A Comparative Study of Farmers' Disaster Coping Capacities and the Impacts of Agricultural Insurance: A case from Gifu Prefecture, Japan, and Laguna Province, Republic of the Philippines

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A Dissertation Submitted to

The Graduate School of Global Studies

Doshisha University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

In

Contemporary Asian Studies

November 2020

Japan

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ABSTRACT

The primary objective of this dissertation was to seek an answer to the question of how agricultural insurance can potentially be an effective and efficient coping mechanism so that the poorest of the poor in isolated rural areas (in the lowland and upland) can avoid falling into the poverty trap amid rising global natural disasters in the most exposed region of East Asia and the Pacific. The study also examined the adaptive and coping capacities as well as disaster management practices across elevations in both countries.

Observations in the field were conducted to investigate the disaster experiences, characterization of extreme events, and coping strategies employed, but the main focus was on farmer experience on agricultural insurance in two types of elevation (lowland and upland) as well as program implementation of the insurance providers in the developed country of Japan and the Philippines as a representation of the developing world. Field work was done during the months of July, August, and September of 2018 in Laguna Province in the Philippines; February, March, June, and July of 2019, in Gifu Prefecture in Japan; and again in the months of August and September of 2019 in Laguna Province in the Philippines. Interviews were done with a total of seventy individual farmer respondents in the Philippines and seven family run farms and farming enterprise in Japan, both in the two types of elevation. The agricultural insurance providers were the government-backed agricultural insurance corporations namely the Philippine Crop Insurance Corporation (PCIC) in the Philippines and the National Agricultural Insurance Association (NOSAI) in Japan. Secondary data were gathered from existing literature such as online articles, scholarly journals, books, news, and annual reports as well as online websites of the government insurance providers in the Philippines and Japan. Primary data were also collected to respond to the objectives of the study. Primary data were analyzed using Descriptive Analysis, Parasuraman's Gap Analysis, Likert Scale, Cost and Returns Analysis, and Logit Analysis.

Out of the coping mechanisms which can be used by farmers, agricultural insurance can be the common ground. There are various coping and adaptation strategies that are utilized by farmers to cope with natural calamities but these might not be enough to protect them in times of need. A good agricultural insurance system which the farmers can trust can be the answer to their woes during the occurrence of these extreme events. The long history of agricultural insurance started in Germany in 1733 and evolved significantly revealed by the literature. Some agricultural insurance markets around the world are sophisticated such as the ones in Europe, the United States, and Japan while others such as the ones in South East Asian countries have room for improvement. African insurance system, on the other hand, is new and launched recently. Even though there are enough evidence to support the positive effects of agricultural insurance on farmer income loss reduction and behavior in general, most of the agricultural insurance markets in the Asia and the Pacific region, which is the most exposed area in the world.

The results of the countries' case studies of the Philippines and Japan shed light on the big differences between the agricultural production, institutional set-up of those involved in agriculture, coping strategies, and agricultural insurance systems. Compared to the Philippines, Japan has stronger infrastructure that can withstand and minimize the effects of destructive disasters. Japanese farmers also have more effective individual coping mechanisms compared to the Filipino farmers, partly because they have higher income per hectare, which gives them the ability to build their capital. The Japanese farmers' savings as well as government subsidies are enough to cushion them from the effects of natural disasters to the point that agricultural insurance may not be necessary anymore. Strong institutions and centralized agricultural cooperatives make way for effective marketing between the consumers and producers which also is the reason why the Japanese farmers are better-off than their Filipino counterparts. The centralized cooperatives also give other services and other information to improve the livelihood of the Japanese farmers. Simply put, there is only one centralized middleman between the farmers and the consumers. In contrasts, the supply chain actors in the Philippines is rather numerous, which results to the middlemen being richer, leaving the Filipino farmers poorer.

Agricultural insurance can be a stand-alone risk management tool for Japanese farmers, as Japan's agricultural insurance provider has enough capital from the premium payment it receives from its beneficiaries. In turn, the insurance association is able to give high indemnity payments, high enough to provide a cushion for Japanese farmers in times of disasters. In contrast, the Philippines' main implementer of agricultural insurance has low capital build up, due to the low premium payments they receive because of low farmer enrolment in its agricultural insurance programs. For this reason, the corporation could not give high indemnity payments to its beneficiaries and could not be used as a stand-alone risk management tool in the Philippines. The Japanese farmers' individual coping and adaptive capacities, paired up with strong institutions, are good enough to the point that the Japanese farmers view that agricultural insurance is not a necessity anymore to be shielded from natural disasters. Meanwhile, the coping strategies of the Filipino farmers are failing, and setting-up a better agricultural insurance system could be the answer for the Filipino farmers' plight.

Based on the results of the comparative studies in the Philippines and Japan, it is concluded that it is possible that the Philippines, other disaster vulnerable developing countries, and other disaster vulnerable countries with undeveloped or underdeveloped agricultural insurance associations and products, could emulate Japan's agricultural insurance system as a single risk management tool to manage the effects of natural disasters.

The study recommends strategies in which the Philippines, and other disaster vulnerable developing countries, can use as a reference to improve their respective agricultural insurance system and to cope more effectively to the rising global natural disasters.

Key words: Agriculture, Disaster Management, Agricultural Insurance, Coping Strategies, Food Security

ACKNOWLEDGEMENTS

I would like to express my sincerest gratitude to the following for the inspiration and assistance extended to me which contributed to the completion of my doctoral dissertation:

Eiji Oyamada Sensei, my adviser, for the significant comments on my study, his guidance, time and patience in checking my research work and making sure that I had a balanced life during my time as a doctoral student;

Yoichi Mine Sensei and **Seifudein Adem Sensei**, for the valuable constructive suggestions and remarks to further enrich my dissertation;

The Faculty members of the Graduate School of Global Studies for all the prized knowledge that I learned in different fields of Global Studies;

The GS Office Staff for being so accommodating when I needed assistance or questions concerning school matters;

Doshisha University for giving me the opportunity to do my doctoral studies without financial burden;

The Kubota Foundation for providing financial support to pay my living expenses which gave me the opportunity to focus on my studies;

Officers and Staff of NOSAI, the **JA Group**, and the **PCIC** for their generosity for providing me the needed data for my research;

The local governments of Gifu prefecture and **Laguna province** for giving me permission to do my fieldwork in their areas and for the information and data I needed for my study;

My Senpai, **Yu Sumi**, for all the assistance he provided me during my fieldwork in Gifu;

My Senpai **Tasuku Ohashi**, and friends **Emily Parker** and **Ayano Nakamura** for helping me with the translating Japanese documents needed for my study;

Kuya Francis Faderogao for helping me in programming and running the statistical analyses;

To all my friends at **Global Studies**, **Intensity**, **the Kyoto Association of Pinoy Scholars**, and **Doshisha Pinoy Group**, who made my PhD life more colorful, without you guys, I might not have the will and strength to finish my doctoral studies;

My sister **Alyssa**, for lending a helping hand in proof-reading my research work; and

To my mother**, Agnes** and father**, Wally** for their never ending support, encouragement, and guidance;

Thank you very much from the bottom of my heart.

DEDICATION

To my family, **Agnes**, **Wally**, **Alyssa**, **Aileen**, **Wilbert**, and **Andrei**, and to all the **Casiple** and **Rola** families, who serve as my inspiration; To **God**, who gave me the will and strength to complete my research; and to all the **agricultural producers**, who are the champions of food security; I dedicate this dissertation to all of you.

Armand Christopher Casiple Rola

LIST OF ABBREVIATIONS

ABS	Automated Business System
ACRE	Agriculture and Climate Risk Enterprise
ADB	Asian Development Bank
ADS²	Accident and Dismemberment Security Scheme
AGF	Agriculture Guarantee Fund
AIC	Agriculture Insurance Company of India Limited
AIP	Agriculture Insurance Program
AMR	Agricultural Mutual Relief
ARC	Agriculture Risk Coverage
ARPA	Agricultural Risk Protection Act
AT	Agricultural Technologist
BOM	Bureau of Meteorology
CALABARZON	Cavite, Laguna, Batangas, Rizal, Quezon
CARD	Center for Agricultural and Rural Development
CBH	Cooperative Bulk Handling
CCC	Climate Change Commission
CCIP	Corn Crop Insurance Program
CDA	Cooperative Development Authority
CNN	Cable News Network
CPU	Central Philippines University
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DILG	Department of Interior Local Government
DRRM	Disaster Risk Reduction and Management
FAO	Food and Agriculture Organization by the United Nations
FCIP	Federal Crop Insurance Program
FIP	Fisheries Insurance Program
FGD	Focus Group Discussion
GAP	Good Agricultural Practices
GDP	Gross Domestic Product

GEJE	Great East Japan Earthquake
GMA	Greater Manila Area
GOCC	Government-Owned and Controlled Corporation
HA	Hectares
HVCC	High-Value Commercial Crops
HVCIP	High Value Crop Insurance Program
IAC-PCIS	Inter-Agency Committee for the Development of the Philippine Crop Insurance System
JA	Japan Agriculture Group
JPY	Japanese Yen
KII	Key Informant Interview
LBP	Land Bank of the Philippines
LGU	Local Government Unit
LI	Lending Institution
LMIP	Livestock Mortality Insurance Program
MAFF	Ministry of Agriculture, Forestry and Fisheries
MAO	Municipal Agricultural Officer
MIMAROPA	Mindoro, Marinduque, Romblon, Palawan
MNAIS	Modified National Agricultural Insurance Scheme
MOA	Ministry of Agriculture
MOFA	Ministry of Food and Agriculture
MPCI	Multi-Peril Crop Insurance
MSU	Mindanao State University
NAIS	National Agricultural Insurance Scheme
NCIP	Non Crop Insurance Program
NDRRMC	National Disaster Risk Reduction and Management Council
NFA	National Food Authority
NIA	National Irrigation Administration
NIAM	National Insurance Association of Malaysia
NPA	New People's Army
NOSAI	National Agricultural Insurance Association of Japan
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration

PAO	Provincial Agricultural Office
PCIC	Philippine Crop Insurance Corporation
PD	Presidential Decree
PHP	Philippine Peso
PIC	People's Insurance of China
PIDS	Philippine Institute for Development Studies
PLC	Price Loss Coverage
POT	Package of Technology
PPP	Public-Private Partnership
PSA	Philippine Statistical Authority
RCIP	Rice Crop Insurance Program
RMA	Risk Management Agency
RSBSA	Registry System for Basic Sectors in Agriculture
RSBSA-AIP	Registry System for Basic Sectors in Agriculture-Agricultural Insurance Program
SCO	Supplemental Coverage Option
SEPO	Senate Economic Planning Office
STAX	Stacked Income Protection Plan
SURE	Supplemental Revenue
TA	Team of Adjusters
UN	United Nations
UNISDR	United Nations International Strategy for Disaster Reduction
UNUEHS	United Nations University Institute for Environment and Human Security
UPLB	University of the Philippines Los Baños
US	United States
USD	United States Dollar
WB	World Bank
WFP	World Food Program
ZEN-NOH	National Federation of Agricultural Cooperative Associations

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CHAPTER 1

INTRODUCTION

1.1. Background of the Study

As the world continues to battle climate change, natural disasters have slowly become a regular part of our daily lives. Thus, citizens have no choice but to adapt to this new cycle. There are a variety of ways to cope with these natural disasters. For instance, a country's government can build infrastructures to protect its citizens from frequent disasters. In Japan, where earthquakes are common, the buildings are designed to be earthquake-proof. The Netherlands, a country known for its low elevation, boasts of the best flood control system in the world. On the other hand, individual citizens can also cope at the household level. They can use their savings or utilize insurance in times of need. Most developed countries have the capacity to employ these adaptation strategies as most citizens are sheltered comfortably in their homes built from strong materials.

However, it is a different case for developing and low-income countries, as their governments and citizens do not have the same capacity to cope with these instances. Among the most vulnerable to these disasters in the developing world are the farmers, who are generally poor, but are the ones responsible in providing food for our plates. Thus, this study aims to provide new perspectives on how developing countries in disaster-vulnerable areas can employ better coping strategies to avoid the poverty trap during disasters, especially in the agricultural sector.

The East Asia and the Pacific, which is mostly composed of developing countries, is the most exposed region to natural disasters in the world, according to the World Risk Report

(UNUEHS, 2018). Its proximity to the Pacific Ocean and the Pacific Ring of Fire makes the region prone to climate-related disasters such as typhoon and flooding, and geophysical disasters such as earthquake and volcanic eruption. Out of the top ten countries at risk, seven of them are in the East Asia and the Pacific region.

Agriculture in the East Asia and the Pacific region is highly exposed to the key climatic risks of typhoon, flood, and drought. For many of the Pacific islands, there are also major exposures to tsunamis. In the most northerly territories such as China, Japan, Mongolia, and Nepal, agriculture is also exposed to hail, frost, and snow damage. Hail and frost are also major exposures in parts of Australia and in New Zealand (FAO, 2011).

Climate change is a major hindrance to increasing agricultural productivity through the growing occurrence of extreme events resulting to more disasters, such as floods and droughts. With this amplified frequency of extreme events, there is growing concern over its impact on future global food production and food security (Kurukulasuriya and Rosenthal, 2003, pp. 7-23). The hardest-hit of this phenomenon would be the developing countries, which still rely on agriculture as the backbone of their economies. Any bad harvest due to climate extreme events would significantly affect the viability of agricultural industries, particularly the small farmers who are unable to recoup their investments (Magno and Bautista, 1989). Especially in rural areas, the farmers' livelihood systems are often so delicate that a small misfortune can destabilize a household for many years. Natural disasters and shocks threaten the already low and irregular income and can have long-term effects on livelihood strategies and welfare (World Bank and Department for International Development, 1999, pp. 30-38).

The most vulnerable to these events are the farmers located in isolated rural areas in developing countries. To illustrate, in December 2010, overwhelming flooding in Colombia

resulted to over 200 fatalities and 1.7 million displaced residents. The catastrophe saw 628 cities and towns hit by floodwaters and over 1,800 homes devastated (The Guardian, 2011). Most of the affected who lost their relatives, homes and belongings will have no compensation for their losses and would need to restore their lives from scratch. Many of them were poor farmers living in isolated rural areas which are similar for all victims of most natural disasters all over the world (The Guardian, 2011).

Table 1.1 shows the classification of risk that agricultural producers face (Zorilla, 2002; Holzmann and Jorgensen, 2001 in Reyes, et al., 2017 pp. 2-3). Climatic risks include hail, frost, drought, wind, snow, pest infestation, and flood, while geological risks consist of earthquake and volcanic eruptions. Agricultural producers not only experience natural disasters but also risks in sanitary, agricultural production and market prices, interest rates, operational, environmental, policy, health, and property.

These risk and vulnerability to risk are fundamental reasons of underdevelopment (World Bank, 2000; Dercon, 2006; and Islam, 2007). Sudden misfortunes induce loss of income and production— which usually force the exposed poor to dispose of productive assets. These result to lower productivity, lower income, and higher vulnerability in the future: a process known as the poverty-vulnerability vicious circle (Mosley, 2009 p.1). Moreover, the expectation of such shocks stimulates the vulnerable to invest their resources in low-yield activities such as production of drought-resistant subsistence crops, to protect themselves against the shocks, and thus dampens the potential income of the poor below what it would be if they were not exposed to shocks. For both reasons, the costs of risk to the livelihoods of poor people are severe. Dercon (2006, p. 123) revealed in his survey of income shocks suffered by individuals covered by the Ethiopian Rural Household Survey between 1999 and 2004, estimates that “if these shocks had been insured and smoothed, poverty would have been lower by about a third”.

Table 1.1. Classification of risk facing agricultural producers

Types of Risks	
Climatic	Hail, frost, drought, wind, snow, pest infestation, flood
Geological	Earthquake, volcanic eruptions
Sanitary	Plagues, diseases
Price	Commodity, inputs, exchange rates
Financial	Interest rates
Operational	Availability of inputs, evolution of production technologies
Environmental	Pollution, deforestation
Policy	Public subsidies, agricultural policy
Health	Illness, injury, disability, epidemic diseases
Property	Fire, theft

Sources: Zorilla (2002), Holzmann and Jorgensen (2001) in Reyes, et al. (2017)

Due to lack of necessary safety nets, the farmers tend to become poorer, and would relatively require a longer time to go back to their original income level. The commonly observed coping mechanism among the rice farming households after an extreme event such as typhoon and flood is to take out loans from relatives/friends, or sell farm assets like livestock (Israel and Briones, 2013, p. 13). This will further push them back to a lower level of poverty. This scenario will contribute to the perpetuation of poverty among rural and agricultural households. Low-income people are different from the wealthy individuals because the poor do not have enough assets to give them cushion during periods of calamities. Overall, when disasters happen, poor farming households will have less access to risk management options needed to cope with the consequences of such events (Israel and Briones, 2013, p. 13).

Nonetheless, there are other risk management tools or coping mechanisms that may help in reducing the farmers' climate-related losses (Reyes, et. al. 2015, p. 2). One of these is the agricultural insurance, which is a financial instrument used to manage agricultural production risks brought about by natural calamities, pest infestation, and plant diseases, among others. The general definition of insurance is the "form of risk management primarily used to hedge against the risk of a contingent, uncertain loss" (Dickson, 1960, p. 324). According to the same paper, insurance is defined as the reasonable shift of the risk of a

loss, from one unit to another, in substitute for payment. Agricultural insurance is not only limited to crops, but also covers livestock, forestry, and even aquaculture.

A vast number of the poor households around the globe are living in environments where risk is a daily reality, agricultural insurance is resurfacing as a topic of interest to farming households, policy makers, insurance companies, and development finance institutions (Reyes, et. al., 2017, p. 2). Farmers worldwide use numerous risk management strategies but a lot of these are seen to be inefficient. In several cases, after major income shocks, the poor recourse to high interest rate loans. Some argue that the poor don't have enough money to purchase ex ante insurance protection against extreme events, yet there are prevalent uses of ex post loans (World Bank, 2005, pp. 45-52). The task remains on how to boost the effectiveness and affordability of insurance during extreme events.

The World Bank (2005, pp. 45-52) identified two major matters constrain the improvement of risk transfer markets for agricultural losses brought about by extreme events which were: 1) organizing ex ante financing for highly correlated losses can result in extremely large financial exposure; and 2) distorted information problems, for instance moral hazard (occurs when individuals engage in hidden activities that increase their exposure to risk as a result of purchasing insurance, or attempt to influence the claims outcome) and adverse selection, (occurs when potential insured parties have hidden information about their risk exposure that is not available to the insurer, who then becomes more likely to erroneously assess the risk of the insured) lead to high transaction costs. In addition, this makes it difficult to impart traditional agricultural insurance for small farmers, since the huge amount of fixed transaction costs considerably increase the average cost of insurance protection for small-scale farmers (World Bank, 2005, pp. 45-52).

A study by Wenner (2005, pp. 2-23) reported that producers in developing countries are exposed to weather vagaries and have little access to formal agricultural insurance products that would allow them to transfer production risk to other parties. Moreover, Wenner and Arias (2003, p. 2) mentioned that when the swings significantly reduce income in the short-term, there can be grave consequences in the lack of effective risk management mechanisms, especially when those swings are systemic shocks to the whole agricultural sector. For instance, the negative shocks can influence the farmer's ability to repay financial obligations which results to a loan default. Likewise, Hill (2010, pp. 2-4) discussed that when households have little access to insurance, weather shocks not only have a direct effect on welfare when they occur, but they also affect the decisions poor households make about their livelihood. Thus better coping mechanisms to these rising disasters is important to improve the farmers' welfare in the short run and ultimately improve income growth opportunities in the long run.

According to Mosley (2009, p. 1), insurance is potentially one of the basic establishments which can deliver protection against social and financial segregation for those whose current coping strategies are failing. If people's sources of income are effectively protected, then this would encourage lower income groups to invest in insurance and raise overall investment and growth rates.

Mosley (2009, p. 1) added that there is no doubt that the provision of insurance, one of the potentially most poverty reducing services, is extremely deficient specially at the bottom end of the market where the risk coping capacity is worst.

Marza, et al, (2015, pp. 594-599) described agricultural insurance as a tool that can help not only food producers but also other players in the food supply value chain. In addition, agricultural insurance can be helpful in managing risks in the agricultural food value chain,

as it can stabilize farming income and promote investments in agriculture. Although insurance alone cannot provide food security, it can play an instrumental role in raising awareness of the significance of risk mitigation and encourage investments to increase agricultural efficiency (Marza et al, 2015, pp. 594-599).

1.2. Rationale of the Study

Yearly, substantial crop damages have been attributed to natural calamities. The Philippines and Japan are two of the countries in the East Asia and the Pacific Region that are very much vulnerable to these events. According to the World Risk Index report, the Philippines' risk to natural disasters ranked 3rd while Japan ranked 29th. Among the countries in the region, Japan has been the leader in terms of adapting and coping to natural disasters. The country has a similar score in terms of exposure to disasters such as earthquake, cyclones, floods, droughts and sea-level rise with most countries in the region, but is ranked lower in terms of risk. For instance, Japan is 29th in the rankings in terms of risk to natural disasters while the Philippines is 3rd even though their exposure scores are not far apart, with Japan tallying a score of 46.55 and the Philippines with 49.94, according to UNUEHS (2018). This is because Japan has strong scores in adapting capacities (depending on indicators such as governance, health care, and social and material security) and coping capacities (related to coming natural events, climate change and other challenges). This implies that even though Japan experiences the same amount of natural disasters every year, the country can adapt and cope better than most of their neighbors.

In a span of ten years from 2006 to 2015, the total cost of damage caused by major natural extreme events and disasters in the Philippines was estimated to be at 374,199 billion Philippine Pesos (7.2 billion U.S. Dollars) as reported by the Business World (2018). The country's agricultural sector is very much reliant on the weather and climate variability and

any bad harvest from extreme events such as typhoons, flood, drought and infestations from rats and diseases will pose a big threat in farming activities (Magno and Bautista, 1989).

The photo by a Greater Manila Area (GMA) news reporter (Figure 1) captures a corn farmer inspecting damages to his crops in Tuguegarao City in Cagayan. The farmer was only two weeks away from harvesting the fruits of his labor and investments only to see it wiped out by a typhoon.

Figure 1.1. A photo from Atom Araullo, a reporter from GMA News, Philippines, September 2018

In Japan, the "Great East Japan Earthquake" (GEJE) was one of the major natural disasters that caused significant amount of damages to the country. According to Nanto, et al. (2011, pp, 2-6), the physical damage was estimated to be around 195 billion U.S. Dollars to as much as 305 billion U.S. Dollars which is comparable to Greece's Gross Domestic Product (GDP) of 330 billion U.S. Dollars at that time. In excess of 27,000 persons in Japan were killed or missing, and more than 202,000 homes and other buildings have been totally or partially damaged. The negative effects of the earthquake and tsunami are being compounded by the continuing crisis at the Fukushima nuclear reactors and the resulting evacuations, radioactive contamination, and shortages of electricity; continuing aftershocks; and the extensive damage to infrastructure, homes, manufacturing plants, and other buildings (Nanto, et. al., 2011, pp. 2-6). Moreover, the summer of 2018 has been disastrous for Japan as the country has suffered deadly calamities such as earthquakes, floods, typhoons

and heat (CNN, 2018). Last September 2018, typhoon Jebi landed with “very strong” force in Tokushima prefecture, the strongest typhoon to hit the country's mainland since 1993, said Akihiro Kikuchi of Japan's Meteorological Agency. Not long after that, a landslide was triggered by a magnitude 6.7 earthquake that shook Hokkaido, which left at least 20 people killed, houses collapses, and power lines to millions of homes cut. (CNN, 2018). Given that both countries experience numerous natural disasters annually and each of the country’s agriculture sector are very much vulnerable to risks, they would benefit from insurance as a strategy to deal with such risks.

The Philippine Crop Insurance Corporation (PCIC), an attached agency of the Department of Agriculture (DA), is the main implementing agency of the government’s agricultural insurance program in the Philippines. The PCIC’s principal mandate is to provide insurance protection to farmers against losses arising from natural calamities, plant diseases, and pest infestations of rice and corn crops as well as other crops and livestock (PCIC, 2019). Meanwhile, in Japan, the Crop Insurance Act was established in 1938, but it implemented a Multiple Peril Crop Insurance (MPCI) program in 1939 that provided nationwide coverage for paddy rice, wheat, barley and mulberries, and subsidized 15% of premium costs (Yamauchi, 1986, pp. 223-239). The government provides approximately 50% premium subsidies. In addition, it acts as reinsurer of last resort for the whole agricultural insurance scheme.

One of the problems encountered in the implementation of crop insurance in the Philippines mentioned by Bangsal and Mamhot (2012, pp. 3-7) is that the scheme is commonly linked with poor information between a farmer and insurer, resulting in high transaction costs. The marketing, operational, and other administrative costs of the PCIC were revealed to be greater than the sum of premiums collected. Alarkon (1997) reported that the problems encountered by the rice farmers in Tarlac province, Philippines who

participated in the program were high insurance premium, small amount of insurance coverage, small amount of indemnified claims, and longtime waiting for the release of the claim. Similarly, Rola (2017, pp. 46-50) in his assessment of the Rice Crop Insurance Program (RCIP) in the province of Laguna, reported that the farmers complained about the long process of releasing their indemnity payments as well as the heavier work required in filing for indemnity claims.

In contrast, in Japan, the scheme starts as the local farmer's cooperative action to establish a joint reserve fund by accumulating the contributions as premium for the purpose of making up the loss. The National Agricultural Insurance Association or NOSAI is an agriculture mutual aid system operated by the Agricultural Mutual Relief (AMR) Associations or municipal governments. According to the NOSAI (2020) the insurance program is operated as a device of dispersing risk in which the liabilities by the AMR associations and the municipal governments are reinsured by their prefectural federation. The federation's liabilities are re-insured by the national government. Accordingly, this agricultural insurance scheme aims to help stabilize farmers suffering from damages caused by natural disasters and contribute to the growth of the Japanese agriculture (NOSAI, 2020). This is also considered as the centerpiece of the government's measures for natural disasters in agriculture, and financial assistance is provided from the government.

By looking at the case of Japan, which has strong coping and adaptive capacities, and the Philippines, which is a representative of the countries with weak coping and adaptive capacities in the region, this research seeks to answer the question of how agricultural insurance can potentially be an effective and efficient disaster management tool and recommend strategies based on the lessons learned which can be adopted by the Philippines and other disaster vulnerable developing countries. In addition, the study aims to showcase new perspectives of how a successful agricultural insurance implementation can be an

effective farmer protection tool to disasters. The ultimate goal is to make recommendations to assist farmers to avoid falling into a poverty trap as a result of disasters.

1.3. Objectives of the Study

1.3.1. Why Philippines? Why Japan?

As classified by the World Economic Situation and Prospects report by the United Nations (2018), Japan is categorized as a developed economy while the Philippines is a developing economy. Both countries are located in the East Asia and the Pacific region which is the most risky in terms of disasters, has rice as their staple food, and has rice crop vulnerable to natural disasters. The researcher is a Philippine national, and has first-hand experiences on how natural disasters dampen development in the country, with billions of pesos lost in disasters yearly. What the Philippines lacks in disaster management can be found in Japan, which is one of the global leaders in terms of Disaster Risk Reduction and Management (DRRM). In addition, the Philippines is one of Japan's biggest trading partners in the region. Sharing DRRM practices in agriculture can be beneficial for both countries to achieve and sustain food security as the Philippines could learn from Japan. The former could reduce poverty arising from natural disasters, while the latter can continue to import agricultural products from the Philippines as a solution for its aging farmers and the younger generation seemingly uninterested to venture in agricultural business.

1.3.2. General Objectives

By examining the case of Japan, which possesses strong coping and adaptive capacities, and the Philippines, which is a representative of the countries with weak coping capacities in the East Asia and the Pacific region, the primary objective of this research is to answer the question of how agricultural insurance can potentially be an effective and efficient coping mechanism so that the poorest of the poor in isolated rural areas (in the lowland and

upland) can avoid falling into the poverty trap amid rising global natural disasters in the region. The study will also look into adaptive and coping capacities as well as disaster management practices across elevations in both countries. The agricultural insurance will include rice and other crop insurance and livestock insurance such as small ruminants, chicken, cattle, and horse.

1.3.3. Specific Objectives

Specifically, the research seeks to: 1) Describe the various agricultural insurance products in Japan and the Philippines, and other countries around the world; 2) Compare different disaster experiences among different elevations between Japan and the Philippines; 3) Compare different disaster management practices among different elevations between Japan and the Philippines; 4) Compare the program implementation of these various agricultural insurance products across Japan and the Philippines, and other countries around the world; 5) Analyze the effectiveness of service delivery of agricultural insurance products as a disaster management tool in Japan and the Philippines; 6) Evaluate the efficiency of the service delivery of agricultural insurance in Japan and the Philippines; 7) Explain facilitating and constraining factors in farmer's adoption of agricultural insurance; and 8) Recommend strategies based on the lessons learned in Japan which can be adopted by the Philippines and other disaster vulnerable developing countries to improve their agricultural insurance system so that agricultural insurance can be used as an effective social protection tool for farmers experiencing disasters.

1.4. Conceptual Framework of the Study

1.4.1. General Conceptual Framework

This study investigated the role of agricultural insurance in reducing the economic losses due to natural disasters and peril exposure in rural areas of the Philippines and Japan.

Agricultural insurance protects farmers from damages and income losses, thus preventing the poorest and the most vulnerable to fall into the poverty trap. But the successful adoption of crop insurance depends on the effectiveness of its program implementation. As well, crop insurance complements rather than substitutes, other coping mechanisms in protecting the poor farmers against income loss risk.

Natural disaster and peril exposure include typhoon, flooding caused by typhoon and heavy rains, strong winds, landslide in the high elevation areas, earthquake, volcanic eruption, drought in the Philippines, unusually cold weather or frost in Japan, and the incidence of pests and diseases (Figure 1.2). For agriculture, the aforementioned disasters and perils are a problem and would incur damages and result to income losses for those who are venturing in the agricultural sector.

People who are exposed to natural disasters and perils have varying degrees of sensitivities and some are more resilient than the others. Small farmers who operate in the marginal lands and the rain-fed production systems, such as the ones found in the Philippines, are the most vulnerable to these disasters (Ludi, 2009, pp. 1-2).

The reduction of the impacts to farming households and agricultural production will be determined by the coping and adaptation strategies that are available to them which will determine their capacity to reduce income losses, and for the Philippine farmers' case, escaping poverty. Agricultural insurance, in particular, is a coping strategy a farmer can use after the occurrence of a natural calamity. Agricultural insurance provides indemnity payments to the damaged farms which can reduce the income losses of the farming households.

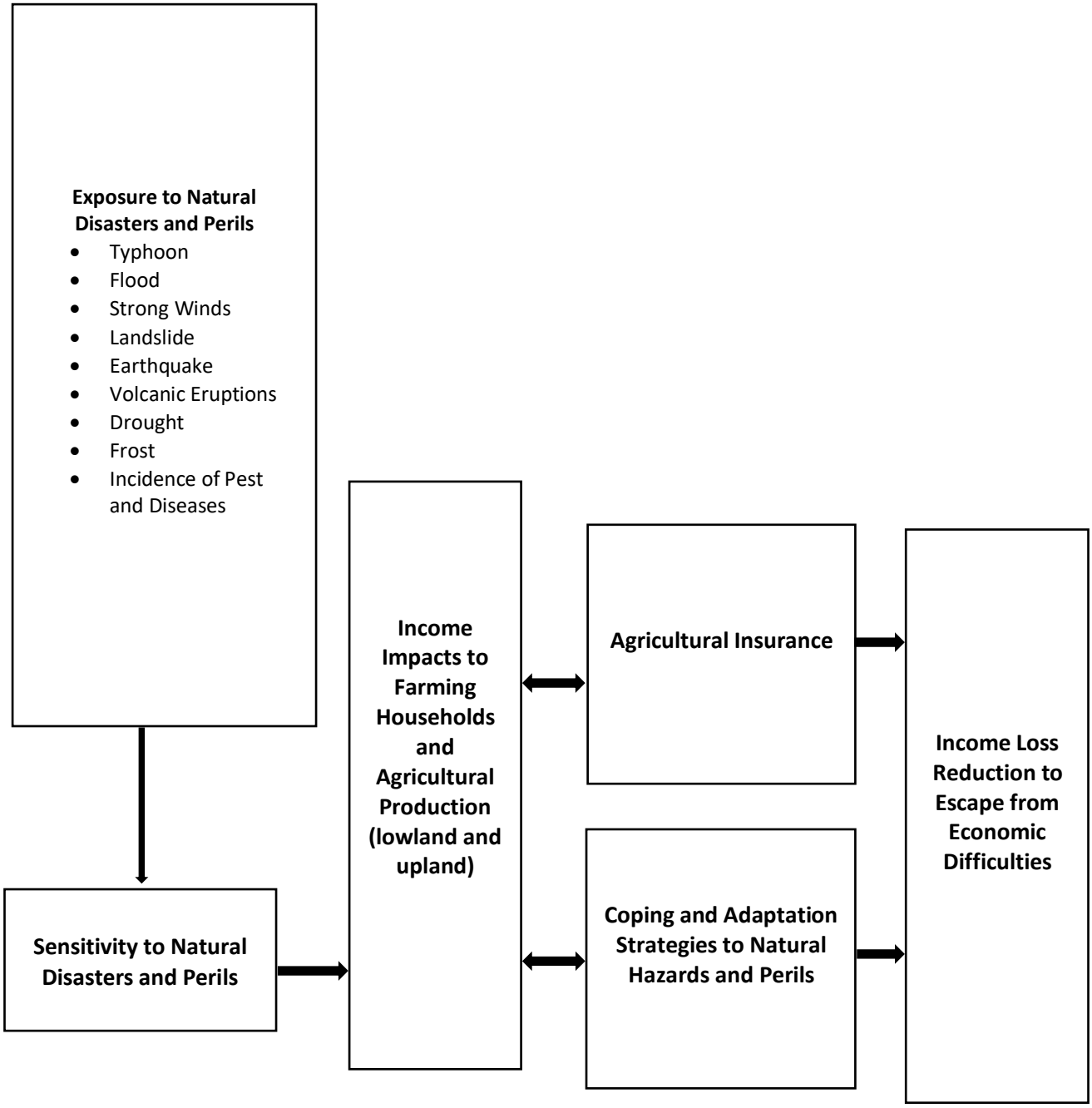

Figure 1.2. Conceptual Framework of the Study

1.4.2. Comparison Framework

Figure 1.3 illustrates the comparison framework used in this study which will be discussed more in detail in chapters 4 and 7. The grounds for comparison between the countries of Japan and the Philippines focused on the countries' exposure to risk. As mentioned before, both countries are similarly exposed to numerous natural disasters annually yet Japan proved to be more resilient based on its adaptive and coping capacity scores based on the UNUEHS report. This comparison framework was designed to compare and contrast the disaster management in agriculture between the two countries using selected frames of reference.

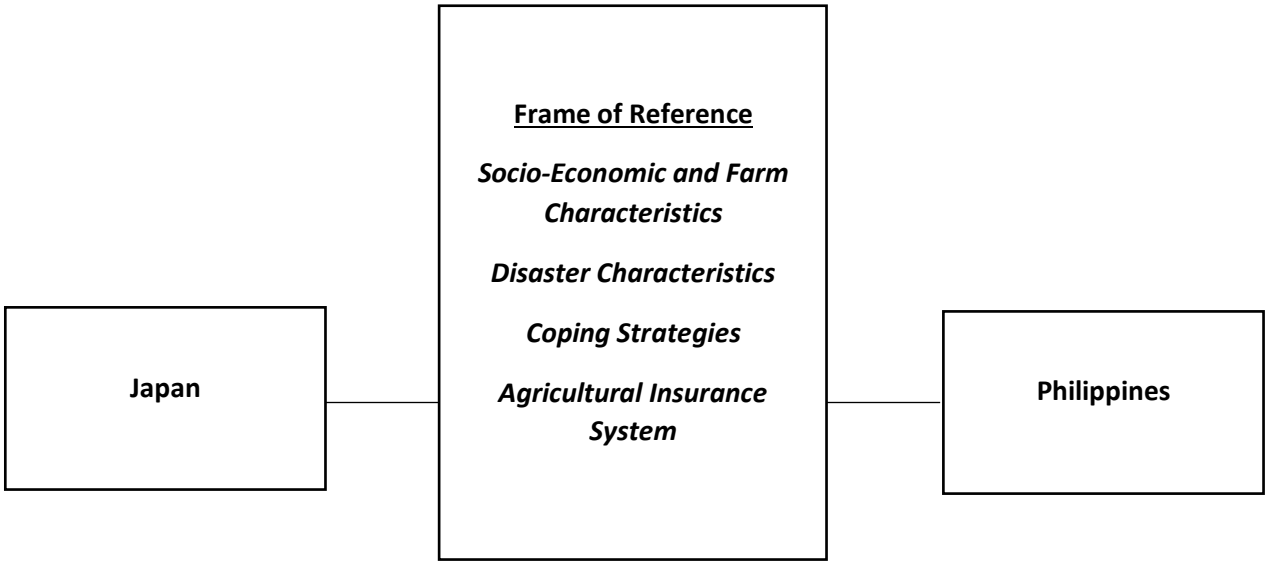

Figure 1.3. Comparison Framework of the Study

Between the Philippines and Japan, the frames of reference for comparison are socio-economic and farm characteristics such as farm system types, cooperative membership, annual income, education, and age; disaster characteristics such as disaster exposure, disaster experience, and disaster characterization; coping and adaptation strategies employed; agricultural insurance system focusing on the main agricultural providers

Philippine Crop Insurance Corporation and the National Agricultural Insurance Association with focuses on targeted risk, excluded risk, and farm eligibility.

1.5. Methodology

1.5.1. Fieldwork and Description of the Location of the Study

Observations in the field was conducted to investigate the disaster experiences, characterization of extreme events, coping strategies employed, but the main focus was on farmer experience on agricultural insurance in two types of elevation (lowland and upland) as well as program implementation of the insurance providers in the developed country of Japan and the Philippines as a representation of the developing world.

The specific study areas were Gifu prefecture in Japan and the province of Laguna, in the Philippines. The study sites selected are both agricultural areas that have similar disaster experiences in lowlands and the uplands in each country. The field work was done during the months of July, August, and September of 2018 in Laguna Province in the Philippines; February, March, June, and July of 2019, in Gifu Prefecture in Japan; and again in the months of August and September of 2019 in Laguna Province in the Philippines.

Interviews were done with a total of 70 farmer respondents in the Philippines and 7 family run farms and farm business corporations in Japan (88 in total), both in different elevations, as well as 6 agricultural cooperative members in the Philippines and 5 members in Japan, 9 local government officials in the Philippines, 4 official in Japan, and 14 key informants of insurance providers in the Philippines and five informants in Japan for a total of 201 respondents.

The low and high elevation were selected as the main points of analysis given the differences of disaster vulnerability and farming systems found in the lowland and the

upland areas. The assumption is that the lowlands are more vulnerable to flooding while the uplands are more vulnerable to strong winds and landslides.

The classification of elevation is based on the standard metric measurement of elevation, meters above sea level. In this study, the upland areas are located in the high elevation, which measures more than 148 meters above sea level, while the low elevation areas or the lowland, measures less than 20 meters above sea level (Villano, et al, 2016, pp. 45-70). The study sites are the agricultural communities in Gifu Prefecture in Japan, and agricultural communities around Laguna Lake, in the province of Laguna, Philippines.

1.5.1.1. Laguna Province, Philippines[1]

The field work in the Philippines was conducted in the agricultural municipalities of Santa Cruz (lowland), Liliw and Nagcarlan (upland) in the province of Laguna due to the vulnerability of these areas. The municipalities of Santa Cruz and Liliw are vulnerable to climatic hazards like typhoons and flood while the municipality of Nagcarlan is vulnerable to typhoons (Rola, et al., 2016). The information about the Laguna Province can be found at the Provincial Government of Laguna website. The province has a total land area of 175, 973 hectares (1, 759.73 square kilometers) occupying the north-central section of the Cavite, Laguna, Batangas, Rizal, Quezon (CALABARZON) region in Luzon. The province is situated in the southeast of Metro Manila, south of the province of Rizal, west of the province of Quezon, north of the province of Batangas and east of Cavite province. The province of Laguna is the third largest province in the CALABARZON region and the 63rd largest in the entire country and has 60, 624 hectares of alienable and disposable agricultural land. The province (Figure 1.4) also consists of 4 Congressional Districts, 6 Cities, 23 Municipalities, and 674 Barangays.

[1] The Provincial Government of Laguna (https://laguna.gov.ph/)

The province is relatively dry from November to April and wet during the rest of the year for a small portion near the southern boundary. The other parts, west of Santa Cruz municipality, experience a dry season from November to April and rainy season during the rest of the year. The eastern and southern most portions do not have distinct season, with rainfall more evenly distributed throughout the year (Provincial Government of Laguna, 2019).

Figure 1.4. Map of the Province of Laguna
Source: Wikipedia (www.en.wikipedia.org)

According to the Provincial Government of Laguna (2019), the population of the province in the 2015 census was 3,035,081 people, with a density of 1,600 inhabitants per square kilometer or 4,100 inhabitants per square mile. The city of Calamba is the most populous city in Laguna, accounting for 15% of the provincial population with 454,486 inhabitants, while the municipality of Famy is the smallest municipality in Laguna with a

total population of 16,587. In terms of population density, the city of San Pedro has the largest with a density of 14,000 people per square kilometer, while the municipality of Cavinti is the smallest with a density of 110 people per square kilometer. Most of the people in the province of Laguna live in the cities of San Pedro, Biñan, Santa Rosa, Cabuyao, and Calamba, accounting to 58.51% of the population of the province. The province of Laguna is the 3rd most populous province in the Philippines and also the 3rd densest.

The main natural resources of the province are in its agriculture and fisheries, owing to its position near the Laguna Lake and the surrounding lowlands. The top five crops produced in were rice, corn, coconuts, mangoes, and bananas. Other crops grown in the province include Robusta coffee, pineapple, lanzones, rambutan, and sugarcane. Rice farming is an important part of the province's agriculture, with approximately 30,619 hectares of land used for cultivating rice crop. The municipality of Los Baños is also the site of several research institutions, such as the International Rice Research Institute (IRRI), the ASEAN Center for Biodiversity (ACB) and the Southeast Asian Regional center for Graduate Study and Research in Agriculture (SEARCA) (Provincial Government of Laguna).

1.5.1.2. Gifu Prefecture, Japan[2]

The Japan part of the field work was done in Gifu Prefecture in the Chubu Region, specifically in Gifu City for the lowland and Takayama City in the highlands of Hida representing the upland areas (Figure 1.5). Information about Gifu Prefecture can be found at the Gifu Prefectural website.

One of the few landlocked prefectures in Japan, Gifu shares borders with seven other prefectures: Aichi, Fukui, Ishikawa, Mie, Nagano, Shiga and Toyama. The center of

[2] Gifu Prefectural Government (https://www.pref.gifu.lg.jp/foreign-languages/English/info/gifu/1.html)

Japanese population is currently located in Seki City, Gifu Prefecture. As of March 2019, 18 percent of the total land area of the prefecture was designated as Natural Parks, namely the Hakusan and Chūbu-Sangaku National Parks, Hida-Kisogawa and Ibi-Sekigahara-Yoro Quasi-National Parks, and fifteen Prefectural Natural Parks (Gifu Prefectural Government, 2019).

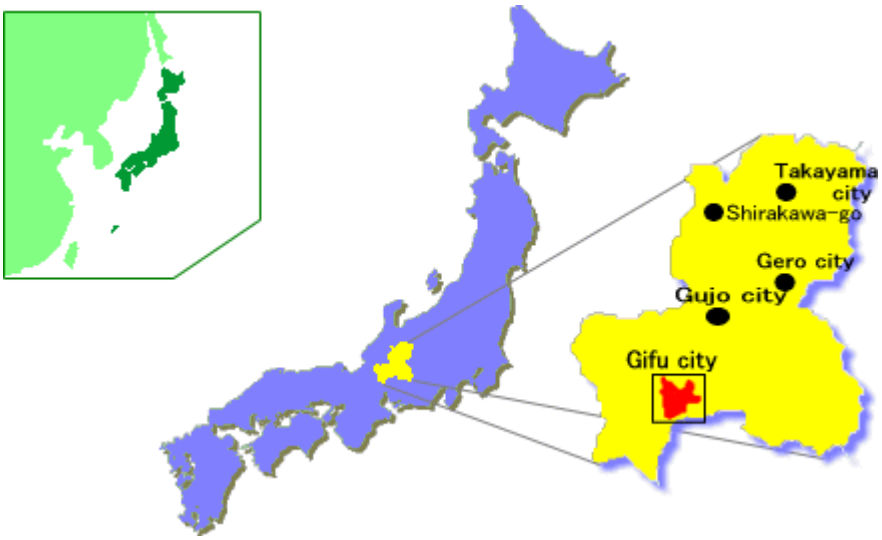

Figure 1.5. Map of Gifu Prefecture
Source: Gifu Convention and Visitors Bureau (www.gifucvb.or.jp)

According to the website of the Gifu Prefectural Government (2019), the prefecture has five unofficial regions, which allows local municipalities to work together to promote the surrounding area. The five regions are Seino, Gifu, Chuno, Tono, and Hida. The borders of the regions are loosely defined, but they are usually delineated among major cities. The northern Hida region is dominated by tall mountains, including parts of the Japanese Alps. The southern Mino region is mostly parts of the fertile Nobi Plain, a vast plains area with arable soil. Most of the population live in the southern part of the prefecture, near the designated city of Nagoya. The mountainous Hida region contains both the Hida Mountains, which are referred to as the "Northern Alps", and the Kiso Mountains, which are known as the "Central Alps" in Japan. The Ryohaku Mountains are also in the Hida

region. Other major ranges include the Ibuki Mountains and the Yoro Mountains. Much of the Mino region is made up of the alluvial plain of the Kiso Three Rivers, which are the Ibi River, Kiso River, and Nagara River. The sources of all three rivers are in Nagano Prefecture and they eventually run through Aichi and Mie prefectures before emptying into Ise Bay. Other major rivers in the prefecture include the Jinzu, Takahara, Sho, Shonai, Yahagi and Itoshiro rivers (Gifu Prefectural Government, 2019).

According to the prefectural website, Gifu's climate varies from humid subtropical climate in the south, eventually making the transition to humid continental climate in the north. Because the Mino region is surrounded by low mountains, the temperature fluctuates through the year, from hot summers to cold winters. The Hida region, with its higher elevation and northerly latitude, is significantly cooler than the Mino region, although there are sometimes extremely hot days there too. The Hida region is more famous for its harsh winters, bringing extremely heavy snowfall, especially in the northwestern areas. The prefecture's population was 1,991,390, as of June 2019 with approximately 1.7 million people in the cities and the rest in towns and villages. The percentage of male and female residents is 48.4% and 51.6%, respectively. 14.4% of the population is no more than 14 years old, with 22.1% of the population being at least 65 years old. The prefecture also has a large variety of agricultural products, which are suited to the natural conditions of each region, are grown all year round. The warm climate in the plains of southwestern Gifu makes it suitable to grow rice while vegetables, including kashu (which are grown during summer and fall) tomatoes, spinach, and natsu daikon (summer Japanese radish), are produced in the cooler summer climates of the high altitude plateaus in the Chuno, Tono, and Hida Regions which are in the central, eastern and northern regions of Gifu. Meanwhile, beef, which is a delicacy of the Hida area, along with dairy cattle, are raised on the mountains. Fisheries are also present in Gifu but are focused on both river fishing,

the key product of which is “Ayu” or the sweet fish, and aquaculture, which grows rainbow trout and “Amago” or the red spotted masu trout (Gifu Prefectural Government, 2019).

1.5.2. Types of Data and Methods of Data Collection

The research activities of this study included an intensive review of the literature; collection of secondary data; courtesy calls to local government officials, and government insurance providers; key informant interviews with the local government officials and officials of the agricultural insurance providers, cooperative officials; face-to-face interviews and focus group discussion with farmer respondents.

Secondary data were gathered from existing literature such as online articles, scholarly journals, books, news, annual reports, as well as online websites of the government insurance providers in the Philippines and Japan. The review of literature focused on farming systems set-up in the developing and developed countries, impact of natural disasters, culture and attitude of different country experiences towards natural disasters, disaster management practices, and history of agricultural insurance, agricultural insurance programs around the world, agricultural insurance effectiveness on income loss reduction, and impact of agricultural insurance on farmer behavior. Primary data was also collected to respond to the objectives of the study. Courtesy calls were done to create partnerships with the national and local government and communities in selected areas in order to ease the collection of data which included Key Informant Interviews (KIIs), Focus Group Discussions (FGDs) for family farms and farm companies in Japan, and farmer level interviews in the Philippines. KIIs was utilized to generate the data at the program level, where the respondents included insurance providers and its staff, while personal interviews were undertaken to understand farmer constraints to adoption and the farm level impact of

an insurance program and to find out their views about the effectiveness and efficiency of the delivery of agricultural insurance.

The study integrates the experience of Japan as a developed country, as well as the Philippines as a representation of other developing countries, to design an effective and efficient agricultural insurance program implementation framework which can be used by the researcher's home country, the Philippines, and other developing countries.

Table 1.2 summarizes the areas of concern, variables, indicators, and sources of data for this research. The data sources of this research will be collected through interviews during the fieldwork, and secondary sources from various libraries and online resources. The fieldwork of this research was a mix of farmer level surveys, key informant interviews, and focus group discussions. The data collection foundation will be based on agricultural product experiences of the farmers and service providers.

In the three months of fieldwork in each selected region, the researcher interviewed 70 farmers in the Philippines and 7 family-run farms and farm business corporations with a total of 88 certified farmers and farmer workers in Japan. The farms were classified by farm location which are the lowland and upland areas in both countries. The service providers of agricultural insurance products, the Philippine Crop Insurance Corporation (PCIC) in the Philippines and the National Agricultural Insurance Association (NOSAI) in Japan were likewise interviewed. The total of 158 farmer respondents were randomly selected. The "Small Sample Theory" by Lehmann (1999, pp. 418-426) asserts that when a population is homogenous, a minimum sample of 30 can already represent the population. In this study, the study areas in each of the case countries are of the same elevation (lowland and upland), same farming system, same farming culture, and the same disaster vulnerabilities. Given these, the population chosen in each country can be justified as homogenous.

Table 1.2. Areas of concern, indicators and variables and sources of data

Areas of Concern	Variable/Indicator	Sources of Data
Farming Systems Set-up	Number and Types of Crops and Livestock Grown	-Scholarly Journals -Online Articles -Farmer Survey
Impact of Natural Disasters	Damages due to Natural Disasters	-Scholarly Journals -Online Articles -News -Farmer Survey
Culture and Attitude towards Natural disasters	Coping and adaptation strategies before, during, and after a natural disaster	-Scholarly Journals -Online Articles -Farmer Survey
History of Agricultural Insurance	Written literature about Agricultural Insurance	-Scholarly Journals -Online Articles
Agricultural Insurance Programs around the World	Written literature about Agricultural Insurance	-Scholarly Journals -Online Articles
Impact of Agricultural Insurance on Farmer Behavior	Written literature about Agricultural Insurance, change of farmer coping strategies and investment after availing insurance	-Scholarly Journals -Online Articles -Farmer Survey
Description and Status of Implementation of Selected Countries' Agricultural Insurance Programs	Written literature about Agricultural Insurance, problems and issues encountered by the insurance providers	-Scholarly Journals -Online Articles -Insurance Provider Website -Insurance Provider Interview
Efficiency of Agricultural Insurance	Days of applying for insurance cover, days it took for assessor to come to damaged farm, days it took for indemnity payment to arrive	-Scholarly Journals -Online Articles -Farmer Survey -Insurance Provider Interview
Effectiveness of Agricultural Insurance	Income with indemnity payment versus income without indemnity payment	-Scholarly Journals -Online Articles -Farmer Survey -Insurance Provider Interview
Participation in Agricultural Insurance Programs	Facilitating and constraining factors on farmer adoption of agricultural insurance	-Scholarly Journals -Online Articles -Farmer Survey -Insurance Provider Interview

Source: Author

1.5.3. Data Analysis

1.5.3.1. Descriptive Analysis

Descriptive statistics such as means, frequencies, and percentages were computed and used to describe the socio-economic and farming system characteristics, occurrence of natural disasters during the past ten years, number and types of coping strategies employed, and number and types of agricultural insurance used, by the farmer respondents. Descriptive analysis was also used to describe the implementation mechanism of the government-backed insurance providers in the Philippines and Japan. The problems encountered on program implementation by the participating farmers as well as their suggested solutions to address the problems were described using frequency tables. In addition, farmer respondents' reasons for agricultural insurance program participation and non-participation as well as recommendations to improve participation of farmers to the agricultural insurance programs were likewise described via frequency tables. Descriptive statistics using means and percentages were used in determining the helpfulness of the agricultural insurance programs.

