SUSTAINABLE PRACTICES OF RICE AGRIPRENEURS

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ABSTRACT

This study, "Sustainable Practices of Rice Agripreneurs," explores how rice agripreneurs in Villasis, Pangasinan, integrate organic farming, modern farming techniques, and smart farming practices to enhance agricultural sustainability. Despite technological advancements, many farmers still face barriers such as limited capital, technical expertise, and training, creating a gap between traditional and innovative farming systems. The study employed a quantitative descriptive design using validated questionnaires administered to 35 registered rice agripreneurs in Villasis, Pangasinan. Data were analyzed through frequency, percentage, weighted mean, and Pearson correlation to assess sustainable practices and their relationship with business profiles. This research is also anchored in the UN-SDGs 1, 2, 4, 10, 12, 15, and 17. Most respondents have extensive agribusiness experience and manage small to medium-sized farms, mainly on rented land. Modern farming techniques were the most practiced (AWM = 3.28), followed by organic farming (AWM = 2.89), while smart farming tools were only sometimes practiced (AWM = 2.21). These findings indicate that while agripreneurs adopt sustainable methods, technological practices remain limited. Moreover, results revealed no significant relationship between business profiles and sustainable practices, implying equal adoption regardless of experience or farm size. The study concludes that rice agripreneurs prioritize sustainability but need improved access to technology, funding, and institutional support. It recommends implementing GreenGrain: Empowering Sustainable Rice Agripreneurs for Inclusive Growth, an extension program that promotes education, digital literacy, and eco-friendly innovations to enhance productivity, profitability, and environmental resilience.

Keywords: Sustainable Practices, Rice Agripreneurs, Organic Farming, Modern Farming Techniques, Smart Farming Tools

INTRODUCTION

Rice remains the cornerstone of food security and a primary source of livelihood for millions of Filipinos, providing both income and sustenance for rural communities (Delas Alas et al., 2024). However, rice production in the Philippines faces persistent challenges, including climate change, water scarcity, high input costs, and unsustainable farming practices (Bo & Mutuc, 2019). These issues are intensified by limited access to technology, education, and institutional support among smallholder farmers, which hinders their ability to transition to sustainable and innovative farming systems (Alamgir et al., 2021). Sustainable agriculture, as emphasized by Sekhar et al. (2024), promotes the integration of traditional knowledge and modern agricultural techniques to enhance productivity and environmental resilience. Yet, the adoption of such practices among local rice agripreneurs remains limited due to financial barriers and lack of technical training (Briones et al., 2024). While government programs and digital solutions have been introduced to promote eco-friendly farming, many local farmers remain unaware or unable to access these opportunities (Abioye et al., 2022).

In the context of Villasis, Pangasinan, most rice agripreneurs continue to rely on conventional farming methods, making the transition to sustainable agriculture slow and uneven. Thus, this study was conducted to assess the extent to which rice agripreneurs integrate organic, modern techniques, and smart farming practices in their operations. The research is anchored on the United Nations Sustainable Development Goals focusing on reducing poverty, ensuring food security, promoting sustainable production, and fostering partnerships for agricultural innovation.

Framework

This study is built on Everett Rogers' (1962) Diffusion of Innovations Theory and the UK Department for International Development's (1999) Sustainable Livelihoods Framework. The Sustainable Livelihoods Framework examines the various resources and external factors that influence people's ability to adopt sustainable habits. In contrast, Rogers' theory explains how new ideas and technology propagate within communities. These theories give a comprehensive framework for understanding how rice agribusiness owners in Villasis, Pangasinan, implement sustainable and innovative agricultural methods. The Diffusion of Innovations Theory (Rogers, 1962) supports our study on how rice agripreneurs in Villasis, Pangasinan, utilize sustainable farming practices, including Organic Farming, Modern Farming Techniques, and Smart Farming Tools.

