

# Philippine Farmers Adaptation of Hybrid Rice Technology to Increase Profitability and Contribute to Rice Sufficiency

Dei Chiara C. Abao<sup>1</sup>, Jose Carlo M. Aquino<sup>2</sup>, Amiel C. De Guzman<sup>3</sup>, Adona Mae Francisco<sup>4</sup>, April A. Rafa<sup>5</sup>, Jocelyn B. Cruz, Ph.D.<sup>6</sup>

<sup>1</sup>Administrative Assistant I, Department of Education - Division of Science City of Muñoz

<sup>2</sup>Sales and Service Associate, Philippine National Bank

<sup>3</sup>Technology Consultant I, DXC Technology

<sup>4</sup>Branch Operations Assistant II, Chinabanking Corporation

<sup>5</sup>Administrative Staff, Central Luzon State University

<sup>6</sup>Dean, Graduate School, Nueva Ecija University of Science and Technology

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**Abstract**— This study explored the adaptation of Filipino farmers to using hybrid rice and its farming technology. A sample of 100 respondents was selected through convenience sampling. Data were collected mainly through a questionnaire (digitalized online survey) distributed to the targeted groups. The findings revealed that most of the farmers chose to plant both inbred and hybrid rice seeds during the wet and dry seasons even knowing that hybrid rice varieties have a higher yield potential than inbred seeds. The study also revealed that after planting hybrid rice seeds, farmers' yield increased significantly that has positively affected their income. The major challenge the farmers is facing is the high cost of hybrid rice seeds and farm inputs. It is recommended that farmers should try using hybrid rice seeds in farming and further request the government to provide them more subsidies for it. They should also attend trainings about hybrid rice production to equip them about the latest technology in farming.

**Keywords**— hybrid rice, farmer's income, profit, technology.

## I. INTRODUCTION

Rice is one of the primary foods in the Philippines, its production is also an important source of employment and livelihood for Filipino farmers. In order to have a good return in rice seed production, farmers secure first to have a good quality seed. Rice seeds can be inbred or hybrid rice seeds. Inbred rice seeds allow the plant to reproduce itself through self-pollination or inbreeding; it means that the last harvested crop could be used to plant again providing the same yield and characteristics. Its plant height averages from 90 to 100 cm only and its yield potential ranges from 5 to 9 metric tons per hectare for the wet and dry season. Hybrid rice seed is the first-generation product of crossing two rice plants. It has two genetically different parents in which their excellent traits

can complement each other (IRRI, 2007). Hybrid Rice Seed can provide a 15-20% yield advantage over inbred rice seeds (Wang, Zheng, & Tang, 2018) that is why the Philippine agricultural sector eyes that it could be one factor to achieve rice sufficiency in the country. Major physical characteristics of hybrid rice seeds such as tillers, panicles, plant height, etc., are higher compared to inbred variety. China is the first country which starts research on the great potential of hybrid rice seeds. The embracement of China to this study led them to answer food security, feeding one-fifth of humanity and avoiding mass hunger (A. Barclay, 2007). The hybrid rice seed production technology is one of the most successful applications that increased rice yield potential by 15–20% and guaranteed greatly Chinese food security (X. Wang et al., 2018). According to the Food and Agriculture Organization

(FAO), hybrid rice technology is the key approach for the increase of global rice production (C. Chase, 2015). In 2018, the total land area used for palay cultivation in the Philippines was around 4.8 million hectares. The production area of hybrid rice in the Philippines is still low at around 200,000 hectares, as compared to some of its neighboring countries, such as Vietnam and Indonesia. Although the country is one of the major consumers of rice globally, it is still a net importer of the commodity. Thus, the country is aiming to boost its domestic production of rice by introducing hybrid seeds. Despite the high yield that hybrid rice seeds can offer, still, not all farmers are choosing to plant hybrid seeds. In fact, last 2019 in a briefing with IRRI, they said that only 10% of agricultural lands are planted with hybrid varieties while 90% are planted with inbred rice seed in the country (Business World, 2019). In the study of Mordor Intelligence, the production area of hybrid rice in the Philippines is still low at around 200,000 hectares, as compared to some of its neighboring countries, such as Vietnam and Indonesia. The promotion of hybrid rice has been the centerpiece of the Arroyo's administration rice production program since 2001. Government efforts to encourage hybrid seed production and adoption by farmers actually began in 1998 (C. David, 2007). These early efforts focused on intensified research, short term and season-long training programs on hybrid seed production, and large-scale technology demonstrations in 11 top rice-growing provinces. The Department of Agriculture (DA) wants to further improve the country's rice productivity and adequacy levels this year, boosted by the combined outcomes of government interventions and continued strong partnerships with farmers' groups, rice industry stakeholders, and local government units (LGUs). "We target to produce 20.4 million metric tons (MMT) of palay, surpassing last year's record harvest of 19.4 MMT, and factoring in challenges of the lingering pandemic and adverse weather conditions," said Agriculture Secretary William Dar. Today, the government continues to provide hybrid rice seed subsidies or the hybridization program in chosen provinces with the help of the Rice Board and private sectors and construct trainings and activities that aim to promote the latest technologies in rice production. On the other hand, they also give inbred rice seed subsidies to different provinces. The aim of this study is to know if the farmers are adopting the use of hybrid rice seed in farming and how it affects their profitability and its contribution to achieving rice sufficiency in the country. Also, to know the reason why some farmers are still not using hybrid rice seed in farming. Lastly, to provide the

government with some ideas/information regarding the ratio and kind of rice seed subsidy to offer.

