overcoming the effects of natural disasters. The Ex-ante and ex post strategies that are usually adopted by farmers were determined to know how farmers adapt with or mitigate the effect of natural disasters.

2. METHODS

This study made of use of qualitative research. A case study was conducted among small-scale farmers in a village in the Philippines to determine how they cope with natural disasters. Cross-sectional studies were performed to examine the presence or absence of coping mechanisms and their exposure to climate during their farming.

A case study is a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context. It is an established research design that is used extensively in a wide variety of disciplines, particularly in the social sciences. The rates that result from cross-sectional studies are termed prevalence instead of incidence as in cohort studies. Cross-sectional studies can be performed without the need for follow-up, making them less expensive to perform.

The participants are farmers who experience natural disasters and their associated effects from time to time. Their responses were statements describing their coping strategies to disturbances and changes on the effect of natural disasters on crops, livestock, and their households.

Below are the target participants and their activities.

Table 1. Activities and Participants of the Study

Activity	Participants	Sample Size
Assessment (FGD)	*Randomly selected farmers*	*n* = 10
Interviews	Municipal Officers on (Agriculture and Environment, Planning and Disaster Management, Women and Sangguniang Bayan, Sta Catalina Farmers Association	*n* =10
Observational	*Farming practices during the rainy season*	*n* =2

The Assessment activity through focus group interview involved the *10 Randomly selected farmers. Another 10 participants from the municipal offices and sectors were interviewed, and two farm areas were observed as to how farmers cope with natural hazards.*

The ex-ante and ex-post coping strategies served as the themes that were focused in this qualitative study. The codes were extracted based on the dominant focus of answer by the participants of this study. The prevalent codes served as the findings.

On farm strategies are applied or seen on site of farming while off-farm refers to those that were not done on-site of farming but could do at home, commercial and institutional areas. Furthermore, coping strategies for ex-post coping strategy were classified according to intensity of problem or stress as felt by the farmers.

Table 2. Thematic Guide to Gather the Data Needed

Theme	Codes
Ex-Ante Coping Strategies - adoption of risk management strategies before the occurrence of climatic shocks	
• **On-farm strategy**	
• **Off-farm strategy**	
Ex-Post Coping Strategies - coping strategies after the occurrence of climatic shock	
• **On-farm strategy**	High stress
	Middle stress
	Low stress
• **Off-farm strategy**	High stress
	Middle stress
	Low stress

Ethical Consideration and Gender Responsiveness The researchers observed ethical consideration and gender responsiveness as per guidelines set by the UNP Research Ethics Review Committee and the UNP Gender and development.

Ethical principles, as well as gender sensitivity that was observed, included the informed consent process, risks and benefits, and individual and University of Northern Philippines considerations.

On the principle of informed consent, the rationale, methodology, gender concern, and other information required by the university in the conduct of the study were discussed between the respondents and researchers.

3. RESULTS AND DISCUSSION

The researchers and data gatherers made face-to-face meetings and interviews to collect data on farmers' ex-ante and ex-post coping strategies. They recalled the disasters that hit the place, and the terrible experiences in farming when disasters strike. They also revealed their personal strategies in coping with these problems especially when typhoons Ompong, Mario, and Lawin hit the Philippines [9]

Ex-Ante Coping Strategies

To answer the needed data in determining the ex-ante coping strategies, the researchers asked the participants about the adoption of risk management strategies before the occurrence of a change in weather or climate, which includes the coming and passing of typhoon, cold, windy months, and the long hot, dry season.

Findings show that there are various coping mechanisms done by the farmers A typical day on the farm starts just before sunrise and morning ends for breakfast. Their afternoon farming starts again after their siesta time then ends before dark or angelus.

Their usual activities to prepare them for heavy rains or typhoons include the following: checking and fixing possible problems to face during the coming of typhoon like water drainage; checking for the presence of worm, among others. Rains are favorable for worms and insects to some value crops.

In case of scarcity of water for irrigation the farmers do the following to cope with the problem: grow rice that do not require much water; use private wells to irrigate their farmland; construct a shed made of nets to protect seedlings from too much sun exposure; seedbed for vegetables like cauliflower and cabbage are also prepared early to get rid of the worms and insects during the hot dry summer months.

To cope with fogs or early morning dews, the farmers apply the following mechanisms: young onions are with hay to prevent exposure from thick fogs or when a sudden fall of rains come. They do use black plastic because it is too hot for the leaves and just simply cook the onion leaves; prepares their onion bulbs to be planted even before rice harvesting come. This is enabled them to plant onions earlier so as to make it harvested before the foggy months of December, January and February comes.

In case of unexpected price increase due to scarcity of supply caused by typhoon or high demand in the market, the farmers: farmers did not reduce their farm area; reduced the number of fertilizers applied; lengthened the interval of irrigation.

The study differs from the study of [6] that in response to shocks, farmers in the surveyed communities had resulted to the selling of assets to moving to a distant area in search for a temporary work.

The farmers also have solutions to meet the wrath of natural disasters that are made at the farming area but done at home, commercial areas and institutional. These are referred to in this study as off-farm strategies to counter natural hazards.