1.5.3.2. Parasuraman's Gap Analysis

The Gap Analysis developed by Parasuraman, et al. (1985, pp. 41-50) will be used as an assessment of the efficiency of the agricultural insurance programs. Gap analysis refers to the process through which an organization compares its actual performance to its expected performance to determine whether it is meeting expectations and using its resources efficiently (Parasuraman, et al., 1985, pp. 41-50). Gap analysis seeks to describe the present state of a company or organization and the target state of the same company or organization. Therefore in the study, Gap Analysis aims to determine the gaps between the ideal services (that were set by the PCIC) of the agricultural insurance program and the actual services given to the farmer participants such as the days of processing of application for admission

(gap is equal to the ideal days minus the average actual days), days of filing for damage claims (gap is equal to the ideal days minus the average actual days), days it took before the team of damage assessors came on-site (gap is equal to the ideal days minus the average actual days), estimation of damages (gap is equal to the average team of damage assessors' estimate minus the average farmers' estimate), and days before indemnity payment was received (gap is equal to the ideal days minus the average actual days).

1.5.3.3. Cost and Returns Analysis

Assessing the effectiveness of the agricultural insurance products in both countries will utilize cost and returns analysis to determine income loss reduction as a measure of effectiveness.

Cost and returns analysis on per farm and per hectare basis was undertaken to determine the extent of total income loss incurred by the farmers in the lowlands and uplands before receiving indemnity payments. Gross margin was used as measure of profit in agricultural production and was computed as follows:

Gross Margin = Gross Return – Total Variable Cost

A positive gross margin means that agricultural production is profitable. Conversely, a negative value of gross margin will indicate a loss in agricultural production. Moreover, other effectiveness measures such as the awareness and accessibility of the beneficiaries of agricultural insurance products, helpfulness of staff of the insurance providers, and expectations met by the insurance product were studied.

1.5.3.4. Likert Scale

The overall effectiveness of the program was also identified through the Likert Scale, which is a method of ascribing quantitative value to qualitative data. A numerical value is

assigned to each potential choice and a mean figure for all the responses is computed. In determining the knowledge of the respondents regarding the enrolment, damage filing, and insurable damages, a 5-point Likert scale was used. The scale used included the following responses: no knowledge, low knowledge, moderate knowledge, high knowledge, and very high knowledge. The responses were coded accordingly as: 1 = no knowledge, 2 = low knowledge, 3 = moderate knowledge, 4 = high knowledge, and 5 = very high knowledge.

In terms of the accessibility of the program, the scale used included the following responses: no access, low access, moderate access, high access, and very high access. The responses regarding access were coded as: 1= no access, 2 = low access, 3 = moderate access, 4 = high access and 5 = very high access.

The helpfulness of the agricultural insurance provider's staff utilized a 5-point scale which included the following responses: not helpful, sometimes helpful, helpful, most of the times helpful, and always helpful. Responses were coded as: 1 = not helpful, 2 = sometimes helpful, 3 = helpful, 4 = most of the times helpful, and 5 = always helpful.

The extent to which the expectations of the respondents were met was measured by using a 5-point scale which included the following responses: never, rarely, sometimes, most of the time, and always. Responses are coded accordingly as: 1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time, and 5 = always.

In addition to measuring the effectiveness of the agricultural insurance programs, the Likert scale was also utilized to find out the characterization of extreme events of the farmer respondents in both countries. A 5-point Likert scale was also used. The scale used included the following responses: strongly disagree, disagree, don't know, agree, and strongly agree. The responses were coded accordingly as: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, and 5 = strongly agree.

1.5.3.5. Logit Analysis

Logit analysis was employed to determine the factors that significantly influence the decision of the farmers to participate in the agricultural insurance programs in the Philippines. The logit regression model was estimated using STATA 16 software program.

The general form of logit regression model is specified as:

$$P = f(\alpha + \beta X) = \frac{e^{(\alpha+\beta X)}}{1+e^{(\alpha+\beta X)}} = \frac{1}{1+e^{-(\alpha+\beta X)}}$$

Where: *P* is the vector of probabilities of a choice,

E is the base of natural logarithms,

X is the vector of independent variables,

α is the constant, and

β is the vector of other estimated coefficients corresponding to X in the model.

In order to apply a linear form, the above function can be written as follows:

$Ln[P_i/(1-P_i)] = \alpha + \beta_i X_i + \varepsilon_i$

where: *i* presents the individual farmer *i*,

ε is error term.

In this study, this empirical model of the simple logit functional form was used to determine the farmer's choice of whether to participate or not participate in the Agricultural Insurance Program:

$$Z_i = Ln\left(\frac{p_i}{1-p_i}\right) = \alpha_0 + \alpha_1.age + \alpha_2.tenurestatus + \alpha_3 coop + \alpha_4.idisaster + u_i$$

where:

pi = the probability of choice of farmer i with regard to participation in the Rice Insurance Program. The value of the dependent variable is 1 if a farmer chooses to participate in the program and it takes a value of 0 if a farmer decides not to participate in the program.

$\alpha 0$ = intercept

age = age of farmer (in years)

tenure status = tenure status of the farmer (0 = not farm land owner, 1 = farm land owner)

coop = membership in cooperatives (0 = not a member, 1 = member)

idisaster = farmer rating of overall impact of disasters (1 = lowest grade, 5 = highest grade)

1.6. Limitations of the Study

This research only focused on comparing two disaster vulnerable countries – the Philippines as a representation of developing countries and Japan as a representation of developed countries. There is a possibility that the research results would have been very different have the research been done in different disaster vulnerable countries with different culture and attitude towards natural disasters, coping strategies, different agricultural insurance systems, and farming practices. The poor data keeping of the Philippine Crop Insurance Corporation served as a limitation as the researcher could not have access to the trend of farmer participation in the PCIC's insurance programs as well as the corporation's operating and management expenses. Moreover, there are no available data of the annual income of farmers in a per province basis in the Philippines which means that this study could not determine if the farmer-respondents income level is better or worse than the national average annual income of farmers in the country. The deficiency of Japanese language ability of the researcher also served as a limitation while doing fieldwork in Japan.

1.7. Organization of the Study

This section describes the structure and focus of the dissertation, as introduction to discussions in the succeeding chapters. Chapter 2 will describe the research's theoretical background. To introduce the idea about various farming systems around the globe, the chapter will start by discussing the different kinds of farming systems in different regions

around the world. They differ from country to country depending on their location, climate, vulnerability to natural disasters, or if the country is a developing or developed economy. Moving on to the next section of the chapter, the natural disasters' impacts on households, infrastructure, agricultural production, and historical impacts over the last ten years will be assessed using secondary data. This is to illustrate the extent of damages brought about by natural disasters and their effects on the daily lives of the farmers. To understand the impacts of the strategies to cope with these natural disasters, the chapter will then tackle the culture and attitude of various countries towards natural disasters and their disaster management practices or coping strategies. Different countries have different culture, practices, and coping mechanisms. For instance, in the Philippines, religious people believe that natural disasters are a force majeure (act of God) to eliminate sinners.

Following the discussions about disaster management practices, Chapter 2 will introduce the concept of agricultural insurance and showcase past studies to have a better understanding of the topic while pointing out the research gaps in concluding the chapter. To build on the arguments discussed in Chapter 2, Chapter 3 will begin by discussing the history of agricultural insurance. The section will describe agricultural insurance's origins, how it was evolving over time, and what it is in present time. Moreover, the agricultural insurance programs in selected countries all over the world will be analyzed to illustrate the similarities and differences of program administration in the various countries. This chapter will then determine the effectiveness of agricultural insurance in terms of income loss reduction to understand the performance of program administration in the selected countries, via past studies. The impacts to farmer decision-making behavior will be analyzed to know any changes on their agricultural production practices, other risk management practices, and on their daily lives, before concluding the chapter.

A detailed description about the PCIC and NOSAI will be in Chapter 4 and to have a better understanding of the government-backed agricultural insurance systems in the Philippines and Japan, respectively. The two chapters will showcase the origins and history of both NOSAI and PCIC and describe the corporations' agricultural insurance products. Moreover, the status of implementation of agricultural insurance in each country case was examined to learn more about the conditions of the institutions involved in administering insurance. This will also shed more information about concerns in implementation.

Chapters 5 and 6 will tackle the case studies in Japan and the Philippines, respectively. Both country cases will have similar effectiveness and efficiency indicators and overall analysis. The socioeconomic profile of farmer respondents in the different elevations will be described. In addition, the farming systems set-up will also be described to have an idea about the farmers' variety of crops and livestock in the different elevations. Agricultural production focusing on each farmer's yearly investments and their profit after harvesting during normal year and a disaster year will also be studied. These two chapters will also analyze the natural disaster experiences and disaster management practices and coping strategies to recognize any differences and similarities within the two elevations. The next sections will discuss the efficiency of service delivery of insurance products and the effectiveness in terms of reducing income losses after a natural disaster. Each of the country cases will also study the reasons for participating and not participating in the insurance program. For instance, it could be a requirement by law or by a cooperative, or because of disaster vulnerability. For the case of the Philippines, the factors affecting agricultural adoption will be identified using logit analysis.

A comparative study between the two country case studies of the Philippines and Japan will be discussed in Chapter 7 using the comparison framework mentioned above. It aims to illustrate their similarities and differences, in terms of institutional set up of

insurance administration, efficiency of service delivery and effectiveness of the agricultural products in reducing income losses, and the lessons that can be learned from Japan as a developed country. In addition, the socioeconomic profile, agricultural production income during normal and disaster years as well as the coping and adaptation strategies employed will be compared and studied in this chapter. The last chapter (Chapter 8) will conclude the paper and suggest recommendations based on the integrated case study experiences of Japan as a developed country, and the Philippines as a representation of developing countries, of agricultural insurance as a potential coping mechanism tool in times of natural disasters.

CHAPTER 2

THEORETICAL BACKGROUND

2.1. Introduction

This chapter synthesizes global literature to explore the theoretical work on farmer's coping mechanisms particularly agricultural insurance, as a potential tool to cope with the damages brought about by natural disasters; to have a clearer view of the research problem and to identify the knowledge gaps. The next section will define the farming-systems set-up and its different types all around the world. Literature on the impacts of natural disasters was tackled to know more about natural disasters' impacts to farming households and agricultural production. In addition, the historical impacts was also reviewed to illustrate the extent of damages due to natural disasters. The perception of various countries in the East Asia and the Pacific region towards natural disasters and their relationship with the country's disaster management practices were also examined. Following these discussions, agricultural insurance was defined and past studies were summarized to identify the gaps of knowledge that this research is aiming to fill.

2.2. Farming Systems Set-up

A farming system as defined by the Food and Agriculture Organization (2001), is a "population of individual farm systems that have broadly similar resource bases, enterprise pattern, household livelihood and constraints, and for which similar development strategies and interventions would be appropriate. Depending on the scale of the analysis, a farming system can encompass a few dozen or many millions of households". The classification of the farming systems of developing regions were based on these following criteria: 1) have

available natural resource base, including water, land, grazing areas and forest; climate, of which altitude is one important determinant; landscape, including slope; farm size, tenure, and organization; and 2) have dominant pattern of farm activities and household livelihoods, including field crops, livestock, trees, aquaculture, hunting and gathering, processing, and off-farm activities (FAO, 2001).

2.3. Major Farming Systems around the World

In terms of agriculture, the world can be divided into eight (8) regions. Dixon and Gulliver (2001) of the Food and Agriculture Organization by the United Nations characterized the dominant types of farming systems around the world and is collated in table 2.1 while the dominant farming systems around the world classified by region and by elevation is discussed below and is shown in figure 2.1.

2.3.1. Sub Saharan Africa

The Sub-Saharan African region contains 11 types of farming systems in the lowland which are the irrigated, tree crop, forest based, rice-tree crop, root crop, cereal-root crop mixed, large commercial and smallholder, agro-pastoral millet/sorghum, pastoral, coastal artisanal fishing, and urban based farming systems. There are three types of farming systems found in the uplands namely highland perennial, highland temperate mixed, and maize mixed farming systems (Dixon and Gulliver, 2001).

2.3.2. Middle East and North Africa

The fewest types of major farming systems are located in this region. There are a total of nine kinds of farming systems which are mostly situated in the lowland while only the Highland Mixed farming system is located in the high areas. The lowland farming systems are irrigated, rainfed mixed, dryland mixed, pastoral, sparse (arid), coastal artisanal fishing, and urban based farming systems (Dixon and Gulliver, 2001).

2.3.3. Eastern Europe and Central Asia

The Eastern Europe and Central Asian region consists of 11 major types of farming systems. Majority are located in the lowlands, while only one type is found in the uplands. These are the irrigated, mixed, forest based livestock, large-scale cereal-vegetable, small-scale cereal-livestock, extensive cereal-livestock, pastoral, sparse (cold), sparse (arid), and urban based faring systems and the horticulture mixed farming system in the upland (Dixon and Gulliver, 2001).

2.3.4. Latin America and Caribbean

This region has the most diverse types of farming systems among all the regions around the world. The lowland farming systems are the forest based, irrigated, coastal plantation and mixed, intensive mixed, cereal-livestock, moist temperate mixed-forest, maize-beans, temperate mixed, dryland mixed, extensive dryland mixed, pastoral, and urban based farming systems. The uplands meanwhile consist of intensive highlands mixed (northern Andes), high altitude mixed (central Andes), and sparse (forest) farming systems (Dixon and Gulliver, 2001).

2.3.5. South Asia

The South Asian region has ten major farming systems. These are the rice, coastal artisanal fishing, rice-wheat, rainfed mixed, dry rainfed, pastoral, sparse (arid), tree crop, urban based farming systems in the lowland, while highland mixed and sparse (mountain) farming systems are found in the uplands (Dixon and Gulliver, 2001).

2.3.6. North America

North America comprises of ten farming systems which are chiefly found in flat areas. These are the irrigated, mixed, cereal-root crop mixed, large-scale cereal-vegetable,

extensive cereal-livestock, pastoral, sparse (cold), sparse (arid), and the urban based farming systems. Two types are situated in high areas namely highland mixed and sparse (forest) farming systems (Dixon and Gulliver, 2001).

2.3.7. Northern and Western Europe

This region has twelve kinds of farming systems which are concentrated in the lowlands. These are the irrigated, mixed, cereal-root crop mixed, large-scale cereal-vegetable, small-scale cereal-livestock, extensive cereal-livestock, pastoral, sparse (cold), sparse (arid), and urban based farming systems. The highland mixed and sparse (forest) farming systems can be found in the uplands of the region (Dixon and Gulliver, 2001).

2.3.8. East Asia and the Pacific

The East Asia and the Pacific region consists of eleven kinds of major farming systems. Three of them can be found in the high areas, which are the upland intensive mixed, highland extensive mixed, and sparse (forest) farming systems. However, majority of the types of farming systems are located in the low areas. These are the lowland rice, rice-wheat, tree crop mixed, root-tuber, temperate mixed, pastoral, sparse (arid), coastal artisanal fishing, and urban based farming systems.

Elicited from the information by Dixon and Gulliver (2001) and as classified by the author by elevation, a common trend can be seen in figure 2.1. Most of the farming systems fall under the low elevation, while the farming systems in the high elevation are mostly found in mountain and mountain range areas. The most common farming system around the world is the irrigated farming system, which is usually found in the low elevation areas. The Latin America and Caribbean region has the most number of types of major farming systems with 15 different kinds of farming systems in both the high and low areas. This is because of the region's unique geography and climate, which cover countries around the equator, the

Andes Mountains, the Amazon, and the colder areas near the Antarctic, as collated from the information from Dixon and Gulliver's (2001) report. On the other hand, the least number of types of farming systems is the Middle East and North African region. The lower number of farming systems of the region compared to others can also be explained by the region's geography and climate, which is predominantly dry, little to no amount of rainfall, and the presence of dessert areas.

The description of the farming systems by region and by elevation can help insurers understand more about these classifications and possibly aid in the establishment of farming system-based insurance in the future.

Table 2.1. Farming Systems around the World

Regions of the World	Major Farming systems
Sub-Saharan Africa	agro-pastoral millet/sorghum, cereal-root crop mixed, coastal artisanal fishing, forest based, highland perennial, highland temperate mixed, irrigated, large commercial and smallholder, maize mixed, pastoral, rice-tree crop, root crop, tree crop, urban based
Eastern Europe and Central Asia	extensive cereal-livestock, forest based livestock, horticulture mixed, irrigated, large-scale cereal-vegetable, mixed, pastoral, small-scale cereal-livestock, sparse (arid), sparse (cold) , urban based
Middle East and North Africa	coastal artisanal fishing, dryland mixed, highland mixed, irrigated, pastoral, rainfed mixed, sparse (arid), urban based
Latin America and Caribbean	cereal-livestock, coastal plantation and mixed, dryland mixed, extensive dryland mixed, forest based, high altitude mixed (central andes), intensive highlands mixed (northern andes), intensive mixed, irrigated, maize-beans, moist temperate mixed-forest, pastoral, sparse (forest), temperate mixed , urban based
South Asia	coastal artisanal fishing, dry rainfed, highland mixed, pastoral, rainfed mixed, rice, rice-wheat, sparse (arid), sparse (mountain), tree crop, urban based
East Asia and the Pacific	coastal artisanal fishing, lowland rice, pastoral, rice-wheat, root-tuber , sparse (arid), sparse (forest), temperate mixed, tree crop mixed, upland intensive mixed, urban based
North America	cereal-root crop mixed, extensive cereal-livestock, highland mixed, irrigated, large-scale cereal-vegetable, mixed, pastoral, sparse (arid), sparse (cold), sparse (forest), urban based
Northern and Western Europe	cereal-root crop mixed, extensive cereal-livestock, highland mixed, irrigated, large-scale cereal-vegetable, mixed, pastoral, small-scale cereal-livestock, sparse (cold), sparse (forest), urban based

Collated by the author from the information from Dixon, J. and Gulliver A. 2001. Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World.

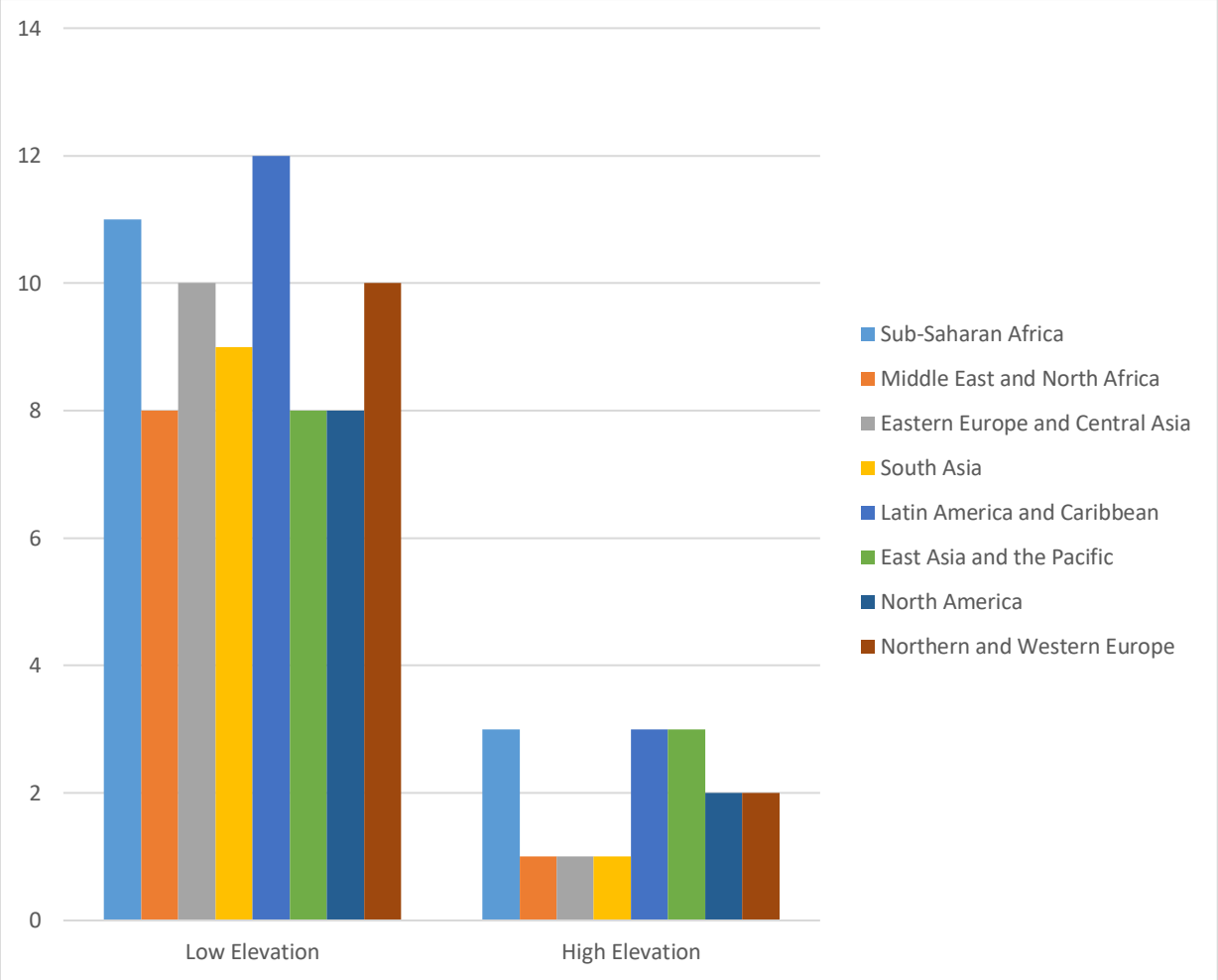

Figure 2.1. Farming Systems around the World Classified by Region and Elevation
(Collated by the author from the information from Dixon, J. and Gulliver A. 2001. Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World)

2.4. Risk to Natural Disasters

Among the regions around the world, the East Asia and the Pacific region is the most vulnerable to natural disasters and perils (Figure 2.2.), as reported by the UNUEHS (2018) of which the two case countries (Japan and Philippines) were studied. According to the report, the small island nation of Vanuatu is the country with the highest disaster risk (index score: 50.28) of the 172 countries covered. Tonga (index score: 29.42) is in second place, and the Philippines is in third place (index score: 26.70). In these countries, exposure to extreme natural events such as cyclones or earthquakes is very high.

The report mentioned that Germany is on rank 155 (index score: 2.42), whereas the countries on ranks with the lowest disaster risk (rank 170 to 172, are Saudi Arabia (index score: 1.39), Malta (index score: 0.57), and Qatar (index score: 0.36). They are only very slightly endangered by natural hazards, and have a low to very low societal vulnerability. The report also mentioned that nine island states are represented among the 15 countries with the highest disaster risk. They are particularly exposed to natural hazards such as floods, cyclones, and sea-level rise.

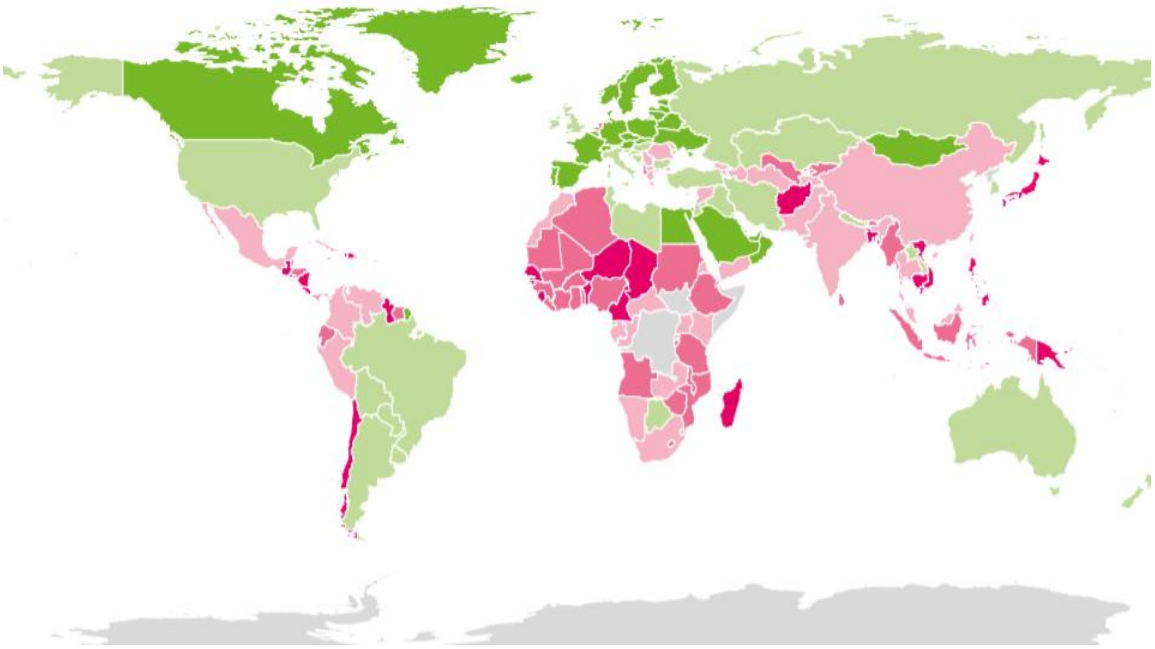

Figure 2.2. World Disaster Risk Map
(Source: the World Risk Report 2018 by UNUEHS)

Even though Japan is ranked 29th among 172 countries covered by the report, it does not imply that Japan does not experience its fair share of natural disasters. According to a Japanese news website (nippon.com, 2019), Japan only accounts for 0.28% of the world's land area and just 1.9% of its population, but it is the site of 18.5% of earthquakes with a magnitude of 6 or greater and 7.0% of active volcanoes. This was the finding of a 2014 white paper on disaster management (Figure 2.3).

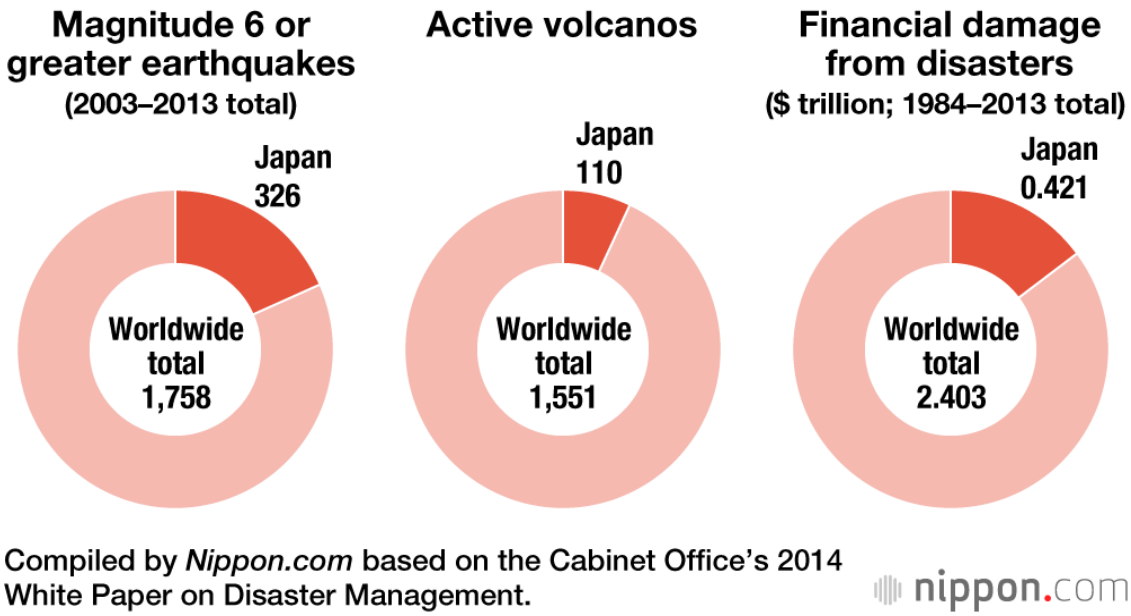

Figure 2.3. Natural Disasters in Japan
(Source: www.nippon.com)

In addition, nippon.com (2019) reported that among the largest natural disasters that have occurred worldwide since 1900, Japan was the site of 9% (5 of 56) of the meteorological disasters from typhoons, flooding, and other causes, and 16% (9 of 55) of the earthquakes and tsunamis as shown in figure 2.4.

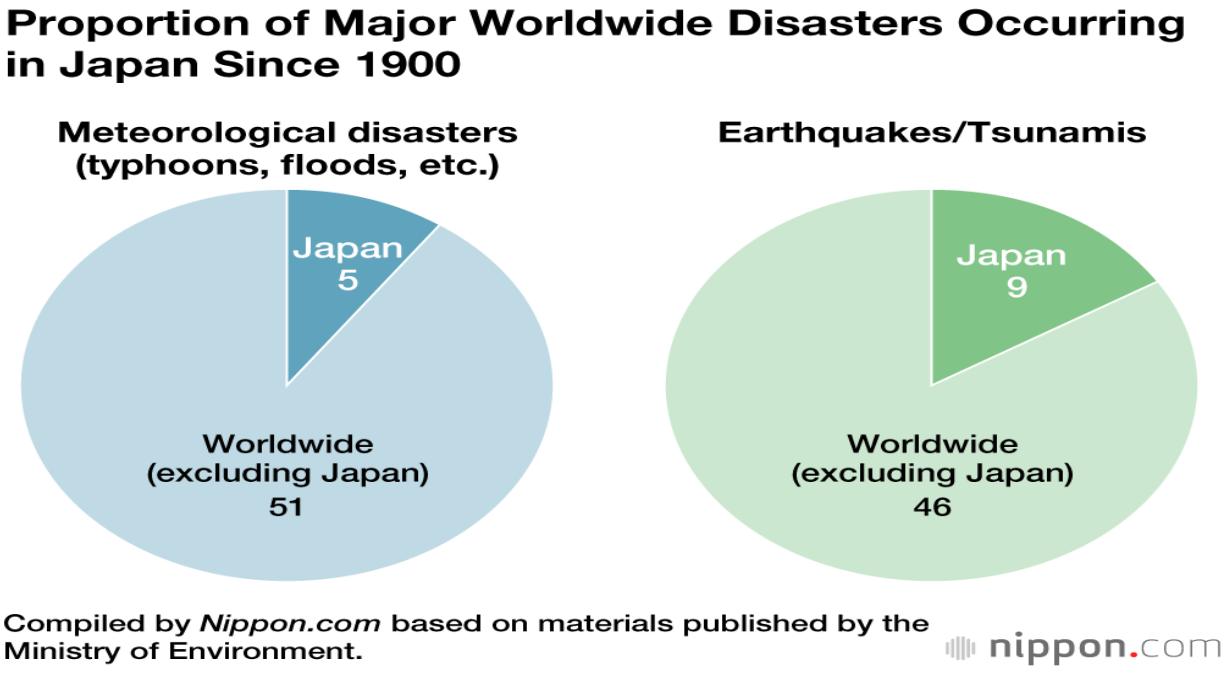

Figure 2.4. Proportion of Major Worldwide Disasters in Japan
(Source: www.nippon.com)

In a study, Habara (2014, p. 207) mentioned that aside from the many typhoons and earthquakes that ravage Japan annually, it is expected that the Tokyo Metropolitan Area will experience the “Tokai”, “East-Nankai”, “Nankai” and other earthquakes around the Japan and Chishima Trench that can happen suddenly anytime. The study also mentioned that future natural disasters in Japan can be more destructive due to the effects of global warming (Habara, 2014, p. 207).

The literature shows evidence that Japan has been enduring all these violent natural disasters yet they rank lower in terms of risk. This is because the country has strong scores in adapting capacities (depending on indicators such as governance, health care, and social and material security) and coping capacities (related to coming natural events, climate change and other challenges).

2.5. Impacts of Natural Disasters

Natural disasters damage agricultural production and assets/wealth and incomes of households. This section discusses the evidence from the literature regarding these impacts. Moreover, the historical impacts were gathered to show the increasing extent of damages through time that can be due to dynamic factors such as climate changes and agricultural intensification.

2.5.1. Impacts on Agriculture

Natural disaster is defined by the United Nations as “a serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the capacity of the affected society to cope using only its own resources” and also plays a major role in the economic development and survival of humans throughout history (Sivakumar, 2006). Casualties since the 1950s went up to 50 percent for each decade until the 2000s, while the global annual economic costs associated to natural disasters have been

valued to be about 50 to 100 billion US Dollars. Agricultural production is highly reliant on weather, climate and access to water, and is therefore unfavorably affected by weather and climate-related disasters. Effects of natural disasters would be severe in the agriculture sector. Moreover, agriculture is also the important source of income in most developing countries as 70% of the global land is used for agriculture, rangeland, and forestry (Sivakumar, 2006).

A study by the Food and Agriculture Organization (2017, pp. 40-53) meanwhile mentioned that between 2003 and 2013, disasters produced by natural hazards caused 1.5 trillion US Dollars in economic damage globally. In developing countries alone, these disasters value about 550 billion US Dollars and harmed 2 billion people. Natural disasters slow down economic growth and development goals, as well as agricultural development and sustainable sector development. FAO (2017, pp. 40-53) also stressed that to protect development investments in the agriculture sector and reinforce the sector's resilience to disasters, a rich understanding about the particular way the sector is affected by disasters is needed. However, globally accessible statistics on damage or losses do not disaggregate the impact on individual sectors, because the data are not collected and reported in a systematic way by sector at the national or subnational levels. Thus, the comprehensive impact of disasters on the agriculture sector is not absolute, (FAO, 2017, pp. 40-53) and methods of data collection and measurement can still be improved.

Despite these evidences from the literature about the impacts of natural disasters to agriculture in terms of damages, according to Chapagain and Raizada (2017, p. 14), many national governments and foreign NGOs are still unsuccessful at assisting rural farmers in the short and long runs. This could be because these organizations failed to understand the true needs of the farmers, ignored their farming culture, and did not take into account the farming system present in those areas. Even with the presence of crop insurance, most of

them insure only one crop, and the farmer needs to enroll in another type of insurance if that particular farmer had other crops – which are common to rural farmers especially in the developing countries.

2.5.2. Impacts on Agriculture in Japan and the Philippines

The 2018 World Risk Report published by the United Nations University Institute of Environment and Human Security (UNUEHS) reported that the Philippines and Japan are two countries which have regular occurrence of extreme events due to their geographical locations. Both countries are situated in the "Pacific Ring of Fire" which make them prone to earthquakes and susceptible to volcanic activity as both countries have numerous volcanoes. The countries' nearness to the Pacific Ocean likewise make them vulnerable to typhoons.

Although Japan is very much exposed to natural disasters with an exposure index score of 46.55, the country ranked 29th among the most disaster risk country globally with a Risk Index of 11.08 percent. This is because the country has strong coping and adaptive mechanisms which contributed to the lower risk index score. Despite this, Japan has its fair share of agricultural damages to natural disasters. For instance, last year (2018), the country suffered damage on the agriculture, forestry and fisheries sectors from the recent torrential rain that hit mainly western Japan estimated at 48.05 billion yen (Japan Times, 2018). Moreover, in the aftermath of one of the country's most devastating earthquakes in 2011, the Great East Japan Earthquake, the country has sustained an amount of 2,384 billion yen of damages to the agricultural sector based on data from Japan's Ministry of Agriculture, Forestry and Fisheries (2013).

On the other hand, the Philippines is known as one of the most hazard-prone nations globally (SEPO, 2013). In a study carried out by World Bank in 2008, the country was

labeled as a natural disaster hot-spot with approximately 50.3 percent of its total area and 81.3 percent of its population being vulnerable to natural disasters. Moreover, Israel and Briones' (2012, pp. 20-33) study showed that typhoons, floods, and droughts have a minor impact on agricultural production at the national level, but indicated that typhoons have a substantial negative impact on the production of paddy rice at the provincial level. In addition, the food security of the households in the afflicted areas was heavily affected by typhoons, as epitomized by "Ondoy" and "Pepeng" in 2009. They also found out that households have shifting consumption and non-consumption strategies to cope with the impacts of typhoons.

A paper by the Overseas Development Institute (Benson, 1997, pp. 50-62) revealed that poverty, disaster vulnerability, and environmental degradation are intrinsically connected, while the occurrence of natural calamities sustains poverty. However, poverty mitigation programs in the Philippines have paid little attention to hazard vulnerability, according to the report. Even though considerable attention has been invested to disaster management, these efforts have mostly centered only on preparedness and post-disaster response, and not much on the prevention and mitigation projects. Similarly, donor disaster-related activities have mainly concentrated only on preparedness and response rather than prevention and mitigation measures (Benson, 1997, pp. 50-62).

Japan and the Philippines are two countries that are most exposed to natural disasters globally. The agriculture sector is the most vulnerable to these events, which threaten food security in the region.

2.5.3. Impacts on Households

Billions have been lost to damages due to natural disasters which also have affected individual households. According to a study by Chantarat, et al. (2015, pp. 85-130), the 2011

mega flood in Cambodia resulted to the victims becoming more risk averse and lowered friend and government trust. Moreover, the study found out that the flood-afflicted farmers reformed their investment behavior on agricultural inputs from high risk to low risk to reduce losses in the future even though agricultural insurance is present in the country.

Luo and Kinugasa (2018, p. 3) examined the short and long term effects of the 2008 Sichuan earthquake on saving behaviors. The results revealed that in the short run, the earthquake has caused radical declines in household saving rates from 24% to 7% and from 23% to 21% for rural and urban populations, respectively. However, household saving rates recuperated to the baseline soon after the shock. This implies that the earthquake had no visible effect on the saving propensity of the victims in the affected areas.

A similar study by Stephane (2016, pp. 18-20) on how volcanic eruption influenced the saving behavior of households in Indonesia and discovered that in the long run, being exposed to volcanic risk leads to a cut back in investment. In addition, changes in beliefs in the magnitude incur grave inhibitions to the recovery process of individual households. While in Vietnam, Bui, et al. (2014, pp. 1751-1766) learned that natural disasters worsened expenditure, poverty, and inequality among the households in the country.

Sawada (2007, p. 66) stressed that there is a severe absence of insurance markets for damages arising from natural and manmade disasters. Without sound ex ante measures, the tangible economic losses caused by a disaster can be massive. For example, the Great Hanshin Awaji earthquake in Kobe proved to be too big for the government to support effectively. After the Kobe earthquake, the central and local governments gave the largest financial support in the history of Japan to rebuild the battered areas and to manage the economic recovery of the affected population. Despite the widespread support given by the

Japanese government, cash transfers to the afflicted, whose houses were totally destroyed, were only given 1,000 to 1,500 US Dollars per household (Sawada, 2007, p. 66).

The evidence shows high damages due to natural disasters; but the absence of adaptive capacities such as insurance to cope, is mostly absent or lacking. It is interesting to know the reasons for this lack of insurance coverage in very vulnerable areas such as the Philippines and other developing countries.

2.5.4. Historical Impacts

Natural disasters can cause not only loss of lives, homes, livelihood and services, but also result in injuries, property damage, health problems, as well as social and economic disturbance. Data compiled by the United Nations International Strategy for Disaster Reduction (2018) mentioned that from 1998-2017 disaster-hit countries reported economic losses estimated at 2,908 trillion US Dollars, of which climate linked calamities were responsible for 2,245 trillion US Dollars or about 77% of the total damages which worsened from 68% of losses noted between 1978 and 1997.

Overall, the reported losses from natural calamities increased by 251% between these two 20-year periods (UNISDR, 2018). According to the same report, in terms of occurrences, climate linked calamities dominated all disasters over the past 20 years, accounting for 91% of all 7,255 recorded events between 1998 and 2017. Flooding was the most frequent within all types of disasters, which accounts to 43% of all recorded events. Moreover, floods also affected the biggest population, at more than two billion, followed by drought, which affected 1.5 billion people from 1998-2017. After flooding, the next most frequent types of natural calamities over the last two decades were storms, earthquake, and extreme temperature, which account to 28%, 8%, and 5%, respectively, of all the types of natural calamities experienced globally (UNISDR, 2018). In terms of deaths, earthquakes

were the number one, causing 747,234 casualties over two decades. This can be attributed to the vulnerability of poor and the low preparedness capacity of the populations exposed to two major events which were the 2004 Indian Ocean tsunami and the 2010 Haiti earthquake. Following geophysical disasters are storms (232,680 casualties), extreme temperature (166,346 casualties), and flooding (142,088 casualties). On the other hand, the UNISDR report revealed that storms were costliest type of disaster, with losses estimating to 1.300 trillion US Dollars over the past 2 decades, which were twice the noted losses for either flooding or earthquakes (UNISDR, 2018).

Having become progressively frequent in the late 1990s, the persistent high level of climate linked events pushed the average number of disasters to 329 annually in the latest 20-year period. Among the countries who sustained economic losses due to natural calamities, Japan was the 3rd largest, losing 376.3 billion US Dollars, only following the United States and China with 944.8 billion and 492.2 billion US Dollars, respectively. Japan's figure was greatly amplified by the Great East Japan Earthquake and tsunami of March 2011.

On the other hand, the Senate Economic Planning Office of the Philippines (2013) reported that from 2000 to 2012, natural disasters in the Philippines caused 12,899 deaths and 138,116 injuries. Moreover, these disasters have also affected more than 71 million people and rendered almost 375,000 individuals homeless. Socioeconomic damages are similarly accounted at 3.37 billion US Dollars, with an average annual damage from 2000 to 2012, of 251.58 million US Dollars (SEPO, 2013).

The evidences from past literature mentioned that natural disasters contribute to significant losses to lives, homes, livelihood, and services. However, it was also observed that the role of insurance as a way to recover losses is not as prominent.

2.6. Perception towards Natural Disasters and Disaster Management

The past studies demonstrate the various negative impacts of natural disasters to society and the question that comes into mind is how the countries view natural disasters, and how these views affect their disaster management practices. This section will shed light about different perceptions and culture to natural disasters and their relationship with the communities' disaster management practices.

Most of the literature on Disaster Risk Reduction often argued that cultural features are ignored when planning and implementing disaster management schemes (Hoffman 1999; Wisner et al., 2004; Palliyaguru et al., 2010; Kulatunga, 2010). As stressed by Nunn et al. (2007, pp. 385-401) and Oliver-Smith and Hoffman (1999, pp. 173-191), failing to consider cultural aspects could worsen the vulnerabilities of community towards disasters and the development of ineffective disaster management tactics.

Likewise, Huntington (2000, p. 133) stressed that cultural values and approaches play roles as constraints and facilitators of the advancement of disaster management activities have been overlooked by governments and aid institutions. Therefore, to advance the assessment of the impact of culture towards disaster management activities, behaviors of communities and individuals were taken into account when subjecting to disastrous conditions as well as their principal cultural beliefs.

The Indonesian Merapi volcano is considered one of the most active volcanoes in the world but despite the threat from the volcano, the Javanese community lives on the foot of the volcano because of the community's living patterns and cultural beliefs (Lavigne et al., 2008, pp. 273-287). The community residing close to the volcano conducts annual offerings to the volcano as part of their traditions. Lavigne et al., (2008, pp. 273-287) also reported that because of the peoples' religious beliefs, majority of those living nearby believe that

losses due to the volcanic eruption is influenced by “divine forces”. During the eruption of Merapi in year 2006, communities went against the instructions of the government and refused to leave their villages until they got orders from their “cultural leader” (Lavigne et al., 2008, pp. 273-287). The community believes that following the commands of the cultural leader is more “precise” than following evidence based knowledge and orders given by government authorities. In addition, the community’s belief with regards to the relationship between god and human is noticeable from the presents and prayers they do to the “gods” rooted in the natural calamities. In another study by Koentjaraningrat (1985), the author mentioned that the Javanese community living close to the Merapi volcano considers that the place they live in and the land they farm are also their ancestors. This is why even the people do not want to leave their villages even during the occurrence of a natural disasters. If a time comes that they would need to leave, they would always come back to their villages every time.

Arunotai‘s (2008, pp. 73-78) study stressed the importance of local and indigenous knowledge towards disaster management. The study mentions the evidences during the Indian Ocean Tsunami in December 2004 in Sri Lanka where the communities and individuals responded to the Tsunami in various ways. Some communities and individuals who had indigenous understanding concerning the Tsunami survived. For instance, the “Moken” community acknowledged the signs from their traditional stories such as the unusual behavior of animals and birds as well as the low tide that serves as warnings for a Tsunami. Because of this, the community was able to evacuate from the sea and moved to more secure areas. On the other hand, other communities, migrants and tourists who do not have innate historical information regarding a Tsunami did not recognize these signs which made them stay at the time of danger. Furthermore, some of the communities in Sri Lanka who do not have historical understanding about the Tsunami moved towards the sea instead

of moving away from coastal areas when the low tide appeared (Arunotai, 2008, pp. 78-78). However, as noted by Arunotai (2008, pp. 73-78), the reason for the poor response was the absence of historical knowledge as a whole. In addition, poor storytelling of historical knowledge and disregarding historical knowledge by seeing such facts as invalid or of not accordance to the present state of the community contributed to the poor response. Nonetheless, a population's vulnerability to natural disasters increases if they only rely on native knowledge for their disaster management practices.

Culture and livelihood of community have a strong relationship as described from literature (Daskon and Binns, 2010; Adato and Meinzen-Dik, 2002). Post-calamity recovery activities that did not take into account the livelihood patterns of the afflicted population have been mostly problematic. A study by Nissanka et al., (2008, pp. 1023-1032) mentioned that after the Tsunami in year 2004, the Sri Lankan government ordered a 100 meter buffer zone limiting any kind of expansion within this boundary. Although the implementation of buffer zone was done to strengthen the protection of the population residing in the coastal areas, it had negative effects on their livelihood patterns and main source of income. Thus, the community did not follow the government's restrictions. This led to the government to rework the policy related to buffer zone and to develop better policies that take into account both the livelihood patterns of the community and their safety (Nissanka et al., 2008, pp. 1023-1032).

In another example, Boen and Jigyasu (2005, pp. 1-4) discussed about the 1992 earthquake in Flores Island in Indonesia. They mentioned that some communities residing in Babi Island were moved due to the likelihood of the occurrence of a Tsunami. The relocated area "Nangahure" was about 200 meters away from the shoreline. However, the relocation ignored the social, cultural, and economic situations of the community (Boen and Jigyasu, 2005, pp. 1-4). The ocean was part of their existence so their fishing activities and

livelihood was gravely affected due to the relocation. The post-disaster reconstruction activities also ignored the traditional structures related with the community's houses. The previous houses were constructed on poles to avoid sinking on the occurrence of high tides and the fishermen utilized these poles to tie their boats near their homes when during these times. However, after the relocation, the houses were built on land without putting in mind the requirements of the community. As a result, after 8 years in 2001, most of the community members have vacated the relocation areas and went back to live near the ocean (Boen and Jigyasu, 2005, pp. 1-4).

Hall (1997, pp. 35-45) mentioned that some of the traditional housing construction in the Philippines ignored technical knowledge. Traditional houses are usually constructed from bamboo trees since they are readily available from the environment. Nonetheless, these houses are not constructed to endure strong winds and are regularly wiped out during the occurrence of typhoons. The significance of material culture and disaster risk reduction also has a significant relationship according to Hall (1997, pp. 35-45). The study mentions that during the occurrence of disasters, some communities did not want to leave their homes and other assets which shows the Filipino culture of having strong attachment towards their material possessions.

Bankoff (2003, pp. 152-179) described the disaster culture in the Philippines and mentioned that for Filipinos, hazard and disaster are simply known aspects of daily life and what can be termed as "frequent life experience". It implies that disasters are seen not as an abnormal event, as it is usually portrayed through the perspective of the Western social sciences, but as an everyday occurrence. It is so normal that the Philippine culture is partly the commodity of adaptation by communities to these incidences though processes that permit the incorporation of threat into daily life, or what can be called the "normalization of threat" (Bankoff, 2003, pp. 152-179).

Japan can be considered as one of the world leaders in disaster management. In this scenario, the country focuses on what aspects in disaster management can they improve. A study by Maeda, et al. (2018, pp. 50-58) mentioned that Fukushima's Great East Japan Earthquakes' natural and nuclear disaster damages greatly distressed the resident's emotional well-being and overall mental health. The study states the other dangers that post-traumatic mental effects as well as other chronic psychiatric effects such as depression, alcohol abuse, and behaviors related to self-destruction such as suicide should also be considered in the post-disaster response.

In a study, Sayaka, et al. (2019, pp. 129-137) stressed that the media coverage of natural disasters can possibly damage one's mental health. The study also mentioned that since different individuals have different levels of responses concerning the media, the emotional effects also varies. The study suggested that social support and stronger social capital can be a "protective mechanism" for mental health when getting news coverage about natural disasters.

Various countries have various perception towards natural disasters and disaster management. Culture, beliefs and religion for instance, play vital roles in the coping to natural disasters. Governments, international organizations, and civil societies involved in disaster risk reduction and management should take these into account. Otherwise, failure is imminent.

The next section will explore the ways of coping and focusing on agricultural insurance during the event of a natural disaster, as gleaned from the literature.

2.7. Agricultural Insurance as a Coping Strategy to Natural Disasters

Agricultural production has been and will always be disturbed by the natural disasters, causing vast global damages (Marza et al, 2015, pp. 594-599). The losses in agriculture

create a huge threat to global food security. At the farm level, there are coping strategies that may help in easing the farmers' climate-related losses. One of these is the agricultural insurance, which is an economic tool used to handle agricultural production risks caused by natural disasters, pest infestation, and plant diseases, among others (Reyes, et al. 2015, p. 2).

Coping strategies are defined as the "practices that households employ in order to minimize the risks threatening their survival" (Maxwell and Caldwell 2008, p. 2). According to the World Food Program (2009), it is in the nature of people to use coping strategies when they feel that they do not have enough food to eat.

A study in Iran by Ghalavand et al. (2012, pp. 831-838) discovered that the farmers with higher rate of participation in drought crop insurance were relatively younger, highly literate, had bigger farm area and income, and were more knowledgeable on the goals and objectives of insurance as a coping strategy. The farmers frequently consulted with other farmers and they have more participation in training classes and sessions. In addition, their linkage with agricultural extension and insurance agents were stronger as they have participated in extension seminars and were similarly knowledgeable of the crop insurance providers' activities (Ghalavand et al., 2012, pp. 831-838).

In India, where climate change has hindered agricultural production in many ways, the use of crop insurance is a coping mechanism (Swain, 2014, p. 4). The study suggested that there is a need to reform insurance products not only as a risk transfer mechanism, but as a strong scheme to reduce risk and crop losses by boosting essential responses in insurance participants in India.

Meanwhile, a study by Hung et al. (2007, pp. 245-258) in Vietnam found out that farming households depend on various coping strategies to respond to agricultural shocks

such as increasing household income through migrant labor, formal and informal borrowing, and the sale of assets such as crops, equipment, or land. The study also reported that recurrent borrowing after severe agricultural losses could lead to selling agricultural land which is a very hazardous coping mechanism.

Japan, on the other hand, view disasters in a different way compared to their neighboring countries as they have historical establishments such as statues and disaster museums which tell the stories of the disasters they experienced. This passes the resiliency mindset from one generation to the next. In addition, a report by Swiss Re (2013) mentioned that the country takes advantage of its insurance culture to cope with natural disasters and is now one of the world's largest and most sophisticated insurance markets. Aside from using insurance, according to a study conducted by Sawada and Shimizutani (2004, p. 9), the Japanese also use their savings as well as borrow money from the bank as a coping strategy when a natural disaster strikes.

Iizumi, et al.'s (2007, pp. 273-282) study on mitigating crop loss due to disasters found that farmers in Japan use agricultural insurance as well as cultivation management such as re-planting as a coping mechanism. However, the study notes that cultivation management are practiced less by the elder farmers because of their unwillingness and lack of resources, thus the elder farmers rely more on insurance to cope.

