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Evaluating Farmer Preferences for Rice Seed Varieties in the Science City of Muñoz

Jaycel M. Paglinawan[1], Shirley A. Magtalas[2], Rodeza S. Pascual[3], Clarissa R. Valeriano[4], Jennifer G. Fronda, Ph. D[5]

[1,4]Central Luzon State University
[2]Department of Education
[3]Nueva Ecija High School – Senior High School
[5]Nueva Ecija University of Science and Technology

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Abstract *— This study evaluates the preferences of rice farmers in the Science City of Muñoz for seed varieties distributed under the Seed Program of the Rice Competitiveness Enhancement Fund (RCEF). The study focuses on key traits farmers value, such as yield potential, adaptability to soil and climate, grain quality, and resistance to pests and diseases. The research aims to improve the alignment between distributed seed varieties and farmer needs by understanding these preferences. The study utilizes a descriptive design, and data were collected from farmers in barangays across the Science City of Muñoz using surveys. The findings revealed that farmers prioritize yield potential and adaptability, while pest resistance and market demand play secondary roles. The study emphasizes the importance of aligning seed distribution policies with farmer preferences and suggests enhancing technical support and sustainable farming practices to boost satisfaction and agricultural productivity.*

Keywords *— **Inbred rice seeds, preferences, Nueva Ecija, RCEF Seed Program, Science City of Muñoz, Seed variety.***

I. INTRODUCTION

Philippine agriculture underscores its fundamental role in advancing national food security and sufficiency. Our country's overall economic performance depends on its capacity to fuel the growth of other non-agriculture sectors (Cabanilla, 2006).

According to Javier (2011), the sector's full potential can be realized by addressing challenges present, such as the absence of political will for full investment, lack of concentration and sustained efforts, insufficient coordination and convergence of public and private investments, and inadequate transparency and accountability in public funds. In order to guarantee inclusive and equitable growth in the agriculture sector, future research should concentrate on participatory methods and targeted interventions.

Recognizing the pivotal role of agriculture, the government has implemented various initiatives to address challenges and promote sustainable growth. Agrarian reform programs aim to distribute land equitably, while subsidies and extension services support farmers in adopting modern practices. Investment in research and development, led by institutions like the Philippine Rice Research Institute (PhilRice), is crucial for developing resilient crop varieties and innovative farming technologies.

In 2019, Republic Act No. 11203, or Rice Tariffication Law (RTL) created the Rice Competitiveness Enhancement Fund (RCEF) to support the growth and global competitiveness of Filipino rice farmers. The 10

billion-peso funds from tariff collections from the importation of rice were set up to support the four (4) core programs of RCEF, namely mechanization (PhP 5 billion), seeds (PhP 3 billion), extension (PhP 1 billion) and credit (PhP 1 billion). Through yield enhancement, cost reduction, a decrease in post-harvest losses, and rice value-adding, the main objective of RCEF is to increase the income and competitiveness of Filipino rice farmers.

Under R.A. 11203 Section 13b., the Department of Agriculture-Philippine Rice Research Institute (DA-PhilRice) was mandated to distribute free certified inbred seeds to farmer beneficiaries nationwide and lead the implementation of the RCEF Seed component. With their goal to increase adoption of high-quality seeds and integrated crop management through promotion and distribution of certified seeds, they have delivered more than 18.25 million bags of certified seeds to 1.77 million unique beneficiaries throughout the Philippines since its first roll-out distribution in 2019 (*PhilRice Magazine, 2024*).

Considering the success of the convergence of the RCEF program, the government ensures the continued government support to the agricultural sector through the enactment of Republic Act No. 12078 (2024). This law amends the validity into another 6-year extension and a significant increase in budget for all components of the RCEF program. With this, a big step towards advancement in the rice industry was strengthened and close to ensuring modernization of the rice sector of the Philippines.

