Nat. Volatiles & Essent. Oils, 2018; 5(2): 131-139
https://doi.org/10.52783/nveo.5487

NVEO
Natural Volatiles & Essential Oils

Analyze Factors That Affect Economic Performance In Varying Rice Farming Systems

Sandeep Thapliyal

Department of School of Architecture and Planning, Graphic Era Hill University, Dehradun, Uttarakhand, India 248002

ABSTRACT

Management skills in rice paddy cultivation are highly correlated with farmer behavior. Lowland rice farmers have benefited greatly from a government-run scheme designed to increase their productivity. Still, farmers are unable to adequately respond to innovations in lowland rice farm management, particularly those that aim to improve farmers' ability. Furthermore, gender differences must be taken into account in the rice production system. Based on the S-C-P-model's analysis, the rice marketing system is imperfect (oligopolistic), with a small number of large purchasers controlling prices. Compared to other market players, assemblers get a larger portion of the marketing margin (as measured by the Gross Marketing Margin), whereas farmers take home a smaller percentage (below the average) of the margin.

KEYWORDS Rice, marketing, farming system, economic.

INTRODUCTION

There are a number of agronomic and environmental issues that have arisen as a result of the increased crop yields in modern rice cultivation. Some of the most pressing issues are a slowdown in rice production growth, soil degradation, increased water consumption, rising water and air pollution, and caused by climate change and its consequences. Maintaining or increasing agricultural yields and enhancing food security are only two examples of the beneficial results that might result from tackling these issues together.

There is evidence from a number of studies to show that shifting to a double-rice or flood-based farming system may increase profits over more labor-intensive triple-rice methods. While many people favor high dikes and intensive rice growing, others are hesitant to switch to flood-based agricultural methods. Farmers' access to markets is both a factor in and a result of economic growth. It's a huge opportunity for those living in rural areas to improve their standard of living and their access to nutritious food. For smallholder farmers, the availability of and access to markets is crucial since it may spur agricultural and economic growth. To increase the number of smallholders who participate in markets and the degree to which they participate, improved market access is crucial.

LITERATURE REVIEW

Alexander M. Stuart et.al (2018) Mekong delta (MKD) rice production intensification has contributed to regional and national food security. Over the course of two rice growing seasons, we used eight performance indicators from the Sustainable Rice Platform (SRP) to compare the sustainability of 1M5R to those of the other three management techniques for rice production. We showed that 1M5R with specific usage limits has the potential to greatly increase the environmental friendliness of rice production in the MKD. In the treated areas, yearly net revenue increased by 19% while overall production costs reduced by 23% on average. The outcome was a 28% increase in the benefit-to-cost ratio. Five out of eight farm-level SRP measures showed increased sustainability performance, despite no change in output, labor productivity, or water productivity. We suggest potential approaches to promote the widespread use of environmentally responsible crop management techniques in the MKD.

Hotden L. Nainggolan et.al (2018) This study aims to examine the impact of political, social, and economic variables on paddy rice-based integrated agricultural systems and regional development in Parlilitan District. The research approach used here is Structural Equation Modeling (SEM), and IBM SPSS Amos 22 is utilized for the analysis. The findings of the study are; The path coefficient for the positive and substantial effect of socioeconomic variables on paddy rice-based integrated agricultural systems is 0.54. Standardized regression weight (p) of each indicator shows that education, farm experience, social capital, venture capital, input prices, and output prices are significant predictors of farmers' views on integrated farming systems and regional development. The path coefisien between socioeconomic parameters and regional progress is 0.64, which indicates a positive and substantial relationship. Farmers' views on integrated farming systems and regional development can be predicted using socioeconomic variables like education, farm experience, social capital, venture capital, input prices, and output prices, with a standardized regression weight (p) of each indicator that is statistically significant at p 0.01. Through integrated agricultural systems, socioeconomic considerations have a favorable and large indirect influence on regional development, with a value of 0.34. Parlilitan District's regional growth is directly affected by socioeconomic variables at a 0.64-point rate-of-change. b) Having a larger pool of forecasters to what extent integrated agricultural systems contribute to regional growth depends largely on socioeconomic factors. Eradicating rural poverty is one sign of regional development, and elements including farmer education, farmer experience, and capital investment play a vital part in doing so.