Reyes et al.'s (2009, p. 10) study in the Philippines showed that crop insurance was among the most ideal risk management instrument by farmers alongside localized climate information, accessible credit, and special assistance programs such as irrigation and seeds provision. In another study in Laguna province, Quilloy et al. (2016, pp. 185-210) discovered that the most common coping strategies were related to income flows such as using savings, borrowing money, or purchasing food on credit, delaying payment of their

utility bills, reducing health and education expenses to prioritize food spending, and selling assets to generate income for purchasing food. Other coping strategies mentioned were cutting back on food expenses and substituting expensive food for cheaper ones and using crop insurance where this latter is not as popularly practiced.

You and Takahashi (2001, pp. 77-90) stressed that there are evidences that adaptation strategies can counterbalance the negative impacts of natural disasters to agricultural production. Although the types of coping and adaptation strategies used will vary by region as different world regions have different climate variability and social and economic conditions. In short, according to the study, there is no "one-size-fits-all" or universal adaptation strategies to offset the effects of natural disasters. However, this can be an opportunity for agricultural insurance to be the universal option to cope to these negative impacts brought by the occurrence of natural disasters.

There are various coping and adaptation strategies that are utilized by farmers to cope with natural calamities but these might not be enough to protect them in times of need, especially with dissimilar social and economic situations in various world regions. A good agricultural insurance system which the farmers can trust can be the answer to their woes during the occurrence of these extreme events.

To understand more about agricultural insurance, the succeeding section of this chapter will tackle the definitions of insurance and agricultural insurance as well as the past studies that explored agricultural insurance as a field of research.

2.8. Understanding Agricultural Insurance

This section will define the concept of insurance, what agricultural insurance is, as well as discuss the past studies about agricultural insurance. In addition, this section identifies the research gaps on agricultural insurance as a risk management tool to cope with natural

disasters based on past studies. By finding these gaps, this current research aims to fill the lack of knowledge in the field of agricultural insurance.

2.8.1. Definition of Agricultural Insurance

Insurance is defined as "a contract, represented by a policy, in which an individual or entity receives financial protection or reimbursement against losses from an insurance company. The company pools clients' risks to make payments more affordable for the insured" (Investopedia, 2018). Insurance policies are utilized to protect against the risk of economic losses that may be a consequence from the damages to the insurance policy holders or the insured person's asset, or from the liability for damage or grievance instigated to a third party (Investopedia, 2018).

An online article by Das (2017) explained that the business model of insurance companies circles around risk. The article mentions that the use of statistics and algorithms to calculate the risk to determine the premium prices differs across insurance institutions and the types of insurance products although it follows basically the same business model. Whenever an insurance institution serves a conditional payout of a big amount, the likelihood of the insured claiming for that indemnity payment is bent upon and expanded across the entire period of premium payment. The amount acquired as premiums is mutually slightly more than what the insurer has to pay to the insurance policy holders in a year that they experienced uncertainty. The reason for this is that most of the income originates from the interest that was made from financing the premium money in safe and short term assets. In this scenario, there will be profits for any insurance institution that serves as funding for operating expenses such as salaries of their insurance agents, commissions, and other administrative costs. At present, there is insurance for everything, such as life, health, assets, and agriculture. (Das, 2017).

One of the many forms of insurance today is agricultural insurance, which farmers can turn to in case of any risks in their agricultural production. Iturrioz (2009, p. 2) gave a clear definition of agricultural insurance, as a special type of asset insurance applied to agricultural ventures. The study also mentioned that because of the concentrated nature of this line of insurance, the current institutions in the market either have an allocated agricultural business departments or can also subcontract the underwriting to institutions that specialize in it. Agricultural insurance is not limited to crop insurance, but also caters to livestock, bloodstock, forestry, aquaculture, and greenhouses (Iturrioz, 2009, p. 2).

2.8.2. Past Studies about Agricultural Insurance

Past studies about agricultural insurance mostly focused on their outcomes such as the capacity to reduce losses and minimize risk during natural disasters. Other studies investigated the insurance's relationship with credit and loans, while others looked at the factors that influence participation in agricultural insurance programs, and the insurance's effects on spending and saving behavior of farmers. Most of the past researches though only looked at one or one group of commodities and not as a whole or a variety of farming systems.

A study conducted in Ghana by Karlan (2009, pp. 1-3), discovered that crop insurance transformed the farmers' investment behavior. The findings revealed that the farmers who participated in the crop insurance were 25 percent more likely to take their harvest to markets rather than sell to direct dealers. However, the change in investment habits did not make agricultural production more prolific.

Summer and Zulauf's (2012, pp. 13-14) discovered that crop insurance in the United States affects production in three ways. First, the subsidies increase the net revenue per acre and thus increase incentives to plant suitable crops and plant more of crops with higher

subsidy rates; second, the accessibility of crop insurance, which is a government-backed program, motivates planting insured crops on fields that would not otherwise be considered for that crop because of the possibility for substantial losses; lastly, by diminishing likelihoods of losses from low yields and prices, crop insurance generates incentives for farmers to take on fewer other risk management practices and thus focus more on the growth in average productivity.

In Hungary, Sporri et al. (2012, pp. 11-12) found out that the level of crop protection mirrored a more rigorous production systems overall and was thus connected extremely with insurance use.

The evidence from the literature shows the effectiveness of agricultural insurance in times of need, yet not all farmers in risky areas are insured. For instance, a study by Ye et al. (2016, pp. 664-677) in the Hunan Province of China found out that the rice farmers' crop insurance participation was unexpectedly low despite years of pilot programs and tens of billions of dollars of investment in government subsidies.

In a similar study in the Philippines, despite the existence of a government-backed insurance program, farmers' participation rate of the rice insurance program of the PCIC has remained below 10 percent from 1981 to 2013 (Reyes, 2015, p. 47).

It is interesting therefore to study the reasons for the seemingly non-popularity of crop insurance as a mechanism to minimize agricultural risks especially during climate related events.

2.9. Research Gaps

Previous works mainly focused on studying only one commodity or one group of commodities and there were only few of studies that take both the crop and livestock into account in managing disasters. This research will fill in this significant gap by analyzing the

role of insurance using the farming system, and by elevation (upland and lowland) as the units of analysis, in which all crops and livestock of a farm are included. There are no insurance products offered on per farming system basis, and this research can serve as a guide for insurance providers in the future. Moreover, this research will study the different ways farmers cope and adapt to natural disasters, as driven by the culture, religion and beliefs of the community. This comparative study will take place in Japan, as the country that has strong abilities to cope and adapt to disasters according to UNUEHS (2018), and the Philippines, as the representation of the countries in the region with weak abilities to cope and adapt to disasters.

2.10. Conclusion

The most common farming system around the world is the irrigated farming system, which is usually in the low elevation areas. There are various farming systems around the world which are affected in various ways by natural disasters. Each type of farming systems and elevations will have different vulnerabilities.

Japan and the Philippines are two countries that are most exposed to natural disasters globally. The agriculture sector, is the most vulnerable to these events, which threaten food security in the region.

The evidence shows high damages due to natural disasters; but adaptive capacities such as insurance to cope, is mostly absent or lacking. It is interesting to know the reasons for this lack of insurance coverage in very vulnerable areas such as the Philippines and other developing countries. Moreover, farmers from various places will have diverse coping mechanisms to disasters which are heavily influenced by their culture, religion, beliefs, and exposure to natural disasters. Country governments, international organizations, and civil

societies involved in disaster risk reduction and management should take these into account. Otherwise, failure is imminent.

Out of all these coping mechanisms which can be used by farmers, agricultural insurance can be the common ground. There are various coping and adaptation strategies that are utilized by farmers to cope with natural calamities but these might not be enough to protect them in times of need. A good agricultural insurance system which the farmers can trust can be the answer to their woes during these extreme events.

CHAPTER 3

HISTORY OF AGRICULTURAL INSURANCE AS A COPING MECHANISM TO NATURAL DISASTERS

3.1. Introduction

The objective of this chapter is to detail the history of agricultural insurance as a disaster management mechanism by exploring the global literature. The succeeding section will illustrate the origins, evolution, and general history of agricultural insurance. Following these discussions, the implementation of various agricultural insurance around the world will be described. Moreover, the effectiveness of agricultural insurance programs in term of income loss reduction after a natural disaster will be tackled. Before concluding the chapter, the impact of agricultural insurance on farmers' behavior in terms of investments in agricultural production, disaster management practices, and daily lives will be discussed.

3.2. History of Agricultural Insurance

Agricultural insurance has an extensive history as the inaugural program began in Germany (figure 3.1) dating back to 1733 (Kerer, 2013, p. 52).Many countries in Europe as well as the United States had crop hail insurance schemes by the 19th century but are purely operated by private organizations. Government arrangements only began in the late 1930s in the United States when the "federal crop insurance" was first introduced titled the "Agricultural Adjustment Act of 1938". It was only during the 1950s, when most agricultural insurance schemes in developing countries began. In the period between the 1950 and the 1980, numerous government Multi-Peril Crop Insurance (MPCI) programs

were ratified in Latin American countries such as Brazil, Costa Rica, and Mexico. Asian countries such as India and the Philippines also introduced their first agricultural insurance schemes during this time. These MPCI programs were often linked to recurring production credit schemes for small-scale farmers (Mahul and Stutley, 2010, pp. 19-24).

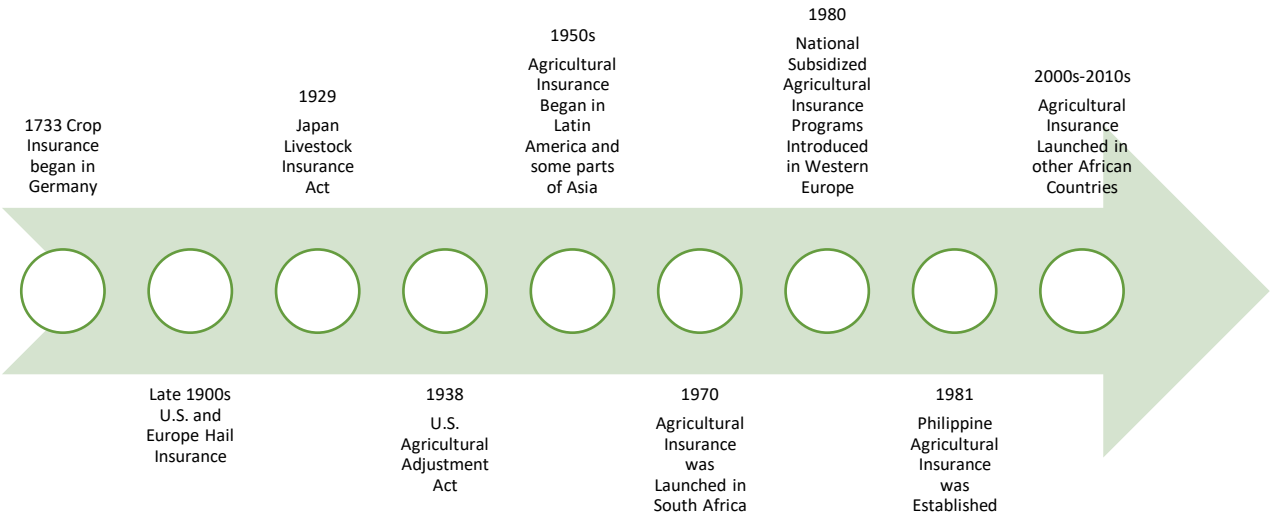

Figure 3.1. Historical Timeline of Agricultural Insurance Programs around the World

Collated by the author from the reports by Reyes, et al (2017) from the Philippine Institute for Development Studies, the Food and Agriculture Organization by the United Nations (2011), Atlas Magazine (2017), and by Mahul and Stutley (2010) from the World Bank

The authors also mentioned that government programs for funding MPCI were initially launched in 1980 in the Western European countries of Portugal and Spain while the former Soviet Union, state-owned MPCI was only utilized on state-owned farms. Most of these government programs had expensive operating costs as well as high loss ratios. Moreover, these got worse by the imposition of very low premium rates and feeble management resulting to the failure of some of the programs. A similar situation happened

in Latin America as most government-backed programs ended by 1990 because of feeble results.

In the Asia and the Pacific region, the first agricultural insurance programs dated back more than 90 years (as of 2019) as reported by the Food and Agriculture Organization (2011). The first countries in the region to establish agricultural insurance include Japan, which has a huge government funded cooperative crop and livestock insurance program, as well as Australia and New Zealand, which boasts of the top private commercial crop, forestry, and livestock insurance departments in the region.

On the other hand, the FAO report mentioned that government-backed agricultural insurance programs are the most common in the insurance market in the Philippines, India, and China. In China, the "People's Insurance of China" (PIC) formerly enjoyed a monopoly in the Chinese agricultural insurance market until the 1990s. In 2006, the government of China launched a major scheme to promote the devolution of agricultural insurance. This caused the surge of commercial crop insurance corporations both in the national and provincial level in the country (FAO, 2011).

Private agricultural insurance in developed countries generally only provided single peril insurance products, in the form of rain and hail insurance, for which it is practical to set statistically steady premiums and assessing losses was trivial according to Wenner and Arias (2003 pp. 2-3). The authors also mentioned that governments took the opportunity of the inability of private insurance institutions to give cheaper insurance products, especially in the MPCI and large-scale damage insurance market departments, as the primary reason to be agricultural insurance providers. The government-financed schemes were generally linked with big losses and expensive subsidy spending (Wenner and Arias, 2003, pp. 2-3).

A report by Mahul and Stutley (2010, pp. 53-58) mentioned that the common direction that governments take since the 1990s were to endorse agricultural insurance via private insurance providers in what is called "Public-Private Partnerships" (PPPs). The authors also stated that numerous government-owned monopoly agricultural insurance organizations in Eastern Europe were denationalized, and markets were opened up to competition by incoming private institutions managing agricultural insurance policies after the collapse of the former Soviet Union in 1990. On the other hand, the Federal Crop Insurance Program's (FCIP) MPCI program in the United States of America was employed via 17 private insurance institutions or managing general agents. These scheme first started in 1938 (Mahul and Stutley, 2010, pp. 53-58).

In Africa, the first agricultural insurance program was first established in South Africa in 1970 according to Atlas Magazine (2017) while the rest of the African countries established their pilot agricultural insurance schemes only recently, from the 2000s.

3.3. Agricultural Insurance around the World

This section focuses on describing agricultural insurance schemes in selected developed and developing countries around the world which were collated form the reports by Reyes, et al (2017) from the Philippine Institute for Development Studies, the Food and Agriculture Organization by the United Nations (2011), Atlas Magazine (2017), and by Mahul and Stutley (2010) from the World Bank as summarized in table 3.1.

3.3.1. Europe

3.3.1.1. Sweden

Mahul and Stutley (2010) and Reyes, et al (2017, p. 10) provided a comprehensive description of the history and present situation of agricultural insurance in Sweden. The first crop insurance scheme in the country was launched in 1928 although private institutions

provided livestock insurance way back from 1890 which makes it the first agricultural insurance scheme in the country (Reyes, et al, 2017, p. 10).

In 1952, Sweden first introduced their area-yield index crop insurance program, but the program was not popular to the farmers and was ultimately abolished. On the other hand, the government-backed crop insurance program in the country was first launched in 1961 and Swedish farmers were required to enroll in the insurance program as noted by Mahul and Stutley (2010). The premium are paid as a form of tax on agricultural deliveries and the Swedish government provided subsidies per farmer for indemnity payments because for Sweden, the agricultural sector is as important as any other sector of the economy (Mahul and Stutley, 2010).

Currently, there are three private mutual insurance companies which offer agricultural insurance namely the "Lansforsakringar" with its subsidiary company "Agria" and the third insurance company is "Dina". The delivery channels for agriculture insurance in the country are the agricultural producers and cooperatives (Reyes, et al, 2017, p. 10).

3.3.1.2. Spain

Reyes, et al (2017, pp. 11-12) explained the details about the agricultural insurance in Spain. Since the country's autonomous regions have different social and economic situations, the central government gives the autonomous region's government to decide about their own agricultural insurance policies in order for them to fit the respective regions' own needs.

The agricultural insurance were controlled by private companies only until 1978. In addition, the insurance products provided only covers losses incurred against hail and fire in crops which were mainly in cereal crops, since the institutions believe that other natural risks were not insurable during this period as noted by Reyes, et al (2017, pp. 11-12).

The government launched a government-backed agricultural insurance program, which was named "Combined Agricultural Insurance Program" or "Seguros Agrarios Combinados" in Spanish, which is a public-private partnership financed by "Agroseguro", which is a private co-insurance pool with a directive to provide subsidized agricultural insurance to all of the country's regions and farmers on an optional basis. This program was first launched in 1980. While from 2008, Agroseguro grew to be the leading and most comprehensive government-backed agricultural insurance program in all of Europe. Today, the organization offers a comprehensive range of single and MPCI policies and an extensive livestock insurance program which include numerous animals like cattle, sheep, and goats as well as freshwater and saltwater aquaculture insurance (Reyes, et al, 2017, pp. 11-12).

3.3.1.3. Germany

The information about German agricultural insurance were compiled by Reyes, et al (2017, pp. 13-14). The first actual agricultural insurance scheme in the world was first introduced by Germany in the form of hail insurance in 1733. The scheme is primarily sold by cooperatives and mutual insurance institutions. Despite this, as of 2006, there were no sophisticated agricultural insurance in the German market. Currently, there are only two developed kinds of insurance schemes in the market, namely the crop hail insurance and the livestock insurance. The first livestock insurance was launched in 1830 and which only covered cattle. At present, MPCI is also offered but is still on its development stages, primarily because of the strictness of the financing. On the other hand, agricultural insurance is funded by mutual insurance, private, and public insurance institutions. Currently, there are about fourteen insurance companies offering hail crop insurance while only a sole company provides MPCI. There are two types of livestock insurance in the country, one of them is a private-public fund protecting animal deaths from epidemic diseases, while private

insurance companies gives insurance coverage from accidents, fire, epidemic diseases, and movement limitations.

Reyes, et al (2017, pp. 13-14) also reported that Germany does not want to finance agricultural insurance programs because the country already give subsidies in times of natural calamities. The German government also view that the current insurance programs provide effective protection against uncertainties so there is no need to create a government subsidized agricultural insurance program.

3.3.2. The Americas

3.3.2.1. United States of America

Du, Feng, and Hennessy (2014, pp. 4-7), Smith (2012, pp. 2-5) and Crop Insurance in America (2019) provided information about the agricultural insurance in the United States. The country's federal crop insurance was endorsed by their congress in the 1930s but the program was considered experimental lasting for decades. Moreover, this program's availability was only limited to certain crops and regions (Du, Feng, and Hennessy, 2014, pp. 4-7).

Crop Insurance in America (2019) noted that the 1980 Federal Crop Insurance Act was the one that expanded the country's agricultural insurance to more crops and regions. This act established a PPP framework in which private companies sell and offer agricultural insurance policies while the costs from administration and operation are shouldered by the federal government.

Smith (2012, pp. 2-5) noted that between the years of 1980 and 2010, the federal crop insurance program expanded vivaciously, in the numbers of crops and regions covered as well as the extensiveness of the programs offered. This is primarily due to the substantial expansion in financing in addition to new congressional mandates (2012, pp. 2-5).

In 2014, the "Farm Bill" or the Agricultural Act of 2014 accelerated the progression of agricultural insurance in the country from the traditional "farm price and income support" to the risk management in the country's agriculture program. This act is viewed as the foundation of the United States' agriculture safeguard that anchor agricultural insurance as the main risk management tool for farmers in the dealing with uncertainties in their agricultural activities as well as the risk of fluctuation of agricultural market prices (Crop Insurance in America, 2019).

3.3.2.2. Argentina

Argentina's information on agricultural insurance was drawn from the reports by Mahul and Stutley (2010, pp. 63-73) and Reyes, et al (2017, pp. 21-22). The first agricultural insurance scheme in the country was in the form of crop hail insurance and was first launched in 1874 (Reyes, et al, 2017, pp. 21-22). The program was sold mainly by cooperatives and mutual companies until 1994, when numerous private insurance companies began to offer crop insurance. The program insures major crops such as soy beans, wheat, corn, and sunflower while the most wanted and marketed product is crop hail and damage-based insurance. Today, 9 private companies provide MPCI and are usually procured by large scale farms.

The Argentine government provides minimal backing and only support provinces and insurance companies in the advancement of agricultural insurance programs by providing technical information. As a result, the respective provinces recently developed their own subsidized agricultural insurance programs to protect their respective farmers from uncertainties (Mahul and Stutley, 2010, pp. 63-73).

As of 2008, there were about 30 insurance institutions which provide agricultural insurance. Of the 30 institutions, 23 were private companies, 6 were cooperatives, and one

was a public insurance institution. The two biggest insurance providers, the "La Segunda" and "Sancor" are both cooperatives (Reyes, et al, 2017, pp. 21-22).

3.3.2.3. Brazil

According to the report by Reyes, et al (2017, pp. 22-23), the first Brazilian agricultural insurance scheme first began in the 1970's as a production cost insurance. The coverage was grounded on "out-of-pocket" production costs and the indemnity payment depends on the damages incurred. PROAGRO, which is a kind of credit insurance, can also be found in the country. In a credit insurance scheme, the insurance was a precondition for access to official credit while insurance protection was based on the amount of the farmers' credit. On the other hand, the pilot agricultural income insurance program started in 2010. The program delivers productivity protection in addition to the coverage for the fluctuating agricultural prices. Reyes, et al (2017, pp. 22-23) noted that this scheme was unable to fully develop due to the poor farmer knowledge with the insurance program and with the price-protection tool. Moreover, poor marketing as well as the lack of subsidies available for the insurance sector overall contributed to the downfall of the program. Most Brazilian farmers are considered poor and agricultural insurance is considered unaffordable without subsidies (Reyes, et al, 2017, pp. 22-23).

3.3.3. Africa

3.3.3.1. Tanzania

In November 2016, the first agricultural insurance policy was sold in Tanzania, a place where agriculture is a big part of the country's economy as reported by Atlas Magazine (2017). The agricultural insurance, named "Linda Mbegu", or in English "insure your crops", is intended to provide protection to farmers from the unproductivity from rainfall shortage. This new agricultural insurance program is the first of its kind to be marketed in

Tanzania. Airtel Tanzania, Agriculture and Climate Risk Enterprise (ACRE), Seed Co Tanzania, and UAP Insurance Tanzania are the main marketers of the insurance policies (Atlas Magazine, 2017).

3.3.3.2. South Africa

The South African government first launched a subsidized insurance program aimed to give protection to farmers from the drought perils in 1970 (Atlas Magazine, 2017). Unfortunately, the results were unexpected as farmers abandoned the program and only relied on the assistance given by the ministry of agriculture to support the partial recovery of their agricultural losses. Although in 1996, a new agricultural insurance program was introduced which was combined within a strategic design intended at boosting agricultural productivity. The insurance program was a PPP and aimed to provide insurance coverage to farmers not just against drought but also from extreme weather events in general (Atlas Magazine, 2017).

3.3.4. Asia and the Pacific

3.3.4.1. Australia

Australia's agriculture insurance can be characterized into two broad categories: the traditional and the index based insurance which is relatively new (FAO, 2011). The peril, multi-peril crop, crop revenue, and mutual funds or "farmer pool" belong to the category of traditional insurance. On the other hand, the index based insurance programs are the weather derivatives, yield index, and the area yield index. Agricultural insurance in Australia is relatively old which was first introduced in 1918. In addition, insurance in the country are deemed to be sophisticated and extremely competitive according to the report of the FAO (2011).

The agricultural insurance programs started rapidly expanding from 1960 until in 1974 to 1975, when private insurance institutions began offering an "area yield guarantee" scheme for Western Australian farmers. However, the program's low farmer enrollment and the lack of dependable farmer records on which to base premiums was a great challenge to the program's implementation (Hatt, M., Heyhoe, E., and Whittle, L., 2012, pp. 3-14).

From 1999 to 2000, there were even more agricultural insurance that entered the market which were provided by private insurers. One of these is the "crop failure" insurance that was used for a designated value per hectare that was used as a representation of the expense of replanting for the next cropping season. On the other hand, weather derivatives were first introduced to Australian farmers from the early 2000s. This is based on the data derived from rainfall and temperatures at weather stations all over the country. Another advancement in the country's agricultural insurance is the "YieldShield" which integrates traditional hail and fire insurance with yield index insurance that provides coverage against inadequate or extreme rainfall, for wheat and grain sorghum (FAO, 2011).

Another innovation in Australia's agricultural insurance programs is the Celsius Pro which specializes in organizing and creating weather derivatives and was first introduced in 2012 (Hatt, M., Heyhoe, E., and Whittle, L., 2012, pp. 3-14). The weather derivatives are grounded on a weather index derived from the readings from the official Bureau of Meteorology (BOM) weather stations all over the country. The biggest perk of the weather certificates is that there is no need for the agricultural damages to be assessed. In the occurrence of a natural calamity, there will be an automatic indemnity payout which will be based on the data from the readings from the BOM (Hatt, M., Heyhoe, E., and Whittle, L., 2012, pp. 3-14).

Australia provides its insurance via brokers who are deemed as the most important in the whole delivery channel (FAO, 2011). According to the report, farmer associations, cooperatives, and banks are vital in the connections between the agricultural producers and the insurance providers. Since there is no government support for agricultural insurance in the country, agricultural insurance participation is optional (FAO, 2011).

3.3.4.2. New Zealand

New Zealand's first agricultural insurance scheme started in the 1970s in the form of livestock insurance according to FAO (2011). On the other hand, the number of crop insurance programs increased rapidly after 1981. There are four private companies and one mutual company that gives both crop and livestock insurance while one private company provides only livestock insurance. New Zealand has no government insurance since the private companies are already sophisticated and there is no need for government support, similar to Australia and Germany. Agricultural insurance in New Zealand is voluntary except for kiwi fruit producers (FAO, 2011).

3.3.4.3. Malaysia

FAO (2011) and Prabhakar, et al (2013, pp. 3-16) provided information about Malaysia's agriculture insurance. The country is a relatively new player in the agricultural insurance market compared to its other Asian neighbors (FAO, 2011). Moreover, the country never employed a government-backed agricultural insurance program. However, there were some private companies that offered insurance for plantation crops such as rubber, oil palm, coconut, fruit, and cocoa since the 1980s since these crops are primarily exported and an important source of income (FAO, 2011).

There was a plan to launch a national insurance program by the government back in 2002, when the National Insurance Association of Malaysia (NIAM) and in 2004, NIAM,

with technical support from its private partner Zurich branch, made pitches for a MPCI for rice (Prabhakar, et al, 2013, pp. 3-16). Even though the proposed program was well acknowledged by the members of NIAM, the Malaysian government, and local farmers, the program unfortunately did not come into fruition due to the expensive premium rates which is unaffordable for the Malaysian farmers. As of 2013, only the private insurers provide agricultural insurance in Malaysia (Prabhakar, et al, 2013, pp. 3-16).

3.3.4.4. Indonesia

Similar to Malaysia, the agricultural insurance in Indonesia is considered new as reported by FAO (2011). The report also mentioned that there are no practices of agricultural crop and livestock insurance in the country until the Indonesian government piloted their first agricultural insurance programs from 2009-2010.

Jakarta Post (2013) reported that the increasing occurrence of droughts followed by excess rain and flooding as well as the climate change impact on food security let the government to introduce through the Ministry of Agriculture (MOA) two pilot agricultural insurance programs that first started in the West and Central Java, one providing MPCI and the other livestock mortality and coverage for theft.

Under the 2009 to 2010 MOA pilot agricultural insurance schemes, the government subsidized 100% of the premiums while insurance are delivered via commercial and rural banks in the country as noted by Reyes, et al (2017, pp. 18-19).

3.3.4.5. India

India first launched its agricultural insurance scheme in 1965 through the Crop Insurance Bill (FAO, 2011). However, due to the complexity of the financial situation, most Indian states were against this bill.

In 2002, the Agriculture Insurance Company of India Limited (AIC), was created (Mahul, Verma, and Clarke, 2012, pp. 2-10). The AIC is viewed to be a dedicated government agricultural insurance company. The AIC's main program was the National Agricultural Insurance Scheme (NAIS), which was mandated to deliver insurance to small and marginal farmers, which is common in India, with access to seasonal production credit at cheap premium rates. In this scheme the government subsidizes 50% of the premium. However, the program underwent amendments in 2010, and became the modified National Agricultural Insurance Scheme (mNAIS). The originally subsidized scheme transitioned to a market-based program with statistically sound premium rates so that it will still be affordable for Indian farmers (Mahul, Verma, and Clarke, 2012, pp. 2-10).

3.3.4.6. Japan

The Japanese government is very serious with the advancement of its agricultural insurance as reported by the FAO (2011). The first insurance policy was first introduced in 1929, when the "Livestock Insurance Act" was authorized as a new disaster relief mechanism. On the other hand, the "National Forest Insurance Law" was passed in 1937 to provide cushion for foresters from losses incurred from fire and extreme weather effects such as wind, water, snow, drought, frost, tidal waves, and volcanic eruptions (FAO, 2011). The succeeding year, the "Crop Insurance Act" was passed but it took one more year for its implementation as a MPCI that provided protection for paddy rice, wheat, barley, and mulberries. In 1947, Japan established a yield insurance program similar to that of the United States.

According to Japan's National Agricultural Insurance Association, there are two types of agricultural insurance programs in the country: national and optional programs. The national program covers rice, wheat, livestock, and barley while the optional program covers

fruit and fruit-trees, field crop, sericulture, and greenhouses. Japan's competence on agricultural insurance comes from the associations that were formed to implement the insurance programs in which members' houses and properties can also be insured. The scheme began from the local farmer's cooperative action to adopt a joint reserve fund by accruing the contributions as the premium payment for the purpose of making up the agricultural losses (NOSAI, 2019).

The Japan National Agricultural Insurance Association or locally known as "NOSAI" is the chief agriculture mutual aid system operated by the Agricultural Mutual Relief (AMR).

3.3.4.7. Philippines

In the Philippines, the Philippine Crop Insurance Corporation (PCIC) is the government organization that implements rice, corn, high-value commercial crop, livestock, non-crop agricultural asset, fishery, and term insurance programs.

The Philippine Crop Insurance Corporation started implementing the Agriculture Insurance Program (AIP) of the Philippines in 1981. Since then, the AIP has expanded its coverage from rice and corn to other crops and to other services including life and accidental death insurance to farmers and their families. As with most AIPs in other countries, the program provides premium subsidies (Virola, 2017, pp. 10-11).

The PCIC has been mandated to give insurance protection to farmers in the Philippines against the damages to crops and non-crop agricultural assets due to natural calamities, pests and diseases, and other perils. It implements and manages various agricultural insurance programs of the government (PCIC, 2019).

Under the support of the Philippine Department of Agriculture, the PCIC functions as a government-owned and controlled corporation and its administrative procedures are not

funded by the national government. Presently, the corporation's operations have been regionalized, with offices set up in respective areas. The PCIC has seven major insurance product lines, which are as follows: rice; corn; high-value commercial crops (HVCC); livestock; fishery; non-crop agricultural asset; and, term insurance packages (PCIC, 2019).

Table 3.1. Agricultural Insurance Origins and Characteristics from Selected Countries

Country	Year Started	Characteristics
Germany	1733	Agricultural insurance is underwritten by mutual insurance companies, private insurance companies, and public insurance companies; Only Hail, Multi-peril, and livestock insurance are present
Argentina	1874	Agricultural insurance are provided by mutual companies, cooperatives, and private companies; federal government support is limited, basically just by providing technical support and information
Australia	1918	Agricultural insurance are in the form of traditional and index based insurance and implemented by private insurers
Sweden	1928	Three private mutual insurance companies administer agricultural insurance: Lansforsakringar, Agria, and Dina
Japan	1929	National Agricultural Insurance Association is agriculture mutual aid system operated by the Agricultural Mutual Relief Associations or municipal governments; also have several private companies offering agricultural insurance
USA	1938	Agricultural insurance works as a public-private partnership through which private sector companies sell and service insurance policies while administrative and operating expenses incurred are reimbursed by the federal government
India	1965	Government implements agricultural insurance program which is the modified National Agricultural Insurance Scheme
Brazil	1970	Agricultural insurance is provided mainly by private insurers; income insurance is present
South Africa	1970	Agricultural insurance works as a public-private partnership with the country's Ministry of Agriculture
New Zealand	1970	Four private sector insurers and one mutual insurer offer both crop and livestock insurance
Spain	1970	Before 1978, all agricultural insurance products are provided by private companies; 1980 Government insurance was established;
Malaysia	1980	Agricultural insurance are provided by the private sector but the government is on the process of developing an agricultural insurance scheme
Philippines	1981	Philippine Crop Insurance Corporation is the government organization that implements agricultural insurance
Indonesia	2009	Government introduced through the Ministry of Agriculture (MOA) two pilot agricultural insurance programs in West and Central Java, one offering MPCI crop insurance and the other livestock mortality and theft cover
Tanzania	2016	Airtel Tanzania, Agriculture and Climate Risk Enterprise, Seed Co Tanzania and UAP Insurance Tanzania are the implementers of the first agricultural insurance program of the country

Collated by the author from the reports by Reyes, et al (2017) from the Philippine Institute for Development Studies, the Food and Agriculture Organization by the United Nations (2011), Atlas Magazine (2017), and by Mahul and Stutley (2010) from the World Bank

3.4. Agricultural Insurance Effectiveness on Income Loss Reduction

Agricultural production is greatly influenced by the weather, climate, and water availability, and is gravely affected by weather and climate natural related disasters (Sivakumar, 2006). This means that the effects of natural disasters would be grave for those who venture in the agriculture sector.

In rural communities in most developing countries, farming is the chief source of income. More than 2 billion people rely on small-scale farming as their occupations and improving conditions for the farmers would reduce global poverty levels (The Guardian, 2014). In this scenario, agricultural insurance has the potential to combat the effects of weather and climate related constraints as well as reduce the farmers' uncertainties. The same report also mentioned that insurance does have an impact on farmers' behavior. In India, for example, farmers protected by rainfall insurance shifted funds towards cash crops, which are more sensitive to rainfall deficit but yield better returns.

A study by Pathak (1986) mentioned that the agricultural insurance indemnity payments serve as a protective mechanism when uncertainties occur. Another study conducted by Leatham, et al. (1987, pp. 113-120) showed that crop insurance consistently decreased farmer income variability, but that the effect on income levels depended on the variability in crop yield. Higher yield variability means an increase to the farmers' incentive to enroll in an agricultural insurance program. At the same time, the study's results discovered that the creditor always prefer to lend farmers with agricultural insurance. This was especially true when yield variability led to farm failure. On the other hand, the study also discovered that agricultural insurance maybe liked by the creditors but that is not the case for the farmers.

A study conducted by Rola (2013, pp. 72-80) in the province of Laguna, Philippines revealed that the amounts of net income losses of the rice farmers were considerably reduced as a result of their participation in the rice crop insurance program. A higher average net income loss was incurred by the farms near the Laguna Lake as opposed to those farther away from the lake. Meanwhile, farmers who are land owners incurred higher net income losses than tenants for the reason that a higher production cost was suffered by the tenured farmers. Rola's (2013, pp. 72-80) study also showed that a larger amount of average net income loss was suffered among large farms since these farms had a higher cost of production than the small farms.

In another study, Rola (2017, pp. 46-50) found out that the indemnity payments received by the farmers were effective in reducing the farmers' income loss. However, it took an average of one hundred and three days after coverage filing for the indemnity payment to arrive which was considered too late for the farmers as the cropping season has already passed and the opportunity to re-plant is lost.

There are evidences in the literature that prove that agricultural insurance has a positive effect on reducing income losses of the farmers in times of natural disasters.

3.5. Impact of Agricultural Insurance on Farmers' Behavior

Past studies revealed positive impacts of agricultural insurance such as the easing of the farmers' burden after an occurrence of a natural disaster. In addition to those, there are positive impact in the behavior of farmers in terms of investments, risk attitudes or disaster management practices, and towards daily lives.

As mentioned in the previous chapter, the study conducted in Ghana by Karlan et al (2009, pp. 1-3) discovered that crop insurance transformed the farmers' investment behavior. Most farmers are risk averse indicating their fear of taking risks. After investing

in agricultural insurance on the other hand, the farmers' behavior changed and they were more open to taking more risky decisions.

Einhorn and Hogarth (1981, pp. 53-88) explained this occurrence and mentioned that the traditional theory of economic decision-making under risk and uncertainty assumes that the decision-maker conducts the decision that maximizes his or her utility. Moreover, Edwards (1954, p. 380) stated that to be able to make the decision that make the most of the utility, the assumption is that a person should be "completely informed, infinitely sensitive, and completely rational".

Furthermore, the results of Enstrom and Eriksson's (2018, pp. 35-39) study concluded that the farmers recognize that the insurance decision from an expected utility perspective was probably irrational. Even though the farmers recognize that the premiums for the agricultural insurance in the long run will surpass the potential indemnity payment from the insurance company, they still value agricultural insurance because of its likelihood to contain the negative financial effect of a natural disaster in the short run (Enstrom and Ariksson, 2018, pp. 35-39).

Another study about corn farmers in Zambia by Miura and Sakurai (2015, pp. 19-29) found out that that the delivery of insurance resulted to farmers to sow corn seeds earlier than normal. This approach was able to proliferate corn production, but is perilous in terms of rainfall variability. In addition, the study discovered that insured farmers use more fertilizer and expand the area which they plant corn. This is because insurance gives farmers the peace of mind to invest in riskier situations (Miura and Sakurai, 2015, pp. 19-29).

The literature illustrates that insured farmers are more positive than those who are not insured. The insured farmers are more likely to engage in risky farming activities knowing that they have a fallback in times of uncertainty.

3.6. Conclusion

The long history of agricultural insurance started in Germany from the 1733 and have evolved significantly as seen in past literature. Some agricultural insurance markets around the world are sophisticated such as the ones in Europe, the United States, and Japan while others such as the ones in South East Asian countries have room for improvement. African insurance on the other hand are new and most are launched recently. Even though there are enough evidences to support the positive effects of agricultural insurance on farmer income loss reduction and behavior in general, most of the agricultural insurance markets in the Asia and the Pacific region, areas which are the most exposed to natural disasters, are underdeveloped.

CHAPTER 4

AGRICULTURAL INSURANCE SYSTEM IN JAPAN AND THE PHILIPPINES

4.1. Introduction

This chapter aims to describe the agricultural insurance system in Japan and the Philippines, focusing on the main implementer of Japanese and Filipino agricultural insurance, which are the National Agricultural Insurance Association (NOSAI) and the Philippine Crop Insurance Corporation (PCIC), respectively. The following sections will shed light on the insurance provider's origins and evolution as the countries' main provider of agricultural insurance and characterize the implementation mechanisms of agricultural insurance programs administered by the NOSAI and PCIC and their status and problems encountered in the implementation of the agricultural insurance programs based on key informant interviews. In addition, a comparison between the two insurance providers will be tackled before concluding this chapter.

4.2. Agricultural Insurance System in the Philippines

4.2.1. History of Agricultural Insurance in the Philippines

During the Philippines' precolonial and colonial era (until 1946), there were no established agricultural insurance in the country despite it experiencing numerous natural disasters yearly. To protect Filipino farmers from these natural perils, the Philippine Government introduced the Philippine Crop Insurance Corporation (PCIC), which is a

government-owned and controlled corporation (GOCC). The PCIC is controlled by the government yet does not get any funding from the government.

The PCIC, was launched through the Presidential Decree number 1467 on June 11, 1978, of which the financing came from the Agriculture Guarantee Fund (AGF), which was reassigned to the new institution as part of the government's support to the funding of PCIC. The Land Bank of the Philippines (LBP) formerly administered the AGF and previously guarantee the rice production loans which was managed by the "supervised credit program" of the LBP (Reyes et al, 2015, pp.4-6). Meanwhile, the 7th section of the same Presidential Decree stated that the corporation's Board of Directors (BOD) is deciding if they would carry on guaranteeing the activities launched from the AGF financing. Therefore, the true foundation of the PCIC came from the financing reserved for the funding of land reform making the corporation an organizational offspring of agrarian reform (Reyes et al, 2015, pp.4-6).

The LBP launched an inter-agency committee that performed a feasibility study of implementing crop insurance, and originally projected that crop insurance will be a part of their supervised credit programs. The committee, called the "Inter-Agency Committee for the Development of the Philippine Crop Insurance System" (IAC-PCIS) included representatives from the Armed Forces of the Philippines (AFP), Department of Agriculture (DA), Department of Agrarian Reform (DAR), private insurance institutions, other private organizations, cooperatives, and the University of the Philippines (Reyes et al, 2015, pp.4-6).

The PCIC charter was amended by Presidential Decree number 1733 on October 21, 1980 and further amended by Republic Act 8175 on December 29, 1995 to make the corporation more effective. Presidential Decree number 1733, pronounced on October 21,

1980, made crop insurance a requirement for all lending institutions such as the LBP, rural banks, and other banks that provide loans for the production of rice crop under the supervised credit programs of the government, and these institutions would also serve as underwriters for the PCIC (Reyes et al, 2015, pp. 4-6).

On the other hand, the PCIC started implementing the Agriculture Insurance Program (AIP) of the Philippines in 1981 with two inaugural insurance programs namely the rice crop insurance and the corn crop insurance programs. Currently, the AIP has extended its coverage to other crops as well as other services which now include life and accidental death insurance not just to agricultural producers but to their families as well (Virola, 2017, pp.19-20).

4.2.2. Implementation Mechanisms of Agricultural Insurance Programs in the Philippines

The PCIC's corporate mandate is "As the implementing agency of the agricultural insurance program of the government under the Presidential Decree number 1467, as amended by the Republic Act of 8175, PCIC is mandated to provide insurance protection to the country's agricultural producers particularly the subsistence farmers, against: Loss of their crops and/or non-crop agricultural assets on account of natural calamities such as typhoons, floods, droughts, earthquakes and volcanic eruptions, plant pests and diseases, and/or other perils. PCIC can also provide guarantee cover for production loans extended by lending institutions to agricultural producers for crops not yet covered by insurance" (PCIC, 2019)

The corporation's mission is: "PCIC, as an agricultural insurer, is committed to help stabilize the income of agricultural producers and promote the flow of credit in the countryside by: Providing insurance protection to qualified farmers and other agricultural

stakeholders against losses of their crops and produce, including their livestock, farm machineries and equipment, transport facilities and other related infrastructure arising from natural calamities, pests and diseases, and other perils beyond their effective control; Extending innovative and client-responsive insurance packages and other services thru people's organization including farmers' cooperatives, agricultural lenders and service providers."

The PCIC's vision is to "broaden the availability and increase the effectiveness of its crop insurance programs for managing farm losses while at same time ensuring their visibility and sustainability by 2020" (PCIC, 2019).

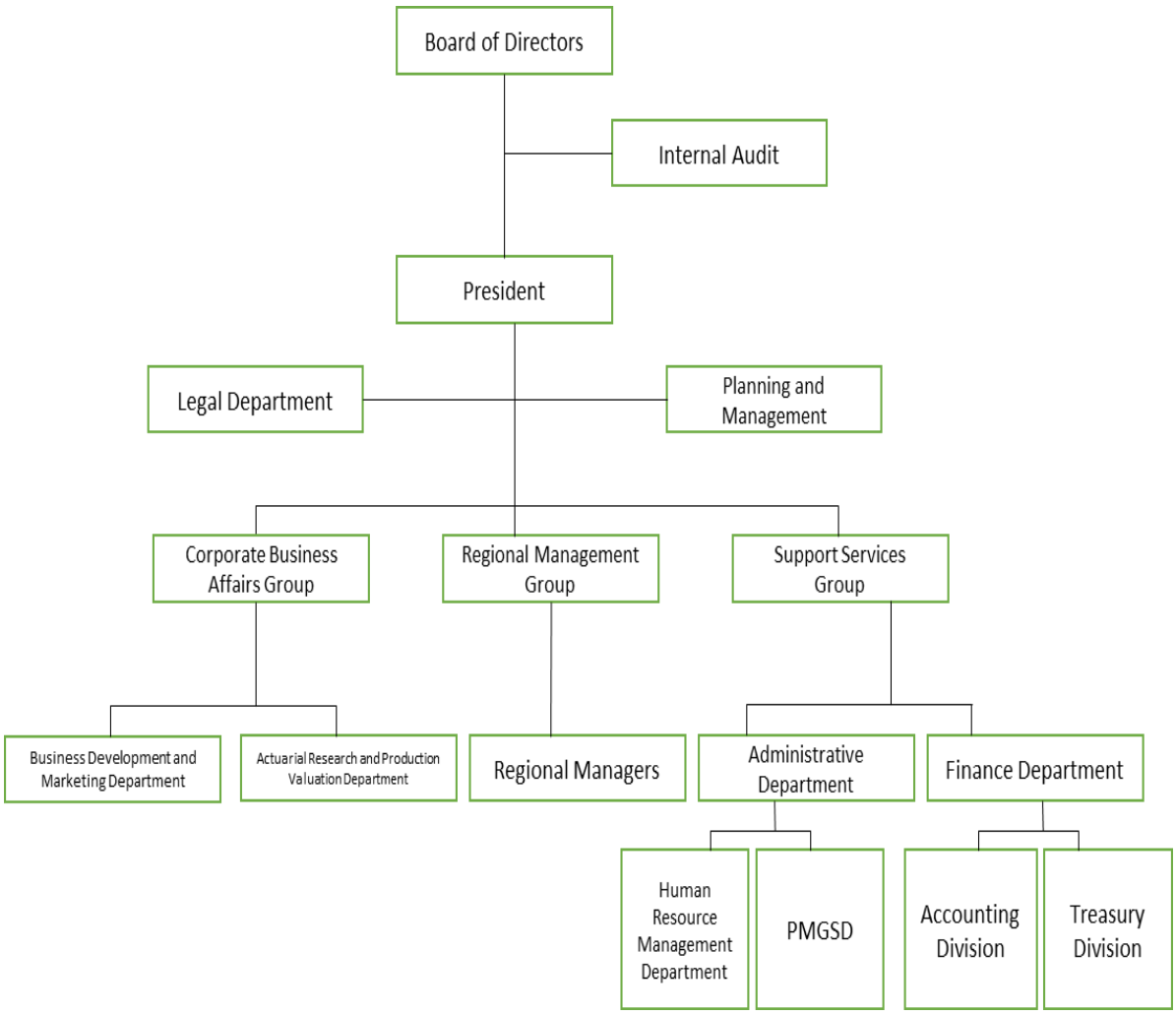

Figure 4.1. Organizational Chart of the Philippine Crop Insurance Corporation (Source: Information from PCIC website)

4.2.3. Agricultural Insurance Programs of the Philippine Crop Insurance Corporation

The agricultural insurance programs provided by the Philippine Crop Insurance Corporation are the Rice Crop Insurance Program (RCIP), Corn Crop Insurance Program (CCIP), High Value Crop Insurance Program (HVCIP), Livestock Mortality Insurance Program (LMIP), Non Crop Insurance Program (NCIP), Fisheries Insurance Program (FIP), and the Accident and Dismemberment Security Scheme (ADS^2). Aside from these programs, the PCIC also provides a special insurance program which is the Registry System for Basic Sectors in Agriculture-Agricultural Insurance Program (RSBSA-AIP), which was a new insurance program for subsistence farmers and fishers (PCIC, 2019).

4.2.3.1. Farm Eligibility

In order for the farm to be eligible to be insured under the PCIC's insurance programs, the farms should meet the following criteria set by the PCIC: "*1) The farm must not be part of a riverbed, lakebed, marshland, shoreline or riverbank; 2) The farm must have an effective irrigation and drainage systems. Rainfed areas are eligible farms during wet cropping season subject to planting cutoff date; 3) The farm must be accessible to regular means of transportation; 4) The farm must be suitable for production purposes in accordance with the recommended Good Agricultural Practices (GAP)/Package of Technology (POT) (such as right zinc content); and 4) Farm location must have generally stable peace and order condition and not hazardous to health*".

4.2.3.2. Excluded Risks

The insurance programs of the PCIC insure its beneficiaries from perils and other shocks but there are excluded risks. The PCIC categorized these general excluded risks into two groups. The first group are the losses arising from: "*1) Fire from whatever cause; 2) Theft and robbery, pillage, sequestration, strikes or other commotion, war, invasion, acts of*

foreign enemies, hostilities (with or without declaration of war), civil war, rebellion, revolution, insurrection, acts of terrorism, military or usurped power or radio-active contamination whether controlled or uncontrolled; 3) Any measure resorted by the government in the larger interest of the public; 4) Avoidable risk emanating from or due to neglect of the assured/non-compliance with the accepted farm management practices by the assured or person authorized by him to work and care for the insured crop; 5) Strong winds and heavy rains that were not induced by typhoon; 6) Unintentional acts of persons, natural or judicial, that may cause damage to the insured crop; 7) Losses arising from failure to comply with the eligibility requirements; and 8) Any cause or risk not specified under Covered Risks Section".

On the other hand, the second group of excluded risks are from losses occurring: "*1) Prior to the effectivity of insurance; 2) Prior to seed growth; and 3) Beyond the scheduled date of harvest, unless harvesting could not be undertaken on such scheduled dates due to adverse weather conditions as certified to by the Agricultural Technologist (AT) or the Municipal Agricultural Officer (MAO) or death of the assured and that the subject loss occurs within five days after the scheduled date of harvest*".

While for the Non-Crop Insurance Program, the PCIC determined that the following are not insurable: For the damages caused by fire and lightning, the following risks are excluded: "*1) Non-agriculture related warehouse and industrial risks; All fire risks not classified under warehouse risks/industrial risks; 2) Earthquake, riot and all allied perils (such as typhoon, flood, etc.); 3) Burglary and robbery; 4) All prohibited risks and perils under ordinary fire policy; and 5) Loss or damage related to war and terrorism*".

4.2.3.3. Estimation of Damages and Delivery of Indemnity Payments

To claim indemnity payments, the insured farmer or any immediate family member would need to fill up the "PCIC Indemnity Form" and submit it to the nearest PCIC Regional Office within forty-five calendar days from when the damages was incurred. A team of adjusters (TA) consisting of two members, one from PCIC and the other from either the Department of Agriculture (DA), Department of Interior Local Government (DILG), Department of Agrarian Reform (DAR), National Irrigation Administration (NIA), or a concerned Lending Institution (LI) such as the Land Bank of the Philippines (LBP), will visit the damaged farm to inspect the damages. The verification of the damages will be categorized into three loss categories: "*a) Total loss - if loss is 90% and above; b) Partial loss - if loss is more than 10% and below 90%; and c) No loss - if loss is 10% or less*". According to the PCIC officials, the team of adjusters are expected to arrive and inspect the damaged farms within three calendar days after the receipt of the indemnity form.

The officials of the PCIC mentioned that a the indemnity payment will be paid as quickly as possible, but not later than sixty (60) calendar days from the submission by the affected farmers of the complete claims documents to the nearest PCIC regional office (PCIC, 2019).

4.2.4. Problems Encountered by the Philippine Crop Insurance Corporation

This section reveals the problems encountered of the agricultural insurance programs provided by the PCIC in the implementation of its insurance programs based on the data provided and the results of the interviews with the key informants with the PCIC officials in the region 4 office in the province of Laguna, Philippines. The region 4 office of the PCIC is located in the city of Calamba and is the only regional office that caters two regions of the Philippines, region 4A and 4B.

Figure 4.2. Map of CALABARZON
Source: Wikipedia (www.en.wikipedia.com)

Region 4A (figure 4.2), locally known as CALABARZON, stands for the provinces of Cavite, Laguna, Batangas, Rizal, and Quezon. All of these provinces are located in the Luzon mainland with the exception of Quezon province's Polillo islands. On the other hand, region 4B (figure 4.3), locally known as MIMAROPA, stands for the provinces of Mindoro, Marinduque, Romblon, and Palawan. All of the region's provinces are island provinces.

The regional office may be located in the city of Calamba in Laguna province, but there are insurance underwriters assigned in each province depending on the number of farmers in the respective provinces. The province of Quezon has the most number of insurance underwriters with five while Palawan comes in next with four. Occidental Mindoro has three while the provinces of Laguna, Batangas, Cavite, and Oriental Mindoro each have two. The rest of the provinces have one. All the island provinces have their own provincial extension offices as they are difficult to reach especially in times of widespread disasters.

The head office of the PCIC, which is located in Quezon City in the Metro Manila, provides annual budget for each of the regional offices. The flow of operation starts at the

regional level. From each regional office, the regional staff coordinates with the aforementioned underwriters per province. The underwriter coordinates with the Department of Agriculture (DA) or the Department of Agrarian Reform (DAR) through the Municipal Agricultural Officer (MAO) of each municipality. The MAO then coordinates with the Agricultural Technicians (AT), who then coordinate with cooperatives, irrigators' associations, and other farmer groups down to the individual farmers. The underwriters are the ones who train and share information to the MAO and AT in each municipality in each province.