Every season, DA-PhilRice RCEF sets a detailed target as to the number of bags to be delivered and which seed cooperative will be responsible for delivering supply in each municipality. After finalizing the logistics of seed supply, pre-registration of farmers was done in each of the municipalities where their information was collected, such as names, age, address, and area of rice field, including the variety of rice they preferred to get. Each farmer gets to choose from the nationally recommended rice varieties, namely NSIC Rc 222, Rc 216, and Rc 402, and an additional rice variety recommended per region, specifically NSIC Rc 160, NSIC Rc 480, and NSIC Rc 436 in region 3. (*RCEF FAQs*, 2021)

Seed is fundamental to crop production, serving as a crucial input in agricultural practices, particularly in rice cultivation (Louwaars & De Jounge, 2021). However, farmers' decisions to adopt agricultural technologies, including specific seed varieties, are significantly shaped by their preferences for various attributes (Maligalig & Demont, 2017). These preferences dictate whether farmers choose to utilize the seed for planting rather than for alternative purposes such as selling, milling for personal consumption, or using as livestock feed. Therefore, understanding the factors influencing farmers' choice of seed variety is paramount.

The researcher generally aims to provide valuable insights for seed growers to identify and develop rice varieties that align with farmers' needs and desires. When farmers and seed producers mutually value the chosen varieties, for instance, through the provision and acceptance of preferred free seeds, it fosters a mutually beneficial "win-win" scenario for both parties.

II. METHODOLOGY

This study used a descriptive quantitative data analysis to understand the preferred rice varieties of farmers participating in the RCEF Seed Program and their expectations during seed distribution. Data were collected through surveys supplemented by secondary data from PhilRice to provide additional context.

The study focused on rice farmers (Fronda, 2024) in selected barangays (villages) of Science City of Muñoz, Nueva Ecija, who were beneficiaries of the RCEF seed program. Science City of Muñoz was intentionally chosen as the study site due to its high number of farmer beneficiaries and distributed seed bags. A total of 120 farmers were randomly selected from various barangays within the municipality: Bantug, Catalacanan, Franza, Linglingay, Maligaya, Mangandingay, Maragol, Palusapis, Rang-ayan, Rizal, San Andres, Villa Nati, and Villa Isla.

The collected data were analyzed using statistical methods, including descriptive statistics such as mean, percentages, and inferential tests, to identify commonly preferred rice varieties among farmers in each barangay. A Likert scale was employed to measure and analyze farmer preferences based on the study's objectives. The Likert-type scale is an essential and adaptable research method used to quantify

subjective data like attitudes, opinions, or perceptions. Its straightforward format ensures ease of use across different populations. (Koo & Yang, 2024) Additionally, open-ended questions were included to gather in-depth information about the challenges and hindrances faced by the company in promoting corporate social responsibility.

III. RESULTS AND DISCUSSION

Respondents' Profile

The gathered data showed that the respondents were 44% over 60 years old and 34% between 46 and 59 years old. The age group between 31 and 45 has 17%, and the rest of the minority, which is 5% of the population, falls under the 18 to 30 age range. Most respondents are predominantly middle-aged or older. This suggests we mainly heard from experienced farmers (Fuglie & Rada, 2020).

The majority of respondents, 68%, are male, while the remaining 32% are female. Given the significant gender disparity in the sample may limit the generalizability of the findings, as women may have different variety preferences compared to men (FAO, 2011; Paris et al., 2011).

The largest group of respondents, at 34%, are high school graduates. College level (without a degree) comes in second at 28%. Those with a college degree make up 24%, followed by elementary school graduates at 10%. There are very few respondents with only high school-level education (2%) or other postgraduate qualifications (1%). And less than half of the population has acquired agricultural training from existing extension programs of RCEF and the like.

Most respondents, 62%, are married. Single people make up 23%, followed by widowed at 14% and separated at 1%. As to farm size, most respondents, 58%, have farms between 1 and 10 hectares. Those with farms less than 1 hectare make up 42% of respondents.

Many farmers (42%) have between 21 and 29 years of experience. Followed by a significant portion (34%) who have more than 30 years of experience. A smaller portion has less than 1 year (2%), 11 upto 20 years (8%), or 1 upto 10 years (14%) of experience. Farmers develop in-depth knowledge about the performance, adaptability, and specific traits of rice varieties they have cultivated over time (Bello et al., 2021; Hendra et al., 2016). Their understanding, gained through accumulated local experiences, allows them to make well-informed choices.