Ryan R. Romasanta et.al (2017) Rice straw leftovers that are burned in the open create air pollution and contribute to global warming because of the chemicals they release. To end the yearly carbon cycle that began with photosynthesis, the burning of straw remnants releases a lot of CO2, although this is not included as net GHG emissions. Therefore, we zeroed in on CH4 and N2O emissions from open-field burning relative to the integration of straw. Observations of soil-borne emissions for various straw treatments were made in the field (Exp. B) and smoke samples were collected and analyzed in a specially constructed combustion chamber (Exp. A). For straw with a constant 10% moisture content, the mass-scaled Emission Factors were 4.51 g CH4 and 0.069 g N2O per kilogram of dry weight. Over the course of two growing seasons, we put the following straw management strategies to the test in Exp. B: Four different methods exist for dealing with straw. Soil-borne emissions were assessed in a closed chamber

experiment, whereas indirect emissions from burning straw were computed using the EF from Experiment A. Straw management options were evaluated using the GWP contributions of CH4 and N2O for two cropping seasons. An annual GWP for SRt of 8023 kg CO2eq ha1 was calculated. The GWP of SB was 4913 kg CO2eq ha1, which was quite close to that of PSRm. CSRm had a much smaller GWP than SRt. Straw taken from the field will have to be accounted for in terms of greenhouse gas emissions, but this will be contingent on how the straw is used and the off-field emissions that result. This research's measurement of open field burning may be useful for a variety of reasons, since it provides data on a key component in emission inventories and a carbon footprint analysis of rice**.**

Keith Wiebe et.al (2015) Historically, researchers have analyzed agricultural productivity and food security by merging meteorological, crop, and economic models; however, due to differences in models, scenarios, and input data, the results have been very inconsistent. With the use of a thorough model comparison centered on a path with high emissions, this gap has recently been investigated (and closed). More feasible socioeconomic situations and emission paths are explored in this article. When comparing the effects on trade and pricing, SSP 3 is more disruptive than SSP 2, which is more disruptive than SSP 1. Consequences on the climate for all variables are about the same under low to moderate emissions scenarios, but worse for a high emissions scenario (RCP 8.5). Keep in mind that these worldwide averages may be concealing localized differences. Whether or whether we accept the three potential common socioeconomic paths based on population, income, and productivity characteristics, the effects of climate change on global average yields, area, output, and consumption are very comparable. The results show how different socioeconomic and emissions scenarios affect the consequences of climate change. Changes in population, wealth, and technology all have different effects on yields, but all may be mitigated by pricing and other endogenous shifts.

Bjoern Ole Sander et.al (2014) Methane (CH4) and nitrous oxide (N2O) emissions from the soil and crop residues between rice harvests have been the subject of substantial research, but their effects in tropical rice fields are less well understood. In the Philippines, we studied the effects of several fallow treatments on emissions of carbon monoxide (CO) and nitrogen oxide (N2O) throughout the course of two rice growing seasons. During the fallow period, the land was either flooded continuously, dried by preventing rain from falling (dry), dried with dry tillage (dry + tillage), or let to dry and wet naturally (dry and wet). All fields were separated into two groups: those that had all above-ground rice residues removed (without residue) and those that had all standing biomass left after harvest (with residue). Chambers were used to collect the released gas on a weekly basis. There was a significant difference in GHG emissions during rice growth between fallow and non-fallow treatments. After a flooded fallow, methane emissions and GWP were the highest, after a dry and wet fallow they were intermediate, and after a dry and dry + tillage fallow they were the lowest. The GWP was higher when residue was present in all fallow treatments. More than 90% of the total GWP throughout the rice harvest came from CH4 emissions, whereas nitrous oxide emissions were quite low. In the tropics, drying the soil between rice harvests may reduce GWP and CH4 emissions from the next crop.

METHODS

Tangerang Regency was the site of the study. Eight basic public schools (BPPs) in the Tangerang Regency were randomly chosen for this study (Table 1): BPP Kronjo, BPP Tegal Kunir, and BPP Sukatani. From July through October of 2017, data were collected. Purposive sampling was used to choose participants from among households actively engaged in rice growing. The research population included as many as 850 lowland rice farmers; the sample size was determined mechanically using a random proportional sampling procedure. Primary data and secondary data were also obtained. Primary data was gathered using a combination of questionnaires, in-person interviews, and an extensive documentation and observational research. Descriptive statistics and inferential statistics were used to examine the data. In this analysis of farmers' traits, we focused on their levels of education and training, both formal and informal, their farming experience and tenure, and their capacity in terms of resource management, crop planning, opportunity recognition, problem solving, and environmental adaptation. Some of the routine tasks performed by paddy farmers are highlighted in this analysis. Using crop rotation or rotating varieties of crops; using intermittent irrigation; using a balanced inorganic and organic fertilizer; emphasizing biological control through the use of a botanical pesticide; applying PHT; conserving natural enemies

Table 1. Several members and farmer groups based on group class in Tangerang Regency in 2017.

