



RESEARCH ARTICLE

PROSPECTS AND CHALLENGES OF RICE INDUSTRY IN THE PROVINCE OF LAGUNA TOWARDS SUSTAINABLE MARKETING AND INNOVATIONS

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ABSTRACT

This study presents the challenges of the Philippine rice industry and that of Laguna Province where actionable solutions are drawn toward sustainable marketing and innovations. Secondary data were gathered, and a descriptive type of research was utilized. The study showed that majority of the rice farmers in Laguna are between the ages of 51 to 70 years old, about half of them have either elementary education or did not have any formal education. Majority of farmers in Laguna operate small scale farmlands of 3 hectares or less who are mostly leasehold tenants, and their income are not enough for their daily expenses. The study showed that there are too many middlemen between the rice farmers and the end consumers. Various sources explain that government and farmers’ associations have the capability to assist farmers and improve the rice distribution system of Laguna and the country. This study concludes that the young Filipino generation should become agricultural entrepreneurs, taking advantage of technology and government support. This study recommends that the government develop a comprehensive plan to help farmers and improve rice distribution system while strengthening farmer associations and cooperatives.

KEYWORDS

Rice industry, sustainable marketing, agriculture, farming

1. INTRODUCTION

Philippines has about 10 million rice farmers who are still considered the disadvantaged sector of the society despite decades of government assistance and system reforms within the farming industry. This study is aimed at presenting the challenges of the rice industry of the country and more specifically that of the Province of Laguna and draw out actionable solutions toward sustainable marketing and innovations. This research study aims to find out the rice farming system specific to the Province of

Laguna that includes both the production of rice as well as its distribution system (Manilay and Borja, 2011). What this paper intends to establish is how innovations can be implemented in the rice production and the marketing and selling of rice in the Province of Laguna in sustainable and ecologically friendly ways and means to maximize its benefits to the people of Laguna (Mataia et al., 2020). The conceptual framework of this study is presented in the form of a paradigm. Using the given theories, the researchers came up with this framework that provides the flow of the study:

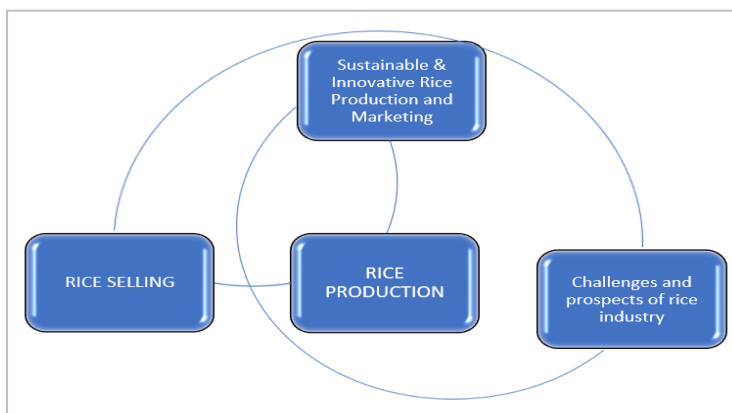


Figure 1: Research Paradigm of the Study

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The rice farmers of Laguna Province can be generally divided into two, those who are involved in planting and harvesting or production of rice and those who are selling the rice either in bulk or in retail / "tingi-tingi". This research paper describes the system of production of rice in the Province of Laguna as to what are the methods farmers are using. This determines the sustainability of their system and describes how ecologically friendly are their ways and means in doing so. The kind of supports and incentives farmers are getting from the government in the production of rice are also described in this paper.

As regards those also involved in the distribution of rice to the general public, this paper also describes the system they use and what are the innovations they employ which is the basis of determine how effective they are in reaching target customers. The government support they get in this endeavor of marketing and selling rice in the province is also described in this paper. With the existing rice production and rice selling systems in the Province of Laguna, the difficulties and challenges of these endeavors are also described in this research paper. Suggestions and recommendations on how to handle and manage challenges and difficulties experience by rice farmers and sellers are also presented in this paper.

This research study was aimed at answering the following research problems: (1) What is the ecological profile of the Province of Laguna in terms of its: natural resources; rice production and sufficiency; distribution process of rice from its production to rice consumers; (2) What are the challenges of rice production in the areas of: climate and global warming profitability or rice production; manpower needs in rice production; technology availability and use in rice farming; (3) What are the challenges of rice distribution system; and (4) What are the support and assistance that the government and farmer associations provide and can provide to rice farmers and rice sellers / distributors?

2. LITERATURE REVIEW

The staple food in the Philippines, which has over 10 million population, is rice. The country has about 10 million rice farmers who are still considered the disadvantaged sector of the society despite decades of government assistance and system reforms within the farming industry. Starting in the early 1980s during the administration of Ferdinand Marcos, up to the administration of Benigno Aquino III in 2016, the government through the National Food Authority (NFA) has dominated and controlled the rice market of the country to a point of monopoly through policies that control rice trades, rice importation licensing and quotas. The purpose of which was to establish rice-sufficiency (local production) in the country led by the Department of Agriculture and control the rice market through the NFA for rice supply management and price stability. However, this led to problems that resulted to Filipinos having shortage on rice (Tolentino and de la Pena, 2020).

Apart from regulating market participation and activities, the NFA's interventions in the rice market took the following forms: (1) the procurement of palay or paddy (unmilled rice) to support a bureaucratically-determined minimum or floor farmgate price, (b) rice procurement and buffer stocking, particularly for "lean" months between rice harvests, and (c) rice release to the market, again subject to bureaucratically-set rice retail prices, and distribution to influence rice consumer price.