Figure 4.3. Map of MIMAROPA
Source: Wikipedia (www.en.wikipedia.com)

The PCIC gives incentives to the MAO and AT for enrolling farmers to insurance programs. According to the key respondent (Field Interview, August, 2019), the MAO and AT receive 1 percent of the total premium collected for crops and 2 percent of the total premium collected for livestock in their municipalities. The PCIC assumes that this strategy

can increase the number of insured farmers in the region. Yet according to the key respondent (Field Interview, August, 2019), the MAO and AT were not cooperative with the PCIC which resulted to the low participation rate of farmers in the PCIC's insurance programs. It was only until 2017 that the MAO and AT increased their cooperation with the PCIC. The key informant mentioned that this could be attributed to the RSBSA becoming a national program, which technically makes the farmers' premium free as long as they are enlisted in the master list of the RSBSA. According to the key informants, there are about five hundred thousand farmers in both region 4a and 4b, and only about thirteen percent are insured before the creation of the RSBSA.

The farmers' information included in the master list of the RSBSA was conducted by the Department of Budget and Management (DBM) which started in 2014, before the RSBSA was introduced and later on became a national program. According to the key informants, the DBM failed to include all eligible farmers all over the Philippines in the master list of the RSBSA, therefore not all farmers can avail free premiums. Most of the farmers listed in the RSBSA are members of a cooperative and any kind of farmers' association. Most of the farmers in the hard-to-reach areas such as those who are located in the higher slopes of the uplands, coastal areas, island villages, and the areas which are considered to be the territory of the rebel group New People's Army (NPA) are the ones not listed by the DBM in the RSBSA.

All the regional offices of the PCIC have fourteen permanent positions and even though PCIC's region 4 office administers insurance for two regions, the number of permanent positions is the same as in other region. They are responsible for ten provinces, five of which are island provinces. According to the informants, there are about thirty to forty members of the team of adjusters (TA), or those who visit the farms and inspect the damages after the occurrence of a natural disaster. The TA are on job order basis only and

have low monthly salaries amounting to twenty thousand Philippine pesos (or about four hundred US dollars) per month for six months per contract. Most of the members of the TA seek jobs elsewhere for job security and a higher salary. The informants also mentioned that when they hire new members of the TA, they usually undergo a one-day training before getting dispatched. Since the job is not too appealing, not so many agriculture graduates apply for this job, therefore the PCIC have no other choice but to hire non-agriculture experts. The one-day training is not enough to gain basic knowledge in assessing agricultural damage, let alone training non-agriculture experts. This causes a lot of discrepancy between the damage estimates of the farmers and the TA.

Another difficulty that the PCIC region 4 faces is the lack of manpower in times of widespread natural disasters. The informant mentioned that it was impossible for them to manage about one hundred thousand farmers in both regions given the limited number of underwriters and members of the TA. That is why it is impossible for the PCIC to meet the demands of all the insured farmers. The members of the TA could not visit the farms, process the insurance payments, and deliver the indemnity in time. Moreover, the infrastructure in the hard-to-reach farms also pose a challenge for the undermanned PCIC. For instance, the lack of roads in the upper slopes of the upland farms and coastal areas as well as the lack of bigger boats to reach the island villages constrain the service delivery of the PCIC to its farmer beneficiaries to these areas. Especially in times of a widespread disaster, the PCIC caters first to the nearer and easier areas to reach, leaving the farmers in the isolated areas no other choice but to wait longer for the PCIC services to arrive. This will reduce the PCIC's efficiency in terms of service delivery to their beneficiaries.

The informants mentioned that since 2012, the region 4 office increased its employees from less than twenty, to ninety-nine today yet there are still only fourteen permanent position while the other eighty-five are on job order basis. The existence of a

non-permanent, contractual job makes the PCIC more inefficient, and most of the staff seek employment elsewhere after their contract expires. This way, the PCIC will spend more resources on seminars and training of the newly hired staff, which is usually done every six months (after the contract of the job order staff ends) according to the informants. Moreover, even if the PCIC hires more staff, it may ease the service delivery in some areas, but not in the hard-to-reach areas. For instance, to reach the island villages, larger boats are needed especially in the occurrence of high tides and big waves. The PCIC can send more people to cater to the needs of the island villages but it is impossible to provide services on time in the absence of large boats. The same can be mentioned in case of the high elevation areas. Without roads and light posts, it is impossible to travel safely in these areas.

Another problem of the PCIC is its record-keeping. Until 2013, there is no permanent staff who was in charge of data keeping. There was also no centralized record-keeping system. Since most of the PCIC staff are on a job-order basis, once the contract of that staff ends, the records and data are most of the time lost. Most of their records are also not digitalized, which makes it harder to keep and manage the database. Because of these issues, the PCIC introduced an Automated Business System (ABS) in 2013 to improve the record-keeping and to promote the digitalization of the data of PCIC. Even with the creation of the ABS, old data are lost because of the poor record-keeping during the previous years.

4.3. Implementation Mechanisms of Agricultural Insurance Programs in Japan

4.3.1. History of Agricultural Insurance in Japan

The government of Japan views the progression of agricultural insurance seriously. The first agricultural insurance policy offered in the country anteceded to 1929, when the Livestock Insurance Act was authorized as a contemporary disaster relief mechanism. On the other hand, the “National Forest Insurance Law” was passed in 1937 to provide protection to forest owners from losses arising from fire and extreme weather effects such

as wind, water, snow, drought, frost, tidal waves, as well as volcanic eruptions (FAO, 2011). The succeeding year, the "Crop Insurance Act" was ratified although it took another year for it to implement a Multi-Peril Crop Insurance Program (MPCI) that delivered insurance coverage for paddy rice, wheat, barley and mulberries. After that, in 1947, Japan implemented a yield insurance program (FAO, 2011).

In 1949, the implementation of building mutual aid business began while agricultural machinery mutual aid business started in 1951. After that, the fruit tree mutual aid project was implemented in 1971 while the implementation of field crop mutual aid gardening facility started in 1979.

On the other hand, the 40th anniversary of the NOSAI system was celebrated in 1987 with the establishment of the NOSAI philosophy corporate slogan and symbol mark. In 1993, a mutual aid gold record highest amount of 440 billion yen was recorded for paddy rice.

In NOSAI's 70th founding anniversary in 2017, the law to revise a part of the Agricultural Disaster Compensation Act was enacted and the succeeding year (2018) saw the amendment of the agricultural disaster compensation law enforcement, with its legal name changed to "Agricultural Insurance Act" (NOSAI, 2020).

The two types of agricultural insurance programs in Japan are the national and optional programs. The national program covers rice, wheat, livestock, and barley while the optional programs covers fruit and fruit-trees, field crop, sericulture, and greenhouses. Japan's strength on agricultural insurance comes from the unions that are formed to implement the insurance programs in which members' houses and properties can also be insured (NOSAI, 2020).

4.3.2. Implementation Mechanism of Agricultural Insurance Schemes of the National Agricultural Insurance Association of Japan

According to the National Agricultural Insurance Association of Japan, agriculture is an industry affected most by nature. Japan is situated in the "Asian monsoon zone", a place where weather fluctuation are most common. Therefore, huge area of Japanese agriculture incur heavy damages caused by typhoons, floods, cool summers and other extreme meteorological events. Japanese farmers are very vulnerable to natural disasters especially given their production conditions and small-scale farm management. In addition, it would be difficult for Japanese producers to recuperate their economic losses by themselves caused by natural disasters. Additionally, the government view the sustainability of Japanese agriculture that provide food security as important objectives. Because of this, the government of Japan launched and sustained the Agricultural Insurance Scheme, which uses insurance to help the farmers recover their losses caused by natural disasters and contribute to the growth of Japanese agriculture. This strategy is the chief mechanism used by the government in response to natural disasters in agriculture. The agricultural insurance schemes has been amended many times to meet the shifting agricultural conditions and has made extensive contributions to the Japanese agricultural advancement (NOSAI, 2020).

4.3.3. Agricultural Insurance Programs of the National Agricultural Insurance Association of Japan

The types of the Agricultural Insurance Programs provided by the NOSAI are as follows: 1) Rice, Wheat and Barley Insurance (nationwide program); 2) Livestock Insurance (nationwide program); Fruit and Fruit-tree Insurance (optional program); 3) Field Crop and Seri culture Insurance (optional program); 4) Greenhouse Insurance (optional program); 5)

Farm Machinery Insurance (optional program); and 6) Building Insurance (optional program) (NOSAI, 2020).

Aside from the programs mentioned above, associations which were launched to implement the agricultural insurance programs were given the authority to insure their farmer members' houses and properties other which is separate than the ones covered by the above-listed programs. This is known as "Farmers' House Insurance" (NOSAI, 2020).

4.3.3.1. Features of the Agricultural Insurance Programs

As explained below, the government re-reinsures the program's projects excluding the Farmer's House Insurance. The association's implementation of the projects is compulsory for the Rice, Wheat and Barley Insurance and the Livestock Insurance. As for the Rice, Wheat and Barley Insurance, the participation of the farmers who cultivate either of the rice, wheat, or barley in the fields over the specific acreage (see farm eligibility) is compulsory. A part of the premium (50% in principle) which member farmers bear is paid by the government. The government also bears a part of the operational expenses of the organizations (NOSAI, 2020).

4.3.3.2. Organizational Structure of the Agricultural Insurance Programs

The Japan's Agricultural Insurance Programs starts from local farmers' cooperative that establishes a joint reserve or mutual fund from accrued premium payments. This is for the purpose of making up for the losses of farmers brought about by a natural disaster. This is the nature of insurance by the Agricultural Mutual Relief (AMR) Associations (NOSAI, 2020).

Similar to the case in other countries, farmers with huge farmlands regularly suffer huge losses due to natural disasters. The risk cannot be sufficiently distributed within the limit of local communities or prefectures. As a result, the insurance program functions as a

device of dispersing risk, in which liabilities by the AMR Associations and the municipal governments are reinsured by their prefectural federation. The federations' liabilities are then re-reinsured by the national government (NOSAI, 2020).

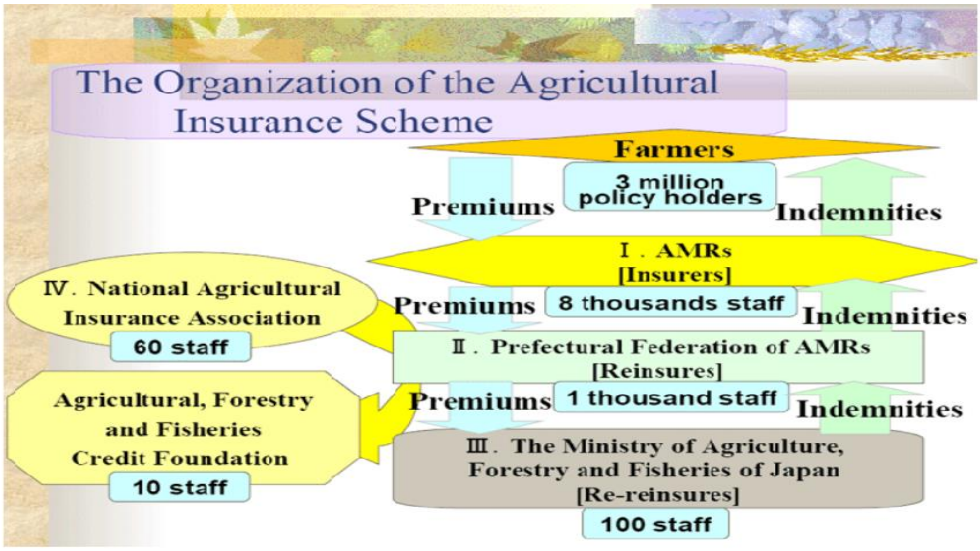

Figure 4.4. Organizational Chart of Japan's Agricultural Insurance Programs
(Source: NOSAI website)

4.3.3.3. Farm Eligibility

Eligible farms that can be insured under NOSAI's insurance programs shall meet the following requirements set by the NOSAI: "*1) Rice farms with sizes ranging from 4 to 16 hectares in size (except for rice farms in Hokkaido which should range from 12 to 100 hectares); 2) Fruit tree farms with sizes ranging from 2 to 12 hectares; 3) Vegetable farms with sizes ranging from 2 to 12 hectares (Hokkaido can be from 12 to 100 hectares); 4) Greenhouses that have a house body and covering material, including glass rooms and optional incidental facilities; and 5) Buildings owned or managed by farmers (including ancillary facilities such as electricity, gas, water, cooling and heating facilities), gates,*

fences, fences, and other structures attached to the buildings, furniture and farm equipment housed in the buildings are eligible to be insured under NOSAI's insurance programs".

4.3.3.4. Target Risks

As opposed to the PCIC's "excluded risk", NOSAI set a different approach to look at risks as the association focus more on what risks should be insurable in their programs. NOSAI terms this "target risks" in English. The following are the target risks for the NOSAI's insurance programs: For rice, wheat, barley, vegetables, and fruit and fruit trees (decrease in quality and income insurance are included): "*disasters caused by wind and flood, drought, cold, snow, and other weather causes (including earthquakes and eruptions) as well as damages from fires, pests, birds and animals are insurable. However, artificial disasters such as phyto-toxicity are not included*";

For greenhouses: "*disasters due to wind, flood and other weather causes, hail damage, snow damage, fire, rupture or explosion, crash or contact of aircraft, fall of objects from aircraft, collision and contact of vehicles and their payloads, pest and insect damage, bird and animal damage are insurable*";

For buildings: "*fire, lightning, explosion, falling, flying, collision, contact, or collapse of objects from outside the building (excluding those caused by natural disasters), Collision or contact of the vehicle or its load inside the building (excluding accidents caused by natural disasters), water wetting due to water leakage, water discharge, and water discharge due to an accident that occurred in the plumbing system, damage due to theft, violence and vandalism associated with mayhem and group actions and natural disasters such as wind and flood damage, snow damage, landslides, earthquake, volcanic eruption and tsunami are insurable*"; lastly

For farm machinery: "*fire, lightning, falling or flying objects, rupture or explosion, theft or damage due to theft, bird and animal damage, as well as collision, contact, fall, capsize, entrapment of foreign matter, and similar operating accidents and natural disasters such as typhoons, whirlwinds, floods, storm surges, landslides, landslides, snow damage such as avalanches, and other similar natural disasters (excluding earthquakes, eruptions, and tsunamis)*" are all insurable.

4.3.3.5. Excluded Risks (for Farm Machinery only)

Japan's NOSAI insures its beneficiaries through its insurance programs and focused on "target risks". Of these programs, there is one exception which is the insurance program for farm machinery. The following are excluded risks for farm machinery as set by NOSAI: "*1) Intentional damage and serious negligence; 2) Intention of relatives belonging to the same household as the insured; 3) Intentional and serious negligence of a person other than the insured when receiving the mutual aid; 4) Intentional damages and serious negligence caused by anyone operating the farm machine; 5) Accidents caused by other causes other than agricultural work; 6) Defects, wear, corrosion, rust, and other natural causes; 7) Failure such as electrical or mechanical damage not directly caused by any accident; 8) Freezing damages due to forgetting to drain the cooling water of the radiator among others; 9) Damages caused only to consumable parts; 10) Accidents due to war and civil war; 11) Accident due to earthquake, eruption, or tsunami; 12) Accident caused by nuclear fuel material; and 13) Accident before receiving mutual aid contribution*" are not insurable.

4.3.3.6. Estimation of Damages and Delivery of Indemnity Payments

In the event of a disaster and the expectation of payment of mutual aid, NOSAI will conduct a "loss assessment" to determine the extent of the damage. If the Japanese farmers suffered agricultural losses due to natural disaster or other reasons, they are required to

submit a “notice of the damage” to NOSAI Associations. When the NOSAI confirms receipt, damage assessors selected by the NOSAI union chief (although for municipalities, the mayor of the municipality will select the assessors) will examine the “actual measurement” versus the “expected yield” for all the damaged farms. This inspection is termed “Exhaustive Survey”. The survey will be carried out in groups of three but the group may consist of more than three people if the damaged farm area is considered large. The farm area to be surveyed is called the “evaluation area” and will be assessed in one to two days depending on the farm size and the number of people in the group of inspectors (NOSAI, 2020).

Figure 4.5. Damage Assessors inspecting damages on Paddy Rice
(Source: NOSAI Website)

Before the team of inspectors visit a damaged farm, the damage assessment committee will first conduct a sampling assessment. After they and have completed the initial investigation, the team of inspectors will conduct a sampling assessment in each area where the sampling assessment by the damage assessment committee was conducted. This is done in order to balance the sampling survey groups. Based on the results of these investigations, the union leader holds a damage assessment meeting and finds a reduction in the amount of co-payment for each farm land (NOSAI, 2020).

The Ministry of Agriculture, Forestry and Fisheries (MAFF) then examines the results reported by the NOSAI associations and then decides the amount of indemnity payment and issues the certification of approval.

On the other hand, prefectural veterinarians visit every month for inspections for the case of livestock. If they need insurance, they can file and receive it after two months.

According to the key informants of the NOSAI, the stages of filing and receiving insurance comprise of five steps: 1) Submit the insurance slip; 2) Three different inspectors will inspect separately the crop damages; 3) People from the prefectural level will also come and inspect the quality of the crops if the submitted insurance slip is up to date; 4) Then the people from the Central government will visit the farm and inspect the damages; 5) All the damage estimates will be finalized in November regardless of when the damage was incurred then the indemnity payouts will be released in December.

4.4. Problems Encountered and Other Issues by the National Agricultural Insurance Association of Japan

Unlike the PCIC, the NOSAI does not encounter a lot of problems on the implementation of agricultural insurance programs. The only problem that the key informants mentioned was the inconsistency of damage estimates of the damage inspectors and the farmers. Most of the time, the damage estimates by the inspectors are lower than the damage estimates of the farmers but these issues can usually be raised by and through farmer associations. For instance, during the early 2000s in Gifu prefecture, the damage inspectors were strict when it came to damage inspection. The local farmer associations raised the issue and during the 2010s, the damage inspectors got kinder and the damage estimates from then on were more equal as the damage estimates of the farmers.

The government requires the farmers to enroll in NOSAI's nationwide programs of which they are provided 50% insurance premium subsidies. According to the key informants, after 2031, the government will no longer provide subsidies and will no longer require farmers to get insurance. To illustrate, rice farmers are required until 2031, and the premium is 293 yen per 10 acres per month, where 50% are paid by the government. This means the farmers will only pay 147 yen per 10 acres per month. After 2031, insurance won't be required and there will be no more subsidies from the government. This means they have to pay 293 yen per 10 acres per month if they still want to be insured. This could influence enrollment in NOSAI's insurance programs in the future, and with a decrease in the number of insurance policies, this will result to a decrease in NOSAI's income coming from insurance premium payments.

In terms of participation, the Japanese farmers can communicate their needs using the NOSAI homepage on the internet. But since majority of the farmers are old, they are not so familiar with technology so they can only voice their opinions during the meeting with NOSAI.

Another issue mentioned by the key informants was that agricultural insurance is not really a necessity for the farmers. This is because the farmers usually have effective coping mechanisms in times of natural calamities such as using their savings, multi-cropping, and the utilization of other types of insurance, as the Japanese farmers have an insurance culture unlike their Filipino counterparts.

Japan also has better infrastructure compared to other countries and there are structures that could reduce the impact of severe natural disasters (Figures 4.6 and 4.7). In addition, the Japanese government provides subsidies to the agricultural sector in times of widespread disaster, according to the key respondents. Most of the farmers enroll in

nationwide programs since the government requires them, but when the time comes that insurance is not a requirement, they could opt not to use agricultural insurance anymore and use other coping strategies instead. For these reasons, the agricultural insurance programs and NOSAI may be obsolete in the future.

Figure 4.6. Flood Control Gates for Flood Prevention in Gifu
(Source: Author, from July 2019 fieldwork)

Figure 4.7. Flood Control Gates and Warning System for Flood Prevention in Gifu
(Source: Author, from July 2019 fieldwork)

4.5. Comparison of the Features of the PCIC versus NOSAI

Japan has a long history of agricultural insurance dating back to 1929, where the livestock insurance was first enacted (FAO, 2011) while the Philippines only started its agricultural insurance program in 1981. While the Philippines experiences numerous natural disasters yearly, agricultural insurance is not compulsory for Filipino farmers. In addition, agricultural insurance only protects the farmers' agricultural production. Meanwhile in Japan, farmers producing rice, wheat, and barley as well as livestock are required to enroll in the insurance program. These might be because these agricultural products are very much vulnerable to natural disasters. Moreover, the farmers' house and properties can also be

insured by the associations, such as the JA Group (Japan Agriculture) which administers the agricultural insurance program.

In the Philippines, other than livestock insurance, the government-owned and controlled PCIC is the only organization which provides agricultural insurance program while as discussed previously, other countries have plenty of private insurers which provide agricultural insurance to the farmers. In Japan, on the other hand, the government partially gives subsidies to the associations which provide agricultural insurance.

Table 4.1 illustrates the key differences of the PCIC and NOSAI's characteristics. Both insurance providers' operations are administered by their respective governments, but the Japan Agriculture (JA) group is helping the Japanese government administer insurance program operations in Japan. In the Philippines, each regional office of the PCIC handles five or more provinces, and the number of permanent staff positions in each PCIC regional offices are only fourteen. On the other hand, each NOSAI prefectural office in Japan has sixty permanent staff positions. Because of this, the NOSAI is more efficient in terms of service delivery to its beneficiaries. Meanwhile, the PCIC could not cater to all their beneficiaries, especially in times of widespread calamities because each regional office has inadequate manpower.

Other institutions involved and with partnerships with the PCIC include the main government body in charge in agriculture, the Department of Agriculture, the Department of Budget and Management which is in charge of listing beneficiaries of the RSBSA, and the Land Bank of the Philippines and other Rural Banks which also serves as underwriters. On the other hand, other institutions involved with NOSAI is the Ministry of Agriculture, Forestry and Fisheries and the National Federation of Agricultural Cooperative Associations.

Table 4.1. Characteristics of the PCIC versus the NOSAI

Item	PCIC	NOSAI
Foundation Year	1981	1929
Administered by	Philippine Government	Japanese Government, Japan Agriculture Group
Other Institutions Involve	Department of Agriculture (DA), Department of Budget and Management (DBM), Land Bank of the Philippines (LBP) and other Rural Banks	Ministry of Agriculture, Forestry and Fisheries (MAFF), National Federation of Agricultural Cooperative Associations (ZEN-NOH)
Income from Premium Payments (2019)	PhP 2,295,448,091 (JPY 4,958,167,877)	JPY 2,745,700,000,000 (PhP 1,271,157,407,407)
Number of Staff in Prefectural/ Regional Office	14	60
Number of Major Insurance Programs	7	6
Government Subsidy	Full Premium Subsidies for Farmers Listed in the RSBSA	50% Subsidy for Nationwide Programs
Requirement to Enroll in Insurance	No	Yes, for Nationwide Programs until 2031
Farm Eligibility	Not near a body of water; Have effective irrigation system; Farm should be accessible; Farm should be appropriate for agricultural production; farm should not be located in conflict areas	Farm size should fall under the minimum and maximum farm area
Risk	Excluded Risk	Target Risk; Excluded risk for Machinery Insurance only
Estimation of Damages	Team of Adjusters only	Team of Inspectors, Union Leader, MAFF
Delivery of Indemnity Payments	Within 60 Days After Filing for Damages	Systematic

Source: information collated by the author from the information given by the PCIC and NOSAI

In 2019, income from premium payments collected by the PCIC amounted to PhP 2,295,448,091 (JPY 4,958,167,877) while NOSAI was able to collect JPY 2,745,700,000,000 (PhP 1,271,157,407,407). NOSAI has six major insurance programs, two of which are nationwide programs that require farmers to enroll and which the government provides 50% premium subsidies. NOSAI also has a special insurance program established to protect the farmer beneficiaries' houses. On the other hand, the PCIC has seven major insurance programs and one special insurance program which provide 100% premium subsidies but only to the farmers and fishermen listed in the farmer registry. The Philippine government does not require its farmers to enroll in the PCIC insurance programs unlike Japanese farmers, who are required to enrolin the nationwide insurance programs.

In order for a farm to be eligible to be insured under the insurance programs of the NOSAI, the farm size should fall under a specific area range (see farm eligibility). On the other hand, Filipino farmers must meet more requirements for them to get insured under the PCIC's insurance programs. In terms of risks, the PCIC emphasized that there are risks that are not insurable, while NOSAI emphasized more on the target insurable risks with the exception of machinery insurance.

As anticipated, Japan has fewer challenges in the implementation of its agricultural insurance program as compared to the Philippines. The most important point raised by the key informants in Japan is the inconsistency in the estimation of damages between the damage inspectors and the farmers (Table 4.2). In the Philippines, the team of adjusters are sometimes under-trained to do the job, thus the differential estimate between inspectors and farmers is also a problem. But aside from this, the Philippines has few personnel to cater to many farmers. For instance, a regional office that consists of 14 permanent staff are usually tasked to manage farmers from 10 provinces. This proves to be difficult for the case of the PCIC region 4. In addition, field offices are not accessible especially to the most vulnerable farmers, and there is a lack of record-keeping capacity in the PCIC that is important in the monitoring of claims and record of payments.

Table 4.2 Problems in Implementation of Agricultural Insurance Programs in Japan and the Philippines

Philippines	Japan
Very few and underqualified personnel to estimate damages Field Offices are not accessible to farmers Lack of record keeping capacities	Inconsistency of damage estimates between the damage inspectors and the farmers

Source: information collated by the author from the information given by the PCIC and NOSAI

4.6. Conclusion

This chapter described the two main agricultural insurance providers in the case countries of Japan and the Philippines which are the NOSAI and PCIC, respectively. Both countries' agriculture sectors are exposed to numerous natural disasters every year and agricultural insurance is one of the strategies to cope with these extreme events. The PCIC is relatively young compared to its Japanese counterpart and can surely learn from NOSAI. For instance, for the PCIC to increase the efficiency of its operations, it should consider providing more permanent positions. Each NOSAI prefectural office has sixty permanent staff whereas only fourteen permanent staff cater to the beneficiaries in five or more provinces. For the case of PCIC region 4, fourteen permanent staff and on-call job order members of the team of adjusters have to service beneficiaries in ten provinces, which makes it impossible to give an efficient service delivery.

There are also numerous requirements needed to enroll in the agricultural insurance program in the Philippines. This discourages Filipino farmers to insure their farms, and especially if insurance is not required. In comparison, Japanese farmers can easily insure their farms as long as the farm size falls within the minimum and maximum range of farm area eligible to be insured. Furthermore, the Japanese government requires farmers to insure their farms if they grow rice, wheat, barley, and livestock. Although there are other Japanese farmers who do not produce these agricultural products, they can still insure their farms through the NOSAI and other private insurance institutions, something the Filipino farmers do not have easy access to.

The Japanese farmers have easier access to other effective coping mechanisms such as the utilization of their savings and doing multi-cropping. These strong coping strategies may later have a negative effect on the NOSAI.as farmer insurance enrollment may decrease

after 2031, when government subsidies stop. This would likely affect NOSAI's income generated from insurance premium payments.

In contrast, the Filipino farmers still do not have the capacity to adapt and cope to natural disasters by themselves, as gleaned from results of key informant interviews. This is the reason why agricultural insurance could be an effective risk management tool to shield the farmers in times of natural disasters. In other words, the development and improvement of PCIC's operations could be the solution to the Filipino farmers' vulnerability to natural disasters. There is a need to analyze the system of agricultural insurance programs to understand to what extent they can be used as an effective tool to cope with extreme events.

Japanese farmers meanwhile enjoy the protection they receive from the NOSAI, at the same time, find effective adaptive and coping strategies by themselves. The Japanese government has provided good infrastructure to the point that the Japanese farmers may not need agricultural insurance as a major coping strategy.

This chapter described the agricultural insurance system from the point of view of the insurers. In the succeeding chapters, the adaptive capacity and coping mechanisms of both Japanese and Filipino farmers will be discussed in case studies in the Laguna Province in the Philippines, and Gifu Prefecture in Japan, from the point of view of farmers.

CHAPTER 5

CASE STUDY: LAGUNA PROVINCE, PHILIPPINES

5.1. Introduction

The case study discussed in this chapter relies on primary data obtained during the author's fieldwork in Laguna Province in the Philippines. The chapter presents an analysis of the efficiency and effectiveness of the Philippine Crop Insurance Corporation (PCIC) based on the experiences and responses of seventy farmer respondents in the lowland municipality of Santa Cruz and the upland municipalities of Nagcarlan and Liliw (Table 5.1). In addition, the farmers' farming systems set-up and agricultural production during normal year vis-à-vis a disaster year are included in the analysis. Moreover, the farmer respondents' natural disaster characterization, experience, and impacts of these disasters to their farming and everyday life, as well as their coping strategies are discussed.

Table 5.1. Description of the Study Sites and Number of Survey Respondents, Laguna Province, Philippines

Study Site	Elevation	Number of Respondents
Nagcarlan	Upland	17
Liliw	Upland	18
Santa Cruz	Lowland	35
Total	-	70

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

These will be examined using mostly descriptive analysis. In order to compute for the efficiency of the PCIC, Parasuraman's Gap Analysis was utilized, while the effectiveness of the agricultural insurance programs provided by the PCIC was analyzed through Cost and Returns Analysis and Likert Scale. Lastly, Logit Analysis was applied to determine the factors affecting farmer adoption of agricultural insurance programs.

5.2. Characteristics of the Farmer Respondents

This section presents the general characteristics of the farmer respondents in this case study. First, the socioeconomic profile of the respondents is discussed followed by a description of the different farming system set-ups and their income and agricultural production expenses. Lastly, the respondents' natural disaster characterization, experiences, impacts, and their coping mechanisms are discussed.

5.2.1. Socio-Economic Profile of the Respondents

Table 5.2 summarizes the socioeconomic profile of the seventy respondents interviewed in this study. The average age of the farmer respondents is forty-nine with the respondents in the lowland areas recording an older average age of fifty-four. Most of the respondents are male (57%) with lowland male respondents registering a whopping 71%.

Table 5.2. Socio-Economic Profile of the Respondents, by Elevation, Laguna Province, Philippines

Item	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Age (in years)	54.26	44.40	49.33
Sex			
Male	25 (71%)	17 (48%)	42 (57%)
Female	10 (29%)	18 (52%)	28 (43%)
Education (in years)	9	10	10
Marital Status			
Single	1 (2%)	4 (12%)	5 (7%)
Married	29 (83%)	30 (86%)	59 (84%)
Others	5 (15%)	1 (2%)	6 (9%)
Household Size	4.17	4.40	4.29
Agricultural Insurance			
Yes	14 (40%)	13 (37%)	27 (39%)
No	21 (60%)	22 (63%)	43 (61%)

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

On the other hand, there were more female respondents in the upland areas (52%) for the reason that their husbands have other full time jobs in the transportation and construction sectors and were unavailable during the times of interview. Majority of the respondents completed secondary school education and are married (84%) while the average household size in both lowland and upland areas is four members. Even though the farmer

respondents are exposed to numerous natural disasters yearly, only 39% of the respondents' farms are insured. Non-participating farmer-respondents cited financial difficulties and lack of information as their principal reasons for failure to participate in the crop insurance program of the PCIC. All the respondents were affected by natural disasters and the insured farmers were able to claim indemnity payments.

5.2.2. Farming Systems Set-up

In the province of Laguna, lowland rice farming systems dominate the lowland areas while upland intensive and tree crop mixed farming systems are generally practiced in the upland areas. In comparison, the farming systems that are found in the East Asia and the Pacific regions are coastal artisanal fishing, lowland rice, pastoral, rice-wheat, root-tuber, sparse (arid), sparse (forest), temperate mixed, tree crop mixed, upland intensive mixed, and urban based farming systems. The average number of crops and livestock produced in the selected study municipalities is 2.51 but most respondents in the lowland areas produce only rice (Table 5.3). Conversely, upland farmers grow more crops mainly vegetables and fruit trees (dominant crops are Sayote, Lanzones and Rambutan) as well as livestock as they fall under the upland intensive mixed farming system.

The average farm size of the respondents is 1.38 hectares. Lowland farmers have larger farms (1.75 ha) due to the cultivation of rice as a monocrop. Majority of the farmer respondents do not own their farms (31% are farm owners) and majority are tenants (58%). In terms of elevation, 77% of lowland farmers are tenants compared to 40% of upland farmers. This finding generally approximates the tenure status of Philippine farmers across the landscape.

Majority of the respondents are also members of a cooperative. Seventy seven and sixty six percent of the lowland and upland farmers, respectively, claimed that they are active

members of a farmer's cooperative. The major reason cited for joining a given cooperative is to be able to easily access low cost loan/credit without collateral in times of financial difficulties. Since most of the farmer respondents are tenants, they are unable to use the land as collateral and being a member of a cooperative is one of the best options to access low cost credit facility.

Table 5.3. Farming Systems Set-up and Farm Characteristics of the Respondents, by Elevation, Laguna Province, Philippines

Farm Characteristic	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Number of Crops and Livestock	1.11	3.91	2.51
Major Crops	Rice	Sayote, Lanzones, Rambutan	-
Major Farming System	Lowland Rice	Upland Intensive Mixed	-
Farm Size (in hectares)	1.75	1.01	1.38
Tenure Status			
Land Owner	8 (23%)	14 (40%)	22 (31%)
Lessee	0	5 (15%)	5 (7%)
Tenant	27 (77%)	14 (40%)	41 (58%)
Others	0	2 (5%)	2 (4%)
Cooperative Membership			
Yes	27 (77%)	23 (66%)	50 (71%)
No	8 (23%)	12 (34%)	20 (29%)
Cooperative Status			
Officer	5 (19%)	9 (39%)	14 (28%)
Active Member	21 (78%)	13 (56%)	34 (68%)
Inactive Member	1 (3%)	1 (5%)	2 (4%)

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

5.2.3. Agricultural Production and Other Sources of Income of the Respondents

The average annual cost per farm of agricultural production (as of 2019) in the selected study areas is 109,246 Philippine Pesos (PhP) (235,971 Japanese Yen (JPY) or 2,184 US Dollars (USD)). Lowland farmers spend about thirty thousand pesos more than the upland farmers (Table 5.4) since lowland rice farming generally incur additional farm expenditures for irrigation fees and inputs including fertilizer and other chemicals as prescribed by the technician(s) of the Municipal Agricultural Office (MAO) and Provincial Agricultural Office (PAO).

Table 5.4. Agricultural Production during Normal Year and Year with Extreme Events by the Respondents, per Farm, by Elevation, Laguna Province, Philippines

Income	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Annual Production Cost			
Philippine Peso	123,165	95,327	109,246
Japanese Yen*/	266,037	205,906	235,971
US Dollar**	2,463	1,906	2,185
Profit (Normal Year)			
Philippine Peso	200,393	180,631	190,512
Japanese Yen*	432,849	390,163	411,506
US Dollar**	4,008	3,613	3,810
Profit (Extreme Event Year)			
Philippine Peso	150,996	89,815	120,405
Japanese Yen*	326,151	194,001	260,076
US Dollar**	3,020	1,796	2,408.
Net Difference			
Philippine Peso	-49,397 (25% of income)	-90,816 (50% of income)	-70,107 (37% of income)
Japanese Yen*	-106,698	-196,162	-151,430
US Dollar**	-988	-1,817	-1,402

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

In the same manner, lowland farmers have higher income returns than their upland counterparts. The average profit of the farmer respondents in the study areas during a normal year amounts to PhP 190,512 (JPY 411,506 or USD 3,810). Lowland farmers reported higher average profit of PhP 200,393, which is PhP 19,762 (10.94%) higher than the profit of upland farmer-respondents.

It was also reported that agricultural production in the uplands incurred higher income losses during occurrence of natural disasters as the upland farmers lose 90,815 Philippine Pesos (JPY 196,162 or USD 1,817) which accounted to 50% of their income compared to the lowland farmers who incurred relatively lower losses amounting to PhP 49,397 (JPY 106,698 or USD 988) accounting to about 25% of their income during a disaster year. The Upland Intensive Mixed Farming System is mainly composed of high value crops that are more susceptible to natural disasters, and has thus experienced higher income losses compared to lowland crops. In both areas, an average of 37% farmer income loss was incurred primarily due to typhoons and flooding in the lowland.

Table 5.5. Agricultural Production during Normal Year and Year with Extreme Events by the Respondents, per hectare, by Elevation, Laguna Province, Philippines

Income	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Annual Production Cost			
Philippine Peso	70,380	94,383	79,164
Japanese Yen*	152,021	203,867	170,993
US Dollar**	1,407	1,887	1,583
Profit (Normal Year)			
Philippine Peso	114,510	178,843	138,052
Japanese Yen*	247,342	386,300	298,193
US Dollar**	2,290	3,577	2,761
Profit (Extreme Event Year)			
Philippine Peso	86,283	88,926	87,250
Japanese Yen*	186,372	192,080	188,461
US Dollar**	1,726	1,778	1,745
Net Difference			
Philippine Peso	-28,227 (25% of income)	-89,917 (50% of income)	-50,802 (37% of income)
Japanese Yen*	-60,970	-194,220	-109,732
US Dollar**	-565	-1,799	-1,016

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

Table 5.5 summarizes the agricultural production during normal year and year with extreme events of the respondents on a per hectare basis. Generally, the upland farmers spend more per hectare to grow their crops (spending 34% more) while also earning more (56% more) per hectare. This translates to higher income loss risk for the upland farmers as the farmer respondents lose more (200%) income per hectare than the lowland respondents during a year with extreme events. The farmer respondents in Laguna province earns more per hectare than the average per hectare earnings of farmers in the Philippines. According to the Philippine Statistical Authority (2019a), the average per hectare gross profit of farmers amounts to PhP 89,070 as of 2019.

An annual income from farming of PhP 190,511 is higher than the prescribed poverty threshold income of PhP 120,000 for a family of 5 (Philippine Statistical Authority, 2019b). Still, most of the farmer respondents engage in other jobs outside of farming.

Table 5.6 summarizes other sources of income of the farmer respondents. Only twenty-nine out of the seventy farmer respondents (41%) do not engage in off-farm work. Most of the respondents' non-farm income sources are from either being employed as local village officials, a carpenter or a hired laborer, a for-hire vehicle driver, and a "sari-sari" store operator/owner (a small variety food/store business which is a family run store in the Philippines).

Table 5.6. Other Sources of Income aside from Farming and Total Income of the Respondents, by Elevation, Laguna Province, Philippines

Item	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Respondent Secondary Occupation			
No Secondary Occupation	16	13	29
Government/Village Official	1	5	6
Carpenter/Laborer	3	5	8
Vehicle Driver	5	2	7
Food/Store Business	5	2	7
Others	5	8	13
Annual Income from Secondary Occupation			
Philippine Peso	136,606	58,426	97,516
Japanese Yen	295,069	126,200	210,635
US Dollar	2,732	1,168	1,950
Other Occupation from Other Household Members			
Farming	18	5	23
Government/Village Official	2	1	3
Food/Store Business	3	6	9
Industry Job	3	6	9
Health and Education	1	4	5
No Job/Homemaker	5	7	12
Others	3	6	9
Annual Income from Other Occupation from Other Household Members			
Philippine Peso	153,737	87,999	120,868
Japanese Yen	332,072	190,078	261,075
US Dollar	3,075	1,760	2,417
Total Annual Income of the Household			
Philippine Peso	490,736	327,056	408,896
Japanese Yen	1,059,990	706,441	883,215
US Dollar	9,815	6,541	8,178

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

The average annual income of all respondents from these non-farm activities amounts to PhP 97,516 (JPY 210,635 or USD 1,950) with lowland farmers having higher incomes than the upland farmers. Moreover, the farmer respondents' spouses and other household members likewise contribute to the household's total annual income by also

engaging in farming activities. The average annual income from other occupation of other household members in both the lowland and upland areas amounts to PhP 120,868 (JPY 261,075 or USD 2,417), while the total annual average income of all households as a whole is estimated at PhP 408,896 (JPY 883,215 or USD 8,178), as one adds the farm incomes. Lowland households recorded higher average annual income than the upland households with an average of PhP 163,680 difference which is 50% higher than the total annual income of upland farmers. This is because the average annual income of the other members of the lowland households is significantly higher than those of the upland household member. Moreover, it may also be attributed to lowland households' easy access to better job opportunities than those living in hilly and mountainous areas.

5.2.4. Natural Disaster Characterization, Farmer Experiences, and Impacts on the Respondents

Tables 5.7, 5.8 and figure 5.1 describe the characterization of extreme events and climate change of the farmer respondents in the selected study areas. To determine the farmer respondents' understanding about climate change and extreme events, eleven statements were listed and the respondents were asked to respond if they agree or disagree.

Majority of the lowland farmer respondents (77%) answered "strongly agree" in the given statements. The lowland respondents strongly believe that extreme events are brought about by climate change and are becoming more frequent and more severe; adding that there are problems that need to be addressed.

About half of the respondents also strongly agree that their barangay(s) (village(s)), town(s), and their households in general, are prepared to handle the effects of extreme events. Moreover, sixty percent of the respondents in the lowland areas strongly believe that extreme events have become more severe lately.

Table 5.7. Characterization of Extreme Events of Lowland Respondents, Laguna Province, Philippines

Statement	Strongly Agree		Agree		Don't Know		Disagree		Strongly Disagree	
	Count	%	Count	%	Count	%	Count	%	Count	%
I fully understand the concept of climate change.	15	43	6	17	4	11	4	11	6	17
Climate change is man-made and not caused by God.	14	40	2	6	4	11	8	23	7	20
Extreme events are caused by climate change.	15	43	12	34	3	9	3	9	2	6
Extreme event is predictable.	8	23	3	9	2	6	10	29	12	34
Negative impacts of extreme events can be prevented or reduced.	14	40	13	37	0	0	7	20	1	3
There is an early warning system for extreme events in our barangay/town/city.	15	43	5	14	0	0	7	20	8	23
Extreme events are becoming more severe now.	21	60	9	26	1	3	4	11	0	0
Extreme events are becoming more frequent now.	15	43	9	26	0	0	10	29	1	3
My household is prepared to handle extreme events.	16	46	11	31	1	3	3	9	4	11
Our barangay/town/city is adequately prepared to handle extreme events	18	51	5	14	3	9	3	9	6	17
I consider extreme events as a problem.	27	77	7	20	0	0	1	3	0	0

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

Lowland farmer-respondents strongly believe that they fully understand the concept of climate change (43%), climate change is man-made and not caused by God (40%), extreme events are caused by climate change (43%) but is predictable (23%) and the damages can be prevented or reduced (40%) and there is an early warning system in their respective barangay(s)/town(s) (43%). While majority of the lowland farmers believe that the negative impacts of extreme events can be prevented or reduced, some of the respondents

(29% disagree and 34% strongly disagree) believe that extreme events are unpredictable, therefore it would be hard for them to anticipate the occurrence. Only a few of the respondents (0-11%) provided "don't know" responses to the eleven statements that were presented to them.

Table 5.8. Characterization of Extreme Events of Upland Respondents, Laguna Province, Philippines

Statement	Strongly Agree		Agree		Don't Know		Disagree		Strongly Disagree	
	Count	%	Count	%	Count	%	Count	%	Count	%
I fully understand the concept of climate change.	15	43	14	40	3	9	0	0	3	9
Climate change is man-made and not caused by God.	12	34	10	29	2	6	10	29	1	3
Extreme events are caused by climate change.	12	34	19	54	1	3	3	9	0	0
Extreme event is predictable.	1	3	10	29	6	17	5	14	13	37
Negative impacts of extreme events can be prevented or reduced.	4	11	20	57	1	3	6	17	4	11
There is an early warning system for extreme events in our barangay/town/city.	17	49	8	23	1	3	7	20	2	6
Extreme events are becoming more severe now.	19	54	11	20	0	0	4	11	1	3
Extreme events are becoming more frequent now.	13	37	12	34	0	0	7	20	3	9
My household is prepared to handle extreme events.	18	51	15	43	0	0	1	3	1	3
Our barangay/town/city is adequately prepared to handle extreme events	15	43	16	46	1	3	0	0	3	9
I consider extreme events as a problem.	26	74	8	23	0	0	0	0	1	3

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

The upland farmer respondents likewise have the same opinions about climate change and extreme events. Majority of the upland farmer respondents answered “strongly agree” in most of the given statements. Similar to the lowland respondents, the upland farmers asserted that they have good knowledge about climate change and extreme events and that their respective barangay(s) (village(s)), town(s) and their households in general, are prepared to handle the effects of extreme events.

Most respondents (51%) also claimed that they believe that extreme events are unpredictable. Although majority of the respondents in both upland and lowland areas believe that they have sufficient knowledge about climate change, there were some respondents who have no idea about the concept of climate change. For instance, 28% of the lowland respondents and 9% of upland respondents have no idea about the concept of climate change. In addition, 15% of lowland respondents and 9% of upland respondents do not believe that extreme events are caused by climate change. Moreover, 43% of the lowland farmers and 32% of upland farmers believe that climate change is not man made and is the will of God.

The lack of information dissemination to the farmers living in remote areas both in the uplands and the lowlands justify these figures. Furthermore, Christianity dominates the Philippines and influences the mindset of the people to believe that climate change and extreme events are forms of punishment from God, even though information about them are readily and widely available. It may be difficult to convince those who are strong believers of God and Christianity that there is science behind climate change and extreme events and that there are ways to cope and adapt to these phenomena.

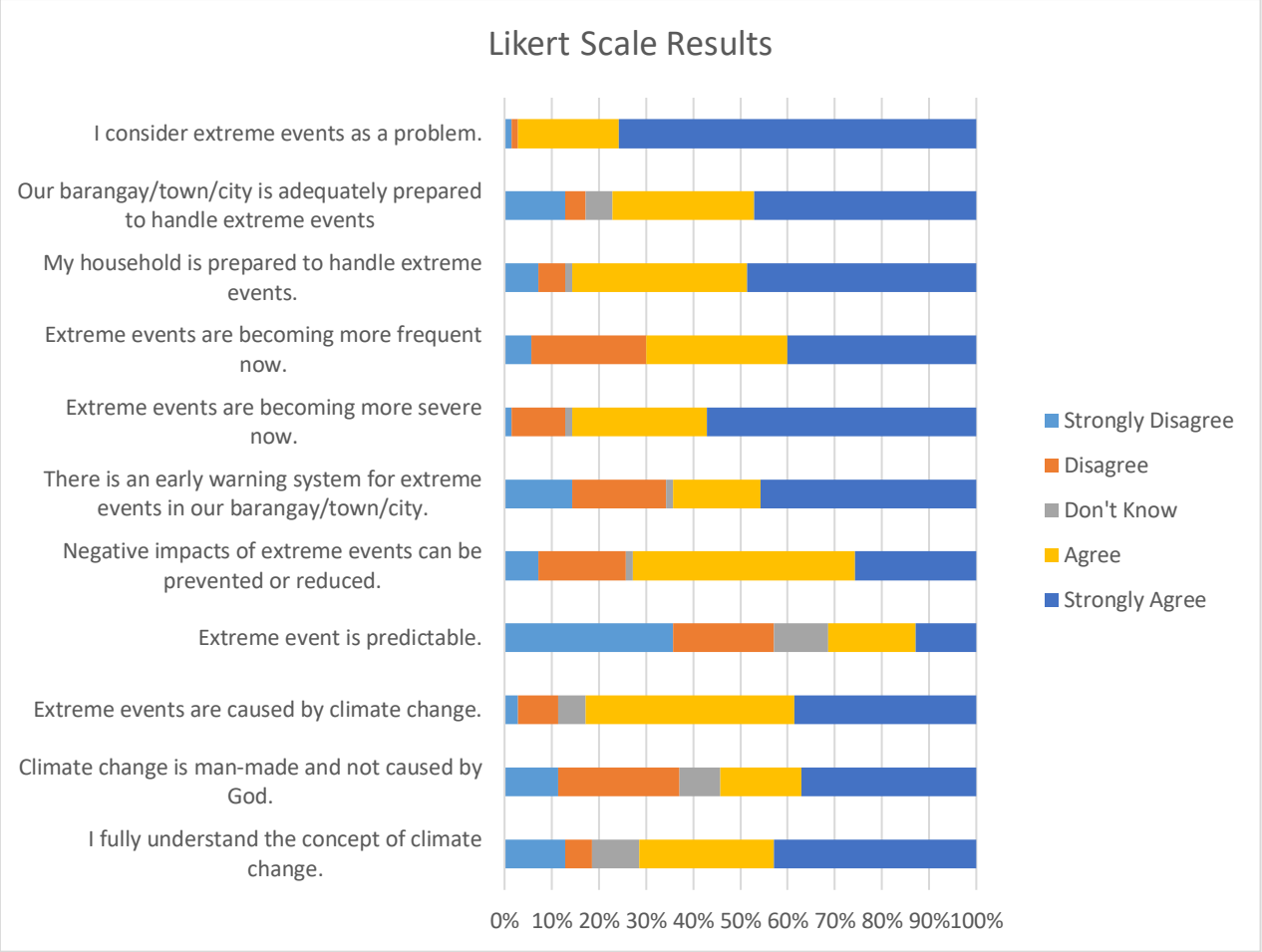

Figure 5.1. Likert Scale of the Characterization of Extreme Events of Respondents, Laguna Province, Philippines

Source: Author's Fieldwork in Laguna Province, Philippines 2018-2019

The farmer respondents experienced an annual average of 18-19 extreme events over the past decade. Among these, ten were in the form of strong typhoons, and five were flooding caused by heavy rains (Table 5.9).

Table 5.9. Average Number of Extreme Events That Affected the Respondents' Farms from 2009 to 2019, by Elevation, Laguna Province, Philippines

Extreme Event	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
Typhoon	10	10	10
Flood	10	0.4	5.2
Landslide	0	0.43	0.21
Earthquake	0.06	0.06	0.06
Pest and Diseases	1.46	2.49	1.98
Drought	1.37	0.77	1.07
Total	**22.89**	**14.29**	**18.56**

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

Annual extreme events among lowland farms (23) are more frequent than upland farms (14) since the latter are generally spared from flooding. Other than typhoon and flooding, the other extreme events that affected the respondents' farms were landslide, earthquake, pest and diseases, and drought albeit on lesser frequencies. Both the upland and lowland farmer respondents were affected by strong typhoons while the lowland farmers experienced more flooding from heavy rains every year unlike their counterparts from the upland for obvious reason. While there were no experience of landslides in the lowlands, both areas are susceptible to pest and disease attacks, though it is more prevalent in the upland areas since there were more vegetable crops grown in the uplands. On the other hand, drought was seen to be more of a problem in the lowlands compared to the upland areas, because there are plenty of surface water sources in the upland study sites (Villano, et al, 2016, pp. 45-70).

The respondents were asked to rate the degree of perceived impact of the extreme events on their agricultural production and overall living with scores ranging from 1 to 5 with the latter being the highest impact (Tables 5.10 and Figure 5.2). In both study sites, 2012 was the year with the lowest mean score rating with an average of 1.20 out of 5.

The lowland farmers were hit hard by typhoon Ketsana (local name "Ondoy") in 2009 which is why the respondents gave a mean score rating of 3.86 out of 5 during that year. On the other hand, the upland farmers were most affected by typhoon Rammasun (local name "Glenda") in 2014 which wiped out their agricultural production and destroyed their homes. The lowland farmers were also affected by Rammasun which is why the farmer respondents gave a mean score rating of 4.01 out of 5 in 2014. The farmer respondents were likewise asked to assign mean score ratings ranging from 1 to 5 on the perceived impacts of extreme events in terms of their overall living. Both types of respondents in the study areas

assigned the highest mean score rating to income with a score of 3.51 out of 5. This implies that extreme events have the most negative effects on the Filipino farmers' incomes.