Objectives of the Study

This study aimed to assess the sustainable practices of rice agripreneurs in Villasis, Pangasinan. It seeks to determine the business profile of rice agripreneurs in terms of years of experience, farm size, type of land ownership, rice farming cycle, and crop maintenance. The study also evaluates the level of sustainable practices focusing on

organic farming, modern farming techniques, and smart farming tools. Furthermore, it identifies the significant relationship between the agripreneurs' business profiles and their level of sustainable practices. Based on the findings, an extension program will be proposed to enhance the sustainability and productivity of rice agripreneurs in the municipality.

METHODOLOGY

Research Design

The study employed a quantitative-descriptive research design to systematically examine the adoption of sustainable farming practices among rice agripreneurs. This approach enabled the collection of measurable data suitable for statistical analysis, providing a factual understanding of sustainability levels and influencing factors.

Population and Locale of the Study

The study was conducted in Villasis, Pangasinan, covering four barangays: Bacag, Barangobong, San Nicolas, and Tombod. Thirty-five (35) registered rice agripreneurs served as respondents, selected through purposive sampling. The selection focused on active rice producers who represent the agribusiness sector in the municipality.

Data Gathering Tools

A structured questionnaire served as the main data collection instrument. It covered two major components: (1) respondents' business profiles, (2) sustainable practices in organic, modern, and smart farming. The instrument underwent validation by two internal and one external expert and achieved a Cronbach's alpha reliability score of 0.818, confirming high internal consistency.

Data Gathering Procedure

Researchers secured approval from university authorities and local barangay officials before data collection. Questionnaires were personally distributed and retrieved from respondents, ensuring a 100% response rate. Ethical standards were observed, including informed consent, voluntary participation, and confidentiality under Republic Act 10173 (Data Privacy Act of 2012).

Treatment of Data

The collected data were analyzed using frequency and percentage to describe respondents' business profiles, the Average Weighted Mean (AWM) to assess the level of sustainable practices, and the Pearson Product-Moment Correlation to determine the relationship between business profiles and sustainability practices.

RESULTS AND DISCUSSION

Table 1:
Business Profile of Rice Agripreneurs
n=35

Variables	Indicators	Frequency	Percentage
Years of Experience in Agribusiness	1-5 years	5	14.3
	6-10 years	7	20.0
	11-15 years	5	14.3
	16-20 years	2	5.7
	More than 20 years	16	45.7
Size of The Farm	1-3 hectares	16	45.7
	4-6 hectares	10	28.6
	7-9 hectares	5	14.3
	More than 9 hectares	4	11.4
Type of Land Ownership	Own land	13	37.1
	Rent/ Leased Land	20	57.1
	Inherited/ Ancestral land	1	2.9
	Joint/ Shared ownership land	1	2.9
Rice Farming Cycle	Twice a year	30	85.7
	Three times a year	3	8.6
	Four times a year	2	5.7
Pest Control Frequency	Once a month	3	8.6
	Twice a month	22	62.9
	Once every two weeks	5	14.3
	Weekly	4	11.4
	Daily	1	2.9
Fertilization Frequency	Once during the growing season	1	2.9
	Twice during the growing season	28	80.0
	Three times during the growing season	6	17.1

The results reveal that most rice agripreneurs are highly experienced, with 45.7% having more than 20 years in agribusiness, indicating strong practical knowledge gained through long-term engagement in farming. In contrast, only 5.7% have 16–20 years of experience. In terms of farm size, 45.7% of respondents operate small to medium farms ranging from 1 to 3 hectares, while only 11.4% manage farms larger than 9 hectares, reflecting limited access to large landholdings. Regarding land ownership, 57.1% of the respondents' farm on rented or leased land, whereas only 37.1% own their land, suggesting that land cost and ownership constraints influence farming practices.

Production-related results show that 85.7% of rice agripreneurs cultivate rice twice a year, making it the most common and practical farming cycle, while only 5.7% farm

four times annually. Pest control practices indicate that 62.9% of respondents apply pest control measures twice a month, with only 2.9% doing so daily, reflecting a preference for sustainable and cost-efficient pest management. Furthermore, 80.0% of the respondents apply fertilizer twice per growing season, while only 2.9% apply it once, demonstrating adherence to balanced and efficient fertilization practices. Overall, the results suggest that experienced rice agripreneurs with small to medium farms adopt moderate and sustainable production practices to effectively manage resources and maintain productivity.