The level of government subsidies to NFA, supplemented by NFA's borrowing from the banking system (which was subject to the Government's sovereign guarantee) limited NFA's capacity to price higher. Given such budget and pricing constraints, the NFA has never been able to procure more than 6% of the total annual production of paddy rice, NFA procurement averaged only 2.5% from 1990 to 2010, and even lower that 1% from 2011 to 2018 (Tolentino and De La Pena, 2020).

Filipino farmers could not produce enough rice to support the need of the population, due to the increasing cost of rice production. The government on the other hand could not subsidize the farmers enough to support them. With the restricted importation of rice, the price of rice is so high for Filipinos which resulted to hunger and inflation. In February 2019, during the administration of President Rodrigo Duterte, Rice Tariffication Law was ratified where the quantitative restrictions on rice imports was lifted. The law also eliminated the role of NFA to import rice. With this new law, licensed private operators can now ship in rice directly from abroad with the purpose of making cheaper rice to enter the Philippine market from abroad (Oxford Business Group, 2019).

From the 1980s to the present, the country faces the same challenges as regards rice farmers, that is, their ability to maximize production of rice

for higher yield and better income in the end. Various efforts from the government have been initiated to protect the and support the farmers. With the more relaxed importation of rice right own, the Filipino farmers are given leverage to compete with lower priced rice coming from abroad through various incentives and support from the government. The kind of support that rice farmers need is discussed in the research entitled "The Future of Rice Farming in the Philippines (Futurerice)" that was published by Philippine Rice Research Institute in 2017. The purpose of highlighting the efforts of the government in support the rice farmers is to strengthen their capacity to produce rice at lower cost for them to increase their profit and improve their livelihood (Barroga, 2017).

The Philippine Rice Research identified 4 important components of the *Future of Rice Farming in the Philippines* dubbed as FutureRice which are: (1) Rice Innovation Center; (2) Establishment of a Model Farm; (3) Farm Automation through the use of ICTs; and (4) Advocacy, Capacity Building and Agrotourism Development (Barroga, 2017). The Philippines is a component of monsoonal Asia, endowed with agriculturally suitable natural resources for rice farming. Before, elementary school teachers usually emphasized to their students that the countryside is the country's backbone where farm tracks meet. There are lands, fruit trees, rivers, and springs. It is the nation's source of food at the time (Fernandez, 2014).

Rapid economic development has been achieved in some areas of Laguna province in recent years through industrialization, with a significant impact on rural society and agricultural production. The role of rice farming and related institutions is expected to include the land tenure system. The region's village economy has also undergone significant change. (Fernandez, 2014). Rice businesses are common in the Philippines, and the grain's constant demand means the trading rice grain is profitable. A rice retailing store is a business that buys rice directly from farmers and then sells it to the public and other businesses. Rice is sold in the form of "tingi tingi," or per kilo or sack, whether in person or online.

The Philippines is a rice producing country. Its rice fields are located in provinces, one of which is Laguna. However, as a result of the inclusion of Laguna in the so-called CALABARZON, which is composed of the provinces of Cavite, Laguna, Batangas, Rizal and Quezon, the western part of the Laguna province is currently undergoing massive changes in its landscape. The western side of Laguna, like the rest of the CABARZON group of provinces has transitioned from an agricultural to an industrial economy (Fernandez, 2014). The farmer owners' challenges in the rice field were not easy in rice planting. Some of them complained about the high cost of planting materials. As a result, some of them are considering selling or leasing their land. A single kilogram of rice requires approximately 2,500 liters of water to produce; in fact, rice production consumes more than one-third of the world's irrigation water. Furthermore, rice contributes to climate change, with flooded paddy fields responsible for 10% of total global methane emissions.

As stated by the article "Rice may be cheap, but production comes at a cost", the idea for the Sustainable Rice Platform came from the need to focus on food commodities primarily produced in developing countries and consumed by food insecure people. Unlike coffee or cocoa, over 90 percent of all rice is produced and consumed in the same country—predominantly in Asia. In addition, given the environmental footprint of the rice sector, it seemed appropriate for UN Environment to take up this challenge," commented James Lomax, Programme Management Officer for food systems and agriculture at UN Environment. As per the researchers, the environment cannot be sacrificed in exchange for progress through industrialization and commercialization, nor is it the solution to the underlying problem of poverty. The only source of life and hope for future generations, particularly in the Province of Laguna, is the God-given land and water resource. The purpose of this research is to determine the long-term marketing and innovation of the rice industry in the province of Laguna, Philippines.

3. METHODS

This research compiled secondary data to answer the problems that were stated in the previous section. Extensive research on available data were exhausted in order to present a comprehensive landscape of the rice farming industry in the Philippines and specifically that of Laguna Province. Various articles and studies that are available on the internet were utilized by this study. Specific data from the Philippine Statistics Authority and the Department of Agriculture as well as its attached agencies were also gathered and compiled. Based on the data gathered, conclusions were formed and recommendations were presented towards the end of this research.