Table 5.10. Mean Score Rating of the Perceived Impact of Extreme Events on Agricultural Production of the Respondents from 2009 to 2019, by Elevation, Laguna Province, Philippines

Year	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
2009	***3.86***	1.91	2.89
2010	1.37	1.23	1.30
2011	1.37	1.11	1.24
2012	1.29	1.11	1.20
2013	2.26	2.09	2.17
2014	3.06	***4.97***	***4.01***
2015	1.57	1.31	1.44
2016	1.38	1.46	1.41
2017	1.80	1.14	1.47
2018	2.46	2.46	2.46
2019 (Jan-July only)	2.49	2.71	2.60

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

When a crop farm is totally destroyed, aside from the direct income loss (such as the expected profit that the farmers would earn if an extreme event did not occur), they also need to raise additional money to be spent for replanting. This makes life difficult for farmers if they do not have insurance and savings. This is why borrowing from formal and informal sources are common among the poor Filipino farmers. On the other hand, the farmer respondents view that health and the education of children are the least affected by extreme events. Aside from the negative income effects, the relatively poorer upland farmers reported that their assets (2.97), emotional well-being (2.57), and education of their children (1.86) have contributed to their overall state of living score of 2.83. On the other hand, food (2.51) and health concerns (1.77) have contributed to the overall living score of the lowland farmers at 2.57. Lowland farmers gave a higher score on health than upland farmers since they are more affected by flooding which can cause dangerous diseases such as dengue from mosquitoes and leptospirosis from rats (Figure 5.2).

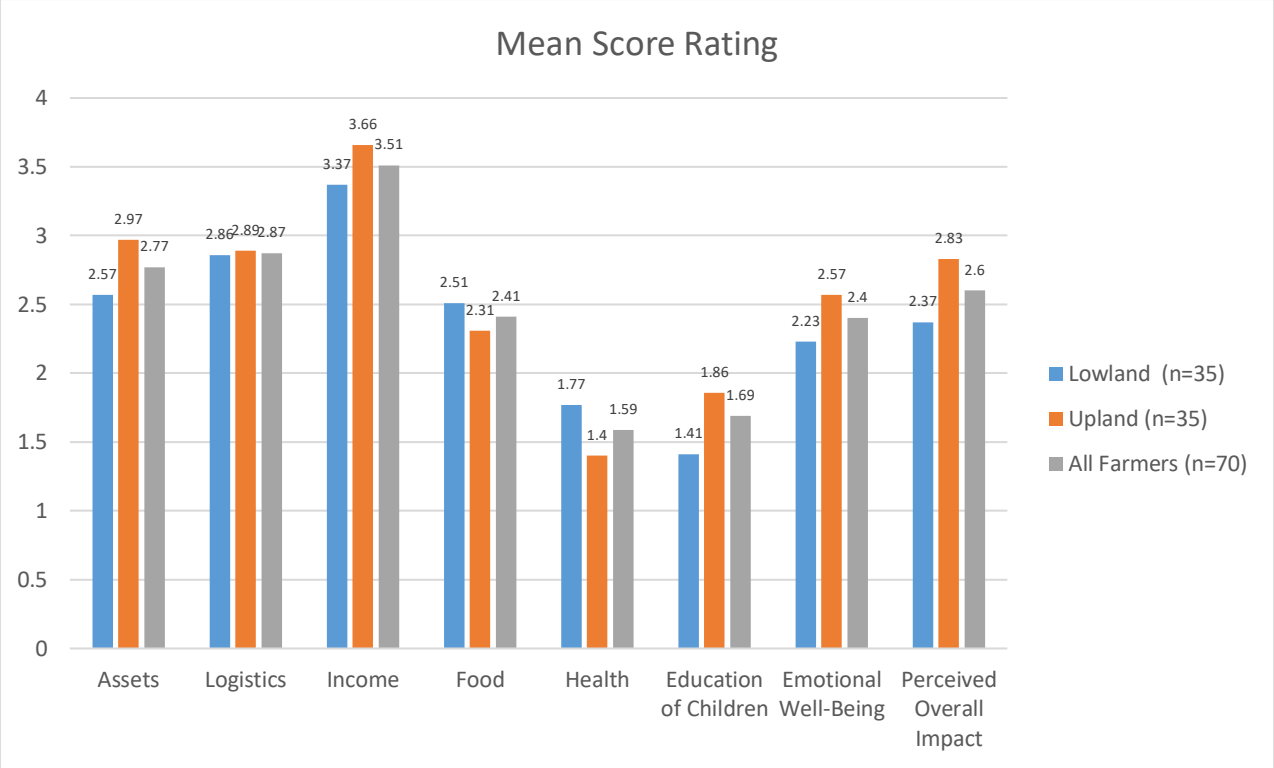

Figure 5.2. Mean Score Rating of the Perceived Impact of Extreme Events of the Respondents, by Elevation, Laguna Province, Philippines
Source: Author's Fieldwork in Laguna Province, Philippines 2018-2019

5.2.5. Coping Strategies of the Respondents

Coping strategies are generally defined as "the practices that households employ in order to minimize the risks threatening their survival" (Maxwell and Caldwell 2008, p. 2). According to the World Food Programme (2009), it is the nature of people to respond using coping strategies when they feel that they do not have enough food to eat. They do not wait until they completely have nothing to eat but rather find strategies to minimize risks to their livelihoods and food security (Quilloy, et al, 2016, p. 201). Majority of the farmer respondents' households employed more than five coping strategies to minimize the risks and impacts associated with natural disasters (Table 5.11) while twenty respondents employed four. The average number of coping strategies in both study areas is five although there were three farmers in the upland areas that do not employ any coping mechanism. The most employed coping strategies were the income related ones.

Table 5.11. Number of Coping Strategies Employed by the Respondents for Extreme Events, by Elevation, Laguna Province, Philippines

Number of Coping Strategies	Lowland (n=35)	Upland (n=35)	All Farmers (n=70)
None	0 (0%)	3 (9%)	3 (4%)
Only 1	5 (14%)	1 (3%)	6 (9%)
2 to 3	6 (17%)	8 (23%)	14 (20%)
4 to 5	9 (26%)	11 (31%)	20 (29%)
More than 5	15 (43%)	12 (34%)	27 (39%)
Average Number of Coping Strategies	**5.57**	**4.94**	**5.26**

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

According to Quilloy, et al, (2016, p. 202), generally, income related coping strategies imply a less severe food insecurity problem compared to food consumption related coping strategies with the exception of if the household strategy is to produce its own food. Majority of the farmers use their savings and produce their own food to cope with the impacts of natural disasters as seen in figure 5.3. Most of the farmer respondents also borrow money and stock food to cope, while the least employed coping mechanism was eating at others people's house, who is usually a relative or a friend. Stocking of food is generally being practiced in anticipation of a forthcoming extreme event whether predicted or not. This resembles some sort of a safety net and is only possible if farmers have income and or production surplus during the previous season. The other types of coping mechanisms that the respondents employed were eating less food, reducing the number of meals per day, reducing expenses on health and education of their children, delaying the payment of utility bills, selling assets, and claiming agricultural and other types of insurance. Only a few farmers view agricultural insurance as an effective coping mechanism against the perils of natural disasters, and most of them resort to borrowing money. This is maybe because of the untimely claim releases by the insurance agency. For those who were gravely affected by natural disasters, they had no choice but to sell their assets as they encounter severe food security problems. The worst case scenario is to address their lack of food problems by simply eating at their willing relatives, friends and or neighbors.

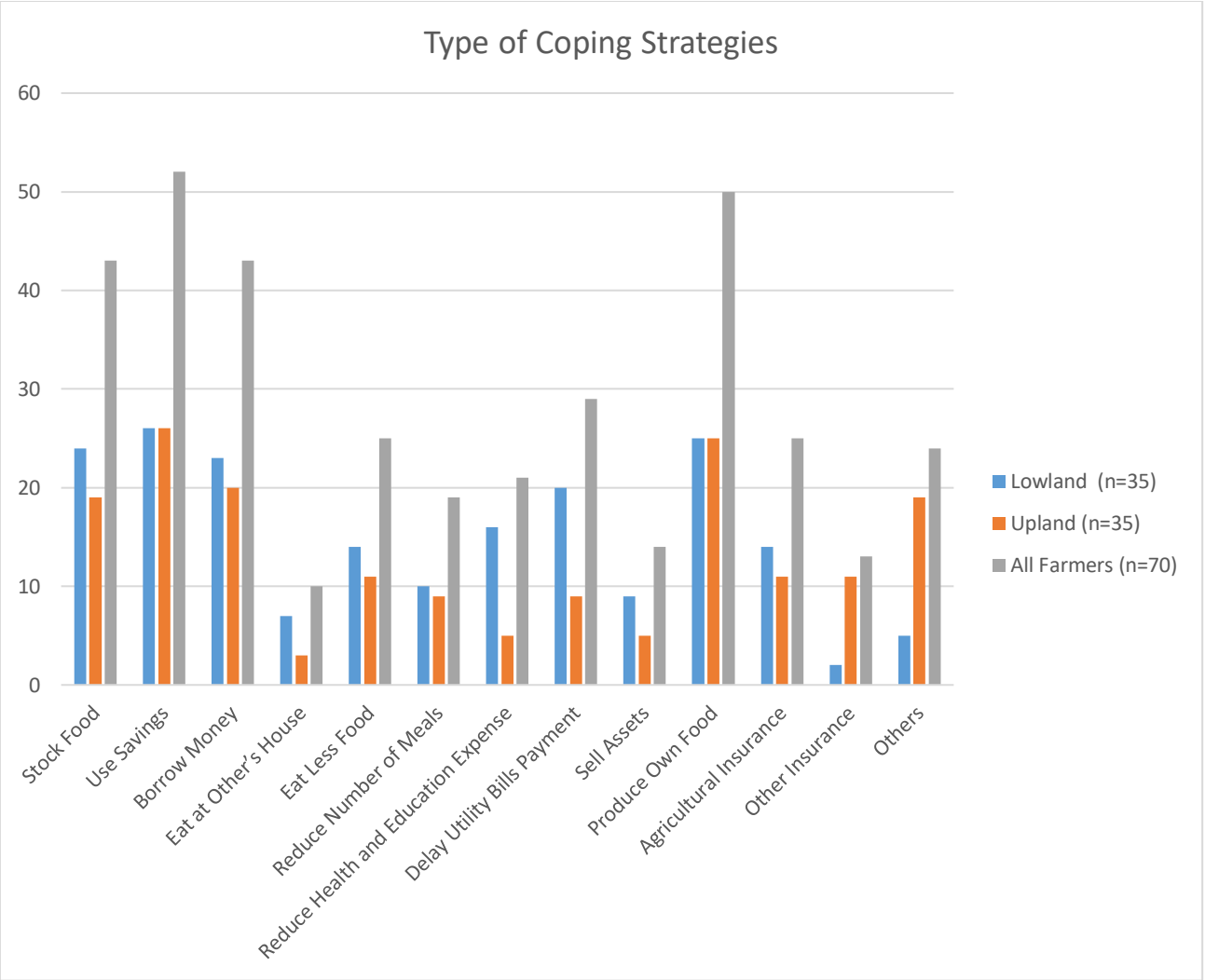

Figure 5.3. Types of Coping Strategies Employed by the Respondents for Extreme Events, by Elevation, Laguna Province, Philippines

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

Figure 5.4. Rice Fields in the Lowland Municipality of Santa Cruz, Laguna, Philippines

Source: Author's Fieldwork in Laguna Province, Philippines, August, 2019

Figure 5.5. Coconut and Sayote Crops in the Upland Municipality of Nagcarlan, Laguna, Philippines

Source: Author's Fieldwork in Laguna Province, Philippines, August, 2019

5.3. Assessment of the System Operations of the Philippine Crop Insurance Corporation by Farmer Respondents

The commonly observed coping mechanism among the rice farming households after an extreme event such as typhoon and flood is to take out loans from relatives or friends, or sell farm assets like livestock as discussed above and as found in other studies (Israel and Briones, 2013, p. 13). This will further push them back to a higher level of poverty. Nonetheless, there are other risk management tools or coping mechanisms that may help in reducing the farmers' climate related losses (Reyes, et. al. 2015, p. 2). One of these is to avail of the agricultural crop insurance, which is a financial instrument used to manage agricultural production risks brought about by natural calamities, pest infestation, and plant diseases, among others. This section assesses the implementation mechanism of the Philippine Crop Insurance Corporation (PCIC), the main provider of agricultural insurance in the Philippines, by examining its efficiency, effectiveness, and farmer participation. Data were provided by the farmers.

Among all the respondents, only 38% have agricultural insurance and only 34% are insured under the agricultural insurance programs of the PCIC (Table 5.12). The previous sections mentioned that the lowland farmers employed more coping strategies than the upland farmers, and the same is true when it comes to agricultural insurance as more farmers have PCIC insurance in the lowlands (40%) compared to the uplands (28%).

The average annual premium payments of the lowland farmers is PhP 475, which is significantly lower compared to an annual average premium payment of PhP 1,862 of the upland farmers. This is because the lowland farmers mainly produce rice and most of them are listed in the Registry System for Basic Sectors in Agriculture (RSBSA), which entitles these farmers to free insurance.

On the other hand, upland farmers mostly produce high value crops and are not entitled to free premium payments under PCIC policy. As such, they have to pay higher premiums to insure their agricultural produce. Moreover, upland farmers generally receive lower indemnity payments compared to the lowland farmers on a per farm basis since upland farmers have smaller farm areas in general. Although in a per hectare basis, upland farmers receive more indemnity payments due to larger damages incurred on their farms.

Table 5.12. Types of Insurance Employed by the Insured Respondents, by Elevation, Laguna Province, Philippines

Types of Insurance	Lowland	Upland	All Farmers
PCIC Agricultural Insurance	14 (40%)	10 (28%)	24 (34%)
CARD Bank Microinsurance	0 (0%)	1 (3%)	1 (1%)
Kaunlaran sa Laguna Insurance	0 (0%)	2 (6%)	2 (3%)
Total	14 (40%)	13 (37%)	27 (38%)
Average Premium Payment per farm (PhP)	475	1,862	1,143
Average Premium Payment per hectare (PhP)	271	1,844	828
Average Indemnity per farm (PhP)	8,091	6,634	7,302
Average Indemnity per hectare (PhP)	4,623	6,568	5,291

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

5.3.1. Efficiency of Agricultural Insurance Administration of the PCIC

To measure the overall efficiency of the agricultural insurance programs of the PCIC, this study employs Parasuraman's (1985, pp. 41-50) Gap Analysis Model. Parasuraman's method determined the gaps between the ideal services of the PCIC's agricultural insurance programs and the actual services given to the farmer beneficiaries such as the days of processing of application for enrollment in the insurance program (gap is equal to the PCIC ideal days minus the average actual days), days of filing for damage claims (gap is equal to the PCIC ideal days minus the average actual days), days that took before the team of adjusters visited the damaged farms (gap is equal to the PCIC ideal days minus the average actual days), estimation of damages (gap is equal to the average team of adjusters' estimate minus the average farmers' estimate), and days before indemnity payment was received by the farmer beneficiaries (gap is equal to the PCIC ideal days minus the average actual days).

Table 5.13 summarizes the identified gaps on the efficiency of the agricultural insurance programs provided by the PCIC in the study areas. According to the PCIC officers and staff, the ideal number of days to enroll in the PCIC's insurance program is one but it actually took the farmer beneficiaries an average of four days to enroll in the insurance programs which is a three-day delay from the ideal. To enroll in the insurance programs of PCIC, the farmers can either visit the regional or satellite offices by themselves, or let the members of the Municipal Agricultural Office (MAO) in charge of their area or their cooperatives enroll in their behalf.

Table 5.13. Gaps Identified on the Efficiency of Agricultural Insurance Programs of the PCIC, by Elevation, Laguna Province, Philippines

Tasks	Lowland (n=14)			Upland (n=10)			All Farmers (n=24)		
	Perceived Competence	Ideal	Gap	Perceived Competence	Ideal	Gap	Perceived Competence	Ideal	Gap
Enrollment in Program	4	1	(3)	4	1	(3)	4	1	(3)
Filing of Applications for Cover (Days)	3	1	(2)	3	1	(2)	3	1	(2)
Team of adjusters' response (Days)	34	5	(29)	18	5	(13)	24	5	(19)
Indemnity Received (Days)	43	60	17	93	60	(33)	64	60	(4)
Damage Estimate Gap (PhP)	47,667			10,200			30,636		
Damage Estimate Gap (JPY)	102,960			22,032			66,175		
Damage Estimate Gap (USD)	953			204			613		

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

According to the PCIC key informants, it takes a much longer time for farmers to enroll in the insurance programs because most of the time, the farmers have missing documents or wrong and missing information in their application documents. That is why

the farmers would need to return another day to bring the missing documents and revise their application forms which would take them a few days.

The same is true for the farmers who sought the help of the MAO and their cooperatives to enroll in the insurance programs in their behalf. The PCIC's enrollment processes are mostly in English, which most farmers could not understand easily, given their average age and educational attainment. This results to a much longer time for them to be insured under the PCIC. In terms of filing for application for cover, a three-day gap was identified. Similar to the process of enrollment to the insurance programs, the application for cover requires complex documents which the farmers could not easily understand.

The team of adjusters ideally should be able to visit the damaged farms within five days after the receipt of the application for cover of the farmers. It took an average of thirty-four days in the lowland areas, while it took eighteen days in the upland areas before the team of adjusters arrived to inspect the damaged farms. This gives a gap of twenty-nine and thirteen days for the lowland and upland areas, respectively.

The reason why the team of adjusters visits the farms quicker in the uplands than the lowlands is because the upland farms are generally smaller and easier to inspect, and there are less farmers in the area even though the uplands are harder to reach. On the other hand, lowland farms are generally larger in size and takes more time to inspect the damages of one farm. As mentioned in chapter 4, one of the challenges that PCIC regional offices face is the lack of manpower, in region 4. Specifically, the PCIC has to service ten provinces and this makes it extremely impossible to cater to all affected farms within five days.

Meanwhile, the PCIC is more relaxed when it comes to the handing out of indemnity payments. Ideally, the farmers should wait up to sixty days to receive their indemnity payments. There were no gaps in the lowland areas, as they receive the indemnity payments

an average of seventeen days earlier than the ideal number of days. On the contrary, upland farmers have to wait for thirty-three more than the ideal delivery days. According to the PCIC key informants, this is because the lowland farmers are easier to reach so the PCIC prioritizes giving the payments to the lowland farmers. In addition, there are generally more farmers in the lowlands than in the uplands so the PCIC tend to concentrate on giving the indemnity payments first to the lowland farmers.

In terms of damage estimates, there is a huge gap between the estimates of the farmers and the estimates of the team of adjusters. An average of 10,200 Philippine Pesos (PhP) (JPY 22,032 or USD 204) was the identified difference between the adjusters' estimates and the upland farmers' estimates. A larger amount of PhP 47,667 (JPY 102,960 or USD 953) was the difference between the adjusters' and the lowland farmers' estimates. According to PCIC key informants, there are always discrepancies between the adjusters' and the farmers' estimates. In general, farmers tend to overestimate the damages while the team of adjusters tend to underestimate the damages according to the key informants. Most of the farmer respondents argue that the team of adjusters are not agriculture experts which make their estimates unreliable. The key respondents mentioned that before the team of adjusters investigate damaged farms, they would undergo a one-day special training on how to properly estimate agricultural damages. The team of adjusters are also on a job-order basis and are not agriculture graduates themselves. It can be argued that a one-day training is not sufficient to gain the expertise on agricultural damage assessment, especially if the members of the adjusters do not have any background in agriculture.

The lack of roads and good infrastructure also contributes to the inefficiency of the PCIC's service delivery. There are farms in both areas that are located in remote places and are not accessible by car. There are also no roads present in those areas, which require hours to reach on foot. Moreover, these remote areas are the usual hideout of rebel group New

Peoples' Army, which is why the PCIC staff takes precautionary measures while crossing these areas. In addition, some areas do not have electricity, which makes it more dangerous for the PCIC staff to travel especially when it is too late at night.

Another reason for the inefficiency of the agricultural insurance programs is that the pamphlets and instructions are mostly in English. Even though the English language is an official language of the Philippines, not all Filipinos can speak fluently. The English language is usually taught during elementary education, and is taught more intensively during high school and university education. In poor households, education is a luxury. In the case of the farmer respondents, some of them barely know how to read and write, more so using the English language. The farmers' lack of English language comprehension results to longer times of enrolling in the agricultural insurance programs and filing for cover. Hence, this makes the PCIC's service more inefficient.

The identified gaps between the ideal service and the perceived competence of the PCIC seems to suggest that efficiency in the delivery of agricultural insurance programs can still be improved. The PCIC's inefficiency was largely caused by the lack of manpower and the shortage of agriculture experts that could assess farm damages better.

5.3.2. Effectiveness of the PCIC's Agricultural Insurance Programs

The Likert Scale was employed to measure the effectiveness of the PCIC's agricultural insurance programs. The Likert Scale is a method of assigning quantifiable value to qualitative statistics. A numerical value is assigned to each potential choice and a mean figure for all the responses is computed. In determining the knowledge of the respondents regarding the enrolment, damage filing, and insurable damages, a 5-point Likert scale was used. The scale used included the following responses: no knowledge, low knowledge, moderate knowledge, high knowledge, and very high knowledge. The responses

were coded accordingly as: 1 = no knowledge, 2 = low knowledge, 3 = moderate knowledge, 4 = high knowledge, and 5 = very high knowledge.

In terms of the accessibility of the program, the scale used included the following responses: no access, low access, moderate access, high access, and very high access. The responses regarding access were coded as: 1= no access, 2 = low access, 3 = moderate access, 4 = high access and 5 = very high access.

The helpfulness of the agricultural insurance provider's staff utilized a 5-point scale which included the following responses: not helpful, sometimes helpful, helpful, most of the times helpful and always helpful. Responses were coded as: 1 = not helpful, 2 = sometimes helpful, 3 = helpful, 4 = most of the times helpful and 5 = always helpful.

The extent to which the expectations of the respondents were met was measured by using a 5-point scale which included the following responses: never, rarely, sometimes, most of the time and always. Responses are coded accordingly as: 1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time, and 5 = always.

Figure 5.6 and table 5.14 summarize the results of the Likert Scale as a measure for the effectiveness of the agricultural insurance programs of the PCIC. The respondents were asked about their knowledge about the insurance program, the enrollment processes, filing for insurance coverage, access to PCIC services, helpfulness of the PCIC staff, and meeting the beneficiaries' expectations of the insurance programs.

Majority of the farmer respondents answered that the PCIC staff were helpful in assisting them and that their expectations about the benefits of participating in the insurance programs were met. In contrast, the farmer respondents cited low access to PCIC services and have reported low knowledge about its insurance programs, enrollment processes, and

filing for insurance coverage. From the farmer respondents' answers, the mean score rating was computed.

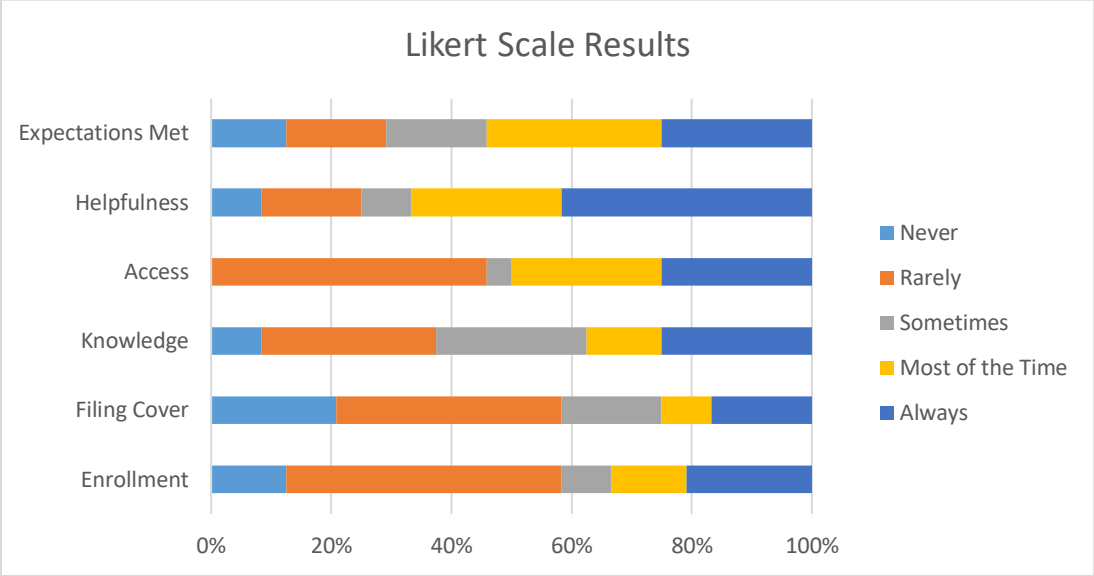

Figure 5.6. Likert Scale Answers of the Respondents to Measure the Effectiveness of PCIC's Agricultural Insurance Programs
Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

Table 5.14. Mean Score Rating of the Effectiveness of Agricultural Insurance Programs, by Elevation, Laguna Province, Philippines

System Indicator	Lowland (n=14)	Upland (n=10)	All Farmers (n=24)
Knowledge in Enrollment in Program	2.93	2.70	2.83
Knowledge in Filing for Applications for Cover	2.78	2.40	2.62
Knowledge About the Program	2.71	3.80	3.17
Access	3.57	2.90	3.29
Helpfulness of PCIC Staff	3.93	3.50	3.75
Meet Expectations	3.36	3.40	3.37
Average Distance of Nearest PCIC Office	4.71 km	10.00 km	6.92 km
Overall Agricultural Insurance System Rating	**8.14**	**7.00**	**7.69**

Source: Author's Fieldwork in Laguna Province, Philippines 2018-2019

The helpfulness of the PCIC staff had the highest rating with a mean score of 3.75 over 5. This indicates that most of the farmer beneficiaries agree that the staff were able to help them with agricultural insurance-related problems such as assisting them in enrolling in the programs and for filing for insurance coverage. On the contrary, the lowest-rated system indicators were the knowledge in the enrollment in the program (2.83) and the filing for insurance coverage (2.62). As mentioned earlier in the Gap Analysis, the enrollment and

filing for insurance coverage processes of the PCIC are too complicated for the low-educated and aging farmers. The low mean scores on these indicators confirm that the PCIC failed to set farmer-friendly tools on program enrollment and insurance coverage filing processes, although the helpfulness of the staff may have compensated this shortcoming. The rest of the indicators have mean scores above 3.00 indicating that the agricultural insurance programs of the PCIC are fairly effective.

The farmers in the Philippines usually reside near their farm lands and the average distance from the respondents' farm to the nearest PCIC office is 6.92 kilometers. The upland respondents will have more difficulty reaching the nearest office as the average distance from their farms is relatively farther at ten (10) kilometers. In developed countries, this might sound near but in developing countries such as the Philippines and the study areas in particular, it would take hours to traverse a distance of 10 kilometers. For instance, the lowland respondents' farms were 4.71 kilometers away from the nearest PCIC office on the average, but it will take around 2 to 3 hours to get there. From their farms, they have to ride a tricycle (a local Philippine mode of transportation usually found in rural areas), and would have to take a bus from the main road. Moreover, the traffic on the main road makes the travel longer. Likewise for upland respondents, they have to walk down from sloped areas before taking a bus from the main road. It would normally take one full day going back and forth to the nearest PCIC office even though the PCIC have satellite offices scattered around the region.

The farmer respondents were asked to rate the overall effectiveness of the PCIC's agricultural insurance systems. The lowland farmer respondents gave a rating of 8.14 out of 10.00 while the upland farmers provided a lower rating of 7.00. These ratings nevertheless imply that from the perspective of the participating farmers, agricultural insurance has been effective especially among the lowland farmers as they can avail of their indemnity

payments ahead of time and should give them some safety net in terms of the occurrence of extreme events.

Table 5.15 and 5.16 show the reduction of profit loss before and after receiving indemnity payments from agricultural insurance programs in per farm and per hectare basis. Every year, the farmers are affected by different kinds of natural disasters such as typhoons, flooding and pests, and diseases. Given their vulnerability to these disasters, their farms suffer losses from damaged crops annually.

Table 5.15. Profit Loss Reduction Before and After Agricultural Insurance of the PCIC Insured Farmers, per Farm, Laguna Province, Philippines

Currency	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment
Philippine Peso	70,107	53,417	16,689
Japanese Yen*	151,430	115,380	36,049
US Dollar**	1,402	1,068	334

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

Table 5.16. Profit Loss Reduction Before and After Agricultural Insurance of the PCIC Insured Farmers, per Hectare, Laguna Province, Philippines

Currency	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment
Philippine Peso	50,802	38,708	12,094
Japanese Yen*	109,732	83,609	26,123
US Dollar**	1,016	774	242

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

In 2014, the study area experienced multiple extreme events that totally wiped out their crops. During that year, the farmer respondents lost an average amounting to 70,107 Philippine Pesos (PhP) (37% of average annual income) (JPY 151,430 or USD 1,402) per farm and PhP 50,802 (JPY 109,732 or USD 1,016) per hectare before receiving agricultural insurance indemnity payments. These indemnity payments were able to reduce their income loss and after agricultural insurance, the farmer respondents' loss was reduced to an average

amount of PhP 53,417 (JPY 115,380 or USD 1,068) per farm and PhP 38,708 (JPY 83,609 or USD 774) per hectare. Even though the indemnity payments they received were not that significant, the farmer respondents mentioned that it was good enough since they have other coping mechanisms. On the average, farmers were able to receive PhP 12,094 (JPY 26,123 or USD 242) worth of indemnity payments per hectare.

5.3.3. Factors Affecting Farmer Adoption of Agricultural Insurance

Logit analysis (Table 5.17) was employed to determine the factors that significantly influence the decision of the farmers to participate in the PCIC's agricultural insurance programs in the study areas. This was the method used to analyze farmer participation. The farmers were further asked about their reasons for participating or not participating in the agricultural insurance programs.

Table 5.17. Results of Logit Analysis on Factors Affecting Participation in Agricultural Insurance Programs, Laguna Province, Philippines

VARIABLES	Coefficient (bi)
x1 (age)	-0.76
Standard error	[0.019]
x2 (tenure status)	0.40
Standard error	[0.564]
x3 (cooperative membership)	2.14***
Standard error	[0.647]
x4 (disaster impact)	1.68***
Standard error	[0.189]
Constant	-1.38
Standard error	[1.217]
Observations	70

*** p<0.01
Note: Marginal effects were not computed; the only significant coefficients are non-continuous, in nature.

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

The results of the Logit Analysis only show that the variables having significant influence on the probability to enroll in agricultural insurance are the involvement in cooperatives and perceived disaster impacts. This suggests that the more a farmer is involved or a member of a cooperative, the higher the probability that s/he will have his/her farm

insured. Likewise, the higher the perceived impact of disasters in their agricultural activities, the higher the probability that they will enroll in agricultural insurance programs. All other variables did not exhibit statistically significant results.

The reasons for participating and not participating in PCIC's agricultural insurance programs are summarized in table 5.18. All the lowland farmers are members of a cooperative and as a requirement to borrow from the Land Bank of the Philippines (LBP) through their respective cooperatives and farmer associations, they must have agricultural insurance. This is why 100% of the lowland farmers answered that the reason for enrolling in the agricultural insurance program is a requirement for an agricultural production loan. In addition, the lowland farmers also view agricultural insurance as a coping strategy during the occurrence of natural disasters. Similarly, the upland farmers who were members of a cooperative claimed that getting agricultural crop insurance is also a loan requirement.

Table 5.18. Reasons for Participating or Not Participating in Agricultural Insurance Programs, by Elevation, Laguna Province, Philippines

Reasons	Lowland	Upland	All Farmers
Participation			
Requirement for Loan	14 (100%)	6 (60%)	20 (83%)
Coping Strategy	14 (100%)	10 (100%)	24 (100%)
Advised by Municipal Agriculture Officer	4 (29%)	10 (100%)	14 (58%)
Non Participation			
Don't Know About Existence	9 (43%)	2 (8%)	11 (24%)
Doesn't Need Insurance	12 (57%)	20 (80%)	32 (70%)
Have Other Insurance	1 (5%)	3 (12%)	4 (9%)
Farm Location is not Vulnerable	3 (14%)	20 (80%)	23 (50%)

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

Those who were not members of any cooperative were advised by the municipal agriculture officer in their areas to enroll in an insurance program to be able to access a loan. Similar to the lowland farmers, upland farmers also view agricultural insurance as a coping mechanism in times of extreme events.

Majority of the uninsured farmer respondents noted that the reason for non-participation in the PCIC's agricultural insurance programs is that they do not need

insurance. Especially upland farmers, 80% of the uninsured respondents believe that there is no need to enroll in agricultural insurance programs since their farms are not vulnerable to natural disasters and they have enough savings in times of disasters. The upland respondents mentioned that they would rather put their extra income to their savings rather than pay for insurance premiums. Majority of the upland respondents produce high value crops, which are not covered by the RSBSA, so the upland farmers would need to pay the full amount of premium if they wanted to insure their farms. There were upland respondents who had insurance before, but the damage to their farms was very minimal and were not eligible to receive insurance indemnity payments. This situation discouraged them since they were paying full premiums without getting anything in return. Twenty-four percent of the uninsured respondents were not aware of the existence of such insurance programs, especially in the lowland where forty-three percent of the uninsured respondents were unaware. A minority of nine percent, on the other hand, said that they already have other insurance such as microinsurance by the Center for Agricultural and Rural Development (CARD). The CARD provides microinsurance, wherein the farmers only pay a small amount of premium but also get small amount of indemnity.

5.4. Problems Encountered in the Implementation of Agricultural Insurance and Other Issues

This section discusses the problems encountered by the farmer respondents in the implementation of agricultural insurance as well as their suggestions to improve the programs' implementation to address other issues related to agricultural activities. Thirty percent of the farmer respondents reported that they do not encounter any problem in terms of agricultural insurance program implementation (Table 5.19). The most common problems cited include: 1) inefficiency of the implementation, 2) gaps on damage estimation, 3) poor marketing of the insurance products and 4) no access to agricultural insurance.

Table 5.19. Problems Encountered, Suggestions, and Other Requests of the Respondents, by Elevation, Laguna Province, Philippines

Item	Lowland	Upland	All Farmers
Problems Encountered			
Inefficient Implementation	3%	14%	9%
Damage Estimation Gap	9%	14%	11%
Poor Marketing of Insurance Products	3%	26%	14%
No Access to Insurance	3%	26%	14%
None	26%	34%	30%
Suggestions			
Hire More Staff	23%	9%	16%
Intensify Marketing Promotion	23%	49%	36%
Easier Enrollment Process	6%	6%	6%
Explain More Information to Farmers	20%	43%	31%
Hire Agriculture Experts as a Member of the Team of Adjusters	14%	6%	10%
Other Requests from Government			
Price of Rice Affected by Tarification Law	54%	0%	27%
Strengthen linkages and more support from Government Sector	29%	40%	34%
More Seminar about Climate Change	6%	6%	6%
More Access to Agricultural Insurance	0%	14%	7%

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019

The upland farmers were more vocal on the implementation mechanisms of PCIC's agricultural insurance programs. Upland farmers emphasized "no access to insurance" (26%) and "poor marketing of agricultural insurance product" (26%) as the more pressing problems that need to be addressed. These problems have prevented farmers who could have participated in the PCIC program. Farmer respondents have complained that they either do not know that a crop insurance program existed or that lack of aggressiveness and intensity in the marketing of the crop insurance. This again may be attributed to the lack of manpower by the Regional Office of the PCIC. Fourteen percent of upland farmer respondents also identify inefficient implementation and the significant gap in damage estimation as secondary problems.

The respondents were also asked about the possible suggestions to improve the implementation mechanisms of the agricultural insurance programs of PCIC. Majority of the unsatisfied farmers suggested that the PCIC should promote their agricultural insurance

products aggressively. The previous section mentioned that there were farmers that are unaware of the PCIC's agricultural insurance programs which is why they were uninsured. The farmers who have insurance are usually members of cooperatives, which provide them adequate information about these programs aside from the fact that it is also a loan requirement.

The farmers who were non-members of a cooperative or farmers' associations normally get their information from the municipal agricultural office, with whom they have direct connections with. The farmers living in the remote areas and who needed agricultural insurance the most, generally do not have access to these information. Moreover, results of the Likert Scale on the effectiveness section of this chapter indicated that the insured farmers were not that knowledgeable about the program itself, which is why most unsatisfied farmers suggested that the PCIC should explain this more clearly and make the processes simpler. The PCIC's processes in enrollment in their agricultural insurance programs and filing for insurance are too complicated for the farmers. Additional staff should address the inefficiencies of the agricultural insurance program implementation. Hiring of more staff by PCIC particularly at the Regional level have been suggested by 23% of lowland farmers.

Aside from agricultural insurance, the farmer respondents were also asked about other issues that concern their farming activities, and what they want the Philippine government to address. The lowland farmers are all rice farmers, and are affected by the rice tarification law. The law makes way for foreign markets to sell rice for competitive prices. This results to more rice supply in the market and which further means cheaper rice prices for the consumers. This is seen to be a disadvantage to the local rice farmers who pay high production costs. The farmers also want to build stronger bonds with the government as they believe that the bureaus that are concerned with agriculture do not serve them anymore as the farmers cited that the cheaper price of rice will greatly affect their income negatively

because of the rice tarification law. Lastly, the farmers also want the government to provide seminars about climate change.

5.5. Analysis

The PCIC's agricultural insurance programs implementation has room for improvement based on the farmer survey results. Farmer-respondents asserted that the insurance programs were effective in reducing their income losses during the occurrence of extreme events but the service delivery needs improvement. The participation rate in the agricultural insurance is low because farmers believe that they do not need the insurance while some did not know about its existence. Farmers rationalized this by arguing that their farms are not vulnerable and that they would rather increase their savings instead of paying the insurance premium. This just shows that insurance culture is absent among Filipino farmers.

The inefficiencies can be attributed to inadequate personnel in charge of the agricultural insurance programs in the regional offices. The late response and inconsistencies in the farmers' estimates of the team of adjusters can likewise be attributed to the inadequate personnel and training. Aside from only fourteen permanent positions in the regional office, the members of the team of adjusters are on a job-order basis, a non-permanent and low-wage position. Most of the time, applicants for this job are not agriculture graduates, and they only get a one-day training before starting their job as farm damage inspectors. Moreover, those who have accumulated experience as a member of the team of adjusters resign when they find a relatively more secured and high-paying job. In this scenario, the PCIC will hire and train new members of the team of adjusters. This would imply that the PCIC is not properly allocating its limited resources as it has to spend for the training of the newly-hired staff. Rather than hire permanent members of the team of

adjusters, the PCIC wastes resources on advertising, hiring, and training of the new members of the team.

Inadequate staff of the PCIC handling the delivery of indemnity payments also contributes to the late arrival of the reimbursements especially in the upland areas. On the other hand, the complicated requirements contribute to the delayed filing and enrollment. Moreover, the PCIC's English instructions contribute to the low number of insured farmers. A lot of farmers do not know about the existence of agricultural insurance programs which reveals the poor marketing by the PCIC. Only cooperative members, and members of farmer associations, and those who are related to local government officials are aware of the program.

Farmers practicing lowland rice farming system are eligible to get free insurance premium via the RSBSA. This encourages the lowland rice farmers to enroll in the insurance program. On the other hand, upland farming systems are upland mixed, and mostly produce high value crops. Upland farmers pay insurance premiums for several crops. This means that they have to insure and pay premium for each and every crop they grow. In addition, even though the upland farms incurred more income losses than the lowland farmers, they are still not entitled to get insurance or get the minimum premium payment as each of their crops suffered minimal damages even though the aggregate damages were higher than that of the lowlands. Hence, upland farmers see no incentive in insuring their crops. They would rather put their extra income into their savings rather than pay insurance premiums for all their crops and get nothing in return in times of natural disasters.

In general, the farmer respondents view the insurance programs as reasonably effective although the indemnity payments they receive are not enough to cover the damages they lost after the occurrence of an extreme event. The average annual income losses of the

farmers is PhP 120,405 (JPY 260,076 or USD 2,408) and after the receipt of indemnity payments, the loss declined to PhP 103,716 (JPY 224,026 or USD 2,074) which is still a huge amount of loss. That is why the farmers use other strategies to cope with the effects of natural disasters.

The ideal goal is for indemnity payments for insured crops to be enough as coping mechanism for natural disasters but it only represents a small proportion of the actual losses. To achieve higher indemnity payments that would approximate the actual damage incurred on any given farm, it would need a more efficient and effective implementation of the PCIC Insurance Program along with the willingness of the farmers to pay a relatively high premium to ensure a higher indemnity that would significantly reduce the farm losses.

Based from past studies by Rola (2013), Rola, et. al, (2015), Rola and Querijero (2017) and Rola and Aragon (2018), the results of this research revealed that little has been done to improve the efficiency of the PCIC's agricultural insurance programs. In addition, there is not much progress in increasing the number of farmer beneficiaries, making the Filipino farmers vulnerable to extreme events.

The results of this study and both global and Philippine literature showed the effectiveness of agricultural insurance in terms of income loss reduction, but agricultural insurance can truly reduce these losses, only if there will be efficient delivery of the insurance programs. However, there are constraints in most farmers' participation in the agricultural insurance that magnify the vulnerabilities of this marginalized group to address losses due to increasingly frequent disasters.

5.6. Conclusion

The Philippines is the 3rd most at risk to natural disasters country according to the report by the United Nations University Institute for Environment and Human Security (2018), and the farmer respondents' disaster experience confirm this scenario. The Philippines and other developing countries do not have strong infrastructure to protect its citizens from these natural disasters. The most vulnerable to these extreme events are those who venture in agricultural sector. This chapter examined the effectiveness, efficiency, and farmer participation in agricultural insurance programs of the PCIC, from the farmer perspective. The respondents interviewed for this case study were the lowland farmers of the municipality of Santa Cruz, and the upland farmers from Nagcarlan and Liliw, which are all located in the province of Laguna in the Philippines. Lowland farming system is dominantly rice, while the uplands is a mix of crops and trees. In general, upland farmers tend to not buy insurance also because of the diversity of their crops. But of course, there are other reasons including distance from the knowledge or information centers.

Results of the survey concludes that the agricultural insurance programs of the PCIC is effective in terms of income loss reduction and helpfulness of staff but has been assessed as inefficient due to the lack of regional staff and lack of agriculture experts. Moreover, the PCIC does not aggressively market its agricultural insurance programs and the government does not educate the farmers enough to gain knowledge about the possible benefits of insurance as well as the perils of climate change. This resulted in the low number of insured farmers.

The results of the study revealed that little has been done to improve the efficiency of the service delivery of the PCIC as well as increasing the number of farmer beneficiaries. Agricultural insurance may be effective in reducing income losses but it can only be truly

effective if there will be efficient delivery of the insurance programs and eliminate or reduce farmer participation constraints. Therefore, stronger policies on boosting efficiency and encouraging farmers to participate in the PCIC's agricultural insurance programs should be adopted.

The succeeding chapters will examine the Japanese insurance system focusing on Gifu prefecture, compare the Philippine and Japanese agricultural insurance system, and find out what the Philippines and other disaster vulnerable developing countries can learn from Japan, which is considered as one of the global leaders in disaster management.

CHAPTER 6

CASE STUDY: GIFU PREFECTURE, JAPAN

6.1. Introduction

This chapter relies on primary data acquired during the author's fieldwork in Gifu Prefecture in Japan. The chapter examines the efficiency and effectiveness of the main agricultural insurance implementer of the country, the National Agricultural Insurance Association (NOSAI), based on the experiences and answers given by seven farmer families and corporations in the lowland cities of Gifu and Motosu, and the upland city of Takayama (Table 6.1). Of the seven farmer groups, five of them are in the lowlands, while two groups were in the uplands. The total number of respondents interviewed for the lowlands and the uplands is 88 farmers and farm workers.

Table 6.1. Description of the Study Sites and Number of Survey Respondents, Gifu Prefecture, Japan

Study Site	Elevation	Number of Farmer Groups	Total Farmers and Farmer-workers
Gifu City	Lowland	3	10
Motosu City	Lowland	2	10
Takayama City	Upland	2	68
Total	**-**	**7**	**88**

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

The farmer groups' farming systems set-up and agricultural production performance during normal year vis-à-vis a disaster year will be discussed. Moreover, the farmer respondent groups' natural disaster characterization, experience, and impacts to their farming and everyday life, as well as their coping strategies will be tackled. These will be examined using mostly descriptive analysis. In order to analyze the effectiveness of the

agricultural insurance system of the NOSAI, Likert Scale, Cost and Returns Analysis, and Descriptive Analysis were employed.

6.2. Characteristics of the Farmer Respondents

This section presents the general characteristics of the farmer groups and respondents in Gifu Prefecture, Japan. The profile of the farmer groups and the socioeconomic profile of the respondents will be examined first, then the different farming system's set-ups, incomes, and agricultural production expenses will be discussed. Lastly, the respondents' natural disaster characterization, experiences, and impacts, as well as the respondents' coping mechanisms will also be discussed.

6.2.1. Profile of the Farmer Groups and Corporations

1. GODO SUIDEN YUME Club LTD

The GODO SUIDEN YUME Club LTD is a farming corporation located in the lowland city of Motosu in Gifu prefecture. The farming corporation is composed of six farmers and a farm size of 6 hectares producing rice and wheat. The farm leader holds a bachelor's degree in Agriculture from Gifu University. All farmers of this corporation are active members of the Japan Agriculture (JA) Group, which is a farmer cooperative in Japan. The crops, buildings, and machineries of the farm are insured by NOSAI. The average age of the farmers is 70, and the farmer leader is the oldest, aged 75.

2. Sumi Farms

Sumi Farms is a family-run farm located also in Motosu city in Gifu prefecture. The family farm is run by four farmers on a 10 hectare Lowland Rice Farming System. The farm leader holds a bachelor's degree in Business Economics, and is a former high-ranking official in the JA. All the members of the family-run farm are active members of the JA. The

crops, buildings, and machineries of the farm are likewise insured by NOSAI. The average age of the main farmers is 75, while farmer workers age are younger at 55. Similar to the previous farmer group, the farmer leader is the oldest at age 82.

3. Washimi Family Farm

The Washimi Family Farm is also a family-run farm located in the lowland city of Gifu in Gifu prefecture. Four people handle the operation of the family farm with an area of 5 hectares which produces Japanese Green Beans (Edamame) and Broccoli. After graduating from high school, the farmer leader decided to go into full time farming. All members of the family-run farm are active members of the JA although the farm doesn't have agricultural insurance. The average age of the farmers of the farm is 71, of which the farmer leader is the oldest at age 73.

4. Makazu Family Farm

The Makazu Family farm is a family-run farm also located in the lowland city of Gifu in Gifu prefecture. The family operates the farm of 0.16 hectares which is utilized to grow strawberries. The farm leader was a graduate of Bachelor's in Mechanics and was working as a salaryman (a term for an office worker working in the corporate world) before going to agriculture after he retired. Though he and his wife are active members of the JA, their farms do not have agricultural insurance. This family-run farm is generally younger than the other farming groups and corporations, with farmers having an average age of 67.

5. Yamanaka Family Farm

The Yamanaka Family Farm is a family-run farm composed of four farmers cultivating Japanese Green Beans, Broccoli, Iwai Daikon, and Spinach in an 8 hectare farm. The farm is located in the lowland city of Gifu, Gifu prefecture. The farm leader holds a bachelor's degree in Commerce and all are members of the JA. Since the Yamanaka Family

Farm grows a variety of crops that are not required to be insured under the NOSAI, the crops of this family-run farm are nevertheless insured under the NOSAI and their machineries are insured under the "KYOSAI" which is also run by the JA. The Yamanaka family farm group is the second youngest among the farm groups that were interviewed in this study, with an average age of 63.

6. Wakabayashi Farms

The Wakabayashi Farms is a farming corporation composed of twenty-one farmers in the upland city of Takayama, Gifu prefecture. This farm corporation plants tomato, spinach, beans, and garlic in a 4.8 hectare farmland. The farm leader holds a bachelor's degree in Agriculture and all the farmers are active members of the JA. The crops of the farm are insured under the NOSAI. The Wakabayashi farm group have many younger aged farmer workers with an average age of 65.

7. Hashiba Farms

The Hashiba Farms is a large farming corporation composed of 47 farmers and is situated at the upland city of Takayama in Gifu prefecture. This farm corporation produces tomato and mushroom. In addition, the corporation also processes its tomatoes into other tomato products such as tomato sauce, paste, juice, and ketchup, among others. The farm leader is a graduate of Agriculture from Gifu University. All of the farmers are members of the JA and all the crops grown in the farm are insured under the NOSAI. Hashiba farms have the most number of farmer workers and the youngest average age of 39.

6.2.2. Socio-Economic Profile of the Key Respondents

Table 6.2 shows the socioeconomic characteristics of the key respondents of each of the farmer groups interviewed in this study. With an average age of 66 for all locations, it was noted that the lowland farmers are older compared to upland farmers with an average

of seventy-two years for lowland farmers compared to the average age of fifty-two years for upland farmers. This is because the upland farms employ more farmer-workers who are generally younger (average age of farmer-workers is 53, while main farmers is 71). All but one of the respondents are university graduates (with degrees on Agriculture, Business Economics and Commerce) and all are married with their spouses also helping in the family farm or corporation. All farm groups but two in the lowlands have agricultural insurance. One farming group in the lowlands is insured under a private insurance company.

Table 6.2. Socio-Economic Characteristics of the Key Respondents, by Elevation, Gifu Prefecture, Japan

Item	Lowland	Upland	All Farmers
Average Age (in years)	72	52	66
Education (in years)	15	15	15
Marital Status			
Single	0	0	0
Married	5	2	7
Others	0	0	0
Agricultural Insurance			
Yes	3	2	5
No	2	0	2

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

6.2.3. Farming Systems Set-up

The farming systems that are found in the East Asia and the Pacific region are coastal artisanal fishing, lowland rice, pastoral, rice-wheat, root-tuber, sparse (arid), sparse (forest), temperate mixed, tree crop mixed, upland intensive mixed, and urban based farming systems. In Gifu prefecture, the temperate mixed farming systems dominate the lowland area while the highland city of Takayama widely practices highland extensive mixed farming system. The average number of crops and livestock in the lowland areas are two per farm groups and the major crops grown are rice, wheat, edamame (Japanese beans), strawberry, and broccoli.

On the other hand, the upland farm groups grow an average of three crops per farm per year where the main crops are tomato, spinach, mushroom, garlic, and beans. The

average farm size of lowland farms is 5.83 hectares while 6.40 hectares is the average in the upland. All of the farm groups and corporation own the land they till and all are members of either the Japan Agriculture (JA) Group or other local cooperatives.

Table 6.3. Farming Systems Set-up and Farm Characteristics of the Key Respondents, by Elevation, Gifu Prefecture, Japan

Farm Characteristic	Lowland	Upland	All Farmers
Number of Crops and Livestock	2.00	3.00	2.29
Major Crops	Rice, Wheat, Edamame, Strawberry, Broccoli	Tomato, Spinach, Mushroom, Garlic, Beans	-
Major Farming System	Temperate Mixed	Highland Extensive Mixed	
Farm Size (hectares)	5.83	6.40	5.99
Tenure Status			
Land Owner	5	2	7
Lessee	0	0	0
Tenant	0	0	0
Cooperative Membership			
Yes	5	2	7
No	0	0	0
Cooperative Status			
Officer	1	0	1
Active Member	4	2	6
Inactive Member	0	0	0

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

6.2.4. Agricultural Production of the Respondents

The average annual production cost per farm in the selected study areas is 26,500,000 Japanese Yen (JPY) (12,190,000 Philippine Pesos (PhP) or 238,500 US Dollars (USD)) and JPY 4,424,040 (PhP 2,035,058 or USD 39,816) per hectare. Upland farms are generally larger and spend about 40 million Japanese Yen more per farm and around 7 million Japanese Yen per hectare than lowland farmers. In a similar fashion, upland farmer groups reported higher average profit per farm than their lowland counterparts (Table 6.4 and 6.5).

The average profit of the farmer groups during a normal year was estimated at JPY 76,250,000 (PhP 35,075,000 or USD 686,250) per farm and JPY 12,729,549 (PhP 5,855,593 or USD 114,566) per hectare. Upland farm groups recorded higher average profit per farm of JPY 194,875,000 which is JPY 166,075,000 (577%) higher than the average profit of

lowland farmer groups. The average profit per hectare of the upland farms on the other hand is JPY 30,449,219 which is JPY 25,509,253 (616%) higher than the average per hectare profit of the lowland farmer groups.