Table 2:

Sustainable Practices of Rice Agripreneurs in term of Organic Farming

Indicators	Weighted Mean	Descriptive Equivalent
1. Organic fertilizers (e.g., compost, vermicast) are used to enrich soil health.	2.80	Practiced
2. Animal waste and natural soil enhancers are incorporated into the farming routine.	2.11	Sometimes Practiced
3. Farm waste is regularly composted to create fertilizer.	2.89	Practiced
4. Crop rotation is practiced to maintain soil nutrients and productivity.	3.17	Practiced
5. The use of synthetic pesticides and herbicides is avoided.	2.89	Practiced
6. Natural repellents and biological controls are relied upon to manage pests and diseases.	2.80	Practiced
7. Traditional planting techniques that protect the environment are practiced.	3.74	Always Practiced
8. Complementary crops (e.g., legumes) are grown alongside rice to support soil balance.	2.37	Sometimes Practiced
9. Organic seeds are produced and stored for future planting.	2.66	Practiced
10. Participation in organic farming seminars and trainings is maintained to enhance farming knowledge.	3.51	Always Practiced
Average Weighted Mean	**2.89**	**Practiced**

Table 1 presents the results of organic farming. Rice agripreneurs reported that "Traditional planting techniques that protect the environment are practiced" with a high mean score of 3.74, meaning they are "Always Practiced." This indicates that rice agripreneurs rely on traditional knowledge to sustain their farming practices. On the other hand, "Animal waste and natural soil enhancers are incorporated into the farming routine" scored the lowest at 2.11, or "Sometimes Practiced," suggesting that rice agripreneurs use them less often due to lack of resources, extra labor, or limited awareness. Supporting systems, such as providing accessible organic inputs, hands-on training, and community-

based composting or waste management programs, can help rice agripreneurs adopt these practices more effectively.

Table 3:

Sustainable Practices of Rice Agripreneurs in term of Modern Farming Techniques

Indicators	Weighted Mean	Descriptive Equivalent
1. Mechanized equipment is used for planting and harvesting rice.	3.80	Always Practiced
2. Soil is tested for dryness before applying fertilizers.	2.49	Sometimes Practiced
3. Climate-resilient and high-yield seed varieties are adopted.	3.63	Always Practiced
4. Irrigation is scheduled based on the rice plant's growth stages.	3.91	Always Practiced
5. Water-saving irrigation methods (e.g., alternate wetting and drying) are used.	3.69	Always Practiced
6. Weed control techniques that reduce chemical usage are implemented.	3.51	Always Practiced
7. The rice cropping calendar is planned based on weather patterns.	3.46	Practiced
8. Livestock or poultry is integrated with rice farming to promote sustainability.	2.17	Sometimes Practiced
9. Pesticides are applied safely and at appropriate times when needed.	3.71	Always Practiced
10. Production is tracked using basic record-keeping methods such as logs.	2.40	Sometimes Practiced
Average Weighted Mean	**3.28**	**Practiced**

Table 2 outlines modern farming techniques. Results show that "Irrigation is scheduled based on the rice plant's growth stages" had the highest mean of 3.91, or "Always Practiced," which indicates rice agripreneurs' awareness of proper water management for improving crop productivity. In contrast, "Livestock or poultry is integrated with rice farming to promote sustainability" obtained the lowest mean of 2.17, indicating "Sometimes Practiced," which suggests limited integration due to resource or facility constraints, as well as a lack of institutional or technical support systems to encourage its adoption.