Before going to the farm site, the farmer: have a cup of coffee and bread before going to the farm to prevent stomach ache; wear boots is going to farm not only to prevent their feet from being soaked with rainwater but also from possible snakes and thorns or debris flown during typhoon; do the sign of the cross before leaving the house for protection and ask for better harvest; listen to radio or watch news on weather forecasting to monitor the entry of typhoon as well the duration of hot and dry summer; to maintain their usual practices, borrowed capital to finance the additional requirements of their rice crop.

To be prepared for the coming of natural disasters, the farmers join with formal and informal groups like The MAO distribute drought-resistant seeds to farmers for their rice farming. In addition to this, farm chemicals are also distributed to the farmers for free by the MAO; The MDRRM office monitors and reports to the mayor agricultural damages caused by typhoon and drought. Prayers are still their best weapon in preparing and facing typhoons and other natural disasters.

The study supports the article of [7] that in farm families, the men are automatically the ones who make the decisions. Family members gain skills, show commitment, and shoulder responsibilities, family discussions in farming.

Ex Post Coping Strategies

Farmers rely on an ex post coping strategy to cope with the risks when ex ante coping strategies fail to address the risks. stress. High stress refers to those that the farmers claim that need immediate response to remove their stress or problems caused by a disaster. Medium or middle stress refers to problems caused by the disaster in which the solutions can be postponed or set aside for a while. Low stress asks for actions that are done as called for or not a priority.

The Ex-Post Coping Strategies of Farmers Against Natural Disasters

Findings from the study revealed the following to be attended so soon ***on-site*** to remove attached stress it gives to faming: Farmers sought for medication in case of injury or disease incurred in farming; They need to do more on-farm work to manage farming activities after the disasters, like making small canals to clear drain standing water from the fields; Farmer's replant those that were destroyed by fog, typhoon or intense heat; Farmers do share of seedlings to fellow farmers with damaged plants due to typhoon; They do not plant rice nor vegetables to areas flooded with seawater[14].

The study shares the same views of Ambong [5] that the most common coping mechanism used by the farmers is active coping by means of concentrating their efforts on doing something about the situation and to make the situation at the farm area better. Looking into the study of Rakotobe [8].

], farmers from Madagascar and the participants in this study have some similarities in coping with natural disasters. Their similarities include replanting crop fields damaged by cyclones and finding temporary work to buy food. However,

Madagascar farmers reduce consumption of staple foods and harvesting wild foods.

In response to making agriculture climate-resilient, Agriculture Technicians from Municipal Agriculture Office distributed *corn and palay* seeds that are tolerant to rains and drought [10].It is necessary that farmers be apprised further on the adverse effects of climate change[11].

. The said office is also promoting to farmers to plant off-season tomatoes and eggplants. Seeds of beans that could tolerate rains were used to be distributed by the MAO [10]. Cutting branches of trees or pruning crowns of nearby trees is an old strategy of farmers that makes plants more exposed to sun energy making it more beneficial in photosynthesis [15]

The following are the coping strategies on-site that are claimed by the farmers of the least priority, but it does not mean to them as of no concern: Farmers seat with their own informal groups while on-farm to assess and talk about a typhoon or infestation and clear out fallen branches but ask help from the village officials if trucks are needed

The participants of this study agreed with [3] that membership in farmer groups significantly and positively influences farmers' adaptive behavior.

Findings from the study revealed the following ***off-site*** coping strategies: Farmers divert to tricycle driving after clearing the debris since cash is easily generated through it. Parents explained to their children to practice frugality. Offering thanksgiving mass after a harvest season They sell immediately their high value vegetable cash crops while prices are still high enough to avoid losses

Selling their crops immediately is also considered by [3] as coping strategy to prevent produce to be consumed by a disaster

The study shares the same views of [5] that religion also provides an excellent coping mechanism for the farmers and often use prayer for peace and finding comfort in religion or spiritual belief.

Farmers ensure their crops like rice but claim that there are more problems than it had created than help because it is hard to claim payment

Adjusting planting time and choosing a different crop variety were the most common and important of these measures for damages. Farmers convert dried fishponds into areas for planting cauliflower and corn [12]. While climate and weather are known limiting factors of agricultural production, the middlemen intervention raise price for consumers [13].

The following are the coping strategies on-site: Celebrating birthday and fiesta is recognized by farmers as costly but this gives joy to the family and justified as a form of thanksgiving; they ask loan for money from their relatives like those ones working abroad rather than banks; and they are usually listed as members of the farmers' association with insurances

Empirical data also show that farm households that experienced shocks also took risk-reducing measures at the start of planting season. Any public goods, however, households seldom invest in cleaning streams and canals or building dikes because these activities benefit the whole community. Further research is needed to determine priorities among the risk management and coping strategies represented in the conceptual framework provided.

4. CONCLUSIONS AND RECOMMENDATIONS

Amidst natural disasters that threaten and destroy properties and crops of Farmers in the village, the farmers claimed that their common coping strategies for both on-site and offsite are technical and scientific, Coping strategies call for holistic and multidimensional needs.

Farmers must sustain the coping strategies with the assistance of the government in enhancing their resilience. Based on the conclusion formulated, the Local Government units may also craft a Local Climate Change Adaptation Plan.

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