Seed Variety Characteristics

Based on the frequency of data, NSIC Rc 222 is the most popular variety received by farmers from the seed distribution of RCEF program and used by 68% of farmers. NSIC Rc 436 is the second most popular (20%), followed by NSIC 2016 Rc 480 (6%). The remaining varieties, NSIC Rc 218 and NSIC Rc 534, are used by a smaller percentage of farmers.

A significant majority (66%) of farmers expect a yield potential of 81-100 cavans per hectare. Thirty-one percent (31%) anticipate yields exceeding 100 cavans per hectare.

Forty percent (40%) of farmers believe the varieties they use are resistant to pests and diseases. However, 31% believe they are not resistant, and 29% are uncertain. This suggests a need for more extension programs to be implemented for farmers to reinforce their knowledge on these varieties with pest and disease resistance.

On adaptability to soil and climate change, a large majority (85%) of farmers believe the varieties they use are well-adapted to their soil and climate conditions. Only a small percentage (13%) believe they are not adaptable.

Moreover, the survey results indicate that NSIC Rc 222 is the most widely used variety among the respondents. The dominance of NSIC Rc 222 could be attributed to its alignment with key farmer preferences, such as high yield potential, good grain quality, or suitability to local growing conditions, as identified in previous studies (Cabusora et al., 2022).

Description of Farming Practices

The data of respondents' reveals that farmers in barangays of the Science City of Muñoz primarily cultivate rice using the transplanting method, with 100% of farmers utilizing this technique. This suggests a preference for transplanting seedlings over direct seeding or other methods.

The survey highlights a significant reliance on chemical inputs. A striking 100% of farmers reported using both fertilizers and pesticides in their farming practices. Farmers reliance on the use of

agrochemicals such as fertilizers and pesticides play a crucial role in boosting rice production and efficiency. (Manalili, et al., 2016)

Crop rotation practices are not widely adopted by farmers. Only 40% of farmers reported practicing crop rotation, while 60% do not. This indicates a missed opportunity to improve soil nutrients and better pest management control to reduce reliance on chemical inputs through this sustainable agricultural practice. (Medina, 2018)

Furthermore, water management techniques are diverse. Canal irrigation is the most prevalent method, utilized by 60% of farmers. Tube well irrigation is employed by 38% of farmers, and a small percentage (2%) use a combination of both methods. Rainfed agriculture is not practiced by any of the surveyed farmers.

The results suggest a need for promoting sustainable farming practices. This includes encouraging the adoption of crop rotation, promoting the responsible use of fertilizers and pesticides, and exploring alternative water management strategies to ensure long-term agricultural sustainability.

Table 1. Factors affecting farmers' preference for seed variety

	Weighted Mean	**Verbal Interpretation**
I received the variety of seeds that I prefer to plant or cultivate.	4.16	Agree
I prefer to use the seeds because of its yield potential.	4.67	Strongly Agree
I prefer to use the seeds because of its free.	4.97	Strongly Agree
I prefer to use the seeds because of its resistance to pest and diseases.	3.88	Agree
I prefer to use the seeds because of is adaptability to soil.	3.68	Agree
I prefer to use the seeds because of is adaptability to climate changes.	3.64	Agree
I prefer to use the seeds because of its local market demand.	4.15	Agree
I prefer to use the seeds because of its profitability.	3.98	Agree
I prefer to use the seeds because of its grain quality.	4.36	Agree
I prefer to use the seeds because of peer influence and the recommendation of other farmers.	3.0	Neutral
AVERAGE WEIGHTED MEAN	**4.05**	**Agree**

The table reveals that farmers have strong preferences for seed varieties based on several key factors:

Yield Potential: Farmers prioritize seed varieties with high yield potential, with a strong "Strongly Agree" response. This indicates that maximizing output is a major driving force in their seed selection decisions.

Seed Availability: Farmers highly value the availability of the seeds they prefer, with a "Strongly Agree" response. This suggests that access to preferred seed varieties is crucial for their farming operations.

Pest and Disease Resistance: While important, pest and disease resistance is viewed with an "Agree" response. This suggests that while farmers recognize the

importance of disease-resistant varieties, it may not be the primary factor driving their seed choices.