4. THE DATA ANALYSIS

4.1 Ecological Profile of Laguna Province

Laguna province is the third-largest province in Region IV-A known as the CALABARZON (Cavite, Laguna, Batangas, Rizal and Quezon). Laguna has a total land area of 175,973 hectares or 1,759.73 square kilometers, covering 11% of the total land area of the CALABARZON. It is considered as an inland province that comprises the largest portion of the Laguna de Bay Region where the Laguna Lake lies which is the country's largest inland water and the second-largest freshwater in Southeast Asia. Laguna Province is characterized by flat and rugged terrain and its slope ranges from level to steep slope. (DENR) Of the 1,759.73 hectares land area of Laguna Province, 38 percent or 49,311 hectares are forest land while 86,062 hectares, or 48.9 percent are agricultural in classification. Laguna's 2,105 hectares or 1.5 percent is considered industrial lands while 1,804 hectares, or 1 percent is commercial. The remaining 36,691 hectares or 20.9 percent is classified as residential lands. Of the province's 86,062 hectares of agricultural land, 18,441.75 are rice farms (Bureau of Agricultural Statistics as cited in Fernandez, 2014).

Laguna Province has generally been considered an agricultural province, but when the province was included in the so-called CALABARZON, the western part of the province has undergone massive changes in its landscape. Like its neighboring provinces, the western side of Laguna has partly switched from agricultural to industrial economy (Fernandez, 2014). Industrialization is all over the Philippines, the natural resource which is the country itself is under threat. In the desire of the government to give more employment, farmland is being converted to commercial centers. The growing number of populations in Manila affects the countryside, this include the western part of the Laguna province.

At present, the people in the Third, Fourth and part of the Second Districts in Laguna still enjoy the remaining beauty of nature – rice fields, green lush forests, and vibrant life of Laguna de Bay. However, rice farmers still struggling to survive on their own capacities with minimal government assistance. They are in need of assistance from Government, the private sectors (NGOs), and the business sectors (corporate social responsibility) for the protection of the environment and resources in the countryside which are the great attributes to the sustainability of rice farming.

In terms of rice sufficiency in the Province of Laguna, a 2014 study conducted by Fernandez (2014), stated that based on the actual and projected population and the per capita consumption, rice sufficiency level in Laguna decreased from year 2007-2009 and it was only Sta. Maria and Mabitac municipalities that attained rice sufficiency level in 200, the year when storm depression Ondoy occurred in the province. Ondoy flooded the rice farms and created so much destruction and instability in the area. The 2007-2009 rice insufficiency in Laguna was in contrast with 2006-

2007 situation where there were eight municipalities who have reach rice sufficiency level, which were Calauan, Victoria, Majayjay, Pila, Siniloan, Famy, Mabitac, and Sta. Maria. There were six municipalities in 2007-2008 that have reached the rice sufficiency level, and these were Calauan, Victoria, Lumban, Famy, Mabitac, and Sta. Maria which were all municipalities of Districts III.

4.2 Challenges of Rice Production

The research paper of Fernandez enumerates the challenges of rice production in the Province of Laguna to be increasing population, climate and global warming and capital, profit, technology and manpower (Fernandez, 2014). The population in Laguna had its sudden increase in the 1990s when manufacturing industries started to boom in the province where people from other provinces migrated to Laguna due to employment opportunities created by manufacturing firms. It was naturally followed by more housing projects where agricultural lands and farmlands started to be converted to residential areas which gradually resulted to lesser rice production in the province. Climate and global warming also had it steady threat on the production of rice in the Province of Laguna. The El Nino and La Nina phenomena that caused extreme weather conditions that can either result to flood or drought put a strain on rice production which made it very difficult for farmers to produce rice.

The rice farmers in Laguna Province are classified as landowners who have other sources of income in addition to the farmland income, a landowner and farmer who solely rely on his farmland for his family's daily sustenance, a farmer and tenant who agrees to share the farmland's profit to the landlord, a farm laborer who gets paid from working in the farm. Many farmers in Laguna are considered poor specially when they solely rely on the farmland for their livelihood. This is because rice production does not regularly provide enough money to cover the expenses and inputs to run and manage the farm and at the same time provide for the needs of the farmers' families. The study of Fernandez involved interviewing farmers who explained that the money they earn from the rice farm can be enough for their families as long as there is no calamity, such as typhoons, that would affect their production (Fernandez, 2014).

Manilay and Borja interviewed 100 farmers in Laguna Province covering the towns of Victoria, Pila and Sta (Manilay and Borja, 2011). Cruz who were affected by typhoon Ondoy in 2009. The interviews were conducted to find out how the farmers coped with the destruction bought by the said typhoon. Typhoon Ondoy brought about 781 million pesos worth of rice damage in the whole of Region IV-A where 17,081 hectares of rice land suffered the devastation. The said destruction resulted to farmers having not enough money to finance the production of their next season's rice production cycle on top of having not enough money to support the basic household needs of their families (Manilay and Borja, 2011). The study of Manilay and Borja profiled their 100 respondents as follows:

Table 1: Age Distribution of 100 Rice Farmers, by Municipality, Laguna, 2011

Age (Years)	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
20 – 30	0	1	3	4	4
31 – 40	1	3	4	8	8
41 – 50	5	9	8	22	22
51 – 60	7	14	8	29	29
61 – 70	13	9	4	26	26
71 and older	4	4	3	11	11
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.3.

Table 2: Distribution of 100 Rice Farmers, by Educational Attainment, by Municipality, Laguna, 2011

Educational Attainment	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
No formal education	5	10	6	21	21
Reached grade school	9	7	4	20	20
Finished grade school	6	4	5	15	15
Reached high school	3	4	4	11	11
Finished school	3	5	2	10	10
Reached college	0	3	2	5	5
Finished college	2	3	4	9	9
Finished a vocational course	2	4	3	9	9
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.3.