Table 6.4. Agricultural Production during Normal Year and Year with Extreme Events by the Respondents, per Farm, by Elevation, Gifu Prefecture, Japan

Income	Lowland	Upland	All Farmers
Production Cost			
Philippine Peso	6,593,333	28,980,000	12,190,000
Japanese Yen	14,333,333	63,000,000	26,500,000
US Dollar	129,000	567,000	238,500
Profit (Normal Year)			
Philippine Peso	13,248,000	89,642,500	35,075,000
Japanese Yen	28,800,000	194,875,000	76,250,000
US Dollar	259,200	1,753,875	686,250
Profit (Extreme Event Year)			
Philippine Peso	9,393,200	62,749,750	24,637,928
Japanese Yen	20,420,000	136,412,500	53,560,714
US Dollar	183,780	1,227,713	482,046
Net Difference			
Philippine Peso	-3,854,800	-26,892,750	-10,437,072
Japanese Yen	-8,380,000 (30% of income)	-58,462,500 (30% of income)	-22,689,286 (30% of income)
US Dollar	-75,420	-526,163	-204,204

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019
*1 Japanese Yen = 0.46 Philippine Peso
**1 Japanese Yen = 0.009 US Dollar

Table 6.5. Agricultural Production during Normal Year and Year with Extreme Events by the Respondents, per Hectare, by Elevation, Gifu Prefecture, Japan

Income	Lowland	Upland	All Farmers
Production Cost			
Philippine Peso	1,130,932	4,528,125	2,035,058
Japanese Yen	2,458,548	9,843,750	4,424,040
US Dollar	22,127	88,594	39,816
Profit (Normal Year)			
Philippine Peso	2,272,384	14,006,641	5,855,593
Japanese Yen	4,939,966	30,449,219	12,729,549
US Dollar	44,460	274,043	114,566
Profit (Extreme Event Year)			
Philippine Peso	1,611,184	9,804,648	4,113,177
Japanese Yen	3,502,573	21,314,453	8,941,688
US Dollar	31,523	191,830	80,475
Net Difference			
Philippine Peso	-661,201	-4,201,992	-1,742,416
Japanese Yen	-1,437,393 (30% of income)	-9,134,766 (30% of income)	-3,787,861 (30% of income)
US Dollar	-12,937	-82,213	-34,091

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019
*1 Japanese Yen = 0.46 Philippine Peso
**1 Japanese Yen = 0.009 US Dollar

The percent income loss of both study areas is identical at 30% but agricultural production in the uplands incurred higher income losses during occurrences of natural disasters. The upland farm groups lost JPY 58,462,500 (PhP 26,892,750 or USD 526,163) per farm and JPY 9,134,766 (PhP 4,201,992 or USD 82,213) per hectare compared to the lowland farm groups who incurred lower losses per farm at JPY 8,380,000 (PhP 3,854,800 or USD 75,420) and JPY 1,437,393 (PhP 661,201 or USD 12,937) per hectare. The reason for this is that highland extensive mixed farming systems are largely composed of high value crops and livestock that are costlier to produce but produces higher returns, therefore have experienced relatively higher income losses than lowland crops.

6.2.5. Natural Disaster Characterization, Farmer Experiences, and Impacts on the Respondents

Figure 6.1 provides the characterization of extreme events and climate change of the farmer groups in the selected study areas. To determine the farmer respondents' understanding about climate change and extreme events, eleven statements were listed and the key respondents on behalf of each farmer group and corporation were asked to respond if they agree or disagree. Every one answered either "Agree" or "Strongly Agree" on the statement that considers extreme events as a problem. Meanwhile, majority of the key respondents were not sure if and disagrees that their respective town(s) city(s), or prefecture(s) are prepared to handle extreme events.

However, all of the respondents believe that their household(s) can handle extreme events. Most of the key respondents also answered "Agree" and "Strongly Agree" on the statements mentioning that extreme events are becoming more frequent and more severe in the present as opposed to the past.

The responses on the "presence of the early warning system" is divided among the key respondents as some of them believe that there are early warning systems in their areas while some do not. Most of the key respondents believe that the negative impacts of extreme events can be prevented or reduced and extreme events are caused by climate change.

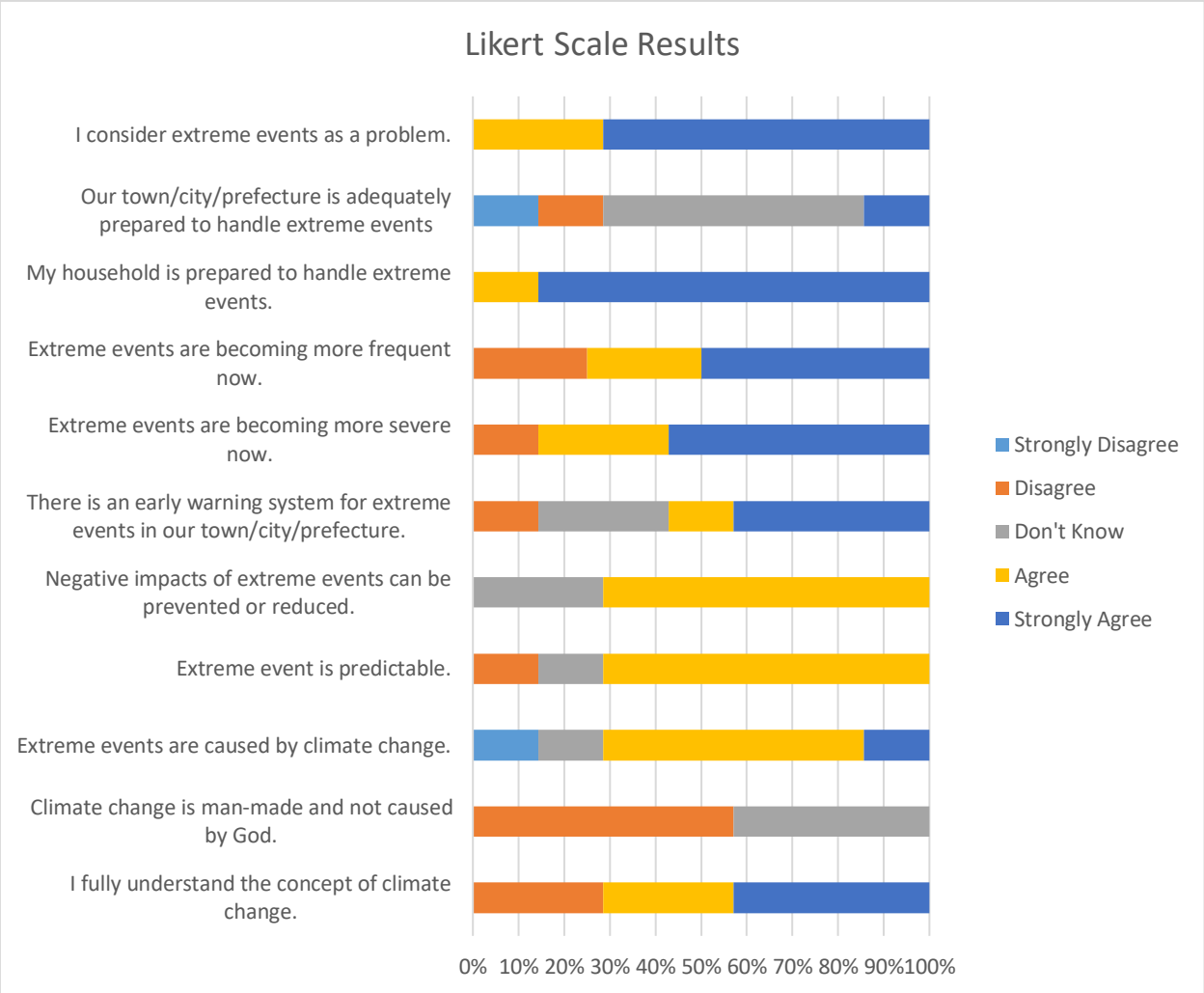

Figure 6.1. Likert Scale of the Characterization of Extreme Events of Respondents, Gifu Prefecture, Japan

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

Interestingly, most of the respondents answered "Disagree" when asked if climate change is man-made and not caused by God. Japan in general believes in many gods, and the farmer respondents believe that climate change is a creation of one of these gods. One of the key respondents mentioned:

"Climate change is natural and can be a form of one of the gods' displeasure. But there are ways to cope with these events. Japanese farmers normally adjust their crop cultural practices. For instance, summers in Japan are getting warmer and warmer and the summer heat is more of a problem for Japanese farmers so they cope by planting earlier in the morning, from 3 to 4 am, to avoid getting heat stroke. For Japanese farmers, health is more important than crops because being healthy means being productive."

In this scenario, the Japanese farmers would generally take more precautions on their health than their farming activities. As long as they are healthy, even if the crops would be destroyed by a natural calamity or disaster, they would entertain the idea that they would be able to re-plant. Most of the key respondents are not too familiar with the concept of climate change. Even though there is a lot of information about climate change on the internet and on online articles, Japanese farmers are relatively old and rely on the information shown on television.

The farmer groups experienced an annual average of 11 extreme events over the past decade. Among these, six were in the form of typhoons and four are attacks of pests and diseases (Table 6.6). The lowland farms experienced flooding and drought while pest and diseases were more prevalent in the upland farms since there were more vegetable crops which were prone to pest and disease attacks.

Table 6.6. Average Number of Extreme Events That Affected the Respondents' Farms from 2009 to 2019, by Elevation, Gifu Prefecture, Japan

Extreme Event	Lowland	Upland	All Farmers
Typhoon	6	6	6
Flood	0.8	0	0.57
Pest and Diseases	2	10	4.29
Drought	0.4	0	0.29
Total	**9.2**	**16**	**11.15**

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

The respondents were asked to rate the degree of perceived impact of the extreme events on their agricultural production and overall living with scores ranging from 1 to 5, 5 being the highest impact (Tables 6.7 and Figure 6.2).

Table 6.7. Mean Score Rating of the Perceived Impact of Extreme Events to Agricultural Production of the Respondents from 2010 to 2019, by Elevation, Gifu Prefecture, Japan

Year	Lowland	Upland	All Farmers
2009	1.80	2.50	2.00
2010	1.00	1.00	1.00
2011	1.60	1.00	1.43
2012	1.00	1.00	1.00
2013	1.80	1.00	1.57
2014	1.00	1.00	1.00
2015	1.00	1.00	1.00
2016	1.00	1.00	1.00
2017	1.20	1.00	1.14
2018	***2.60***	***4.50***	***3.14***
2019 (Jan-July only)	1.20	1.00	1.14

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

In both study areas, the worst year for extreme events in terms of impact was 2018, the year when typhoon "Jebi" occurred. Moreover, that same year, Japan also experienced numerous earthquakes. Even though there were natural disasters every year in Japan, the farms were seemingly not much affected by them as the farmers gave the lowest score of 1 out of 5 during most years of the past decade.

The farmer respondents were likewise asked to assign mean score ratings ranging from 1 to 5 on the perceived impacts of extreme events in terms of their overall living (Figure 6.2). Both types of respondents in the study areas assigned the highest mean score rating to income with a score of 3.29 out of 5. This is more pronounced among the upland farmers, as they gave a score of 4 out of 5. As mentioned earlier, severe calamities can amount to millions of agricultural income losses especially in the upland areas. Next to income, the second highest mean score that was recorded was in terms of emotional well-being. The farmers believe that having a good emotional well-being is vital in any kind of work, including farming activities. Severe calamities could cause trauma to persons and could negatively affect their emotional well-being and hence affect their productivity.

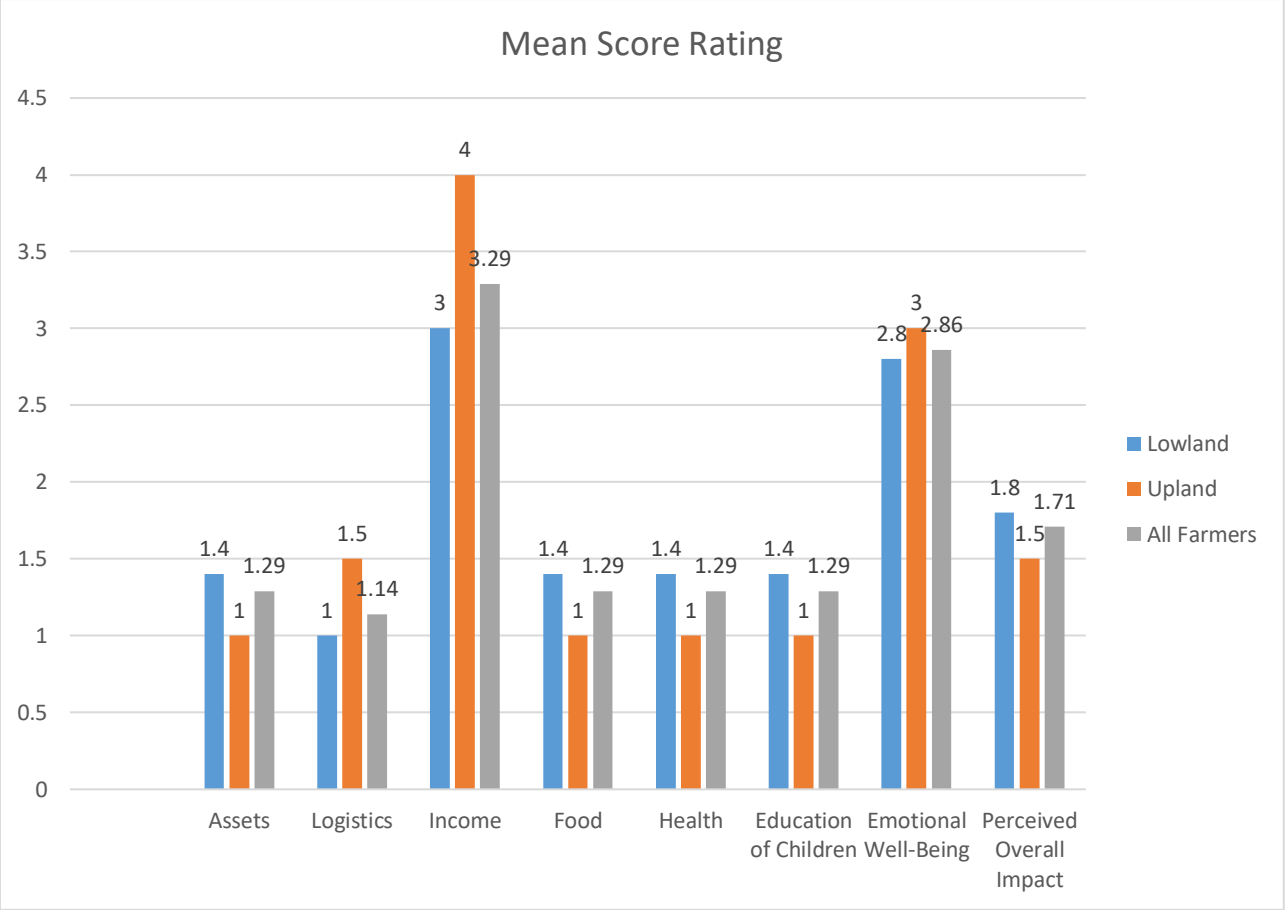

Figure 6.2. Mean Score Rating of the Perceived Impact (1 is the least and 5 is the highest affected) of Extreme Events of the Respondents to Over all Living, by Elevation, Gifu Prefecture, Japan

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

On the other hand, Japanese farmers view logistics as the least affected by extreme events. Japan has excellent infrastructure and the farmers are confident about the quality of their infrastructure thus assigning the lowest mean score to logistics. Aside from the perceived negative effects of income, the farmer respondents assigned a relatively low score to assets (1.29), food (1.29), health (1.29), and education of children (1.29). Japanese farmers have other types of insurance which covers asset losses and health-related concerns and thus gives Japanese farmers confidence and reduces their worries in terms of these indicators.

6.2.6. Coping Strategies of the Farm Groups

Majority of the farm groups, regardless of category, employed two to three coping strategies to minimize the risks and impacts due to natural disasters (Table 6.8). The average number of coping mechanisms utilized in both study areas is three and none of the farming groups used more than five types of coping strategies.

Table 6.8. Number of Coping Strategies Employed by the Farmer Groups for Extreme Events, by Elevation, Gifu Prefecture, Japan

Number of Coping Strategies	Lowland	Upland	All Farmers
None	0	0	0
Only 1	2	0	2
2 to 3	1	2	3
4 to 5	2	0	2
More than 5	0	0	0
Average Number of Coping Strategies	**2.40**	**2.5**	**2.57**

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

The Japanese farm groups have good enough incomes, thus their number one coping strategy used to minimize the risks brought about by natural calamities is to utilize their savings (Figure 6.3). The next popular coping mechanism of the farmer groups is using agricultural insurance and other types of insurance. According to the key respondents, the Japanese farmers have an "insurance culture", it is common for them to avail of an insurance for any investments associated with risk, no matter how big or small that risk would be.

Other coping strategies that the farmer groups resorted to are eating less food, doing multi-cropping, and in rare cases, borrowing money. The Japanese farmers generally do not have to worry about food insecurity, as they generally have enough savings in times of need. In addition, key respondents asserted that since the government of Japan views agriculture as a vital part of the Japanese society, Japanese farmers are provided with subsidies in times of severe calamities.

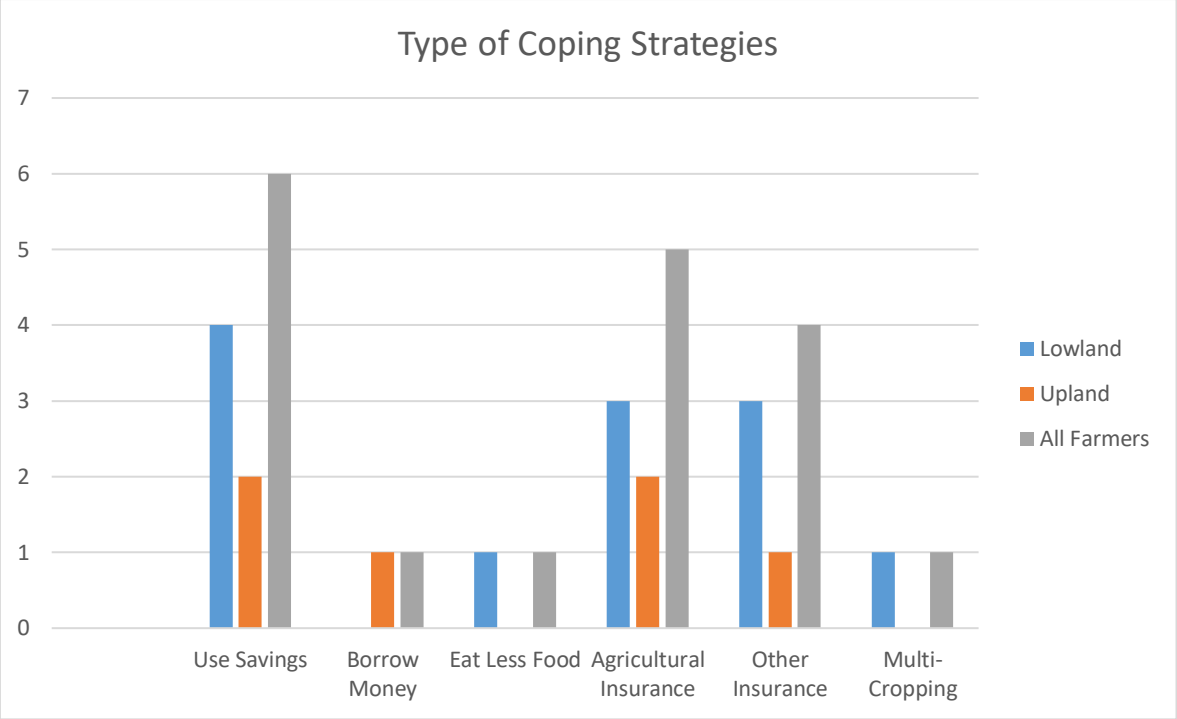

Figure 6.3. Types of Coping Strategies Employed by the Farm Groups for Extreme Events, by Elevation, Gifu Prefecture, Japan
Source: Author's Fieldwork in Gifu Prefecture, Japan, 2018-2019

Figure 6.4. A Farmer Leader Inspecting Strawberry Farms in the Lowland City of Gifu, Gifu Prefecture, Japan
Source: Author's Fieldwork in Gifu Prefecture, Japan, July, 2019

Figure 6.5. Hashiba Farms in the Upland City of Takayama, Gifu Prefecture, Japan
Source: Author's Fieldwork in Gifu Prefecture, Japan, July, 2019

Figure 6.6. Farm Machinery Used to Process Edamame in the Lowland City of Motosu, Gifu Prefecture, Japan
Source: Author's Fieldwork in Gifu Prefecture, Japan, July, 2019

6.3. Assessment of the System Operations of the National Agricultural Insurance Corporation of Japan, by Farmer Respondents

Aside from using the farms' savings, the next popular coping mechanism of the farmer groups is agricultural insurance. Among the farmer groups interviewed in the study areas, all but two groups have availed of agricultural insurance. All but one of the insured farms are insured under the NOSAI. The average annual indemnity payment per farm was JPY 123,400 and JPY 20,601 per hectare though the upland farm groups paid higher premiums amounting to JPY 177,500 per farm and JPY 27,734 per hectare (Table 6.9).

Table 6.9. Types of Insurance Employed by the Insured Respondents, by Elevation, Gifu Prefecture, Japan

Types of Insurance	Lowland	Upland	All Farmers
NOSAI	2	2	4
KYOSAI*	1	0	1
Total	3	2	5
Average Premium Payment per farm (JPY)	87,333	177,500	123,400
Average Premium Payment per hectare (JPY)	14,980	27,734	20,601

*Insurance used for Machineries
Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

The indemnity payments vary from each insured farm group. Annually, each farm is required to submit an "income report" to the NOSAI which provides information on their farms' profit. If the insured farm suffered total farm damages, the NOSAI would give them indemnity payments equal to a maximum of 80% of what they submitted on their income reports from the previous years. If the farm incurred less than that, then the NOSAI would pay indemnity payments until it matched the 80% of the income report they have submitted from the previous year.

6.3.1. Effectiveness of NOSAI's Agricultural Insurance Programs

The Likert Scale was employed to measure the perceived effectiveness of the NOSAI's agricultural insurance programs. The Likert Scale is a method of attributing numerical value to qualitative statistics. A numerical value is assigned to each potential

choice and a mean figure for all the responses is computed. In determining the knowledge of the respondents regarding the enrolment, damage filing, and insurable damages, a 5-point Likert scale was used. In this study, the scale used included the following responses: no knowledge, low knowledge, moderate knowledge, high knowledge, and very high knowledge. The responses were coded accordingly as: 1 = no knowledge, 2 = low knowledge, 3 = moderate knowledge, 4 = high knowledge, and 5 = very high knowledge.

In terms of the accessibility of the program, the scale used included the following responses: no access, low access, moderate access, high access, and very high access. The responses regarding access were coded as: 1= no access, 2 = low access, 3 = moderate access, 4 = high access and 5 = very high access.

The helpfulness of the agricultural insurance provider's staff utilized a 5-point scale which included the following responses: not helpful, sometimes helpful, helpful, most of the times helpful, and always helpful. Responses were coded as: 1 = not helpful, 2 = sometimes helpful, 3 = helpful, 4 = most of the times helpful and 5 = always helpful.

The extent to which the expectations of the respondents were met was measured using a 5-point scale which included the following responses: never, rarely, sometimes, most of the time, and always. Responses are coded accordingly as: 1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time, and 5 = always.

Figure 6.7 and table 6.10 summarize the results of the Likert Scale as a measure for the effectiveness of the agricultural insurance programs of the NOSAI. The respondents were asked about their knowledge about the insurance program, the enrollment processes, filing for insurance coverage, access to NOSAI services, helpfulness of the NOSAI staff, and meeting the beneficiaries' expectations of the insurance programs.

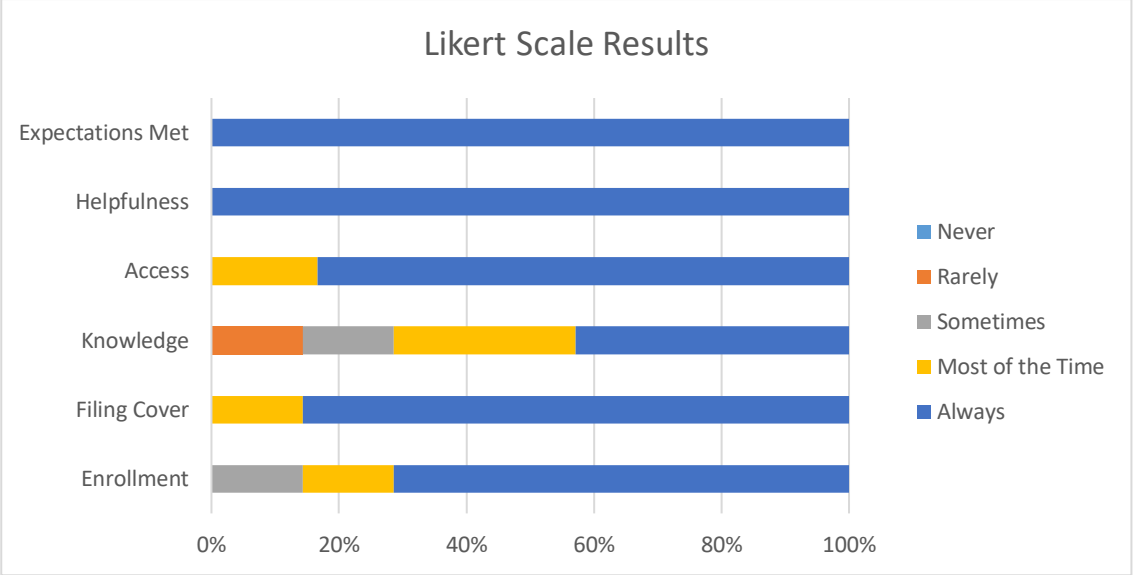

Figure 6.7 Likert Scale Answers of the Respondents to Measure the Effectiveness of NOSAI's Agricultural Insurance Programs
Source: Author's Fieldwork in Gifu Prefecture, Japan, 2018-2019

All farmer respondent groups answered that the NOSAI staff were helpful in assisting them and that their expectations as insured farms were met. All farmer respondent groups also reported that they have readily available access to NOSAI services. In terms of the knowledge about the agricultural programs, majority of the farmer respondent groups claimed that they are knowledgeable. There was one farmer group that is not sure and another farmer group which answered that they do not know enough about the agricultural insurance programs of NOSAI. In terms of filing for insurance cover and enrollment to the program, majority of the farmer groups are well informed. From the farmers' answers, the mean score rating was computed.

The helpfulness of the NOSAI staff and expectations met had the highest and perfect rating of 5.00 while the lowest rating was the enrollment in the NOSAI's agricultural insurance programs with a rating of 4.57 out of 5.00. Generally, the farmers gave all the system indicators high scores. However, when the farmer respondent groups were asked to rate the NOSAI's overall agricultural insurance system from 1 to 10 with 10 being the

highest, they gave a mean rating of 5.60 out of 10.00. This is because the farmers are not happy with the NOSAI's agricultural insurance system.

Table 6.10. Mean Score Rating for the Effectiveness of the System of Agricultural Insurance Programs, by Elevation, Gifu Prefecture, Japan

System Indicator	Lowland	Upland	All Farmers
Enrollment in Program	4.80	4.00	4.57
Filing of Applications for Cover	4.80	5.00	4.86
Knowledge About the Program	3.80	4.50	4.00
Access	4.80	5.00	4.86
Helpfulness of the Staff	5.00	5.00	5.00
Meet Expectations	5.00	5.00	5.00
Average Distance of Nearest NOSAI Office	1.10 km	4.00 km	1.93 km
Overall Agricultural Insurance System Rating*	**6.00**	**5.00**	**5.60**

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019
*In a scale of 1 to 10, where 10 is the highest.

Table 6.11 and 6.12 show the reduction of profit loss before and after receiving indemnity payments from agricultural insurance programs of the NOSAI. Every year, the Japanese farmers are affected by various extreme events and their crops are susceptible to damages which results to income losses among the farmers. As mentioned earlier, the Japanese farmers are required to submit an income report to the NOSAI used as a basis in estimating premium payments and the amount of indemnity the farmers would receive. When the farm experiences losses from insurable damages, the NOSAI would give them indemnity payments until it matches eighty percent of their submitted income report from the previous year. The average income of the farmer respondent groups in both study areas is JPY 76,250,000 (PhP 35,057,000 or USD 686,250).

On the other hand, the average income losses of the groups in a disaster year before receiving agricultural insurance is JPY 22,689,286 (PhP 10,437,072 or USD 204,204) per farm and JPY 3,787,861 (PhP 1,742,416 or USD 34,091) per hectare. After receiving indemnity payments, their income losses for the year has decreased to JPY 5,672,322 (PhP 2,609,268 or USD 51,051) per farm and JPY 946,965 (PhP 435,604 or USD 8,523) per hectare. The average indemnity received by the farmer groups in both study sites amounts

to JPY 17,016,965 (PhP 7,827,804 or 153,153) per farm or JPY 2,840,896 (PhP 1,306,812 or USD 25,568) per hectare which is enough for the farmers to recoup their agricultural losses. On top of these, farmer respondent groups cited that the Government of Japan also provides subsidies in times of severe and destructive disasters.

Table 6.11. Profit Loss Reduction Before and After Agricultural Insurance of Insured Farmers, per Farm, Gifu Prefecture, Japan

Currency	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment
Philippine Peso	10,437,072	2,609,268	7,827,804
Japanese Yen*	22,689,286	5,672,322	17,016,965
US Dollar**	204,204	51,051	153,153

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019
*1 Japanese Yen = 0.46 Philippine Peso
**1 Japanese Yen = 0.009 US Dollar

Table 6.12. Profit Loss Reduction Before and After Agricultural Insurance of Insured Farmers, per Hectare, Gifu Prefecture, Japan

Currency	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment
Philippine Peso	1,742,416	435,604	1,306,812
Japanese Yen*	3,787,861	946,965	2,840,896
US Dollar**	34,091	8,523	25,568

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019
*1 Japanese Yen = 0.46 Philippine Peso
**1 Japanese Yen = 0.009 US Dollar

6.3.2. Farmer Participation in the NOSAI's Agricultural Insurance Programs

The National Agricultural Insurance Association of Japan' major insurance programs are categorized into two types: the nationwide and optional programs. Farmers producing rice, wheat, barley, and livestock are required to insure their farms and animals until 2031 according to the key respondents. On the other hand, insurance of other crops and farm buildings and machineries are of the optional program type which means that the farmer or farmer group has a choice to insure them or not. Enrolling in the agricultural insurance programs is a coping strategy (Table 6.13). Those who did not avail of insurance

claim that they do not need it and that their savings and other coping strategies were enough to recoup their losses due to occurrence of destructive disasters.

Table 6.13. Reasons for Participating or Not Participating in Agricultural Insurance Programs, by Elevation, Gifu Prefecture, Japan

Reasons	Lowland	Upland	All Farmers
Participation			
Coping Strategy	3	2	5
Non Participation			
Don't Need Insurance	2	0	2

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

6.4. Problems Encountered in the Implementation of Agricultural Insurance and Other Issues

This section discusses the problems encountered by the farmer respondent groups in the implementation of agricultural insurance as well as their suggestions to improve the programs' implementation and how to address other issues related to agricultural activities. The research found out that the agricultural insurance programs of NOSAI are overall effective based on the results of the assessment of the NOSAI's agricultural insurance programs. Two farmer groups, however, experienced damage estimate gaps and were not able to receive the indemnity payments they were expecting to receive (Table 6.14).

To improve the implementation mechanism of the agricultural insurance programs of the NOSAI, the farmer respondent groups suggested that the insurance office workers should have enough knowledge on farming and that the NOSAI should diversify its agricultural insurance products. The farmer groups want NOSAI office workers to be knowledgeable in agriculture so that they can be more helpful in assisting farmers on problems that involve agriculture as well as to lessen the gap on the damage estimation. Meanwhile, since there are only six major agricultural programs that the NOSAI provides, some farmers, such as those producing trees, could not insure their crops. Other than these problems and suggestions, the farmer groups view that overall, the NOSAI's agricultural insurance programs are effective coping strategies in times of destructive natural disasters.

Table 6.14. Problems Encountered, Suggestions, and Other Requests of the Respondents, by Elevation, Gifu Prefecture, Japan

Item	Lowland	Upland	All Farmers
Problems Encountered			
Damage Estimate Gap	2	0	2
None	1	2	3
Suggestions			
The insurance office workers should have enough knowledge on farming	3	2	5
NOSAI should diversify Insurance Products	3	2	5
Other Requests from Government			
Give support, subsidies, and encouragement to young farmers as the average age of farmers now is 70 years old	1	0	1
None	4	2	6

Source: Author's Fieldwork in Gifu Prefecture, Japan, 2019

The farmer respondent groups were also asked about what they wish the government of Japan would do more to improve the Japanese agricultural sector. All but one farmer groups view that the agricultural sector of Japan is fine. The farmer group, with an average age of 76, suggested that the government should give support, subsidies, and encouragement to young farmers as the group emphasized that the average age of Japanese farmers is now about 70 years old. With an aging society and the little involvement of the youth in agriculture, there might be no more Japanese farmers in the near future, thus affecting their agricultural productivity and ultimately, their food security.

6.5. Analysis

The National Agricultural Insurance Corporation of Japan provides enough cushion to protect Japanese farmers against the perils of destructive disasters. The principal reason why some farm groups did not enroll in the insurance program is their assertion that their farms were not susceptible to natural disasters and they feel they have enough savings in case of income loss due to disasters. Even though Japan's exposure to climate hazards is high according to UNUEHS (2018), Japan minimizes any climate hazard's impacts by employing effective adaptive and coping strategies. Japan built infrastructure that could

withstand destructive disasters. Buildings were made to endure earthquakes, flood control gates were built to minimize the impacts of flood while the installation of the retaining walls or "Yoheki" protects the upland areas from landslides. Moreover, the Japanese people experienced numerous natural disasters that they have learned to adapt. Museums, statues, and other memorials can be seen all over the country commemorating destructive disasters and reminding and raising the awareness of the Japanese people about natural disasters. This is why the Japanese farmers enroll in agricultural insurance programs, get their own personal insurance, set aside savings for emergency and practice multi-cropping, which is planting different crops on different seasons. This practice is not only good for the soil conditions of the farm, but also gives farmers a "back-up" crop if ever the previous planted crop incurred damages from whatever reason.

In times of destructive disasters, the government of Japan gives subsidies to the affected farmers and farmer groups as the government views agriculture as a vital part of Japanese society, as claimed by the key respondent groups. This provides farmers stronger safety net in times of disasters and a reason for some Japanese farmers to forgo agricultural insurance.

Among NOSAI's agricultural insurance programs, the rice, wheat, barley, and livestock farmers are required to insure their produce. The government also subsidizes 50% of the premium of these agricultural insurance programs. Farmers producing these are only required to insure their farms until 2031. After that, it will be an optional program, just like the rest of NOSAI's insurance programs. In that scenario, the farmers would have a choice to get insurance or not. This will give the farmers producing the aforementioned crops and livestock more options to choose on what effective coping strategy they will employ. By that time, there might be more players in the agricultural insurance market or the government could provide more subsidies. Upland farmer groups, which have higher income than the

lowland farmer groups, can use the money spent on paying indemnity payments elsewhere such as putting it into their savings, building stronger farm facilities and providing health and other types of insurance to their farm workers.

The main differences between the upland and lowland farms are the farm size, relative vulnerability to natural disasters, and income. The upland farms tend to be bigger, and since they are producing crops with higher value, their incomes are also relatively higher. In addition, upland farms are less susceptible to natural disasters. This can be a reason to make agricultural insurance irrelevant, but pest and diseases in the upland farms are more prevalent compared to the lowland. Both areas have the same practices in terms of coping strategies employed to minimize losses during disaster times.

The main challenge of Japanese farmers, according to the respondents, is the sustainability of Japanese agriculture. The average age of the farmer respondents in the lowland areas is 72, while 52 years is the average age of upland farmers. With aging society paired with the unwillingness of the Japanese youth to venture into farming, the farmer respondents are concerned that there might be no more farmers in the future.

6.6. Conclusion

Japan and other countries located around the Pacific Rim of Fire have high exposure to natural disasters such as typhoon, earthquake, and volcanic eruption. Yet, according to the report by the UNUEHS (2018), the country only ranks 29th in terms of risk to natural disasters. This is because Japan has better scores in terms of adaptive and coping capacities compared to the other countries located in the Ring of Fire, which are mostly middle and low income countries that have a hard time coping to extreme events.

The results of this case study shed light on what Japan is doing to cope and adapt better to the effects of extreme events. The study identified two main reasons – good

governance and adaptability. The government provides infrastructure to minimize the effects of natural disasters as well as establishes the NOSAI in addition to subsidies given to farmers during times of disasters. On the other hand, the farmers learned to cope and adapt by themselves, even without the help of the Japanese government.

Japanese farmers also practice self-education regularly, and are always on the look-out for new information from television, the media, and the government. Moreover, exchange of technical information between the farmers and the agricultural cooperatives as well as periodical educational support from the government makes the agricultural insurance system better. The Japanese people have an insurance culture, in which they view any form of insurance as an investment which will be beneficial for them in the occurrence of any uncertainties in every aspect of life.

The NOSAI requires the insured farms to submit income reports every year so they will have a basis on how much indemnity payments to give to their beneficiaries. The NOSAI will pay until the income of the farmers reach 80% of the expected income. In addition, farm equipment, machineries, and buildings can also be insured under the NOSAI or other private insurance companies. When farm equipment, machineries, and buildings are destroyed, the farmers could receive up to 80% of the total original cost of these items. The agricultural system of the NOSAI is effective in reducing economic losses of the farmer beneficiaries and has a systematic way of service delivery which is deemed efficient paired with strong farmer participation. Therefore, it can be concluded that NOSAI's agricultural insurance programs are effective in providing a safety net for natural disasters for Japanese farmers. However, strong government support on agricultural activities, private insurers, and effective coping and adaptive strategies by farmers themselves could make NOSAI unnecessary in the future.

CHAPTER 7

COMPARATIVE STUDY OF AGRICULTURAL INSURANCE IN SELECTED AREAS IN THE PHILIPPINES AND JAPAN

7.1. Introduction

This chapter contains results of comparing previous case studies presented in chapters 5 and 6, which were the cases of the Laguna Province in the Philippines and Gifu Prefecture in Japan. Based on the analyses of the results of the key informant interviews of the local government officials, insurance corporation staff, farmer corporations and family-run farms as well as individual farmers, this chapter compares and contrasts the similarities and differences of both cases. The chapter investigates what the Philippines and other disaster vulnerable countries can learn from the Japanese agricultural insurance system, as well as from the Japanese farmers' insurance culture and coping and adaptive strategies to minimize the damages brought by climate-related extreme events.

The differences and similarities of the profile of the Japanese and Filipino farmers will be discussed with an emphasis on their agricultural production, farming systems set-up, natural disaster characterization, experience, and impacts, and coping and adaptive strategies. Following these discussions, the institutional set-up of agricultural insurance of both countries will be tackled. The efficiency, effectiveness, and participation of farmer beneficiaries in the main implementer of agricultural insurance in both countries will then

be compared and contrasted. The identified lessons from each country experiences will be highlighted before concluding the chapter.

7.2. Comparison of Farmer Respondent Profile, Agricultural Production and Farming Systems in Japan and the Philippines

Table 7.1 compares farming profile and the farming systems set-up of the respondents in selected municipalities of Laguna Province in the Philippines, and Gifu Prefecture in Japan. The key differences between the Japanese and Filipino farmers are the farm set-up, size and ownership. The Filipino farmers operate singularly and can either own, lease, or rent the land they till, whereas Japanese farmers own the land and operate either as a family-run farm, farm business, or a farm corporation or company.

Aside from engaging in farming activities, Filipino farmers take part in off-farm work when they are waiting for their crops to be ready for harvesting or while waiting for a certain amount of days (depending on the crops they grow) until the agricultural land is ready for planting again. Female farmers usually own a “sari-sari store” which is a small informal grocery store common all over the Philippines. Female farmers also usually work as “labanderas” or “laundry women” for more well-off families. On the other hand, male farmers usually work as on-call drivers or engage in construction work or carpentry. Most of the Japanese farmer respondents do not have off-farm work at present but had full time jobs as a “salaryman” and engaged full time in farming after they retired from their corporate jobs. Before they engaged in farming, their wives were the ones who managed their farms full time. This is the case for the family-ran farms, while the farmer leaders of the farm corporations engaged full time in farming at the beginning of their careers.

Unlike Japanese farmers, Filipino farmers operate singularly and most do not own their farm lands ever since the Spanish colonial era. During these times, as illustrated by Sen

Nag (2017), the Spanish, mixed Spanish and native, and other elite families in the region enjoyed exclusive rights over vast tracts of fertile lands, and exploited the native Filipino workers to toil on their lands for their benefit at the locals' expense. This was called the "Hacienda System".

Lowland rice and highland intensive mixed farming systems are found in both countries. Since Japan has a temperate climate, temperate mixed farming systems can be found. Urban based farming systems in the outskirts of urban areas are found all over Japan, while tree crop mixed and root tuber farming systems round up the farming systems found in the Philippines. The average number of crops grown in Japan is two on an average six hectares of farm land, while three is the average in the Philippines on a 1.4 hectares of farm land. All Japanese farmers are members of the Japan Agriculture group and other various cooperatives, while not all Filipino farmers belong to a cooperative.

Both countries' farmers are aging as the Japanese population are generally aging and the Filipino youth are discouraged from venturing into agriculture because they see as a kind of "dirty work". The average age of Japanese farmer-respondents is 71, while the average age of Japanese farm workers is 53. The average age of Filipino farmer-respondents is 55, which is considered old in the Philippines. The average years spent in school of the Filipino farmers is ten years (finished high school) whereas Japanese farmers spent 15 years in school and were bachelor degree holders in various fields such as Business Economics, Mechanics, Commerce, and Agriculture. Most of the female Japanese farmers were into farming activities while their husbands work in the corporate world. On the other hand, Filipino farmers do farming as a main occupation and get involved in non-farm work as another source of income.

There is a huge difference between the average income of the Japanese and Filipino farmer respondents. The average annual income of a Japanese farm respondent is 76,250,000 Japanese Yen (JPY) or 35,856,269 Philippine Pesos (PhP) whereas the average annual income of a Filipino farmer respondent is PhP 408,896 (JPY 869,345). The average annual income of a Japanese farm respondent is the income generated for the whole farm and given these figures, the average annual income of Japanese individual farmer respondents would amount to JPY 6,354,167 (PhP 2,988,022) which is about 630% higher than the average annual income of the Filipino farmer respondents.

Table 7.1. Comparison of Farmer Profile and Farming Systems Set-up of the Respondents in the Philippines and Japan

Frame of Reference	Philippines	Japan
Farmer type	Individual Farmer	Family Farm/Farm Business Company
Farm Tenure Status	Varies (Land Owner, Lessee, Tenant)	Land Owner
Farm Location	Upland – Nagcarlan and Liliw Lowland – Santa Cruz	Upland – Takayama Lowland – Gifu
Farming Systems Type	Lowland Rice Tree Crop Mixed Root Tuber Highland Intensive Mixed	Lowland Rice Temperate Mixed Urban Based Highland Intensive Mixed
Crops and Livestock (number)	3	2
Farm Size (hectare)	1.4	6
Cooperative Membership	Not All	All
Annual Income	PhP 408,896 (JPY 869,345) per farmer	JPY 76,250,000 (PhP 35,856,269) per farm; JPY 6,354,167 per farmer (PhP 2,988,022)
Average Annual Income of Salary Workers	PhP 810,055 (JPY 1,749,719)	JPY 4,140,000 (PhP 1,904,400)
Salary Difference of Farmers vs Average Salary Worker	Salary Worker Annual Salary About 98% Higher	Individual Farmer Annual Salary About 53% Higher
Age	55	71 for main farmers; 53 for farmer workers
Education (in years)	10	15
Other Occupation Now	Non-Farm Work	No

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019; Kawano, 2019; and Average Salary Survey, 2019

The Filipino farmer respondents' annual incomes are above average compared to the annual incomes of the farmers in the Philippines. According to the Philippine Statistical Authority (2019a), the average per hectare gross profit per hectare of farmers amounts to

PhP 89,070 as of 2019. This is lower than the per hectare annual income of the farmer respondents in Laguna province whose average annual income per hectare valued at PhP 138,052. On the other hand, farmer-respondents from Gifu prefecture are in the lowest income group of farmers in Japan in a report by Hori (2017, pp. 2-3) from the Mizuho Corporation. According to the report, Chiba prefecture have the highest income per hectare while Hokkaido has the highest average annual income per farm. Although Hokkaido's income per hectare is low, its income per farm is five times greater than the national average because its agricultural land area per farm is 14.6 times larger than the rest of Japan (Hori, 2017, pp.2-3).

The average annual income of a salary worker in Japan according to Kawano (2019) is about JPY 4,140,000 (PhP 1,904,400) which means that the annual income of an individual farmer in the study areas in Gifu prefecture is about 53% higher. On the other hand, the average annual income of a salary worker in the Philippines according to Average Salary Survey (2019) is PhP 810,055 (JPY 1,749,719) which is almost double the annual income of the average annual salary of the farmers in the study areas in Laguna province.

The comparison of agricultural production of the respondents in the selected case countries is summarized in table 7.2. Japanese farmers spend a lot more to grow their crops with an average annual amount of JPY 4,424,040 (PhP 2,035,058) per hectare compared to Filipino farmers who spend an annual average of PhP 79,164 (JPY 170,993). Japanese farmers spend about 2470% more than their Filipino counterparts. Interestingly in both study areas, the upland farmers spend more per hectare to produce their commodities than their lowland counterparts.

The average annual profit per hectare of Filipino farmers on a normal year is PhP 138,052 (JPY 298,193) whereas the Japanese farmers earn about 4100% more with an

annual profit per hectare of JPY 12,729,549 (PhP 5,855,593) during a normal year. In both countries, similar to the annual production cost, upland farmers have more returns per hectare annually than lowland farmers.

Table 7.2. Comparison of Average Agricultural Production per hectare during Normal Year and Year with Extreme Events by the Respondents in the Philippines and Japan

Income	Philippines			Japan		
	Lowland	Upland	All	Lowland	Upland	All
Production Cost						
Philippine Peso	70,380	94,383	79,164	1,130,932	4,528,125	2,035,058
Japanese Yen	152,021	203,867	170,993	2,458,548	9,843,750	4,424,040
US Dollar	1,407	1,887	1,583	22,127	88,594	39,816
Profit (Normal Year)						
Philippine Peso	114,510	178,843	138,052	2,272,384	14,006,641	5,855,593
Japanese Yen	247,342	386,300	298,193	4,939,966	30,449,219	12,729,549
US Dollar	2,290	3,577	2,761	44,460	274,043	114,566
Profit (Extreme Event Year)						
Philippine Peso	86,283	88,926	87,250	1,611,184	9,804,648	4,113,177
Japanese Yen	186,372	192,080	188,461	3,502,573	21,314,453	8,941,688
US Dollar	1,726	1,778	1,745	31,523	191,830	80,475
Net Difference (Profit during Extreme Event Year – Profit during Normal Year)						
Philippine Peso	-28,227 (25% of income)	-89,917 (50% of income)	-50,802 (37% of income)	-661,201 (30% of income)	-4,201,992 (30% of income)	-1,742,416 (30% of income)
Japanese Yen	-60,970	-194,220	-109,732	-1,437,393	-9,134,766	-3,787,861
US Dollar	-565	-1,799	-1,016	-12,937	-82,213	-34,091

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

On the other hand, Japanese farmers have more to lose in times of destructive natural disasters and other perils. The Japanese farmers lose about 3300% more income compared to their Filipino counterparts. During a disaster year, Japanese farmers' income loss amount to JPY 3,787,861 (PhP 1,742,416) per hectare whereas Filipino farmers' income losses in a disaster year amount to PhP 50,802 (JPY 109,732). Similar to the other cases, upland farmers lose more income per hectare than their lowland counterparts.

The numbers indicate that there is a huge difference between the production costs, incomes, and risk of income loss during disaster years between the Japanese and Filipino farmers. Even though Japanese farmers could incur higher income loss during a disaster

year, they earn a lot more than their Filipino counterparts and their savings would be enough as a cushion to the damages brought by natural disasters. The numbers also indicate that generally, upland farmers are better-off than the lowland farmers. The upland farmers tend to spend more on production costs as they produce high value crops, which could require more expensive fertilizers and pesticides. On the other hand, these crops were more like a "high-risk, high-reward" in terms of investment. The upland commodities were more susceptible to the effects of natural disasters and pests, but can yield more income if the produce would be properly protected.

7.3. Natural Disaster Characterization, Experience, and Impacts

To determine the farmer respondents' understanding about climate change and extreme events, eleven statements were listed and the respondents were asked to respond if they strongly agree, agree, don't know, disagree or strongly disagree. The dominant answers of the farmer respondents in the case study areas are summarized in table 7.3 and figure 7.1. The rankings of their answers are enclosed in a parenthesis.

Among the eleven statements that were asked to the farmer respondents in both case countries, majority of their answers were similar. Majority of the farmer respondents answered "strongly agree" and "agree" about their understanding of the concept of climate change, extreme events as a by-product of climate change, the predictability of extreme events, negative impacts of extreme events, early warning system, the frequency and severity of extreme events, and considering extreme events as a problem.

One of the statements that the farmer respondents answered differently was the statement indicating that "climate change is man-made and not caused by God". Interestingly, majority of the Filipino farmers answered "strongly agree" that climate change is man-made. Although there were some farmers who still believe that climate change is a

work of God, majority of the Roman Catholic nation farmers believe that the phenomenon is man-made. In contrast, majority of the farmer respondents in the Atheist country of Japan believe that climate change is a work of God. Even if the farmers have different beliefs, the Japanese farmers are more prepared to handle extreme events and will be discussed in the following sections. The Japanese farmers also believe that their respective town(s) city(s), or prefecture(s) are not prepared to handle extreme events that is why they try their best as a household or as a farming corporation to be prepared by themselves.

Meanwhile, Filipino farmers agree that their respective town(s) city(s), or province(s) are prepared to handle extreme events. This belief could prove disadvantageous, because the Filipino farmers can cultivate dependency mindset and thus, rely too much on the local governance rather than building strong preparedness ability and coping mechanisms by themselves.

Table 7.3. Comparison of Characterization of Extreme Events of the Respondents in the Philippines and Japan

Statement	Dominant Answer (Rank)	
	Philippines	**Japan**
I fully understand the concept of climate change.	Strongly Agree (6)	Strongly Agree (6)
Climate change is man-made and not caused by God.	Strongly Agree (8)	Disagree (1)
Extreme events are caused by climate change.	Agree (2)	Agree (3)
Extreme event is predictable.	Strongly Disagree (1)	Agree (2)
Negative impacts of extreme events can be prevented or reduced.	Agree (1)	Agree (1)
There is an early warning system for extreme events in our barangay/town/city/prefecture	Strongly Agree (5)	Strongly Agree (5)
Extreme events are becoming more severe now.	Strongly Agree (2)	Strongly Agree (3)
Extreme events are becoming more frequent now.	Strongly Agree (7)	Strongly Agree (4)
My household is prepared to handle extreme events.	Strongly Agree (3)	Strongly Agree (1)
Our barangay/town/city/prefecture is adequately prepared to handle extreme events	Strongly Agree (4)	Don't Know (1)
I consider extreme events as a problem.	Strongly Agree (1)	Strongly Agree (2)
Statement that Most Agree	I consider extreme events as a problem.	My household is prepared to handle extreme events.
Statement that Most Disagree	Extreme event is predictable.	Climate change is man-made and not caused by God.

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

Another notable different belief of the farmers in both case countries is the ability to predict the incoming extreme event before it even occurred. Majority of the Japanese farmers believe that extreme events can be predicted while their Filipino counterparts believe otherwise. Japan has a strong meteorology department which the Japanese farmers believe provides adequate information and warnings about an incoming natural disaster. This way, the Japanese town or prefecture and the Japanese farmers themselves would have enough time to prepare.