## II. METHODOLOGY

The researchers utilized a descriptive research design for this study. According to Aggarwal (2008) as cited by Salaria(2012) & (Garcia & Subia, 2019) "descriptive research is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation". This research design was used because this endeavored to describe the results with the use of hybrid rice technology. Farmer-respondents were selected using convenience sampling. They were picked based on availability and willingness to take part in this study. The researchers provided a questionnaire (digitalized online survey) to distribute it to the targeted group to some 40 barangays in San Jose, Nueva Ecija, Philippines. The data were then tallied, interpreted, analyzed and discussed using some statistical tools.

## III. RESULTS AND DISCUSSION

Table 1. Respondents' history in planting rice seeds

HISTORY	FREQ.	%
Planting only hybrid rice seed	7	7
Planting from inbred rice to hybrid rice seeds	33	33
Both use inbred and hybrid rice seeds	60	60
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The data shows that the respondents were already using the hybrid rice seed in farming, but still they also preferred inbred along with the former. There are pros and cons in the use of hybrid seeds. Filipino rice farmers have still to be educated as regard the benefits of planting hybrid seeds for many reasons. First and foremost consideration is its high yield. Currently, the Philippines is still relying on rice importation to augment the needs for a continuous supply of rice whole year round.

The respondents were asked about the reasons why they adapted hybrid rice and the result is shown in **Table. 2**

Table 2. Reasons why farmers adapted hybrid rice technology

HISTORY	FREQ.	%
Harvested higher yield than inbred rice seeds	80	80
Acquired free hybrid rice seeds from government subsidy	56	56
Hybrid seeds have better quality than inbred seeds	31	31
Palay rice is higher when sold in the market	25	25
Delicious, white, and good-eating quality rice	24	24

The respondents (80 of 100) answered that the main reason why they chose to plant hybrid rice seeds is because of the higher yield compared to inbred seeds. These farmers differentiate the harvested yield since most of them already experienced planting these two kinds of rice seeds in both dry and wet seasons. The respondents (56 of 100) also answered that they adopted hybrid rice because they got it free from the government and that was the chance to experiment on it. The respondents also considered hybrid seed because of its good quality over inbred (31 of 100), they added that hybrid seeds have more grains and panicles resulting in a heavier weight. Lastly, they choose hybrids due to the high market price of it when sold in the market (25 of 100) and the good table-for-food quality (24 of 100) it possesses which is the reason why many consumers like it.

Table 3. Percent change in profit after using hybrid rice technology

HISTORY	FREQ.	%
≤ 0%	8	8
25% increase in profit	46	46
50% increase in profit	30	30
100% increase in profit	16	16
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The majority of the respondents answered that after using hybrid rice, their profit in farming increased and it affected their income (Vertudes, Musa, Cosilet, Salagubang, & Balaria, 2020). Forty-six (46) of respondents said that their profit increased by 25%, 30 respondents answered it increased by 50%, 16 respondents answered it increased by 100% and 8

respondents indicated that there were no increase in their profit. According to the farmer respondents, even if the price of palay was below average in the farmgate then because the hybrid rice variety has a higher yield. Variances in the harvest are partly caused by low turnout of harvest because the Philippines is often visited by typhoons.

Table 4. Percent change in harvested yield after using hybrid rice technology

HISTORY	FREQ.	%
≤ 0%	7	7
25% increase in profit	43	43
50% increase in profit	28	28
100% increase in profit	22	22
<b>TOTAL</b>	<b>100</b>	<b>100</b>

Using hybrid rice seeds increased the rice production of the farmer-respondents. According to Wang, Zheng, & Tang (2018), hybrid rice seeds can provide a 15-20% yield advantage over inbred rice seeds. At the present time, this percentage is already achievable and is continuously increasing because of the new technique applied in farming. The rice resiliency project of the government that provides farm subsidy such as seeds and fertilizers greatly help the farmers boost rice production. During the year 2020, the project provided seeds for 2.15 million hectares to be planted to inbred rice and 550,000 hectares planted to hybrid. The government also have the goal of shifting 200,000 hectares previously planted by inbred into a hybrid to produce an incremental yield of 300,000 metric tons of palay. This project's goal is to hit 93% of the country's total demand for rice which is 14.46 million metric tons (MMT) of rice.

Table 5. Reasons for not using hybrid rice seed

HISTORY	FREQ.	%
Hybrid rice seed is more expensive than inbred	11	64
Hybrid have a tendency to lodge during the wet season	3	18
Lack of supply in hybrid seed	3	18
<b>TOTAL</b>	<b>17</b>	<b>100</b>

Out of 100 respondents, only 17 answered why they missed or intentionally did not want to use hybrid rice seeds. Sixty-four percent of them disclosed that hybrid seeds are more expensive when bought in commercial stores which is their main problem (Abelardo, et al,

2019). This implies that they have a low buying power in terms of inputs. Eighteen percent responded that the tendency to lodge or cause the plant to drop during the wet season are inevitable, hence they are afraid to take this risk. Lastly, another 18% answered that they did not have the ability to plant their desired hybrid variety because of lack of supply.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, the researcher concluded that farmers of San Jose City, Nueva Ecija adapted to planting hybrid rice seeds along with inbred rice seeds. Their adoption to using hybrid rice technology boosted their total yield production as well as their profit or income. If farmers all over the country use hybrid rice seed and experience an increase in yield, then it can largely contribute to achieving rice sufficiency in the country. Based on the findings and conclusions, the following recommendations are given: a. the farmers should consider using hybrid rice seeds even though it is expensive because their cost could be compensated after the harvest, b. farmers should attend trainings regarding rice farming to know more about new techniques especially as regard the hybrid seeds; c. the government should promote and provide more subsidies in hybrid rice than inbred rice seeds and provide farming assistance regarding the hybrid rice technology; d. private company providers of hybrid seeds should strengthen their marketing strategies and promotion.

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