It can be noted that a total of 55% of the respondents were between the ages of 51 to 70 years old. This indicates that young people are deciding not to go to farming as they see this job as something that is not attractive financially. They most likely prefer to work in industry related jobs. This is a problem of the farming industry as there will be very little manpower who will take care of the agriculture sector of the country.

In terms of the educational attainment of farmers, 21% of the respondents have no formal education and 20% did not finish elementary. When

combining the data on the age of the farmers, who majority are in their senior and retirement ages, and their educational attainment, it shows that there is a big challenge in improving the farming situation of the Philippines. It is difficult to transfer technology to an aging farmer group who did not have or have little formal education.

The majority of the farmers are operating small-scale farms as 45% of the study's respondents have 1 hectare or less farmlands and that 20% are farming about 2.1 to 3 hectares of land as shown in Table 3.

Table 3: Distribution of 100 Rice Farmers, by Farm Size, by Municipality, Laguna, 2011

Farm Size (Ha)	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
1.0 and smaller	14	24	7	45	45
1.1 - 2.0	8	8	9	25	25
2.1 - 3.0	3	1	4	8	8
3.1 - 4.0	1	2	2	5	5
4.1 - 5.0	2	2	4	8	8
5.1 - 6.0	0	2	1	3	3
6.1 - 7.0	0	1	1	2	2
7.1 - 8.0	2	0	2	4	4
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.3.

Table 4: Distribution of 100 Rice Farmers, by Tenure Status, by Municipality, Laguna, 2011

Tenure Status	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
Owner-operator	7	7	5	19	19
Leasehold tenant	15	28	18	61	61
Share Tenant	8	5	7	20	20
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.4.

Majority of the farmers (61%) are leasehold tenants who do not own the land they are farming and who have to share their profit with their landlords as agreed upon. This gives them an even lesser amount of money to bring to their families.

When it comes to the income of the farmers, their incomes per season are shown in Table where about half of them (47%) are earning less than P50,000 per season. Since there are generally only 2 cropping seasons, families of farmers struggle with what they have.

To supplement the low income coming from farming activities, other

members of the family take other jobs outside farming. However, these additional incomes are not enough as Table 6 shows. For 27% of the respondents, their additional earning per year amounts to less than P90,000 per year, which is equivalent to P7,500 per month. For 58% of the respondents, their additional income amounts to P90,001 to P180,000 which is between P7,501 to P15,000 per month. Looking into the monthly household expense of the farmers, the most basic of their needs can be met at a monthly income of between P7,580 to P8,206. With this amount of money, Filipino farmers can survive. However, people do not just want to survive, people want to improve their lives and enjoy life and being a survival situation for a long time is tiring, not ideal and not desirable.

Table 5: Distribution of 100 Rice Farmers, by Farm Income Before Typhoon Ondoy, by Municipality, Laguna, 2011

Farm Income (Php)	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
20,000 or less	2	7	1	10	10
20,001 to 50,000	12	17	8	37	37
50,001 to 80,000	7	4	6	17	17
80,001 to 110,000	2	4	3	9	9
110,001 to 140,000	1	1	2	4	4
140,001 to 170,000	0	1	2	3	3
170,001 to 200,000	1	1	1	3	3
200,001 to 300,000	3	5	5	13	13
300,001 or more	2	0	2	4	4
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.4.

Table 6: Distribution of 100 Rice Farmers, by Non-Farm Income, by Municipality, Laguna, 2011

Non-Farm Income (Php)	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
15,001 to 30,000	2	2	1	5	5
30,001 to 60,000	3	5	4	12	12
60,001 to 90,000	3	6	2	11	11
90,001 to 120,000	7	11	6	24	24
120,001 to 150,000	3	4	7	14	14
150,001 to 180,000	8	5	7	20	20
180,001 or more	4	7	3	14	14
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.4.

Table 7: Distribution of 100 Rice Farmers, by Household Expense, by Municipality, Laguna, 2011

Household Expense Items	Municipality				
	Pila	Sta. Cruz	Victoria (PhP)	All Areas	%
Food	4,269	5,150	4,021	4,480	55
Clothing	235	310	232	259	3
Education	1,230	1,760	1,672	1,554	19
Medicine	950	1,247	541	913	11
Electricity	576	670	641	629	8
Others	320	561	233	371	5
Total	7,580	9,698	7,340	8,206	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.5.

Table 8: Distribution of 100 Rice Farmers, with and Without Savings, by Municipality, Laguna, 2011

Savings	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
Yes	7	5	8	20	20
No	23	35	22	80	80
Total	7,580	9,698	7,340	8,206	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.5.

Table 9: Distribution of 100 Rice Farmers, by Amount of Savings, by Municipality, Laguna, 2011

Amount of Savings (PhP)	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
10,000 & below	2	1	5	7	7
10,001 to 20,000	3	1	1	5	5
20,001 to 30,000	1	2	1	4	4
30,001 to 40,000	1	1	1	3	3
40,001 to 50,000	0	0	0	0	0
> 50,000	0	0	1	1	1
Total	7,580	9,698	7,340	8,206	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.5.

With the farmers having a hand-to-mouth income from their farms and outside the farm, it is not surprising to know that 80% of them do not have any savings that can cover whatever can be lost in times of calamities like Typhoon Odoy as shown in Table 8 and Table 9. Typhoons as devastating as Ondoy place farmers at a high risk of starvation and poverty.

A cushion that farmers can fall back on would have been insurance of their crops, but as Table 10 shows, 83% of the farmers do not have any crop insurance. Only 17% were able to afford to have insurance which is a great help in cases of calamities, disasters and other untoward events.