On the other hand, Filipino farmers do not trust the weather information provided to them, saying these are inadequate. Some farmers mentioned for instance that the weather information broadcast on television stated that there would be heavy rains during this particular time when in fact, it was sunny during that time. These scenarios made the Filipino farmers more relaxed when it comes to weather information which could make them less vigilant. On the other hand, Japanese farmers tend to expect the worse every time there is a natural disaster warning. If the natural disaster turned out to be not as strong as predicted, then the farmers would be thankful. The Japanese farmers tend to stay vigilant to future natural disasters that may affect them, unlike their Filipino counterparts.

The statement that the Filipino farmers answered the most "strongly agree" and "agree" was "I consider extreme events as a problem" while the most disagreeable statement answered by the Filipino farmers was "Extreme event is predictable". On the other hand, Japanese farmers' most agreeable statement was "My household is prepared to handle extreme events" while the most disagreeable statement was "Climate change is man-made and not caused by God".

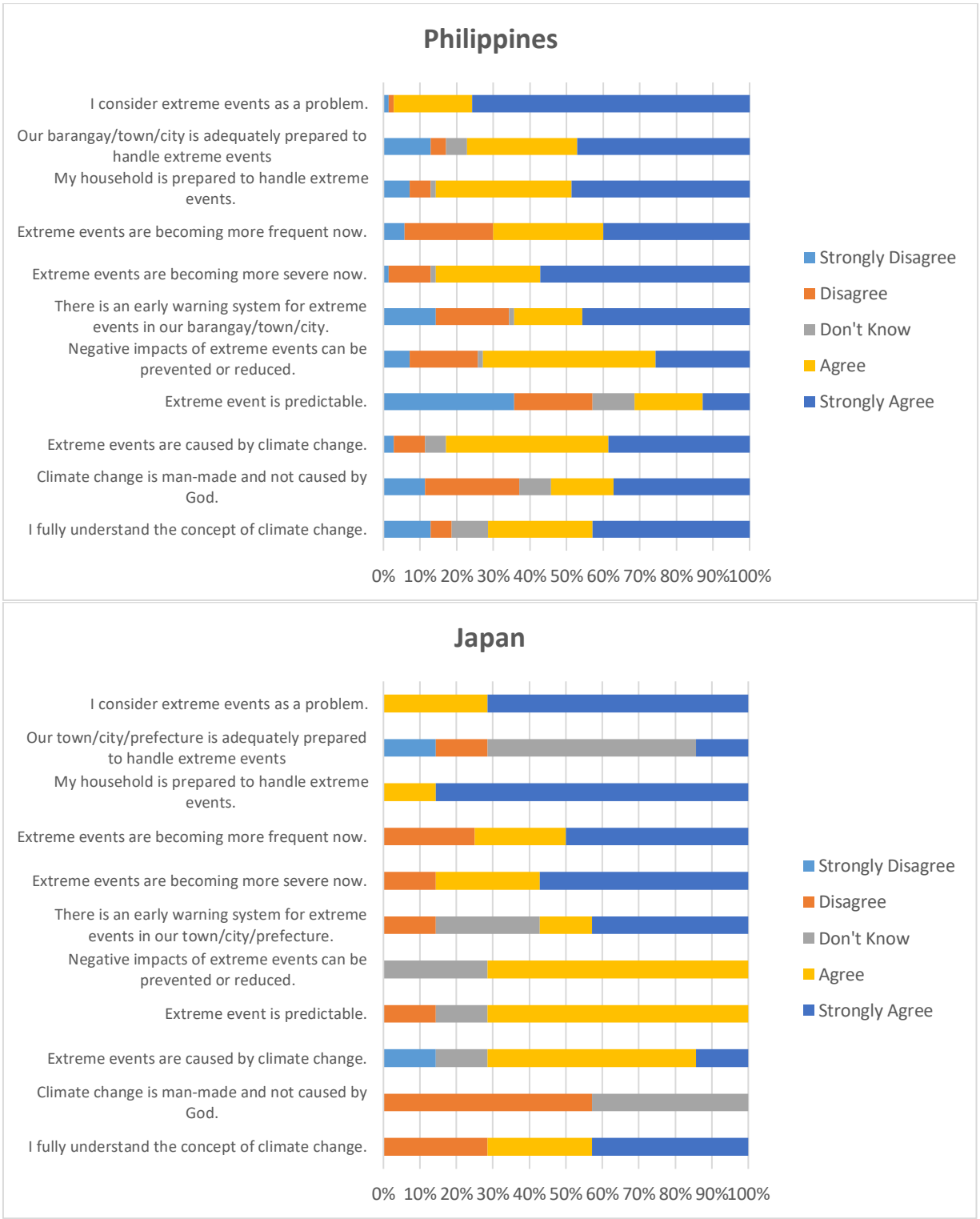

Figure 7.1. Likert Scale of the Characterization of Extreme Events Experienced by Respondents in the Philippines and Japan

Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

Based on these answers, a clear difference can be observed between the mindset of the Filipino and Japanese farmers. Filipino farmers view the impacts of natural disasters as big problems in their farming activities and their daily lives. Although Japanese farmers view natural disasters as a problem too, they focus more on the solutions and what they can do individually or collectively to be more prepared. Thus, Japanese farmers are confident that their households are well prepared to handle the effects of extreme events.

As mentioned in disaster management literature, the community's culture are mostly ignored when designing and executing disaster management schemes (Hoffman 1999, pp. 1-16; Wisner et al., 2004; Palliyaguru et al., 2010, pp. 277-296; Kulatunga, 2010, pp. 304-313). Nunn et al. (2007, pp. 385-401) and Oliver-Smith and Hoffman (1999, pp. 173-191) emphasized that ignoring a community's culture will have more negative effects on the vulnerabilities of a community to natural disasters. In addition, the studies stressed that because of this ignorance, the development of disaster management activities would be unsuccessful. Similarly, Huntington (2000, p. 133) stressed that role of the values of a community's culture as well as the attitude serve as constraints or facilitators of the progress of disaster management tactics. The study mentioned that these were mostly overlooked by governments, thus slows the progress of the community's disaster management activities. Results of the case studies confirm these claims. This is especially true for Filipino farmers and the government. The Philippine government does not require its farmers to enroll in agricultural insurance, and assumes that they can cope on their own. In reality, most of the Filipino farmers do not have an "insurance" culture and have this mindset that they will just deal with the problem if and when it arrives. For this reason, Philippine disaster management in general has not been effective in times of widespread natural disasters.

Generally, the Filipino farmers were affected more by destructive natural disasters from 2009 to 2019 as they were affected around seven more than their Japanese counterparts

(Table 7.4). Farmer respondents in both countries experienced typhoon the most, while flooding brought about by typhoons and heavy rains are prevalent in the Philippines. There were more pest and diseases problems for the Japanese farmers than the Filipino farmers.

Even though both countries experienced earthquakes, these geographical disasters were not strong enough to inflict damages and disruption to the farming activities of the farmer respondents. Drought is present in both areas, but the Filipino farmers are more susceptible to them. A reason for this is the lack of agricultural technology in the Philippines. Shallow tube wells are a common site in Japanese farms that use heavy irrigation, which can be useful in times of drought. Lowland rice farming systems are present in both countries, and that particular farming system heavily relies on irrigation. The lowland rice farming systems in the Philippines generally have less modern technology and not all farms have shallow tube wells and pumps. This makes Philippine farms more susceptible to drought.

The most common natural disaster that the farmer respondents in the lowland areas in the Philippines experienced was flooding, while typhoon was the most common disaster that the Filipino upland farmer respondents experienced over the past decade. On the other hand, both lowland and upland Japanese farmer respondents' most natural disaster experience was typhoon.

Yearly, almost the same number of natural disasters hit both the Philippines and Japan. Yet, results of the case studies revealed that Filipino farmers were more affected by these disasters. The Philippines lacks the agricultural technologies and infrastructure that can help its farmers combat the effects of natural disasters. Japanese farmers have agricultural technologies to combat disasters such as drought, while infrastructure such as flood control gates and boulder walls protect Japanese farmers from flooding and landslides, respectively. Therefore, the Japanese farmers are generally less affected by natural disasters

compared to their Filipino counterparts. These case study results justify the World Risk Report by the United Nations University Institute for Environment and Human Security (2018) which indicated that Japan ranked lower (29th out of 172 countries) than the Philippines (3rd) in terms of risk yet both countries have similar exposure scores. The report mentioned that Japan has stronger scores in adaptive and coping capacities which is why the country was ranked lower overall.

Table 7.4. Comparison of the Average Number of Extreme Events That Affected the Respondents' Farms from 2009 to 2019 in the Philippines and Japan

Extreme Event	Philippines	Japan
Typhoon	10.00	6.00
Flood	5.20	0.57
Landslide	0.21	0.00
Earthquake	0.06	0.00
Pest and Diseases	1.98	4.29
Drought	1.07	0.29
Total	**18.56**	**11.15**

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019
*Flood is most dominant extreme event in Philippine lowland; Typhoon in Upland
**Typhoon is most dominant extreme event in both elevations in Japan

According to the report by the United Nations International Strategy for Disaster Reduction (2018), climate-linked calamities dominated all disasters over the past 20 years. It added the most frequent disaster was floods followed by typhoons, earthquakes, and extreme temperature. The results of the case studies found this to be correct, with the occurrence of floods and typhoons identified as the most common disasters in both countries.

Table 7.5 shows the mean score rating of the perceived impact of extreme events on agricultural production of the respondents in the Philippines and Japan from 2009 to 2019. The farmer respondents were asked to rate the impacts of extreme events to their agricultural production and livelihood in general with ratings ranging from 1 to 5, with 5 being the highest.

Table 7.5. Mean Score Rating of the Perceived Impact of Extreme Events on Agricultural Production of the Respondents in the Philippines and Japan from 2009 to 2019

Year	Philippines			Japan		
	Lowland	Upland	All	Lowland	Upland	All
2009	***3.86***	1.91	2.89	1.80	2.50	2.00
2010	1.37	1.23	1.30	1.00	1.00	1.00
2011	1.37	1.11	1.24	1.60	1.00	1.43
2012	1.29	1.11	1.20	1.00	1.00	1.00
2013	2.26	2.09	2.17	1.80	1.00	1.57
2014	3.06	***4.97***	***4.01***	1.00	1.00	1.00
2015	1.57	1.31	1.44	1.00	1.00	1.00
2016	1.38	1.46	1.41	1.00	1.00	1.00
2017	1.80	1.14	1.47	1.20	1.00	1.14
2018	2.46	2.46	2.46	***2.60***	***4.50***	***3.14***
2019	2.49	2.71	2.60	1.20	1.00	1.14

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

The lowland farmers in the Philippines rated the year 2009 the highest as they were affected by heavy flooding and destruction caused by Ketsana (local name "Ondoy"). All in all, the year 2014 was the worse year for natural disasters for all farmer respondents as they felt the strong impact of typhoon Rammasun (local name "Glenda") which totally destroyed the farms and homes of the Filipino upland farmers and also affected the lowland farmers. On the other hand, Japanese farmers noted that their worst year for natural disasters was 2018, when typhoon Jebi ravaged the country. During the same year, Japan experienced numerous but less damaging typhoons, heavy rains, and earthquakes. The Japanese upland farmers were more affected, as most of their high value crops were destroyed because of the typhoon.

Both farmer respondents in the case countries were asked about the impacts of extreme events other than in agricultural activities and all the respondents from both countries unanimously answered that income was affected the most (Table 7.6). Generally, the Filipino farmers were more affected by the impacts of extreme events based on their mean score rating as the perceived overall impact mean score of the Filipino farmers is 2.60 out of 5.00 while Japanese farmers perceived overall impact mean score is 1.71 out of 5.00. There is one category that the Japanese farmers rated higher which is the Emotional Well-

Being, which they scored 2.86 out of 5.00 compared to the Filipino farmers' score of 2.40 out of 5.00. This could explain the Japanese farmers' vigilance towards natural disasters. When a disaster affects them, the emotional trauma is stronger compared to the Filipino farmers. This is why the Japanese farmers were able to build a stronger attitude on preparedness towards any natural disasters. In contrast, Filipino farmers are not much affected emotionally by natural disasters. The farmer respondents mentioned that even though they were affected by destructive natural disasters, they still find ways to smile and be happy, and for them it is an informal coping mechanism.

Table 7.6. Mean Score Rating of the Perceived Impact of Extreme Events of the Respondents in the Philippines and Japan

Item	Philippines			Japan		
	Lowland	**Upland**	**All**	**Lowland**	**Upland**	**All**
Assets	2.57	2.97	2.77	1.40	1.00	1.29
Logistics	2.86	2.89	2.87	1.00	1.50	1.14
Income	***3.37***	**3.66**	***3.51***	***3.00***	***4.00***	***3.29***
Food	2.51	2.31	2.41	1.40	1.00	1.29
Health	1.77	1.40	1.59	1.40	1.00	1.29
Education of Children	1.41	1.86	1.69	1.40	1.00	1.29
Emotional Well-Being	2.23	2.57	2.40	2.80	3.00	2.86
Perceived Overall Impact	2.37	2.83	2.60	1.80	1.50	1.71

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

7.4. Coping Strategies

Coping strategies are defined as the "practices that households employ in order to minimize the risks threatening their survival" (Maxwell and Caldwell 2008, p. 2). According to the World Food Program (2009), it is in the nature of people to use coping strategies when they feel that they do not have enough food to eat.

The Filipino farmers employed more coping strategies than their Japanese counterparts to minimize the effects of destructive disasters (Table 7.7). The average coping mechanism employed by the Filipino farmers is around five, while Japanese farmers employ

two to three types of coping mechanisms. Farmer respondents in both countries use savings as a coping strategy. In Japan, aside from savings, they use agricultural insurance and multi-cropping (a method of cropping where the farmer cultivates more than one type of crop in a certain farm area).

In the Philippines, aside from using their savings, the farmers resort to stocking and producing their own food and borrowing money from formal and informal sources. Similar results were found by Quilloy et al. (2016, pp. 185-210), as they discovered that the most common coping strategies of Filipinos were related to income flows such as use savings, borrowing money or purchasing food on credit, delaying payment of their utility bills, reducing health and education expenses to prioritize food spending, and selling assets to generate income for purchasing food.

For the case of Filipino farmers, borrowing money is a common coping mechanism but should not be practiced. Continuous borrowing may lead the farmers further down to poverty. According to a farmer leader respondent, most of the Filipino farmers resort to borrowing from informal sources because those who continued to borrow from formal sources such as banks and other financial institutions were not allowed to borrow anymore for the reason that they were not able to settle their previous debts. The Filipino farmers have no other choice but to borrow from informal sources which normally have high interest rates. The farm leader mentioned that these informal sources, termed “5-6”, have an interest rate of twenty percent.

The “5-6” scheme is a practice where someone, usually a neighbor or an official from the barangay (village) will lend you 5 Philippine Pesos (PhP) and you have to pay PhP 6 in return after an agreed upon date which is usually from a week to a month. For instance, if a person borrows PhP 10, that person should pay back PhP 12. Most of the time, the

borrower is unable to pay the lender thus creating tensions between them. This is why the borrower usually borrows money from their friends and relatives. Generally, their more well-off friends and relatives lend them a certain amount of money that they know will never be paid. This practice of borrowing as a coping strategy should therefore be terminated as much as possible. Because of constant borrowing and failing coping strategies, the Filipino farmers rely on relief goods and aid provided by the Philippine government, and other sources such as foreign governments and international organizations to save them in times of natural disasters.

Table 7.7. Comparison of Number of Coping Strategies Employed by the Respondents for Extreme Events in the Philippines and Japan

Number of Coping Strategies	Philippines			Japan		
	Lowland	**Upland**	**All**	**Lowland**	**Upland**	**All**
None	0	3	3	0	0	0
Only 1	5	1	6	2	0	2
2 to 3	6	8	14	1	2	3
4 to 5	9	11	20	2	0	2
More than 5	15	12	27	0	0	0
Average Number of Coping Strategies	**5.57**	**4.94**	**5.26**	**2.40**	**3.00**	**2.57**
Dominant Coping Strategy	using savings, stocking and producing own food, and borrow money			using savings, agricultural insurance and multi-cropping		

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

The Japanese farmers, on the other hand, have stronger individual coping mechanisms. As cited before, the Japanese farmers generally do not agree that their own town or prefecture is prepared to handle extreme events. So they view coping to these extreme events as their own responsibility. The Japanese farmers normally have larger income savings from their income per hectare compared to Filipino farmers. Moreover, the Japanese farmers use multi-cropping as a coping mechanism, so they can still harvest other crops in the event that their main crops fail. In addition to these coping mechanisms, Japanese farmers have agricultural insurance, which give them the assurance that they will only lose a maximum of 20% of their income if they will be affected by natural disasters.

Agricultural insurance programs assure the Japanese farmers that they will have indemnity payments to reach eighty percent of their income. The Japanese government also provides subsidies to the farmers as the government view that agriculture is very important to Japanese society. Moreover, the government of Japan installed strong infrastructures to lessen the impacts of destructive disasters, such as flood control gates to constrain flooding, as well as boulder walls to prevent landslides.

The key differences on the culture and attitude towards coping to destructive natural disasters between the Japanese and Filipino farmers is that Filipino farmers think that the government will take care of everything for them when in reality, they are on their own. The mindset of the Japanese is the opposite, they think that they are on their own when in reality, the Japanese government will always support them. In terms of attitude towards employing coping strategies to minimize the risks and damages brought by natural disasters, the Japanese mindset of eliminating psychological burden and a sense of not causing anyone any troubles proves to be more effective.

7.5. Insurance Administration of the PCIC and NOSAI

Japan and the Philippines' main agricultural insurance providers are both government bodies. To protect Filipino farmers from natural perils, the Philippine government launched the Philippine Crop Insurance Corporation (PCIC). On the other hand, Japan established the National Agricultural Insurance Corporation (NOSAI) to protect Japanese farmers from natural perils. The PCIC is controlled by the Philippine government but does not get any funding from the government. On the other hand, NOSAI is controlled and funded by the Japanese government.

The government of the Philippines and the PCIC do not require Filipino farmers to enroll in agricultural insurance programs and market its insurance programs through either

the local government units, farmers' cooperatives, irrigators' associations, or financial and lending institutions such as the Land Bank of the Philippines (LBP). As mentioned in the literature review of this study and as affirmed by the farmer respondents in the Philippines, most of the time, enrolling in the PCIC's agricultural insurance programs are linked to borrowing. For instance, the LBP lends money to farmers mostly through farmer cooperatives, and as a requirement to borrow money, the crop should be insured.

A respondent mentioned that many farmers think that requiring them to enroll in agricultural insurance programs insures the lending institution, and not the farmers themselves. The farmer respondent mentioned that most of the time, the indemnity payment they receive is just enough to pay their loans at the LBP. Given that the government does not require Filipino farmers to enroll in agricultural insurance programs and with the seemingly poor marketing of insurance products by the PCIC, the insurance participation of Filipino farmers is low.

The Japanese government, on the other hand, requires some farmers to enroll in the NOSAI's nationwide programs until 2031. To date, NOSAI has optional programs, where farmers can opt to enroll or not enroll in these agricultural insurance programs (as discussed in chapter 4). By the aforementioned year, all programs would be optional.

The Japanese farmers employ effective coping strategies and in addition to NOSAI, there are numerous private institutions which also offer agricultural insurance. This justifies the Japanese government's decision to make all agricultural insurance programs of NOSAI optional, which gives the farmers more power to choose other agricultural insurance schemes which suit their needs.

The PCIC is the only insurance program in the Philippines which specializes in agricultural insurance. In this regard, Filipino farmers can only insure their crops via the PCIC whereas Japanese farmers can have more choices.

NOSAI has six major insurance programs, two of which are nationwide programs which require farmers to enroll and where government provides 50% premium subsidies. On the other hand, the PCIC has seven major insurance programs and one special insurance program which provide 100% premium subsidies but only to the farmers and fishermen listed in the special directory.

7.6. Assessment of Agricultural Insurance System of the PCIC and NOSAI

This section compares and contrasts the agricultural systems of the main agricultural insurance provider in the Philippines and Japan, the Philippine Crop Insurance Corporation and the National Agricultural Insurance Association of Japan (Table 7.8). Aside from agricultural insurance products of the PCIC, Filipino farmer respondents also enrolled in microinsurance, a type of insurance wherein farmers pay a small amount of premium but get small amount of indemnity payments. Moreover, Filipino farmer respondents also employed "Kaunlaran sa Laguna Insurance", which is a local provincial insurance. Farmers utilized this insurance to insure their agricultural assets such as machinery and agricultural buildings and structures.

On the other hand, Japanese farmer respondents used "KYOSAI" to insure farm machineries aside from using NOSAI's agricultural insurance products.

The average premium per hectare that the Filipino farmer respondents paid is 828 Philippine Pesos (PhP) (1,788 Japanese Yen (JPY)) while Japanese farmer respondents paid an average insurance premium amounting to JPY 20,601 (PhP 9,538) per hectare, which is about 1000% higher than the amount per hectare the Filipino farmer respondents paid. The

average indemnity payment Filipino farmers received was PhP 12,094 (JPY 26,123) per hectare while Japanese farmers received JPY 1,241,951 (PhP 571,297) per hectare, which is 4600% higher than the amount that the Filipino farmers received.

Table 7.8. Comparison of Types of Insurance Employed by the Insured Respondents in the Philippines and Japan

Types of Insurance	Philippines	Japan
Government Insurance	PCIC	NOSAI
Other Insurance Used in Agriculture	CARD Microinsurance, Kaunlaran sa Laguna Insurance	KYOSAI
Average Premium per hectare	PhP 828 (JPY 1,788)	JPY 20,601 (PhP 9,538)
Average Indemnity per hectare	PhP 12,094 (JPY 26,123)	JPY 1,241,951 (PhP 571,297)

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen

7.6.1. Efficiency and Effectiveness of the Agricultural System

Chapter 5 assessed the efficiency of the delivery of agricultural insurance of the Philippine Crop Insurance Corporation. Results of the assessment found out that the PCIC is generally inefficient in delivering its services in terms of days of enrollment in the agricultural insurance programs, days for filing for application for cover, days it took for the damage inspectors to visit damaged farms, days before the farmer beneficiaries received the indemnity payments and the inconsistencies of damage estimates of the inspectors from the estimates of the farmer beneficiaries. Japanese farmers meanwhile do not experience these inefficiencies because NOSAI has systematic processes on its service delivery as discussed in chapter 6. Japanese farmers mentioned that there were some inconsistencies between their damage estimates and the inspectors' estimates.

Table 7.9 summarizes the mean score ratings of the system of agricultural insurance programs of the PCIC and the NOSAI as claimed by the farmer respondents in the study areas in the Philippines and Japan. The farmer respondents were asked to rate the effectiveness of the agricultural insurance programs of the NOSAI and PCIC from 1.00 to 5.00 with 5.00 being the highest. Moreover, the respondents were also asked to rate the

overall agricultural insurance system as a whole. The system indicator the farmer respondents asked were the a) knowledge of enrollment in agricultural insurance programs of the insurance providers; b) knowledge on filing for application for cover; c) knowledge about the insurance programs; d) access to the insurance programs; e) helpfulness of the staff; and f) expectations met.

Table 7.9. Comparison of the Mean Score Ratings of the System of Agricultural Insurance Programs in Selected Areas in the Philippines and Japan

System Indicator	Philippines			Japan		
	Lowland	**Upland**	**All**	**Lowland**	**Upland**	**All**
Enrollment in Program	2.93	2.70	2.83	4.80	4.00	4.57
Filing of Applications for Cover	2.78	2.40	2.62	4.80	5.00	4.86
Knowledge About the Program	2.71	3.80	3.17	3.80	4.50	4.00
Access	3.57	2.90	3.29	4.80	5.00	4.86
Helpfulness of the Staff	3.93	3.50	3.75	5.00	5.00	5.00
Meet Expectations	3.36	3.40	3.37	5.00	5.00	5.00
Average Distance of Nearest Insurance Provider Office	4.71 km	10.00 km	6.92 km	1.10 km	4.00 km	1.93 km
Overall Agricultural Insurance System Rating	**8.14**	**7.00**	**7.69**	**6.00**	**5.00**	**5.60**

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

The Japanese farmer respondents gave higher ratings in all the system indicators than their Filipino counterparts indicating that the agricultural insurance programs of the NOSAI were more effective than the agricultural insurance programs offered by the PCIC. The Japanese farmers answered that they were knowledgeable about the insurance programs and their processes, and that the staff of the NOSAI were very helpful and the programs were able to meet their expectations as the farmers gave perfect scores in these system indicators. Moreover, the accessibility of NOSAI services to the Japanese farmers was very high since there is always a NOSAI office nearby. The average distance of NOSAI's offices to the Japanese farmer respondents' farms is 1.93 kilometers, proving the high accessibility of NOSAI's services.

On the other hand, the nearest PCIC office to the farms of the Filipino farmer respondents is almost seven kilometers, which is not as accessible compared with NOSAI. Moreover, Filipino farmer respondents mentioned that they were not that much knowledgeable about the processes of the PCIC even though they gave fair scores to the PCIC staff' helpfulness and expectations met.

Filipino farmers gave a high mean rating of 7.69 out of 10.00 in terms of the overall effectiveness of the PCIC's agricultural insurance programs, while Japanese farmers, in contrast, gave lower mean rating of 5.60 out of 10.00 in terms of the overall effectiveness of the agricultural insurance programs of the NOSAI. Even though the PCIC's agricultural insurance programs were only fairy effective, the Filipino farmer respondents still gave a high rating in terms of overall effectiveness. This is because from the perspective of Filipino farmers, agricultural insurance gives them a little bit of a cushion in times of destructive natural disasters. A Filipino farmer leader mentioned that:

"*During times of destructive natural disasters, getting insurance indemnity payments at any amount is better than not receiving anything at all. At the least, the farmers would not rely too much from their savings or would not borrow that much money to start recovering again. So for us farmers, even though the payment is not that much, we are just happy to receive something, which is already a big help for us. So for myself and probably for most insured farmers, the agricultural insurance programs of the PCIC are effective in reducing our income losses*"

On the other hand, Japanese farmer respondents gave a low rating to NOSAI's agricultural insurance programs because even though they were evidently effective, the Japanese farmers are not happy with the overall agricultural insurance system of the NOSAI. A Japanese farmer respondent mentioned that:

"*As you know, NOSAI has optional and national programs and when you are producing crops such as rice, wheat, and barley, then you are required to insure your crops. But what if my farms are not really susceptible to natural disasters? Our family farms are located in various areas within the municipality and some of our farms are not really susceptible to disasters but as a rule, NOSAI requires us to insure every farm and every greenhouse we own. That means we have to pay more premium to insure them all. Rather than putting that money to other things such as our savings, we have to pay higher premiums*".

This testimony of the Japanese farmers tells a bigger story that even though the NOSAI's agricultural insurance programs are effective, there are still some issues that the Japanese farmers are not happy about. In addition, some farmer respondents also mentioned that there is not much variability in NOSAI's agricultural insurance programs. Perhaps when the year 2031 arrives, the Japanese farmers would have more choices since that year, the nationwide programs will be optional programs. That way, Japanese farmers would have more choices and more freedom on what coping mechanisms they would employ and perhaps enroll in other private financial institutions which offers agricultural insurance programs.

In terms of profit loss reduction, the Japanese farmers receive more per hectare than their Filipino counterparts (Table 7.10). The average profit loss per hectare of the Filipino farmer respondents during a disaster year was 50,802 Philippine Pesos (PhP) (50,802 Japanese Yen (JPY)) and the Filipino farmers received an average indemnity payment of PhP 12,094 (JPY 26,123) per hectare which reduced their income losses but only by a small margin. A study by Rola (2017, pp. 46-50) revealed that the indemnity payments received by the farmers were effective in reducing the farmers' income loss. However, it took one hundred and three days after the filing for the payment to arrive which was considered too late for the farmers as the cropping season have already passed.

The Japanese farmer respondents' average profit loss per hectare during a disaster year was JPY 3,787,861 (PhP 1,742,416) and received an average indemnity payment of JPY 2,840,896 (PhP 1,306,812) per hectare. The Japanese farmer respondents received 3276% more indemnity payments per hectare than the Filipino farmer respondents.

Table 7.10. Profit Loss Reduction Before and After Agricultural Insurance of the Farmers, per Hectare, in Selected Areas in the Philippines and Japan

Currency	Philippines			Japan		
	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment	(Profit Loss During Disaster Year) Before Agricultural Insurance	(Profit Loss During Disaster Year) After Agricultural Insurance	Average Indemnity Payment
Philippine Peso	50,802	38,708	12,094	1,742,416	435,604	1,306,812
Japanese Yen*	109,732	83,609	26,123	3,787,861	946,965	2,840,896
US Dollar**	1,016	774	242	34,091	8,523	25,568

Source: Author's Fieldwork in Laguna Province, Philippines, 2018-2019
*1 Philippine Peso = 2.16 Japanese Yen
**1 Philippine Peso = 0.02 US Dollar

Even though the Filipino farmers emphasized that receiving even a small amount of indemnity payments was enough cushion for them, the insurance pay-outs they received were not enough to salvage their agricultural production entirely and have to resort to other coping mechanisms. Japanese farmers meanwhile enjoy the luxury of getting back at least eighty percent of their agricultural profits which is fairly enough to save their farming activities amid destructive natural disasters.

7.6.2. Participation in Agricultural Insurance Programs

The dominant reasons for participating and not participating in the NOSAI and PCIC's agricultural insurance programs are listed in table 7.11. The answers of both farmer respondents in the Philippines and Japan were almost identical. The Filipino farmers' reason for participating in the PCIC's agricultural insurance programs is they view it as a coping

strategy. Lowland Filipino farmers view it as a coping strategy and also as a requirement for loan in financial institutions such as the Land Bank of the Philippines.

On the other hand, Filipino farmers' most common answer to why they did not participate in insurance programs is that their farms are not much susceptible to disasters and they have enough savings as cushion to the effects of natural disasters which is why they do not need agricultural insurance. Moreover, some Filipino farmers especially those who do not belong to a cooperative, do not know about the existence of the PCIC as an institution and the agricultural insurance programs so they were not able to participate in the programs.

Table 7.11. Comparison of Participation in Agricultural Insurance Programs in the Philippines and Japan

Item	Philippines			Japan		
	Lowland	**Upland**	**All**	**Lowland**	**Upland**	**All**
Dominant Reason for Participation	Requirement For Loan; Coping Strategy	Coping Strategy	Coping Strategy	Coping Strategy	Coping Strategy	Coping Strategy
Dominant Reason for Non Participation	Don't Need Insurance	Don't Need Insurance	Don't Need Insurance	Don't Need Insurance	Don't Need Insurance	Don't Need Insurance

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

Japanese farmers producing crops under the nationwide insurance programs of the NOSAI were required to insure their crops. Most of the other insured farmers that are not covered by the nationwide programs participated in NOSAI's insurance programs since they view it as a coping strategy. One of the farming corporation respondents insure their farm machinery as a coping strategy.

Similar to Filipino farmers, the main reason why some Japanese farmers do not participate in NOSAI's agricultural insurance programs is that the crops they produce are not covered by the nationwide program. They added their farms are not that susceptible to

natural disasters, and it would be better for them to use their savings or use multi-cropping as a coping strategy instead of using agricultural insurance.

7.6.3. Problems Encountered on the Implementation of Agricultural Insurance Programs

There are many issues that have room for improvement in terms of the agricultural insurance program administration of the Philippine Crop Insurance Corporation. Similarly, while the National Agricultural Insurance Association of Japan can be viewed as near-perfect by developing countries standards, Japanese farmers were not much satisfied with the association's services.

Filipino farmers' lack of knowledge of the agricultural insurance program processes of the PCIC causes the domino effect of the PCIC's inefficient program implementation. Moreover, the inadequate number of staff of the PCIC also causes these inefficiencies. Especially in times of a widespread disaster, the PCIC caters first to the nearer and easier areas to reach, leaving the farmers in hard-to-reach areas no other choice but to wait longer for the services to arrive. The Filipino farmers cited inefficient implementation, damage estimation gap, poor marketing of insurance products, and having no access to agricultural insurance as their main problems regarding the implementation of the PCIC's agricultural insurance programs.

The PCIC's medium of instruction for agricultural insurance enrollment and filing for indemnity claims is through the English language. Most of the Filipino farmer respondents are not too familiar with the English. Thus, the Filipino farmers' poor English comprehension contributes to the longer time of agricultural insurance program enrollment and filing for insurance coverage.

Another problem of the PCIC is its record-keeping. Until 2013, there is no permanent staff who was in charge of data keeping. Most of their records are also not digitalized, which

makes it harder to keep the data. Because of these issues, the PCIC introduced an Automated Business System (ABS) in 2013 in an effort to improve the record-keeping and to promote the digitalization of the data of PCIC. But even with the creation of the ABS, old data are lost because of the poor record-keeping during the previous years.

In addition to these problems, decentralized agricultural cooperatives in the Philippines provide opportunities for fund mismanagement. The Filipino farmers normally take a loan from the Land Bank of the Philippines (LBP) via their respective cooperatives which in turn would require them to insure their farms. The farmers pay the amount of their loan including insurance premium payments to their respective cooperatives. The Filipino farmer respondents who belong to the same cooperative claimed that they were paying the same amount to the cooperative even after these farmers were listed in the Registry System for Basic Sectors in Agriculture (RSBSA) which was supposed to subsidize the farmers' premium payments. After the full-blown implementation of the RSBSA, the farmers, in principle, should only pay the amount they borrowed from the LBP, yet a group of farmer respondents who belong to the same cooperative claimed that they were paying the same amount even if they were already listed in the RSBSA.

Japanese farmers meanwhile were also unhappy about the damage estimation of the inspectors from NOSAI. Most of the time, the damage estimates by the inspectors are lower than the damage estimates of the farmers but these issues can usually be raised by through farmer associations. One, the local farmer associations raised the issue and during the 2010s, the damage inspectors got kinder and the damage estimates from then on were more the same as the damage estimates of the farmers.

The government requires the farmers to enroll in NOSAI's nationwide programs wherein they are provided 50% insurance premium subsidies. After 2031, the government will no longer provide subsidies and will no longer require farmers to get insurance. To

illustrate, rice farmers are required until 2031, and the premium is 293 yen per 10 acres per month, which 50% are paid by the government meaning the farmers will only pay 147 yen per 10 acres per month. After 2031, insurance won't be required and there will be no more subsidies from the government meaning they have to pay 293 yen per 10 acres per month if they still want to be insured. This could influence enrollment in NOSAI's insurance programs in the future, and with a decrease in the number of insurance policies will result to a decrease NOSAI's income from insurance premium payments.

In terms of participation, the Japanese farmers can communicate their needs using the NOSAI homepage on the internet. But since majority of the farmers are old, they are not so familiar with technology so they can only voice their opinions during the meeting with NOSAI. Moreover, Munchetu (2020) found out that there were problems in the flow of information between the farmers and the executives of the cooperatives in Japan. Thus, it would be difficult for normal Japanese farmers to express their needs to the cooperative top management. Japanese farmer respondents mentioned that they were able to express their dissatisfaction about damage inspection which resulted to kinder inspection the following year, but this was because one of the farmers who expressed dissatisfaction was also an executive of the Japan Agriculture Group.

Another issue mentioned by the key informants, agricultural insurance is not really a necessity for the farmers. This is because the farmers usually have effective coping mechanisms in times of natural calamities, including insurance. Japan also has better infrastructure compared to other countries and there are structures that could reduce the impact of severe natural disasters. In addition, the Japanese government provides subsidies to the agricultural sector in times of widespread disaster according to the key respondents. Most of the farmers enroll in the nationwide programs since the government requires them to, but when the time comes that insurance is not a requirement, they could opt not to use

agricultural insurance anymore and use other coping strategies instead. For these reasons, the agricultural insurance programs and NOSAI would be obsolete in the future.

The Filipino farmers suggested that the PCIC should hire more staff to make the implementation more efficient. Aside from these, the farmers also want to be educated more by the PCIC in terms of their agricultural insurance programs processes or just make the processes simpler and easier to understand. The Filipino farmers would also like the PCIC to hire agriculture experts as member of the team of adjusters or damage inspectors to lessen the disparity of the damage estimates. Japanese farmers also wanted the NOSAI to train its damage inspectors to have sufficient knowledge on farming also to lessen the disparity between the farmers' damage estimates and the inspectors' damage estimates. Aside from these, the Japanese farmers also want more diversity and flexibility on the NOSAI's agricultural insurance programs. For the perspective of Japanese farmers, the NOSAI's agricultural insurance programs were too limited and too restricting.

The problems cited by the Filipino farmers can be solved by creating policies and enforcing them properly. In contrast, the NOSAI's implementation of its programs was effective and efficient, but the Japanese farmers were unhappy with the NOSAI's programs because of the aforementioned reasons. The Japanese are well-known to produce top quality goods and services, and the Japanese farmers expect the same top notch quality services from its main implementer of agricultural insurance.

7.7. Agricultural Insurance Implementation Lessons from each Case Country

This section showcases the lessons that each case country can learn from each other to promote agricultural insurance as a sole risk management tool that agricultural producers use to cope with the increasing destructive natural disasters. The PCIC has a lot to learn from the NOSAI of Japan to improve and increase its efficiency and effectiveness and

potentially can be a one-for-all coping mechanism for Filipino farmers in times of destructive natural disasters.

Unlike Japan, the Philippines does not have a centralized federation of cooperatives that focuses on agriculture. Instead, the Philippines has the Cooperative Development Authority (CDA) which regulates the Philippine cooperatives, regardless of type, in the country. Unlike Japanese farmers who are required to be a member of the Japanese Agriculture Group, the Filipino farmers' membership in agricultural cooperatives is voluntary. Because of this, many farmers in the Philippines operate individually and access to information on agriculture would be a challenge for those who are not members of a cooperative. On the other hand, not only that Japanese farmers already have the mindset of self-education, farmer groups tend to exchange technical information whenever they can. Moreover, the government regularly provide new information to the Japanese farmers to improve farming activities.

Japan's centralized agricultural federation is the National Federation of Agricultural Cooperative Association (ZEN-NOH). The Japan Agricultural Cooperatives (JA) Group is an organization consisting of farmers' cooperatives, whose purpose is to protect and enhance agricultural management and the livelihood of farmers in the spirit of mutual assistance. On the other hand, ZEN-NOH is in charge of the marketing and supply business of the JA Group. It seeks to connect producers and consumers, revitalize production centers, and preserve society and the environment. Through integration with prefectural-level JA federations in the course of organizational restructuring aimed at strengthening its business foundation, the ZEN-NOH Group has now 32 Prefectural Headquarters and one Prefectural Office nationwide (ZEN-NOH, 2020). The Japanese farmers can also get agricultural inputs, machinery, and technology from the ZEN-NOH group. Moreover, the farmers also get other information such as the prices of agricultural commodities as well as information about the

NOSAI. In this scenario, every Japanese farmer knows about the existence of the NOSAI and its programs and processes. The ZEN-NOH group makes life easier for both the consumers and the farmers.

The Philippines, on the other hand, does not have a centralized federation of agricultural cooperative with this kind of set-up. A central agricultural cooperative could prove an effective way to strengthen Filipino farmers, as what Japan did with the ZEN-NOH. Moreover, the PCIC could market its products easier and can insure every Filipino agricultural producer in this kind of set-up. The government does not require Filipino farmers to insure their farms except when they are getting a loan in financial institutions such as the Land Bank of the Philippines (LBP). On the other hand, the NOSAI requires Japanese agricultural producers growing rice, wheat, barley, and livestock, to get insurance although until 2031 according to the key informants. According to a farmer respondent, these crops are essential to the Japanese food system, which could be the reason why the government wants farmers who grow these to get insurance with 50% premium subsidies. The Philippines' food staple is rice, along with corn, livestock, and fish. The Philippines can learn from Japan in this scenario and the PCIC could require these types of agricultural producers to get insurance so that they would be protected and ensure food security in the country.

Climate change is a real threat especially to disaster vulnerable developing countries like the Philippines. If the indemnity payments provided by the PCIC is too low, the Filipino farmers could not use agricultural insurance as a single coping mechanism to natural disasters. Instead, they have to resort to other coping strategies to minimize the effects and damages due to these extreme events. The Japanese farmers not only get subsidies from the National Government in the occurrence of destructive disasters but also get the assurance that the NOSAI will provide indemnity payments until it matches 80% of their income. The

PCIC can learn from this scheme and could provide indemnity payments to Filipino farmers and also match around 70 to 80% of the farmers' income. This could be possible if PCIC increases its premium payments of which the Philippine government may give subsidies initially. The government can also promote insurance culture by educating farmers about its advantages. The PCIC could subsidize income insurance only if the farmers practice good record-keeping, which is a challenge for most of the Filipino farmers. Most of the Filipino farmers do not keep records of their farm expenses and profit, which make it difficult for the PCIC to implement income insurance, just like in Japan.

Even though Japan is the model country in this study, it has some things to learn from the Philippines to further improve the NOSAI's agricultural insurance system. The delivery of indemnity payments is different with that of the Philippines. As described by the farmer respondents, regardless when your farm incurred damages, all indemnity payouts will be given in the month of December. For example, if a Japanese farm was damaged in January, then the farmers would wait until December to receive their payouts. On the other hand, if a farm was damaged on the month of October, they would still receive payouts on the month of December. In the Philippines, once the farmer filed for cover, the indemnity payment is expected to arrive within forty five days, enough time for the farmers to use the money for re-planting. If NOSAI adopts this practice, then life would be easier for Japanese farmers.

The Philippines has a lot to learn from Japan based on the results of the comparison of the countries' case studies. The NOSAI alone could be a sole coping strategy that the Japanese farmers can employ to minimize the impacts of extreme events. In addition, the coping strategies employed by the Japanese farmers were effective, that some view that agricultural insurance is not a necessity anymore. If the Filipino farmers could count on agricultural insurance as an effective stand-alone coping strategy, then it would not be

necessary for them to use other coping strategies such as borrowing from formal and informal sources, and use their extra money to build on their savings instead.

7.8. Analysis

7.8.1. Country Comparison Summary

There are many differences and similarities between the Philippines and Japan when it comes to natural disasters. Tables 7.12 and 7.13 summarize the key differences between the two countries with the information from the author's field work as well as the United Nations University Institute for Environment and Human Security. The indemnity payment system for both agricultural insurance institutions is different. The PCIC hands out indemnity payments ideally after forty-five days after the receipt of the farmer beneficiaries' filing for cover. On the other hand, Japanese farmers would have to wait until the final month of the year (December) to receive indemnity payments regardless of when they incurred damages.

The facilitating and constraining factors of agricultural insurance program enrollment of the Filipino and Japanese farmers were similar in terms of disaster vulnerability. The more the farms were vulnerable to disasters, the more likely the farmers insure their farms. If the farm is not vulnerable, then it is a constraining factor in which the farmer or farm group would not enroll in agricultural insurance programs. On the other hand, another facilitating factor for Japanese farmers is the requirement to enroll in agricultural insurance if they were producing agricultural commodities that fall in the category of nationwide programs such as rice, wheat, barley and livestock. Filipino farmers who take out a loan on financial institutions on the other hand are required to insure their farms which makes loan requirement a facilitating factor. Lastly, a constraining factor for Filipino farmers was the lack of information about the existence of agricultural insurance programs.

Table 7.12. Comparison Table of the Selected Countries

Frame of Reference	Philippines	Japan
Agricultural Insurance Administration	PCIC	NOSAI
Indemnity Payment System	After Damage Incurred	Systematic
Facilitating and Constraining Factors in Agricultural Insurance Enrollment	Disaster Vulnerability Loan Requirement Information Availability	Disaster Vulnerability Nationwide Program Requirement
Disasters	Typhoon, Flood, Drought, Pest	Typhoon, Pest
Disaster Characterization	Based on Experience, Culture, Religion	Based on Experience, Knowledge, Culture, Preparedness
Disaster Experience	Typhoon, Flood, Drought most problematic	Typhoon most problematic
Disaster Impact Score	2.6/5	1.7/5
Dominant Coping Strategy	Use Savings, Stock Food, Borrow Money	Use Savings, Agricultural Insurance
Farmer Agricultural Insurance System Rating	7.7/10	5.6/10
Infrastructure for Disaster Protection	No	Yes
Price of Goods Protection Policy	No	Yes
Government Subsidies After Disasters	No	Yes
Agricultural Cooperative	Decentralized	Centralized (ZEN-NOH)

Source: Author's Fieldwork in Laguna Province, Philippines, and Gifu Prefecture, Japan 2018-2019

The dominant disasters that affected Japanese farmer respondents heavily were typhoon and pests citing typhoons as the most impactful while Filipino farmer respondents suffered from typhoon, flood, drought, and pests which all but pests were deemed problematic. In terms of disaster impact score, the Japanese farmer respondents gave a lower rating of 1.70 out of 5.00 compared to the 2.60 out of 5.00 given by the Filipino farmer respondents. The disaster characterization of Japanese farmers was based on experience, knowledge, culture, and preparedness, while Filipino farmers characterized disasters based on experience, culture, and religion. The dominant coping mechanism that Japanese farmers employed was the use of savings and agricultural insurance while Filipino farmers used their savings, stock food, and borrowed money from formal and informal sources to cope to natural disasters.

In terms of agricultural insurance system rating, the Filipino farmers surprisingly gave a higher overall rating even though the results of this study found out that the PCIC was inefficient in their service delivery yet fairly effective in reducing income losses. Japan has infrastructure such as boulder walls, sea walls, and flood control gates which minimize the damages that destructive disasters may bring. The Philippines, on the other hand, does not have this infrastructure to protect the Filipino farmers. Moreover, Japanese farmers were able to get price of goods protection and government subsidies in times of destructive disasters, which the Philippines also lacks.

As also mentioned elsewhere, the Philippines ranked 3rd in the World Risk Index report of the United Nations University Institute for Environment and Human Security (2018) while Japan is 29th. Both countries have similar disaster exposure scores (Table 7.13) yet Japan ranks lower in terms of overall risks. This is because they scored better in all risk indicators such as vulnerability, susceptibility, coping, and adaptive capacities. All of these risk indicators come hand in hand. According to the United Nations International Strategy for Disaster Reduction (2017), vulnerability is "the characteristics determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards." In the case of Japan, and as confirmed by the fieldwork of this research, the Japanese farmers' vulnerability and susceptibility to disasters are low.

Table 7.13 Comparison Table of the Selected Countries' World Risk Index

Frame of Reference	Japan	Philippines
World Risk Index Score	11.08 (Rank 29th)	25.14 (Rank 3rd)
Disaster Exposure	46.55	49.94
Vulnerability	23.81	50.33
Susceptibility	17.6	29.58
Lack of Coping Capacity	38.39	81.57
Lack of Adaptive Capacity	15.43	39.83

Source: United Nations University Institute for Environment and Human Security (2018)

Individually, the Japanese farmers have better coping and adaptive capacities other than agricultural insurance. On the other hand, Filipino farmers may have some ways to cope, but these mechanisms are not that effective and unsustainable. For instance, the farmers borrow in formal and informal sources as a coping mechanism to natural disasters. If the farmers continue this practice, then they will always be in perpetual debt.

At the community level, the Japanese has strong institutional systems in place. All Japanese farmers are members of the Japan Agriculture Group, of which the National Federation of Agricultural Cooperative Associations (ZEN-NOH) keeps the consumers and producers close as well as provide information on the National Agricultural Insurance Association's processes and services. In addition, the government of Japan provides subsidies to farmers in the occurrence of destructive disasters to help the affected farmers. Moreover, the infrastructure erected by the government of Japan protects and somehow minimizes the risk of disasters for all Japanese citizens. These strong community set-up keeps the vulnerability and susceptibility of Japanese farmers low. The Filipinos do not have this luxury, but they do have strong emotional and social ties in the community level, as explained by the farmer leaders, which could explain why they have better scores on emotional well-being after the occurrence of a destructive disasters than the Japanese people.

In terms of assets, the comparative study reveals that the Japanese farmers are better-off than their Filipino counterparts by a huge margin. The Japanese farmers earn 4100% more per hectare than Filipino farmers. For this reason, the Japanese farmers can easily build on their savings which could serve as a cushion in times of need. Japanese farms, on the other hand, are more of a farm business, which provide a comfortable life for local farmers. The Filipino farming is usually small-scale; the farmers are often looked-down upon in society, and are considered as one of the poorest of the poor.

Overall, the Japanese have a preparedness culture, as mentioned by some of the farmer respondents, and they always look at the worst-case scenario and try to be prepared as much as possible. Therefore, as a society, the Japanese people give their best to strengthen their risk management practices.

The Philippines, on the other hand, has worse scores in all the risk indicators. On the individual level, the farmers resort to multiple yet ineffective and unsustainable coping strategies while in a community level, there are multiple agencies having overlapping duties partnered with poor coordination which leads to a waste in resources. For instance, Japan has the JA and ZEN-NOH which manage all agricultural operations of the farmers, including the NOSAI. The Philippines, on the other hand, has the PCIC, the Department of Agriculture (DA), the National Food Authority (NFA), the National Irrigation Association (NIA), the National Disaster Risk Reduction and Management Council (NDRRMC), and the Department of Environment and Natural Resources (DENR) which are all involved one way or another in the agricultural sector. Poor coordination often causes confusion as to which agency is in charge of a specific duty and leads to inefficiency and ineffectiveness of the agencies' operations.

There is a lot of room for improvement in the Philippines, and protecting Filipino farmers and ensuring food security in the Philippines and its export country partners can be the first step.

7.8.2. Cultural Differences and the Japanese Insurance Philosophy

It is evident from the results of the case studies that the agricultural system of the NOSAI is supreme as opposed to that of the PCIC. However, Japanese farmers still gave the NOSAI's overall agricultural system a low rating as Filipino farmers gave the PCIC's agricultural system a high score. One reason is that Filipinos generally have a "bola" culture,

in which they always avoid speaking ill of others, especially if those people have authority over them. In this scenario, the PCIC, even though inefficient, provides them a little cushion in times of disasters. On the other hand, even though the results of the overall system of the NOSAI was excellent, Japanese farmers were not afraid to give criticism and to expect the highest possible standards the NOSAI can offer. The Japanese people are known to give maximum effort in almost everything they do, and the Japanese farmers expect nothing but the best from the NOSAI.

Another reason the Japanese farmers gave a lower rating to NOSAI is that agricultural insurance is not necessarily the top option to cope with uncertainties. A study by Ichihara et al. (2019, pp. 627-636) mentioned that Japanese agriculture have now evolved from individual self-employment to a farming corporation with farm workers as employees. Therefore, as the study stressed, the occupational risks such as in health and safety of these agricultural workers should not be overlooked. The same study revealed that long working hours and pesticide exposure were the top occupational risks that farmers face. In this scenario, the health and safety of the farm workers are as important as insuring the agricultural produce. These same sentiments were shared by the largest Japanese enterprise who were interviewed. The respondents of the Hashiba farms stressed that the health of their agricultural workers is more important than insuring their crops. The respondents mentioned that it would be better to have healthy workers and just have them plant again when a natural disaster damaged their farms.

Another reason the Filipinos gave a higher rating is the lack of “insurance culture”. Just like any other developing country cultures such as in Africa, (Ajayi, no date), insurance is alien to the Filipino culture. It is not a popular practice especially in most poor households, who may need this more in order to mitigate losses due to human and non- human uncertain events. Thus, Filipino farmers do not know the good standard of an agricultural insurance

system. The Filipino farmers are more than happy to receive any amount from the PCIC during natural disasters, thus giving them a higher rating.

Farmers lack “insurance culture”, because the Filipino culture have strong familial and community ties that bind them in cases of disasters. This explains why some answers on coping mechanisms were “borrowing from friends and family” or “eating at other people’s house”. Filipinos have a strong social capital, which they can rely on even in times of uncertainties. On the other hand, the Japanese do not have this kind of “strong social capital”, thus, when it comes to uncertainties, Japanese people turn to insurance and use their own savings. Kobayashi’s (1997) book about insurance philosophy mentioned that insurance is a “philosophy of helping somebody who is in trouble and is defined in an extremely wide sense as a philosophy that points out measures to be taken regarding a guaranteed order in human life or death”. In addition, in Japanese culture, the people do not want to cause trouble to other people as much as possible. That is why they view insurance as a “total approach” or have created an “insurance culture” in which they have all kinds of insurance – from health, fire, property, accident, and so on. Whenever any kind of uncertainty occurs, Japanese people who have low social capital can always turn to insurance to lessen their anticipated financial burden.

Although the Japanese people have established a strong “insurance culture”, this does not guarantee that their overall coping strategies were better. The results of the Japanese case study found out that Japanese people are worried about their emotional well-being after the occurrence of a natural disaster. This makes sense since they have lower social capital (Okamoto, et al, 2013, pp. 306-312). On the other hand, Filipinos do not worry much about emotional well-being since they have high social capital and emotional support from family and friends.