Table 3:

Sustainable Practices of Rice Agripreneurs in term of Smart Farming Tools

Indicators	Weighted Mean	Descriptive Equivalent
1. Drones or satellite technology are used to monitor crop health and assess pest infestations.	1.06	Rarely Practiced
2. Smart technology is used to monitor soil health for sustainable farming.	2.06	Sometimes Practiced
3. GPS-guided tractors or automated machinery are used for planting, fertilizing, or harvesting.	2.91	Practiced
4. Precision irrigation systems (e.g., sprinklers, moisture sensors) are used to manage water.	1.97	Practiced
5. Automated planting machines (e.g., rice transplanters) are used for seedling planting.	1.54	Sometimes Practiced
6. Soil sensors are used to monitor and maintain soil health and nutrient levels.	1.23	Rarely Practiced
7. Weather forecasting apps are used to schedule planting and harvesting.	3.23	Practiced
8. Smart irrigation systems are used to regulate water usage efficiently.	3.37	Practiced
9. Digital record-keeping systems are used to track farm activities and costs.	2.11	Sometimes Practiced
10. Automated pest control systems are used to manage insect and disease threats.	2.57	Practiced
Average Weighted Mean	**2.21**	**Sometimes Practiced**

Table 3 shows that among smart farming tools, the use of " Smart irrigation systems are used to regulate water usage efficiently" had the highest mean of 3.37 or "Practiced", indicating that rice agripreneurs is using irrigation system for efficient water usage. In contrast, "Drones or satellite technology are used to monitor crop health and assess pest infestations" had the lowest mean of 1.06 and is "Rarely Practiced", due to high costs or limited access. Providing training and access to affordable organic inputs can help rice agripreneurs apply these practices more effectively and sustainably.

Table 4:

Summary of the Level of Sustainable Practices of Rice Agripreneurs as to Organic Farming, Modern Farming Techniques, and Smart Farming Tools

Variables	Average Weighted Mean	Descriptive Equivalent
a. Organic Farming	2.89	Practiced
b. Modern Farming Techniques	3.28	Practiced
c. Smart Farming Tools	2.21	Sometimes Practiced
Overall Average Weighted Mean	**2.79**	**Practiced**

Table 4 summarizes the overall weighted mean of the three variables related to sustainable practices among rice agripreneurs: organic farming, modern farming techniques, and smart farming tools. The overall average weighted mean for these variables is 2.79, with a descriptive equivalent of Practiced, indicating that rice agripreneurs generally apply sustainable practices. The first variable, organic farming, received an average weighted mean of 2.89, corresponding to Practiced. The second variable, modern farming techniques, received an average weighted mean of 3.28, corresponding to Practiced. The third variable, smart farming tools, received an average weighted mean of 2.21, corresponding to sometimes practiced. This implies that rice agripreneurs are adopting sustainable practices, as indicated by the highest weighted mean in modern farming techniques. The high-weighted mean suggests that the rice agripreneurs are more consistent in applying advanced yet practical methods, such as mechanization, balanced fertilization, and irrigation, which directly enhance productivity.

CONCLUSIONS AND RECOMMENDATIONS

The results show that most rice agripreneurs have extensive experience in agribusiness and manage small to medium-sized farms, allowing efficient monitoring and use of resources. However, the majority rely on rented or leased land, which may limit long-term investment and innovation. Despite this, they follow regular cropping cycles and apply pest control and fertilization consistently, reflecting practical and disciplined farm management.

The study also indicates that rice agripreneurs adopt sustainable practices through organic and modern farming methods, while the use of smart technologies remains limited. This suggests a need for additional training and support to improve the adoption of data-driven and precision farming approaches. The proposed extension program may be implemented by the College of Business Management and Accountancy to further strengthen sustainable practices among rice agripreneurs.

It is recommended that local government units, in coordination with the Department of Agriculture, implement the proposed extension program and strengthen training while providing access to organic inputs. Continued support for farm modernization through equipment subsidies, irrigation development, and climate-resilient seeds is also encouraged. Furthermore, collaboration between government agencies and the private sector is recommended to provide affordable smart technologies, digital skills training, and financial assistance to enhance productivity and sustainability among rice agripreneurs.

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