Table 11 shows the amount of money that farmers and their families should have in order to survive calamities and emergencies which amount to P27,214 to P162,925 and in order for them to continue farming as their livelihoods.

To cope with the losses from the calamity brought by Ondoy, the farmers made use of their families' income coming from outside their farming activities as shown in Table 12. Their additional income has an average amount of P31,989 which should cover both the daily household expenses and the amount of money they would need to run and manage the farm.

Table 10: Distribution of 100 Rice Farmers, with and Without Crop Insurance, by Municipality, Laguna, 2011

Crop Insurance	Municipality				
	Pila	Sta. Cruz	Victoria	All Areas	%
With	5	8	4	17	17
Without	25	32	26	83	83
Total	30	40	30	100	100

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.6.

Table 11: Amount Needed for the Planting Season Following the Typhoon and Household Expenses, by Farm Size, Laguna, 2011

Item	Farm Size (Hectare)								
	< 1.0	1	2	3	4	5	6	7	8
Farm expenses	14,980	24,886	56,966	81,192	106,453	155,292	195,420	144,975	253,652
Household expenses	12,234	11,453	16,500	18,000	16,337	21,667	21,667	17,950	21,667
Total	27,214	36,339	73,477	99,192	122,790	177,229	217,087	162,925	275,319

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.6.

Table 12: Distribution of 100 Farmers by Monthly Off-Farm Income by Farm Size, Laguna, 2012

Item	Farm Size (Hectare)									Ave
	< 1.0	1	2	3	4	5	6	7	8	
Off-farm income										
(PhP / month)	12,279	14,486	20,643	23,625	21,007	31,725	30,667	29,812	71,667	31,989

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.7.

Table 13: Amount of Borrowed by 100 Farmers to Finance their Rice Crop Production With and Without the Typhoon, Laguna, 2011

Amount of Loan (PhP)	Farm Size (Hectare)									Ave
	< 1.0	1	2	3	4	5	6	7	8	
Normal harvest (No crops destroyed)	9,172	31,571	45,999	87,889	102,400	136,721	169,136	187,100	209,433	122,428
After Typhoon Ondoy (Crops destroyed)	28,706	39,095	83,421	121,358	105,300	234,679	338,201	206,229	364,235	190,158
Difference	19,534	7,524	37,462	33,469	2,900	97,958	169,065	19,129	154,802	67,730
% Increase	213	24	81	38	3	72	100	10	74	55

Note. Adapted from "Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines", by Manilay, A. and Borja, E. *48th Biennial Convention of the PAEDA, Inc.*, p.7.

Another coping mechanism that farmers resorted to was to take loans both from private and public institutions as shown in Table 13 averaged to P67,730. The research paper of Malinay and Borja concluded that: "Off-farm income and availment of loans were the support systems that helped the rice farmers to cope with the financial problem when Typhoon Ondoy destroyed their rice crop in 2009 (Malinay and Borja, 2011). The respondents did not encounter any problem in accessing credit from both formal and non-formal credit sources. On the other hand, savings and crop insurance did not help the majority of the respondents because they did not keep any savings or availed of crop insurance prior to the typhoon.

4.3 Challenges of Rice Distribution

The study of entitled "Rice Value Chain Analysis in the Philippines: Value Addition, Constraints and Upgrading Strategies" presented the results of their study that surveyed a total of 600 farmers and 409 market intermediaries in 20 provinces and four major cities across the country

(Mataia et al., 2020). Their study illustrates a comprehensive picture of the rice system production and distribution in the Philippines. A summary list of their study participants is shown below.

The study of mentioned that the Philippines placed 7th among the top rice-producing countries in the world in 2014 with a share of about 3% to global rice production (Mataia et al., 2020). Even with this kind of production, the rice sufficiency level of the country in 2014 was only at 92% although this has been a huge improvement of 81% compared to 2010 production according to (Philippine Statistics Authority, 2015). The increase in rice yield of the country can be attributed to the adoption of certified seeds and investment in irrigation initiated by the Philippine government. Based on PSA data, paddy rice production in the country is concentrated in Luzon, 59% of the country's total production which accounts to 10.71 million tons of rice. This is followed by Mindanao with 22.53% (4.09 million tons) and Visayas with 18.45% (3.35 million tons) The rice production and growth rate of the country is illustrated below.

Table 14: Distribution of number of sample chain actors by major island

Major Island	Farmer	Paddy Trader		Rice Processor		
		Cooperative Paddy trader	Private paddy trader	Cooperative miller-trader	Custom miller	Miller- trader
Number of samples						
Luzon	330	3	53	2	1	49
Visayas	120	0	10	3	6	16
Mindanao	180	1	16	1	4	25
Metro Cities						
Total	600	4	79	6	11	90
Major Island	Farmer	Paddy-Rice Trader		Rice Trader		
		Paddy-rice trader wholesaler	Paddy-rice trader wholesaler-retailer	Wholesaler	Wholesaler retailer	Miller- trader retailer
Number of samples						
Luzon	330	1	6	2	30	21
Visayas	120	10	7	12	20	11
Mindanao	180	10	6	10	17	24
Metro Cities				12	10	10
Total	600	21	19	36	77	66

Note. Reprinted from "Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies", by Mataia, A., et al. *Asian Journal of Agriculture and Development*, p.22.