Adaptability: Farmers express agreement regarding the importance of seed adaptability to both soil and climate conditions. This suggests that they carefully consider how well the seed variety will perform in their specific environment.

Market Demand: Farmers also consider local market demand when selecting seed varieties, with an "Agree" response. This indicates that they are attuned to the needs and preferences of their local markets.

Profitability: Seed profitability is viewed with an "Agree" response, suggesting that farmers are mindful of the economic returns associated with different seed varieties.

Grain Quality: Farmers express agreement regarding the importance of grain quality, indicating that they prioritize seed varieties that produce high-quality crops.

Peer Influence: Peer influence and recommendations from other farmers have a neutral impact on seed variety selection. This suggests that while farmers may consider the opinions of others, it's not a primary factor in their decision-making process.

Overall, the survey results demonstrate that farmers' seed variety preferences are primarily driven by factors related to yield potential, availability, adaptability, market demand, and profitability. While pest and disease resistance and grain quality are considered important, they may not be as influential as other factors.

IV. CONCLUSIONS

This study aimed to investigate the demographic profile, financial practices, and climate change adaptation strategies among rice farmers in the Science City of Muñoz, Nueva Ecija. The findings provide a comprehensive overview of the respondents' characteristics, seed variety characteristics, farming practices, and preferences of farmers in the context of seed varieties.

The respondents predominantly fall within the middle-aged and the older age groups, suggesting experience in farming practices has an impact on their seed variety preference for growing. The gender distribution is skewed towards males, which may influence the generalizability of the findings, as it may not fully capture the preferences of the respondents due to unequal distribution of female farmers. The educational attainment of the respondents indicates a substantial portion with high school-level education, suggesting a potential openness to new information and practices related to seed preferences.

Farmers prioritize several key factors when selecting seed varieties. Yield potential emerges as the most influential factor, with farmers strongly agreeing on its importance. Access to preferred seed varieties is also a critical consideration, as indicated by the high agreement regarding the availability of desired seeds. Adaptability to both soil and climate conditions is another significant factor influencing farmers' choices.

Furthermore, market demand, profitability, and grain quality are considered important factors in seed selection. While pest and disease resistance are recognized as desirable traits, they appear to be less influential than factors like yield potential and market demand. Interestingly, peer influence and recommendations from other farmers have a neutral impact, suggesting that individual preferences and market factors play a more dominant role in seed variety selection decisions among the surveyed farmers.

V. RECOMMENDATIONS

The following recommendations are:

1.Farmers to support farmers in making optimal seed choices, seed development and distribution efforts should prioritize high-yielding varieties that are well-adapted to local soil and climate conditions. Improving access to preferred seed varieties through strengthened supply chains and local availability is essential

2.Policymakers should consider giving farmers what seed variety they prefer to use. It should be incorporated in policy briefs and IRR of the law to ensure its implementation. Inclusion of such in the law or written policy will increase the satisfaction of farmers with the agricultural inputs they will receive from the government.

3. Supplementary subsidy programs such as fertilizers and pesticides to boost farmers' yield performance. Subsidies could support the purchase of climate-

resilient seeds, water management systems, and sustainable farming techniques, reducing the financial burden on farmers and promoting sustainable agriculture.

4. Offer technical support and establish initiatives to provide farmers with technical support and capacity-building programs focused on improved farming practices. This includes training programs, workshops, and demonstration farms that showcase best practices in farming, thereby equipping farmers with the knowledge and skills needed to adapt to changing climate conditions and other environmental factors impacting the productivity, profitability, and sustainability (Balaria, et al., 2017) of the rice farming industry. Additionally, it is equally important to have valuable assessments of farmers' access to information and knowledge about different seed varieties.

5.Future studies should aim for a more balanced gender representation to capture a wider range of seed variety preferences and farming practices. Researchers are encouraged to explore the influence of educational attainment on the adoption of new seed technologies and climate adaptation strategies.

By implementing these recommendations, policymakers and stakeholders can support farmers in enhancing the agricultural industry in the Science City of Munoz, Nueva Ecija.

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