7.8.3. Role of Cooperatives

As mentioned previously, the National Federation of Agricultural Cooperative Associations (ZEN-NOH) and the Japanese cooperatives play important roles in the advancement of not just agricultural insurance, but the whole Japanese agricultural sector as well. ZEN-NOH keeps the consumers and producers close by directly marketing the producers' commodities to the consumers. According to their website, the ZEN-NOH Group "*is responsible for the marketing and supply business of the JA Group, including the sale of agricultural products and the supply of materials for use in agricultural production. It works with primary-level JAs, who are members of the ZEN-NOH Group, and prefectural federations to create economies of scale to ensure the competitiveness of marketing and supply activities. These activities support increases in members' farm incomes and expansion of their agricultural production capacity. Another of ZEN-NOH's Roles is to supply food products to consumers across Japan through such activities*" (ZEN-NOH, 2020). As a result, the farmers have big shares of the profit. Moreover, ZEN-NOH also give information about the NOSAI's activities and processes. ZEN-NOH also have strong partnerships with leading centralized agricultural cooperatives around the world.

According to the key informants, Japanese cooperatives also provide various information to their farmer members. Such as information on weather, of which the farmers can use the information so they can adjust their planting time. Moreover, as Rajaratne (2007, pp. 192-198) study emphasized, agricultural cooperatives in Japan have strong networks and cater to their farmers' social, cultural, and industrial sectors aside from the agricultural sector.

The Philippines may have the Cooperative Development Authority (CDA) which caters to all types of cooperatives in the country, but the lack of a centralized agricultural

cooperative proves to be vital in the underdevelopment of the country's agricultural sector. The agricultural marketing in the country goes through a lot of middlemen before reaching the final consumers, thus the farmer share of the profit would be lower. If there would be a centralized agricultural cooperative which can connect the producers to the consumers, there is a potential that the farmers can have a profit share. Moreover, the PCIC, and other institutions involved in the agricultural sector can directly exchange information through a centralized agricultural cooperative. The centralized cooperative can also serve as the main entity that connects and build stronger agricultural cooperative networks in the country.

7.8.4. Can Agricultural Insurance be a Sole Risk Management Tool to Manage Disasters?

The Japanese farmers earn a lot more per hectare than the Filipino farmers and they can easily afford to pay high insurance premium rates. In turn, the National Agricultural Insurance Association receives capital from all the premium payments from the Japanese farmers under the nationwide program as well as the government subsidies. The amount is good enough for the insurance association to pay for its operations as well as provide the Japanese farmer beneficiaries high indemnity payments which pays them until matching 80% of their annual income. In this set-up, agricultural insurance is an effective risk management tool for disasters, even if it is the only tool that the farmers would employ as the Japanese farmers will only lose a maximum of 20% of their income during the occurrence of a destructive disaster aside from other government subsidies.

This is possible in disaster vulnerable countries such as the Philippines. As mentioned in the literature chapter of this research, the PCIC's farmer enrollment has been below 20% ever since its creation (Reyes, et al, 2017; Rola, 2013; Rola and Querijero, 2017). For this reason, the corporation could not build its capital and could not afford to provide high indemnity payments to its farmer beneficiaries. If the PCIC, with the help of a

government intervention, will require all farmers to insure their farms and given that the government would give premium subsidies, would charge higher premium rates, then there is a possibility of capital build-up which in turn would give the PCIC the resources to increase its indemnity payments to its farmer beneficiaries. Given that the Philippines does not have infrastructure like that of Japan, strengthening its agricultural insurance programs and making it the primary risk management tool for farmers would be beneficial for the promotion of food security.

7.9. Conclusion

The results of the countries' case studies of the Philippines and Japan shed light on the big differences between the agricultural production, institutional set-up of those involved in agriculture, coping strategies, and agricultural insurance systems. Compared to the Philippines, Japan has stronger infrastructure that can withstand and minimize the effects of destructive disasters. Japanese farmers also have strong and effective individual coping mechanisms compared to the Filipino farmers, partly because they have much higher income per hectare which gives them the ability to build their capital. The Japanese farmers' savings are enough to cushion them from the effects of natural disasters to the point that agricultural insurance may not be necessary anymore. Strong institutions and centralized agricultural cooperatives make way for effective marketing between the consumers and producers, which also is the reason why the Japanese farmers are better-off than their Filipino counterparts. The centralized cooperatives also give other services and other information to improve the livelihood of the Japanese farmers. Simply put, there is only one centralized middleman between the farmers and the consumers. In contrast, the supply chain actors in the Philippines is rather numerous, which results to the middlemen being richer, leaving the Filipino farmers poorer.

Agricultural insurance can be a stand-alone risk management tool for Japanese farmers, as Japan's agricultural insurance provider has enough capital from the premium payment it receives from its beneficiaries. In turn, the insurance association is able to give high indemnity payments, high enough to provide a cushion for Japanese farmers in times of disasters. In contrast, the Philippines' main implementer of agricultural insurance has low capital build up due to the low premium payments they receive because of low farmer enrolment in its programs. For this reason, the corporation could not give high indemnity payments to its beneficiaries and could not be used as a stand-alone risk management tool in the Philippines.

The Japanese farmers' individual coping and adaptive capacities, paired up with strong institutions, are good justification that the Japanese farmers view agricultural insurance is not a necessity anymore to be shielded from natural disasters. Meanwhile, the coping strategies of the Filipino farmers are failing, and setting-up a better agricultural insurance system at this time including improving the government's extension capacity to educate farmers on climate information could be the answer for the Filipino farmers' plight.

In Japanese culture, insurance is more of a total approach and not just for agriculture. A Japanese person will have insurance on almost everything such as in health, accident, fire, building, vehicle, bicycle, among others. As mentioned in the previous chapter, the Japanese people have an insurance culture, in which they view any form of insurance as an investment which will be beneficial for them in the occurrence of any uncertainties in every aspect of life. On the other hand, Filipino people do not have this kind of mind set. Filipinos do not look at any kind of insurance as an investment but view it as a cost. Filipinos most likely spend their disposable income on leisure activities, material things, and special occasions such as birthday parties and weddings. In most cases, a Filipino would borrow a large sum

to throw a grand celebration in special occasions. Thus in this scenario, Filipinos would not have the money to pay for insurance premium and tend to view it as an additional burden.

Based on the results of the comparative studies, it is therefore concluded that it is possible that the Philippines could emulate Japan's agricultural insurance system, as a single risk management tool to manage the effects of natural disasters. The final chapter of this research will discuss the steps of what the Philippine government, and other similar disaster vulnerable countries can do, to improve their agricultural insurance systems to cope and minimize the effects of the more frequent and more destructive natural disasters.

CHAPTER 8

WAYS FORWARD: MAKING AGRICULTURAL INSURANCE WORK IN DISASTER PRONE DEVELOPING COUNTRIES

8.1. Summary and Conclusion

The primary objective of the study was to seek an answer to the question of how agricultural insurance can potentially be an effective and efficient coping mechanism so that the poorest of the poor in isolated rural areas (in the lowland and upland) can avoid falling into the poverty trap amid rising global natural disasters in the most exposed region of East Asia and the Pacific. The purpose was to gain better understanding of the agricultural insurance system in Japan, as a disaster risk mitigation measure and how can developing countries such as the Philippines learn from this. The study also examined the adaptive and coping capacities as well as disaster management practices across elevations in both countries.

Agricultural insurance can be a stand-alone risk management tool for Japanese farmers, as Japan's agricultural insurance provider has enough capital from the premium payment it receives from its beneficiaries. In turn, the insurance association is able to give high indemnity payments, high enough to provide a cushion for Japanese farmers in times of disasters. In contrast, the Philippines' main implementer of agricultural insurance has low capital build up due to the low premium payments they receive because of low farmer enrolment in its programs. This could be also due to the absence of a policy on agricultural

insurance for the sector. For this reason, the corporation could not give high indemnity payments to its beneficiaries and could not be used as a stand-alone risk management tool in the Philippines.

In due time, (after 2031), the Japanese farmers' individual coping and adaptive capacities, paired up with strong institutions, will be robust enough so Japanese farmers may not need the blanket insurance policy for growing staple crops. Meanwhile, the coping strategies of the Filipino farmers are failing, and setting-up a stronger agricultural insurance system could be the answer for the Filipino farmers' plight.

In Japanese culture, insurance is a total approach and not just for agriculture as they have an established "insurance culture". A Japanese person will have insurance on almost everything such as in health, accident, fire, building, vehicle, bicycle, among others. They view any form of insurance as an investment which will favorably shield them in the occurrence of any uncertainties in every aspect of life.

On the other hand, Filipino people do not have this kind of mind set. Filipinos do not look at any kind of insurance as an investment and instead view it as a cost. Filipinos mostly like to spend their disposable income on leisure activities, material things, and special occasions such as birthday parties and weddings. In some cases, a Filipino person would borrow a large sum to throw a grand celebration in special occasions. Thus in this scenario, Filipinos do not prioritize insurance premium payments and tend to view it as an additional burden.

Japan might have stronger institutions and an "insurance culture" but the Philippines boasts of a stronger social capital. Especially in the rural areas in the Philippines, it is expected that everyone would know everyone. These are evident in the results of the case

studies. One of the popular coping mechanism of the Filipino respondents was to borrow money from relatives and friends, which illustrate the strong social capital of the Filipinos.

On the other hand, the Japanese respondents were most worried about their emotional well-being during the occurrence of a natural disaster. In rural Philippines, relatives and friends usually offer social support in times of crisis which can explain why the Filipino respondents are less worried in the issue of emotional well-being. In bigger cities, the social capital seems to be declining, as the Filipino culture evolves and the socioeconomic transformation occurs, and where neighbors become more individualistic. This can be seen in villages with gated residences. Thus, it is also important to note of the possibility of reduced social capital in the country in the future.

The results of the Philippine case study revealed that the Philippine Crop Insurance Corporation does not aggressively market its agricultural insurance programs and the government does not educate the farmers enough to gain knowledge about the possible benefits of insurance as well as the perils of climate change. This resulted in the low number of insured farmers. Moreover, based on the results of the interviews with the farmer respondents in the upland and lowland areas in the case province, the study concludes that the agricultural insurance programs of the PCIC is effective in terms of income loss reduction and helpfulness of staff but has been assessed as inefficient due to the lack of regional staff and lack of agriculture experts.

The results of the case study also revealed that little has been done to improve the efficiency of the service delivery of the PCIC as well as increasing the number of farmer beneficiaries. Agricultural insurance may be effective in reducing income losses but it can only be truly effective if there will be efficient delivery of the insurance programs and eliminate or reduce farmer participation constraints. Therefore, stronger policies on boosting

efficiency and programs to change the mindset to encourage farmers to participate in the PCIC's agricultural insurance programs should be promoted.

The results of the Japan case study revealed that Japan's National Agricultural Insurance Association's agricultural insurance programs are effective in providing a safety net for natural disasters in Japan. However, Japanese insurance culture, good government support on agricultural activities, private insurers that provide other agricultural insurance product options, and other effective coping and adaptive strategies used by Japanese farmers themselves, could make NOSAI unnecessary in the future. Therefore, Japanese agricultural insurance and other coping and adaptive strategies can serve as a model and best practice in managing risk in the agricultural sector in times of extreme events.

Based on the results of the comparative studies between the Philippines and Japan, it is concluded that it is possible that the Philippines, other disaster vulnerable developing countries, and other disaster vulnerable countries with undeveloped or underdeveloped agricultural insurance associations and products, could emulate Japan's model of agricultural insurance system as a single risk management tool to manage the effects of natural disasters.

In the projected evolution of the Filipino culture, one can foresee a potential decline in the culture's social capital, and in times of the rising and more frequent global natural disasters, their current culture- based adaptive capacities may be ineffective. Therefore, the present time may be ripe to start strengthening agricultural insurance institutions, opening up an insurance culture based attitude of Filipino farmers, to promote regional food security as well as make the agricultural producers' lives better economically.

8.2. Ways Forward to make Agricultural Insurance Work in the Philippines and other Disaster Prone Developing Countries

The following recommendations are suggested to improve the agricultural insurance system in the Philippines and in other disaster prone developing countries, based on the results of the case study and the lessons learned from the Japanese agricultural system.

1. <u>The Philippines' and other developing countries' agricultural insurance system can learn lessons from Japan in terms of its structure.</u> There should be a central agricultural cooperative, or a federation of agricultural cooperatives, or an association of all farmers that directly links the farmers to markets and institutions. All Japanese farmers are members of the Japan Agriculture Group, of which the National Federation of Agricultural Cooperative Associations (ZEN-NOH) keeps the consumers and producers close as well as provide information on the National Agricultural Insurance Association's processes and services. Therefore, the bulk of the profit goes directly to the Japanese farmer groups. On the other hand, there is no set-up like this in the Philippines. Moreover, many Filipino farmers are not members of a cooperative. Because of these, the bulk of the income mostly go to the middlemen. Establishing a centralized agricultural cooperative or an association of agricultural producers can also serve as a marketing channel or linkage in which the cooperatives, irrigators' associations, farmers' organizations, and individual farmers can market their produce directly to consumers and in the process, increasing the farmers' share in profit. Lastly, the centralized agricultural association can be a "one-for-all" organization for farmers which can limit their transactions to the important institutions involved in the agricultural sector and save resources. Moreover, these changes can diminish opportunities for fund mismanagement and other possibilities of corruption, as well as strengthen transparency in the agricultural sector. Having this structure will empower Filipino and other developing country farmers in three ways: a) improved access to credit; b) improved access

to agricultural insurance; and c) improved access to farming information, including climate information and agricultural extension advisories.

2. Strengthening existing and creating new partnerships between the agricultural insurance agencies (such as the PCIC in the Philippines) and institutions involved in agriculture and climate change can promote farmer resiliency. The farmer is resilient if his/her household can adapt to weather disturbances, i.e. can remain food secure, and can adapt to income losses. This implies that social protection should be high. In the Philippines, government controlled agencies such as the Philippine Crop Insurance Corporation (PCIC), Climate Change Commission (CCC), Department of Agriculture (DA), Department of Environment and Natural Resources (DENR), National Disaster Risk Reduction and Management Council (NDRRMC), National Irrigation Administration (NIA), the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), as well as academic institutions' departments and think tanks such as the University of the Philippines Los Baños (UPLB), Philippine Institute for Development Studies (PIDS), as well as donor agencies and international organizations such as the United Nations (UN), Food and Agriculture Organization (FAO), World Bank (WB, Asian Development Bank (ADB), and other private institutions specializing in agriculture and climate change should all work together to minimize the adverse effects of climate change and increase vulnerability to promote farm resiliency. These agencies can work together to train farmers regularly to build their coping and adaptive strategies. For instance, building capacities so farmers appreciate climate information can help in optimal planting dates and harvest dates decisions. The partnership with the Department of Agriculture, academic institutions, donor agencies and international organizations, can improve the farmers' access to information in terms of new farming practices, and new technologies. Farm record keeping skill will be

important to develop, as in the experience of Japan, where it uses previous season's farm profit to determine the indemnity payments.

3. The PCIC should invest in new technology to improve the efficiency of their agricultural insurance programs. This recommendation is a strategy which the PCIC can implement as soon as possible. Past studies revealed that damage assessment of the team of adjusters have been inefficient and this study proves that little has been done to address the inefficiencies of damage assessment of the PCIC. The team of adjusters (TA) are mainly composed of non-agriculture experts which inaccurately assess the damaged farms, this caused the huge gaps between the farmers' estimates and the TA's estimates. Moreover, the TA's take too much time before reaching and assessing damaged farms, making the process longer for the Filipino farmers to receive their indemnity payments and delay their re-planting activities. Investing in new technologies such as drones, GIS, GPS, and others will make the damage assessment faster and more accurate. The PCIC can use agricultural drones and services by creating partnerships with 360PH and Unmanned Systems Consulting Philippines which can do the damage assessment themselves. By investing in new technologies, the PCIC's damage assessment will be more efficient and therefore hastening the damage filing process and provide indemnity payments to farmers faster. In addition, the PCIC will be able to save resources on repeatedly training new hires for the members of the team of adjusters.

4. The top management of PCIC should enhance theier human resources to boost their agricultural insurance programs' effectiveness and efficiency. The regional offices of the PCIC has only 14 permanent positions which in wide spread calamities cannot cater to the whole region. Moreover, most positions in the PCIC are not only on a contractual basis but also have low provisions for salaries and wages which discourage qualified applicants to apply. Even if they do, they tend to transfer to another job which offers higher salaries.

These scenarios have negatively contributed to the program's efficiency and effectiveness. The PCIC can save resources on training the new hires every time a job contract is up by increasing the number of permanent positions and providing attractive incentives. The tenured employees will also have the opportunity to gain more knowledge and experience about the agricultural insurance programs and the system of the PCIC, thus, would increase their agricultural insurance programs' efficiency and effectiveness.

5. The Government should provide premium subsidies for farmers to change the farmer mindset and encourage them to participate in agricultural insurance programs. In order to change the cultural perspective of Filipino farmers and those in other developing countries about insurance as an investment rather than a cost, the government should first provide premium subsidies. To make this scheme sustainable, the government may shoulder a bigger proportion of the premium of farmers in the first year of implementation; and gradually decreasing government share, until the farmers will be willing to fully pay for the insurance premium. The specific percentages can be a subject of future study. The goal is to demonstrate to farmers the benefits of investing in agricultural insurance, thus, gradually changing their mindset.

6. The Government in partnership with private institutions, can provide more information about natural disasters through the media or museums to gradually change their knowledge and perspectives.

In order to change the cultural perspective of Filipinos regarding natural disasters, the government, in partnership with private institutions, can provide information through the media such as in social media, television, and the radio. Filipinos normally get their information on social media nowadays, but those living in rural areas still rely heavily on television and radio for sources of information. Moreover, museums that feature disasters

can not only be beneficial for tourism but also helpful in providing knowledge about disasters and can gradually change the Filipino cultural perspective towards disasters. Given the awareness about disasters and their effects on livelihoods, Filipinos may now be enticed to seek more optimal disaster risk management strategies, including again, investing in insurance, in general.

8.3. For Future Research

Natural disasters are becoming stronger and more frequent and is quickly becoming a way of life, especially for disaster vulnerable countries. Examining the evolving farming practices, coping strategies, agricultural insurance markets, insurance culture, community culture, and disaster management of those who venture in agriculture in all disaster vulnerable countries amid the rising global natural disasters is essential to promote food security and reduce poverty in these regions.

ANNEXES

Annex 1. Farming Systems around the World

A farming system as defined by the Food and Agriculture Organization (2011) is "*a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate. Depending on the scale of the analysis, a farming system can encompass a few dozen or many millions of households*".

The classification of the farming systems of developing regions has been based on the following criteria according to the FAO (2011):

a) available natural resource base, including water, land, grazing areas and forest; climate, of which altitude is one important determinant; landscape, including slope; farm size, tenure and organization; and

b) dominant pattern of farm activities and household livelihoods, including field crops, livestock, trees, aquaculture, hunting and gathering, processing and off-farm activities; and taking into account the main technologies used, which determine the intensity of production and integration of crops, livestock and other activities.

Description of the Farming Systems per region can be found in the following links:

1. Sub Saharan Africa

http://www.fao.org/farmingsystems/SSA_leg_en.htm

2. Middle East and North Africa

http://www.fao.org/farmingsystems/MNA_leg_en.htm

3. Eastern Europe and Central Asia

http://www.fao.org/farmingsystems/EU_leg_en.htm

4. South Asia

http://www.fao.org/farmingsystems/SAS_leg_en.htm

5. East Asia and Pacific

http://www.fao.org/farmingsystems/EAP_leg_en.htm

6. Latin America and Caribbean

http://www.fao.org/farmingsystems/LAC_leg_en.htm

Annex 2. Agricultural Insurance Programs of the Philippine Crop Insurance Corporation

Implementation Mechanism of the Rice Crop Insurance Program

The rice crop insurance program (RCIP) of the PCIC is the major crop insurance program which provides protection for rice farmers across the Philippines. The following link describes all the information about the implementation mechanism of the RCIP:

https://pcic.gov.ph/wp-content/uploads/2019/01/01-Rice-Crop-Insurance-September-03.pdf

Regional Operations of the Rice Crop Insurance Program

Annex table 1 shows the regional operation of the rice crop insurance program in region 4 for the past three years. The number of rice farmers and area insured continue to increase every year. This can be attributed to the establishment of the Registry System for Basic Sectors in Agriculture (RSBSA) which will be discussed in the succeeding sections.

Annex Table 1. Regional Operations of the Rice Crop Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	37,914	66,202.96	166,119,000	7,409	98,301,000	5.93
2017	47,462	86,959.23	213,911,000	13,480	146,742,000	6.79
2018	51,153	86,720.91	218,193,000	12,556	133,824,000	6.14

Source of basic data: PCIC

The program provides free insurance premium for rice farmers which resulted to the yearly increase of insured farms. The premium collected by the PCIC also increased every year while the premium collected versus the farmer indemnity payments are all positive in all the recorded years.

Implementation Mechanism of the Corn Crop Insurance Program

The corn crop insurance program (CCIP) of the PCIC is the major crop insurance program which provides protection for corn farmers across the Philippines. The following like describes all the information about the implementation mechanism of the CCIP:

https://pcic.gov.ph/wp-content/uploads/2019/01/01-Corn-Crop-Insurance-September-03.pdf

Regional Operations of the Corn Crop Insurance Program

Unlike the RCIP, there is a decrease of the number of insured corn farmers from 2017 to 2018 (annex table 2). Large areas of corn plantation can be found in the southern Philippines, which is not much affected by destructive natural disasters. This explains the decline of the number of insured corn farmers.

Annex Table 2. Regional Operations of the Corn Crop Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	2,687	4,807.24	26,401,000	578	7,403,000	5.93
2017	5,279	10,377.25	31,007,000	1,148	12,673,000	4.79
2018	3,341	6,383.85	19,317,000	2,056	21,759,000	13.75

Source of basic data: PCIC

Implementation Mechanism of the High Value Crop Insurance Program

The high value crop insurance program (HVCIP) of the PCIC is the major crop insurance program which provides protection for farmers who produce high value crops such as vegetables across the Philippines. The following link describes all the information about the implementation mechanism of the HVCIP:

https://pcic.gov.ph/wp-content/uploads/2019/01/HVCC-Final.pdf

Regional Operations of the High Value Crop Insurance Program

Annex table 3 illustrates the regional operations of the high value crop insurance program in region 4. Similar to the RCIP, there has been a steady rise in the number of insured high value crop farmers from the past three years. Vegetable crops are one of the most vulnerable to natural disasters and have usually high production cost than the other crops which also yields higher profit than most crops. Because of this, farmers would want to protect their income by insuring their high value crops. This insurance program is one of PCIC's profitable schemes, as the damage rate is less than one percent unlike the rice and corn crops.

Annex Table 3. Regional Operations of the High Value Crop Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	29,480	40,379.80	65,541,000	1,629	6,130,000	0.31
2017	36,422	47,802.62	95,503,000	586	2,457,000	0.13
2018	36,545	50,089.58	278,368,000	1,055	6,457,000	0.16

Source of basic data: PCIC

Implementation Mechanism of the Livestock Mortality Insurance Program

The high livestock mortality insurance program (LMIP) of the PCIC is the major crop insurance program which provides protection for livestock farmers across the Philippines. The following link describes all the information about the implementation mechanism of the LMIP.

https://pcic.gov.ph/wp-content/uploads/2020/01/01-Livestock-april-12-2019-Final-Printing-APRIL-15-2019.pdf

Regional Operations of the Livestock Mortality Insurance Program

Similar to the RCIP and the HVCIP, the trend in the number of insured livestock farmers increases every year in region 4 (annex table 4). Along with the HVCIP, the LMIP

is also one of the more profitable insurance programs of the PCIC with damage ratios of less than one percent in each year.

Annex Table 4. Regional Operations of the Livestock Mortality Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	19,702	82,763.00	32,728,000	354	4,310,000	0.76
2017	20,011	77,019.00	35,762,000	392	3,949,000	0.60
2018	27,983	123,953.00	47,718,000	593	5,760,000	0.61

Source of basic data: PCIC

Implementation Mechanism of the Non-Crop Insurance Program

The non-crop insurance program (NCIP) is an insurance program that protects the agricultural assets of the farmers across the Philippines. Agricultural assets pertain to buildings, machineries, equipment, transportation facilities, and other related infrastructures directly or indirectly used in pursuit of agricultural activities including production and processing, marketing, storage, and distribution of goods and services (PCIC, 2019). The following link describes all the information about the implementation mechanism of the NCIP:

https://pcic.gov.ph/wp-content/uploads/2019/01/Non-Crop-Insurance-September-03.pdf

Regional Operations of the Non-Crop Insurance Program

Annex table 5 shows the regional operations of the non-crop insurance program in region 4. Unlike the other insurance programs, the NCIP insures farm related equipment. There was an increase of the number of insured farm equipment from 2016 to 2017 but it interesting to note that the damage rate is low on both years. Since the risk is low for non-crop insurance, a drastic decline was observed in 2018 with only twenty-six farmers insuring their farm equipment. This program is also considered one of PCIC's profitable schemes as

the premium collected largely outweighs the indemnity paid to the farmers who experienced damages to their farming materials.

Annex Table 5. Regional Operations of the Non-Crop Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	2,405	323.00	1,624,000	13	90,000	0.16
2017	4,629	572.00	4,014,000	9	47,000	0.05
2018	26	11.00	41,000	0	0	0.00

Source of basic data: PCIC

Implementation Mechanism of the Fisheries Insurance Program

The Philippine Crop Insurance Corporation provides insurance protection to fish farmers/fisherfolk/growers against losses in unharvested crop or stock in fisheries farms due to natural calamities and fortuitous events through the fisheries insurance program (FIP). The following link describes all the information about the implementation mechanism of the FIP:

https://pcic.gov.ph/wp-content/uploads/2019/01/Fisheries-Insurance-Aug-17.pdf

Regional Operations of the Fisheries Insurance Program

The FIP has the least number of insurance policy among all other major insurance programs of the PCIC (annex table 6). From 2016 to 2017, there were no eligible damages for the fisheries industry. A large surge of fisher folk can be observed in 2018 which can be attributed to the RSBSA becoming a national insurance program and includes the fisher folk.

Annex Table 6. Regional Operations of the Fisheries Insurance Program

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	328	49.00	1,474,000	0	0	0.00
2017	217	49.00	3,130,000	0	0	0.00
2018	5,565	712.00	17,379,000	36	698,000	0.21

Source of basic data: PCIC

Implementation Mechanism of the Accident and Dismemberment Security Scheme

The Accident and Dismemberment Security Scheme (ADS²) is an insurance protection for agricultural producers, farmers, fisherfolk and other stakeholders that covers death or dismemberment of the insured due to accident. The following link contains all the information about the implementation mechanism of the ADS²:

https://pcic.gov.ph/wp-content/uploads/2019/02/CLTI-BROCHURES.pdf

Regional Operations of the Accident and Dismemberment Security Scheme

Annex table 7 describes the regional operations of the accident and dismemberment security scheme of the PCIC in region 4. Although the amount of accidents and dismemberment is low (below one percent yearly), there has been huge increases on the number of insured farmers every year from 2016 to 2018. Because of this, the scheme also provides the PCIC more inflows vis-à-vis outflows.

Annex Table 7. Regional Operations of the Accident and Dismemberment Security Scheme

Year	No. of Farmers	Area Insured (hectares)	Premium Collected (PhP)	No. of Claimants	Indemnity Payments (PhP)	Damage Rate (%)
2016	3,979	356.00	1,267,000	9	673,000	0.28
2017	10,626	2,984.00	1,519,000	12	551,000	0.10
2018	24,148	12,389.00	3,044,000	46	1,860,000	0.16

Source of basic data: PCIC

The Registry System for Basic Sectors in Agriculture (RSBSA)

The Registry System for Basic Sectors in Agriculture-Agricultural Insurance Program (RSBSA-AIP) is a new insurance program for subsistence farmers and fishers who may not be eligible for the RCIP. The following link contains all the information about the implementation mechanism of the RSBSA:

https://pcic.gov.ph/elementor-14244/

This section enumerates the all the major agricultural insurance programs offered by the Philippine Crop Insurance Corporation. These are the rice, corn, livestock, high value crop, non-crop, fisheries, accident and dismemberment, and the RSBSA. Rice and corn are two of the major and staple food crops of the Philippines that is why protecting these crops are essential for Philippine agriculture. These two crops have their stand-alone insurance programs with the PCIC. The high value crops on the other hand, protects the vegetable crops as well as trees. The PCIC also offers insurance in the fisheries and livestock sector while the non-crop insurance program insures the farmers' agricultural equipment. Lastly, the accident and dismemberment insurance program gives protection to farmers in times of accidents.

Annex 3. Key Informant Interview Guide Questions for PCIC Staff

About the Key Informant and the PCIC

Name of Respondent:

Agency and Office Address:

Position:

1. What are the problems encountered in the program implementation of the PCIC's Agricultural Insurance Programs?

Program Mechanics

Process of Filing

Process of Damage Inspection

Process of Estimation of Damages

Process of Filing Indemnity Claims

Organizational (lack of personnel, lack of resources etc)

Financial

From the perspective of PCIC, what are the reasons for farmers' participation/non-participation in the programs?

1. Reasons for Participating:

2. Reasons for not Participating:

3. Efficiency

Was the actual processing of filing of damages and claims of indemnity payment consistent with the PCIC's desired timetable? ( ) Yes; ( ) No. Explain your answer

What made this process challenging?

What made these processes efficient?

Is the distribution of roles and responsibilities within the AIPs well-defined? ( ) Yes; ( ) No. Explain your answer.

Have the arrangement (roles and responsibilities) been respected in the course of implementation of the AIPs? ( ) Yes; ( ) No. Explain your answer.

How did the AIPs promote partnership and alliances around its outreach areas?

What was the achievement of the programs in terms of number of farmers indemnified during the past year?

What was the achievement of the programs in terms of the rate of participating farmers during the past year?

Could the same achievements and results have been produced at a lower cost (financial, staff time, personnel)? ( ) Yes; ( ) No. Explain.

4. Effectiveness

Does the AIPs readily accessible to farmers need insurance? ( ) Yes; ( ) No. Explain your answer.

What are the bases of selecting farmer participants?

What is the participation rate of the farmers in your area?

What are the selection criteria of the team of adjusters?

Do you conduct training in rice crop damage estimation for the members of the Team of Adjusters? ( ) Yes; ( ) No. Why/Why not

Has the intended indemnity delivered during the intended time frame? ( ) Yes ( ) No. Explain.

Is the indemnity amount/payment of the same amount as expected by the farmers?

To what extent was the implementation of the AIPs constrained or facilitated by: a. Political b. Climatic c. Infrastructure d. Others, please specify

5. Participation

Do farmer participants communicate their needs and demands? ( ) Yes; ( ) No. Explain.

In what way?

If yes, how do demand expressions of the farmers affect the decision making process of the PCIC?

What are your suggestions to increase the participation of the farmers in the rice crop insurance?

Are there other crop insurance modalities that may increase farmer participation (i.e. Weather index based insurance or the WIBI)?

Annex 4. Key Informant Interview Guide Questions for Local Municipal Agricultural Offices

1. Do you fully understand the concept of climate change? Do you think the farmers understand the concept of climate change?
2. Is your town/city prepared for natural disasters?
3. What disasters have you experienced during the past 10 years? What was the worst?
4. How would you rate it in terms of impact?
5. What were the usual coping strategies?
6. What types of insurance do the farmers have?
7. Do you have any knowledge on how agricultural insurance products are administered from the national to the regional to the farmer level? If yes please elaborate.
8. Was Insurance Effective?
9. What were the problems encountered in insurance administration?
10. Suggestions?

Annex 5. Farmer Questionnaire for Philippines Field Work

FARMER'S QUESTIONNAIRE (Philippines)

The purpose of this study is to seek the answer to the question of how agricultural insurance can potentially be an effective and efficient disaster management tool so that the poorest of the poor in isolated rural areas (in coastal and low elevation, middle elevation, and upland communities) can avoid falling into the poverty trap amid rising global natural disasters. The records of this study will be kept private. You will be asked to answer questions about agricultural production, coping mechanisms, and agricultural insurance program. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified and will be strictly for academic purposes only.

I, hereby voluntarily consent to participate in the following field study

Farmer's name and signature

_____
__

Date _____

Phone Number _____

Interviewer _____

I. RESPONDENT'S PROFILE

1. Address (Barangay, Town/City)

_____

__

2. Dominant Crops, trees, animals grown:

_____

__

3. Age: _____

4. Sex: ( ) Male ( ) Female

5. Marital Status: Married ( ) Single ( ) Widow/Widower ( ) Separated ( ) Others: _____

6. Household Size: _____

7. Farm Size (ha): _____

8. Tenure Status: ( ) Land Owner ( ) Tenant ( ) Lessee ( ) Others: _____

9. Buy food from the market? ( ) Yes ( ) No

10. Member of a cooperative/irrigators' association/farmers' association? ( ) Yes ( ) No

If yes, what is your current status? ( ) Officer ( ) Active Member ( ) Inactive Member

II. CHARACTERIZATION OF EXTREME EVENTS

1. State your level of agreement to the following statements (Please check):

Statement	Strongly Agree (5)	Agree (4)	Don't Know (3)	Disagree (2)	Strongly Disagree (1)
I fully understand the concept of climate change.					
Climate change is man-made and not caused by God.					
Extreme events are caused by climate change.					
Extreme event is predictable.					
Negative impacts of extreme events can be prevented or reduced.					
There is an early warning system for extreme events in our barangay/town/city.					
Extreme events are becoming more severe now.					
Extreme events are becoming more frequent now.					
My household is prepared to handle extreme events.					
Our barangay/town/city is adequately prepared to handle extreme events					
I consider extreme events as a problem.					

III. RECOLLECTION OF EXPERIENCES DURING EXTREME EVENT

1. What extreme events have you experienced over the last ten years (Please check)?

Year	Typhoon	Flood	Landslide	Drought	Earthquake	Fire	Pest Infestation	Others (specify)

2009								
2010								
2011								
2012								
2013								
Year	**Typhoon**	**Flood**	**Landslide**	**Drought**	**Earthquake**	**Fire**	**Pest Infestation**	**Others (specify)**
2014								
2015								
2016								
2017								
2018								

2. On a scale of 1-5 (1= not at all, 5 = very much), to what extent did the extreme events affect your life? Indicate your rating (1, 2, 3, 4, or 5).

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

3. Of these extreme events, which do you consider the worst? Why?

_____

_____

_____

IV. SPECIFIC IMPACTS OF EXTREME EVENTS

1. On a scale of 1-5 (1= not at all, 5 = very much), to what extent did the most recent extreme event affect the following aspects of your life (Encircle your rating):

Assets/properties (house, appliances, vehicle, etc.) 1 2 3 4 5

Logistics (water, electricity, infrastructure, etc.) 1 2 3 4 5

Job/source of income 1 2 3 4 5

Food consumption 1 2 3 4 5

Health and nutrition 1 2 3 4 5

Education of children 1 2 3 4 5

Emotional well-being 1 2 3 4 5

Overall well-being 1 2 3 4 5

V. DISASTER MANAGEMENT PRACTICES AND AGRICULTURAL INSURANCE

1. Disaster Management Practices

Practices	Do you apply the following disaster management practices? *(1-Yes, 0-No)*	If yes, does it solve your food security problem? *(1-Yes, 0-No)*
1. Stock Food		
2. Use Savings		
3. Borrow money		
4. Dine at other's house		
5. Consume less food/lower quality		
6. Reduce number of meals eaten per day		
7. Reduce health and education expenses		
8. Delay payment of utility bills		
9. Sell Assets		
10. Produce own food		
11. Agricultural Insurance Payment		
12. Other Types of Insurance		
13. Ask assistance from outside sources		
14. Others (specify)		

2. Agricultural Insurance

Types of Insurance (rice, vegetable, livestock, etc.)	Annual Premium Paid (PhP)	Indemnity Payment After Extreme Event (PhP)
1.		
2.		
3.		
4.		
5.		
6.		
7.		

VI. FARMING SYSTEMS SET-UP AND AGRICULTURAL PRODUCTION

1. Normal Year (most recent cropping season without extreme event)

Type of Commodity	Total Annual Production Cost	Total Value of Production (kg/ no. of heads)	Income/Profit
Crops			
1. Rice			
2.			
3.			
4.			
Vegetables			
1.			
2.			
3.			
4.			
Fruit Trees			
1.			
2.			
3.			
4.			

Other crops			
1.			
2.			
3.			
4.			
Animals			
Livestock			
1.			
2.			
3.			
4.			
Poultry			
1.			
2.			
3.			
4.			
Fisheries			
1.			
2.			
3.			
TOTAL (To be computed by the researcher)			

2. Year with extreme event (Most recent cropping season with a natural calamity)

Type of Commodity	Total Annual Production Cost	Total Value of Production (kg/ no. of heads)	Income/Profit
Crops			
1. Rice			
2.			
3.			
4.			
Vegetables			
1.			
2.			
3.			
4.			
Fruit Trees			
1.			
2.			
3.			
4.			
Other crops			
1.			
2.			
3.			
4.			
Animals			
Livestock			
1.			
2.			
3.			
4.			
Poultry			
1.			
2.			

3.			
4.			
Fisheries			
1.			
2.			
3.			
TOTAL (To be computed by the researcher)			

3. Other sources of income within the household

Household member	Number of years in school	Primary occupation	Secondary Occupation	Annual Income from Non-Agricultural Activities (If any)
Respondent				
Spouse of respondent				
Other members (If any)				
1.				
2.				
3.				

VII. EFFICIENCY AND EFFECTIVENESS OF THE IMPLEMENTATION OF THE RICE INSURANCE PROGRAM

A. Efficiency

1. Is the damage estimate of the field loss assessors consistent with your estimates?
( ) Yes ( ) No
If no, how much was the gap? _____
2. How long did it take for you to receive your indemnity payment? _____
3. How would you rate the overall efficiency and effectiveness of the program? (1 to 10, 10 the highest) _____
Remarks:
_____

B. Effectiveness

1. How well do you know the program?

Program Processes	**Highly Knowledgeable**	**Knowledgeable**	**Moderately Knowledgeable**	**Low Knowledge**	**No Knowledge**
Process of enrolling in the program					
Process of filing damages					

Knowledge of insurable damages					

2. How do you rate your access to Insurance services? Very High Access ( ) High access ( ) Moderate access ( ) Low access ( ) No access ( )
3. How accessible is the nearest office of the insurance providers? (Km)
_____
4. Is the staff helpful in assisting you? Always Helpful ( ) Most of the Time Helpful ( ) Helpful ( ) Sometimes Helpful ( ) Not Helpful ( )
Remarks:
_____
5. Was the insurance program able to meet your expectations? Always ( ) Most of the time ( )
Sometimes ( ) Rarely ( ) Never ( )
Remarks:
_____

VIII. PROBLEMS ENCOUNTERED, SUGGESTIONS AND RECOMMENDATIONS

1. What problems did you encounter regarding the implementation of the Agricultural Insurance Program?
_____
_____
_____
_____

2. What recommendations can you give to improve the overall implementation of the program?
_____
_____
_____
_____

3. Do you have any request from the government to improve agricultural business/ agricultural insurance?
_____
_____
_____
_____

THANK YOU FOR YOUR COOPERATION!!!

Annex 6. Farmer Questionnaire for Japan Field Work

日本国およびフィリピン共和国における
農業保険制度の災害リスク削減機能と営農体系に関する比較研究

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日本国における農業保険制度の実態に関する意識調査

本調査研究では、日本・フィリピン両国の農業保険制度が、自然災害や異常気象による農家世帯の被害削減に果たしている機能を解明することを研究課題としています。

本意識調査の目的は、特に日本において農業災害補償法（農業共済組合, 農済）による保険制度が、世界的に増加している自然災害や異常気象の被害から、日本国内の農家世帯をどのようにして保護しているのか、その実態を把握することにあります。

本調査票の回答者の方々には、以下（1）自然災害や異常気象に関する知識と被災経験（2）各農家世帯の農業生産の実態（3）現行の農業保険制度（農業災害補償法）に関する意識、の 3 項目を中心に回答していただきます。

本調査の集計結果は学術利用の目的においてのみ使用されます。また回答者の方々のプライバシー保護のため、今後、本調査結果に基づいて筆者により作成される学術論文や報告書等の全ての成果物において、回答者の方々のご氏名やご住所等、個人が特定される情報の一切が秘匿されますことをここに明記いたします。

お忙しいところ大変恐縮ですが、ご同意いただけましたら、ご氏名と回答日をご記入の上、下記の各質問にご回答をお願い申し上げます。

ご氏名 _____

回答日 _____

I.　回答者の方に関する情報

1. ご住所 (市区町村名)：

_____

2. 栽培・飼育されている作物名もしくは家畜名：

_____
__

3. ご年齢：_____

4. 性別：_____

5. ご結婚経験の有無：_____

6. 現在の世帯人数: _____

7. お子様のご年齢（お子様のいらっしゃる方）：_____

8. 世帯構成員の方々の内、下記に該当する方の人数：
18 歳以下 の方____名　　60 歳以上の方 ____名

II. お住まいの地域での「異常気象」の影響に関する情報

1. 以下の各項目をお読みになり、該当するものに「✓」をご記入ください：

項目	非常に そう思う (5)	そう 思う (4)	どちらでもない （3）	あまり そう思わない (2)	全く そう思わない (1)
「気候変動」という概念に関してよく理解している					
気候変動は「天災」ではなく、「人災」である					
異常気象は気候変動によって引き起こされている					
異常気象は、予測することが可能である					
異常気象による悪影響は、リスクを防止もしくは削減することが可能である					
居住する都道府県／市区町村には、異常気象発生の際に警告を発する制度がある					
異常気象の影響は、年々悪化している印象がある					
異常気象は、年々発生件数が増加している印象がある					
自身の家では、異常気象への対策を適切にしている					

自身の居住する都道府県／市区町村では、異常気象への対策が適切になされていると思う					
異常気象は、自身や居住する地域に深刻な影響を与える問題だと思う					

III. 近年経験された異常気象／自然災害に関する情報

1. この十年間に経験された異常気象／自然災害についてお聞かせください。該当するものに「✓」をご記入ください：

	台風	洪水	地滑り	干ばつ	地震	火災	害虫の発生	その他（具体的に）
2009年								
2010年								
2011年								
2012年								
2013年								
2014年								
2015年								
2016年								
2017年								
2018年								

2. 各年度に経験した異常気象／自然災害が回答者の方の生活／生計に及ぼした影響を 1～5 の 5 段階で評価してください。(1=全く影響はなかった, 5=甚大な影響があった)

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

3. 上述の各年度に異常気象／自然災害を被災した経験をお持ちの場合、具体的にどの年度の、どの異常気象／自然災害が最も悪影響を及ぼしていたか、理由と合わせてお聞かせください。

_____
__

IV. 異常気象／自然災害の具体的な影響に関する情報

1. 以下の各項目において、近年経験された異常気象／自然災害の影響度を 1～5 の 5 段階で「〇」で囲み評価してください(1=全く影響はなかった, 5=甚大な影響があった)。

私財 (住宅, 家具, 自動車など)	1 2 3 4 5
ライフライン(水道, 電気, ガス等)	1 2 3 4 5
職業／収入源	1 2 3 4 5
食糧消費量（食品購入量や消費量、食事回数等）	1 2 3 4 5
健康状態や栄養状態等	1 2 3 4 5
子どもの教育・就学状況	1 2 3 4 5
精神的安定度	1 2 3 4 5
生活全体における安定度	1 2 3 4 5

V. 異常気象／自然災害の被災時の避難行動と農業保険に関する情報

1. 異常気象／自然災害の被災時の避難行動（被災経験をお持ちの場合）

行動内容	左記の行動に該当する経験の有無 *(1-はい, 0-いいえ)*	左記の行動による食糧確保・生活維持への有効性 *(1-有効, 0-非有効)*
15. 食糧の貯蔵（防災食品等の購入）		
16. 貯蓄の取り崩し		
17. 生活／生計維持のための借金		
18. 知人宅／友人宅等での避難生活		
19. 1 回の食事の際の質・量の抑制		
20. 1 日の食事回数の抑制		
21. 医療・教育関連費の出費の抑制		
22. 公共料金の支払いの延期		
23. 私財・家財の売却		
24. 救荒作物の自家栽培による対処		
25. 農業保険（農済・JA）による補償		
26. その他の保険制度による補償		
27. その他の外部機関による生活援助		
28. その他 (具体的に)		

2. 農業保険制度（加盟されている農業保険についてお聞かせください）

農業保険の種別ごとの名前 (作物, 家畜ごとの保険名称)	年間保険料金（円）	被災後に支払われた補償金額（円）
1.		
2.		
3.		
4.		
5.		

6.		
7.		

VI. 農業生産と営農体系に関する情報

1. 年間農業生産量と商品別生産額 (異常気象等を被災していない、最近の年)

商品種別	年間の生産費用	年間の生産量 (kg もしくは個数)	年間の生産額
農作物（各栽培作物名をご記入ください）			
1. **米**			
2.			
3.			
野菜			
1.			
2.			
3.			
4.			
5.			
果物			
1.			
2.			
3.			
その他の農作物			
1.			
2.			
3.			
家畜およびその他（各飼育動物等の名称をご記入ください）			
家畜			
1.			
2.			
3.			
養鶏			
1.			
2.			
3.			
漁業			
1.			
2.			
3.			
合計（本項目は調査者が記入します）			

2. 年間農業生産量と商品別生産額 (異常気象等を被災した、最近の年)

商品種別	年間の生産費用	年間の生産量 (kg もしくは個数)	年間の生産額
農作物（各栽培作物名をご記入ください）			
1. 米			
2.			
3.			
野菜			
1.			
2.			
3.			

4.			
5.			
果物			
1.			
2.			
3.			
その他の農作物			
1.			
2.			
3.			
家畜およびその他（各飼育動物等の名称をご記入ください）			
家畜			
1.			
2.			
3.			
養鶏			
1.			
2.			
3.			
漁業			
1.			
2.			
3.			
合計（本項目は調査者が記入します）			

3. 各世帯における農業以外の収入源に関する情報

世帯構成員	最終学歴	本業	副業	農業以外の経済活動による年間の収入額
回答者の方				
配偶者の方				
その他の世帯構成員の方				
1.				
2.				
3.				

VII. 農業補償制度の効果と有効性に関する情報

A. 農業補償制度の効果

1. 農済関係者の被災状況の測定結果と、回答者の方による見積もり結果の差の有無：

差が生じた( )　当初の予測通りの測定結果だった ( ) ＊「✓」をご記入ください

差が生じた場合、どの程度の差が生じていましたか？

_____

2. 農業補償制度（農済）による補償金の支払いに要したおおよその日数：

_____

3. 農業補償制度の制度内容に関して 1～10 の 10 段階で評価してください：

_____

上記評価の理由：

_____

B. 農業補償制度の有効性

1. 農業補償制度（農済）に関するご理解の程度についてお聞かせください。

＊該当するものに「✓」をご記入ください。

農業補償制度の補償内容	詳しく理解している	理解している	どちらでもない	あまり理解出来ていない	理解出来ていない
農業補償制度の概要と加入方法					
農業補償制度による被災時の補償方法の仕組み					
農業補償制度による被災時の被災状況測定方法					

2. 農業補償制度（農済）の利便性を評価してください：

＊該当するものに「✓」をご記入ください。

利便性が非常に高い ( )　利便性が高い ( ) どちらでもない ( )

利便性が低い　( )　利便性が非常に低い ( )

3. 農業補償制度（農済）の最寄り事務所までのおおよその距離をお聞かせください：

_____（km）

4. 農業補償制度（農済）の最寄り事務所の対応満足度についてお聞かせください：

＊該当するものに「✓」をご記入ください。

非常に満足している　( )　満足している　( )　どちらでもない（）

あまり満足していない ( )　満足していない ( )

上記評価の理由：

_____

5. 農業補償制度（農済）による補償は、被災後の減収の抑止に有効でしたか？
　有効だった (　)　有効ではなかった（　）
上記評価の理由
_____

VIII. 農業補償制度（農済）に関するその他のご意見に関する情報
1.農業補償制度（農済）への加入と利用に際し生じた問題についてお聞かせください。

_____
_____
2.農業補償制度（農済）全体に関するご意見をお持ちでしたらお聞かせください。

_____
__

3. 農業事業または農業保険を改善するための政府へのご希望はありますか？

_____
__

ご協力ありがとうございました。
本調査研究の結果は、日本とフィリピン共和国の農家世帯における、将来の異常気象／自然災害のリスク削減のために、貴重な研究資料として活用させていただきます。
アルマンド・ローラ

Annex 7. Photos from the Fieldwork

Top photo: Farming materials used by the a Japanese respondent;

Bottom photo: The author with the oldest farmer respondent at 87 years old.

Top photo: The author with a farmer leader in Gifu City, Gifu Prefecture, Japan;

Bottom photo: Farm plantations in Gifu City, Gifu Prefecture, Japan.

Top photos: Farm Plantations and Greenhouse in Gifu City, Gifu Prefecture, Japan;

Bottom photos: Technology used for fertilizer and light and temperature control at the Greenhouses in Gifu City, Gifu Prefecture, Japan.

Top photo: Japan Agriculture Group Office in Gifu City, Gifu Prefecture, Japan;

Bottom photo: Flood control gates in Gifu that help minimize flood impacts due to heavy rain and/or typhoon.

Top photo: The author posing for a photo at rice crop plantations in Gifu Prefecture, Japan;

Bottom photo: The lowland rice crop farms in the municipality of Santa Cruz, Laguna Province, Philippines.

Top photo: Farms and crops at the upland areas of Nagcarlan, Laguna, Philippines;

Middle photo: The author with the farmers' cooperative leader in Santa Cruz, Laguna, Philippines;

Bottom photo: Department of Agriculture Office in Liliw, Laguna, Philippines.

Top and bottom photos: Farms and crops completely destroyed by typhoon Rolly in Santa Cruz, Laguna province, where the author conducted and interviewed farmers. Photo by Maemae Castro taken October 31, 2020.

Annex 8. Webinar Presentation on Agricultural Insurance in the Philippines

Dream Agritech Consultancy Services is a popular group which aims to serve and bridge the gap between prospective investors and the Philippine Agriculture industry. The consultancy group provides services that enable investors to optimize the return on their investment by creating a bespoke farming system that suits both the farm and the investor's vision for it. Agricultural insurance is an often overlooked topic in the Philippine agricultural sector which is why the consultancy group invited the researcher to give an online lecture or a "webinar" to share insights about agricultural insurance in the Philippines on the first of June, 2020. The researcher shared his research results on his field studies in the Philippines in 2018 and 2019 as well as recommendations to improve the Philippine Crop Insurance's agricultural insurance system.

The webinar was conducted live on Facebook and YouTube and garnered around 3,000 views (as of September, 2020) from all over the Philippines, Japan, Thailand, United States, Europe, Australia, New Zealand, Africa, and the Middle-East. Among the participants were high-ranking officials from the Philippine Crop Insurance Corporation (including the vice president), local government officials, officials from the Philippine Department of Agriculture (DA), Philippine Institute for Development Studies (PIDS), and scholars from the University of the Philippines and other state universities in the Philippines. Officials from the United Nations and the International Center for Tropical Agriculture as well as scholars from Doshisha University, Ritsumeikan University, Kyoto University, Hiroshima University, University of Reading, University of Wisconsin-Madison, and University of British Columbia also participated in the webinar.

The webinar only focuses on the field studies done in the Philippines which is the 5th chapter of the paper and recommendations mentioned in the 8th chapter were also proposed to improve the agricultural insurance system of the Philippine Crop Insurance Corporation. The participants from the local government were very keen to learn about agricultural insurance and raised questions to clarify their understanding of agricultural insurance. On the other hand, the scholars of the University of the Philippines who are presently conducting research about the pilot study of a weather-based index insurance shared similar results that farmers tend to view insurance as a cost and not as an investment.

The officials of the PCIC were thankful for the research and asked the researcher for a copy of his dissertation once it is completed. The PCIC also hopes to hold another webinar about the full results of the researcher's study (including Japan field studies) so that they can improve the agricultural insurance system based on the dissertation's recommendations and other lessons which can be learned from Japan.

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