Table 15: Production, area, and yield growth performance

Major Island/ Region	2005–2015				
	Production		Area Harvested		Yield
	Share to total in 2015 (%)	Average growth rate (% per year)	Share to total in 2015 (%)	Average growth rate (% per year)	Average growth rate (% per year)
Philippines	100.00	2.21	100.00	1.31	0.79
Luzon	59.02	2.65	54.70	1.67	0.83
CAR	2.21	1.19	2.39	1.11	0.08
Ilocos Region	9.79	2.59	8.87	1.27	1.16
Cagayan Valley	13.72	3.15	12.54	2.11	0.84
Central Luzon	18.18	2.71	15.03	2.05	0.54
CALABARZON	2.16	0.01	2.43	0.23	-0.21
MIMAROPA	5.96	3.43	6.09	2.08	1.10
Bicol Region	6.97	2.62	7.35	1.13	1.32
Visayas	18.45	1.79	21.33	0.95	0.76
Western Visayas	11.33	1.29	13.37	0.54	0.71
Central Visayas	1.85	5.54	2.20	2.29	2.60
Eastern Visayas	5.27	1.92	5.76	1.51	0.36
Mindanao	22.53	1.49	23.97	0.86	0.57
Zamboanga Peninsula	3.65	1.6	3.51	0.29	1.27
Northern Mindanao	4.00	5.27	3.52	2.83	1.86
Davao Region	2.43	-0.55	2.13	-0.77	0.24
SOCCSKSARGEN	7.12	1.68	7.3	0.85	0.76
CARAGA	2.65	2.25	3.33	2.99	-0.56
ARMM	2.69	-0.95	4.17	-0.25	-0.72

Source: PSA (2015)

Note. Reprinted from "Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies", by Mataia, A., et al. *Asian Journal of Agriculture and Development*, p.25.

The study of Mataia, et. al (2020) further discusses the rice value chain map and marketing channels of the country's paddy and milled rice. Their study explains that: "... the rice value chain that starts from the provision of inputs for paddy production, then on through aggregation, processing, marketing, and delivery for final use by the consumers. These stages of the rice VC [Value Chain] involve greater interaction among chain actors from the farmers to consumers through value-adding activities. Government agencies and NGOs also provide financial and non-financial support services to the rice VC to enhance its performance".

Generally, VC actors are responsible for moving the paddy and milled rice across markets in the country. Paddy and milled rice are transmitted from production surplus areas to major deficit provinces and trading centers through various market channels. In the survey areas, 112 market channels were identified in the domestic rice market. From farmers, marketed surplus paddy commonly went to paddy traders (61%) and miller-traders (36%) on account of the high buying farmgate price. A small percentage is sold to a cooperative (2%) and the National Food Authority (NFA) (2%). On the other hand, milled rice is exchanged at multiple levels of market players before it reaches the consumers. From miller-traders, rice passes through wholesalers, wholesaler-traders, rice passes through wholesalers, wholesaler-retailers and retailers, oftentimes with the engagement of brokers. In this channel, it was observed that paddy and rice changed possessions five to seven times from the farmer to the end user, excluding the involvement of brokers both in paddy aggregation and milled rice distribution. It makes the chain "traditionally long" due to many participating actors."

A graphical presentation of this value chain map and marketing system of paddy and milled rice is shown in Figure 2 below.

Considering the data above, it should be noted that there are so many players involved in the sale of rice from the farmers who cultivate and

harvest the rice paddy to the rice consumers. The layers of people who buy and sell the rice, from rice paddy to milled rice and in between brokers, so many add-on costs on the price of rice occur in the process. This inefficiency in the movement of rice from farm-to-table is a system that should be corrected and attended to by the government, the farmer associations and the farmers themselves.

4.4 Support and Assistance to Farmers

The study of has a sample size of 600 farmers whose average age is 53 years old, with an average of 9 years of schooling where only 8 percent were members of cooperatives (Mataia, et al., 2020). This data is in line / similar with the study of Manilay and Borja where majority of the farmers involved in their study were between 51 to 70 years old (Manilay and Borja, 2011). These information show that the Philippine farmers are aging and very few young Filipinos are interested in having farming as their livelihood.

With the estimated 2.4 million farmers in the Philippines who are generally in their retirement age, the country is facing a huge challenge on how to strengthen its rice farming industry. In addition to the average age of Filipino farmers, rice farming activities are small scale in operations where more than half (54%) of rice farmers cultivate less than 1 hectare of land, 27% are farming 1 to 2 hectares of land and only 9% of farmers work on more than 3 hectares of farmland (Mataia et al., 2020). With this low production of rice per individual farmer, there is not much room to increase the farmers' income from rice production and trading.

The study of identified the following constraints and opportunities of the Filipino farmers where the government and farmer associations can play huge and important roles in helping farmers improve their livelihoods and develop the country's ability to produce rice and be self-sufficient and competitive (Mataia et al., 2020).

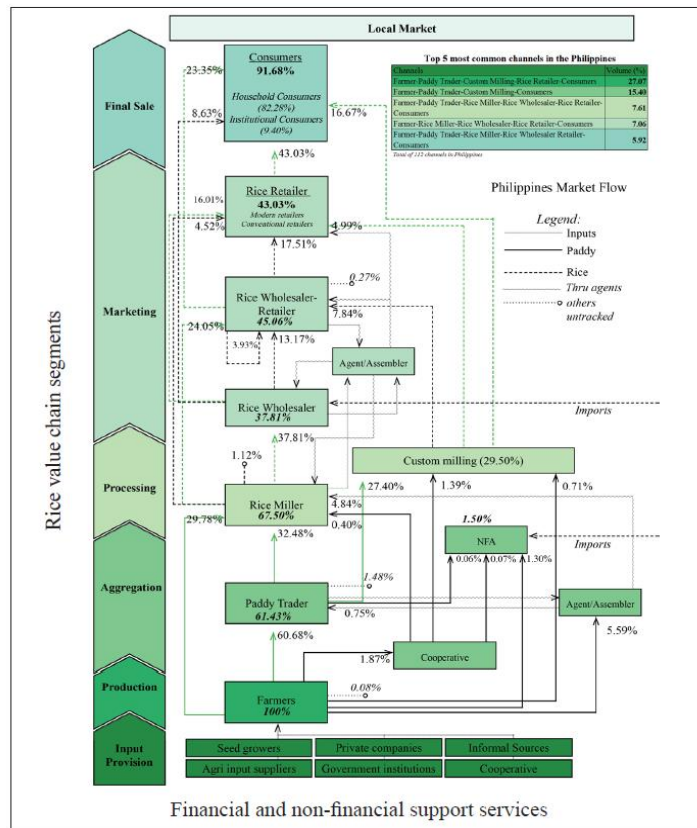


Figure 2: Rice Value Chain Map and Marketing Channels of Paddy and Milled Rice

Note. Reprinted from “Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies”, by Mataia, A., et al. *Asian Journal of Agriculture and Development*, p.27.

Constraints	Opportunities
Production	
Low paddy yield	<ul style="list-style-type: none"> Free quality seed from Rice Competitiveness Enhancement Fund (RCEF) program
High production cost due to high cost and shortage of labor and high price of material inputs (seeds, fertilizer, pesticides, and diesel)	<ul style="list-style-type: none"> Availability of machinery from RCEF mechanization program (i.e., combine harvester) and technologies (direct seeding) that could cut labor costs.
Inadequate water supply	<ul style="list-style-type: none"> Availability of funds from the government for the construction of irrigation facilities and rehabilitation of dysfunctional facilities. The government through the Bureau of Soils and Water Management has also embarked on small-scale irrigation projects such as small water-impounding projects, small diversion dams, shallow tube wells, and small farm reservoir. Availability of water-saving technologies such as alternate wetting and drying (AWD).
Climate change, which results in high production losses	<ul style="list-style-type: none"> Availability of climate-smart technologies and practices such as diversified farming, cultivation of varieties adapted to various ecosystems and stresses, controlled irrigation, and use of machines that consume renewable energy.
Limited drying and storage facilities resulting in low quality and low price for fresh paddy	<ul style="list-style-type: none"> The Department of Agriculture (DA) through RCEF mechanization program and National Rice Program (NRP) provided mechanical dryers and multipurpose drying pavements to farmers’ associations and cooperatives (FACs)

Note. Reprinted from “Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies”, by Mataia, A., et al. *Asian Journal of Agriculture and Development*, p.37.

Constraints	Opportunities
Mismatch of available high-quality variety with farmers’ preference	<ul style="list-style-type: none"> DA regional field offices and LGUs facilitate in making preferred good-quality seeds accessible to farmers. Presence of community seed banks, which is considered an extension tool to increase farmers’ access to high quality seeds.
Pest and disease incidence	<ul style="list-style-type: none"> Availability of pest-and disease-resistant varieties, and good farming practices such as Integrated Pest Management organic pesticides (bio-control agents)
Low adoption of new crop management technologies	<ul style="list-style-type: none"> Presence of LGUs who are responsible for extension services to promote available packages/set of rice technologies and practices. Presence of information portals such as the <i>Pinoy</i> Rice Knowledge Bank, PhilRice Text Center, and Farmers’ Contact Center
Low access to low cost credit and crop insurance	<ul style="list-style-type: none"> Presence of agricultural credit and financing programs of the DA through the Agricultural Credit and Policy Council (ACPC) to help farmers access timely and adequate credit with affordable interest rates. Availability of low-cost credit from RCEF credit program
Unstable price specifically for fresh paddy resulting in low rice farm income	<ul style="list-style-type: none"> Some LGUs and FACs are buying fresh <i>palay</i> to stabilize paddy price

Note. Reprinted from “Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies”, by Mataia, A., et al. *Asian Journal of Agriculture and Development*, p.38.

Philippines has about 10 million rice farmers who are still considered the disadvantaged sector of the society despite decades of government assistance and system reforms within the farming industry. This study is aimed at presenting the challenges of the rice industry of the country and more specifically that of the Province of Laguna and draw out actionable solutions toward sustainable marketing and innovations. As such, secondary data were gathered, and a descriptive type of research were utilized to present relevant data.

Various secondary data sources were utilized to analyze the Philippine rice situation in the Philippines with specific information about Laguna Province. The study of Malinay and Borja showed that majority of the rice farmers in Laguna are between the ages of 51 to 70 years old, about half only have either elementary education or did not have any formal education (Malinay and Borja, 2011). Majority of farmers in Laguna operate small scale farmlands of 3 hectares or less and majority of them are leasehold tenants who do not own the lands they cultivate. These farmers have little income from rice cultivation and production which is not enough for their daily expenses. They end up borrowing money where they need to pay interests.

When it comes to rice distribution, the study showed that there is too many middlemen between the rice farmers and the end consumers which results to lower income of the rice farmers (Mataia et al., 2020). Other sources found in the internet and based on background information known to one of the researchers as a farm technician and local government employee of the Department of Agriculture, the researchers presented in this paper that the government and farmers' associations have the capability to assist farmers and improve the rice distribution system of Laguna and the country in general. Such would be of great benefit to all Filipinos as it will ensure the availability and affordability of rice while making sure that farmers are well taken care of with the opportunity to earn a decent amount of money for their families.

5. CONCLUSION

This research study concludes that the Province of Laguna is very rich in natural resources which is very suitable and ideal for rice farming. However, there is a tendency to convert farmlands to subdivisions / residential and industrial areas as the demands of industrialization increases. The Province of Laguna generally has aging farmers, just like the rest of the country, and many of them did not receive formal education who cultivate small rice farmlands of less than a hectare. Their profits are small and their prospect for better livelihood and better income in farming is low. The rice distribution system in the country which includes the Province of Laguna is problematic and inefficient since there are many middlemen that causes the increase of its price before it reaches the consumers. The farmers who planted and harvested the rice end up earning little while rice is being sold at a higher price to the end users. The government and farmers' associations have the capability to assist farmers and improve the distribution system to benefit all Filipinos in ensuring the availability and affordability of rice while making sure that farmers are well taken care of with the opportunity to earn a decent amount of money for their families.

RECOMMENDATIONS

Researchers of this study recommends that the young Filipino generation should be encouraged to go into farming and make them see the opportunity to earn and make a positive change to the society. This can be done through proper education, transfer of technology and training on managerial skills. All these are necessary for the young people to see the possibility that farming is a very good opportunity to earn a living and be wealthy in it. Young people should be developed to become agricultural entrepreneurs, taking advantage of technology, know-how and support from the government. The government through the Department of Agriculture should develop a comprehensive plan on how to help farmers and the system of distribution of rice. Significant research has already been done about the farming system in the country and what is needed now is a plan and commitment to follow through those plans to ensure that

farmers get the help they need. A consistent check and balance and assessment of steps and processes on how to improve the farming system in the country should be undertaken. Farmer associations and cooperatives should be strengthened so that farmers would have a better chance of selling their products and get the necessary support they need from their fellow farmers.

REFERENCES

- Barroga, R.F., 2017. The Future of Rice Farming in the Philippines (FUTURERICE). National Rice Research and Development. Retrieved on May 20, 2022 from <https://www.philrice.gov.ph/wp-content/uploads/2019/05/FutureRice-2017.pdf>
- Department of Environment and Natural Resources, CALABARZON Region. 2022. Physical and Socio-Economic Profile. Retrieved on May 1, 2022 from https://www.academia.edu/8221129/Coping_Mechanisms_Adopted_by_Rice_Farmers_to_an_Extreme_Weather_Condition_in_Selected_Towns_of_Laguna_Philippines
- Fernandez, D.R., 2012. Threats and Challenges to Agriculture Towards Sustainable Rice Farming. *Asia Pacific Journal of Education, Arts and Sciences* Vol.1, No. 1. Retrieved on June 1, 2022 from <http://apjeas.apjmr.com/wp-content/uploads/2014/04/APJEAS-2014-1-020.pdf>
- Mataia, A., Beltran, J., Manalili, R., Catudan, B., Nefriend, F., Flores, A., Barmon, B., Rahman, S., Zapico, F., Dizon, J., Fernando, E., Borromeo, T., McNally, K., Hernandez, J., Sharma, R., Bharti, N., 2020. Rice Value Chain Analysis in the Philippines: Value Addition, Constraints, and Upgrading Strategies. *Asian Journal of Agriculture and Development*. 17. 19. 10.37801/ajad2020.17.2.2. Retrieved on May 30, 2022 from https://www.researchgate.net/publication/346974332_Rice_Value_Chain_Analysis_in_the_Philippines_Value_Addition_Constraints_and_Upgrading_Strategies
- Manilay, A.A., and Borja, E.C.O., 2011. Coping Mechanism Adopted by Rice Farmers Affected by an Extreme Weather Disturbance in Selected Areas of the Province of Laguna, Philippines. A Paper presented at the 48th Biennial Convention of the PAEDA, Inc., Inc. Retrieved on June 2, 2022 from https://www.academia.edu/8221129/Coping_Mechanisms_Adopted_by_Rice_Farmers_to_an_Extreme_Weather_Condition_in_Selected_Towns_of_Laguna_Philippines
- Ocampo, K.F., and Pobre, K.K., 2021. Fighting the Good Fight: The Case of the Philippine Rice Sector. The Asian Foundation. Retrieved on May 21, 2022 from <https://asiafoundation.org/2021/04/14/fighting-the-good-fight-the-case-of-the-philippine-rice-sector/>
- Oxford Business Group. 2019. Restrictions on Rice Imports in the Philippines have been lifted under new legislation aimed at bridging the supply gap and reducing prices. Retrieved on June 1, 2022 from <https://oxfordbusinessgroup.com/analysis/grain-gains-restrictions-rice-imports-have-been-lifted-under-new-legislation-aimed-bridging-supply>
- Philippine Agricultural Economics and Development Association, (PAEDA) Inc. 2011. The 48th Annual PAEDA Biennial Convention: The Challenges of Enhancing the Competitiveness of the Philippine Agriculture Proceedings. Retrieved on May 20, 2022 from <https://paedacon.files.wordpress.com/2013/10/proceedings-of-the-48th-paeda-biennial-convention.pdf>
- Tolentino, V.B., and de la Pena, B.M., 2020. Deregulation and Tariffication at Last: The Saga of Rice Sector Reform in the Philippines. *Bangko Sentral ng Pilipinas*. Retrieved on May 5, 2022 from https://www.bsp.gov.ph/Media_And_Research/WPS/WPS202006.pdf