No.	WKBPP	Total members	Class group P	L	M	U	Total group
1	Kp Melayu	1.857	22	39			61
2	Sepatan	8.701	48	101	1		150
3	Tg Kunir	6.261	75	30			105
4	Sukatani	5.913	52	59			111
5	Kaliasin	12.260	59	97			156
6	Kronjo	11.213	98	56	2		156
7	Carenang	9.093	8	114	4		126
8	Caringin	6.064	56	105			161
Total in district		61362	418	601	7		1026

DATA ANALYSIS

Farmers in the lowlands and their distinctive traits Table 2 summarizes the characteristics of lowland rice farmers in Tangerang Regency, Indonesia. The vast majority of these farmers are middle-aged males with average levels of college education, vocational training, farmland, and agricultural experience. Farmers, on average, are 50.58 years old, placing them squarely in the "Adults" demographic. Rice cultivation is still vibrant with the energy of people in their twenties to forties. This trend demonstrates that agriculture is still highly sought after by the younger generations. The fact that lowland rice cultivation is so appealing to young farmers suggests that it may provide more than simply a means of subsistence.

In terms of years spent in school, 87.33% fell into the intermediate group (6–12), while 12.66% were classified as low (less than 6). Similarly, the 50.67 percent of farmers with nonformal education who participate in training events between four and ten times a year. Farmers' ability to lead in the adoption of new technologies is correlated with their levels of formal and informal education.

With an average of 7.86 years of schooling under their belts, respondents had a high level of literacy. This is indicative of having completed both Primary (SD) and Secondary (SMP) levels of formal education. However, studies show that traditional schooling cannot independently absorb the technological information presented in text. Meanwhile, farmers have a high technical competence to handle lowland rice cultivation because they get nonformal education 2.78 times each year via training or extension activities. This was also shown to be closely associated to a large amount of informal learning.

Table 2. Characteristics of lowland rice farmers.

Variable	Category	Total (Percent)
1) **Age** **Average 50,58 year.**	1) Young (20– 40)	20,33
	2) Adult (41 – 55)	64.00
	3) Old (> 55)	15.67
	Total	100,00
2) **Formal educations** **Average, 86 year.**	1) low (<6)	12,66
	2) Moderate (6- 12)	87,33
	3) Hight (> 12)	1,00
	Total	100,00
3) **Nonformal educations** **Avarage 2,78 times/year.**	1) never	32,67
	2) Rarely (4- 10)	50,67
	3) often (> 10)	16,67
	Total	100,00
4) **Ownership of Farm** **LandAvarage 0.23 Ha**	1) Low (<1)	54,67
	2) Moderate (1- 2)	32,00
	3) Hight (> 2)	13.33
	Total	100,00
5) **Farming experience** **Average 19,56 year**	1) Low (<10)	28,66
	2) Moderate (10-20)	36.00
	3) Hight (>20	35,33
	Total	100,0

Results showed that over half of respondents seldom engage in extension activities, despite the fact that some farmers have never participated in any nonformal education in the form of extension activities or training, notably in agriculture. The weak intensity of extension operations contributes to the poor standard of nonformal education. Both via extension agents and by other parties also engaged in promoting technological advancements. Similarly, only a small fraction of farmers take advantage of organic rice consulting. In line with the results of the present investigation, the same training participants also likely to have low levels of nonformal education. Some group leaders or members may find success, but without proper technical support, their efforts may not be passed on to the rest of the group or the farmers who use them.

Farmers often take the shape of sakap while working in rice fields. However, there are still farmers who farm on their own land; 54.67 percent of respondents cultivate on less than 1 hectare of land at the moment. Table 2 shows that the typical paddy farmer cultivates 0.23 hectares of land, the majority of which falls into the narrow land group. A tiny field is a reality for farmers in the Tangerang area. Some regions are witnessing a high rate of land conversion to non-agricultural uses, and this is causing farmers to sell their property and look for other places to work.

Low land ownership rates also contribute to a lack of modern agricultural techniques being used. Research shows a favorable correlation between land ownership and the amount of an invention's implementation, leading to greater agricultural output when applied to farming technology (technological innovation). One's position in society may be inferred by the amount of land they own. Land (resources) ownership is a sign of one's authority in rural societies, as stated by. Farmers' expertise in managing lowland rice cultivation is essential to the success of this endeavor. Although farmers' experience levels in the research region are known to range widely, 36% of respondents with at least 10 years of agricultural experience (and on average 19.56 years) fall into the medium group. What this means is that farmers in the area where the study was conducted had, on average, sufficient expertise growing lowland rice.

Success in lowland rice farming often depends on the farmers' ability to apply the lessons they've learned from previous harvests, particularly when it comes to making decisions about the introduction of new technologies for crop protection, seed selection, and fertilizer management.

Extension support in increasing the capacity of lowland rice farmers

The extension counselor's primary responsibilities include assessment, encouragement, facilitation, and inspiration for agricultural producers. The majority of lowland rice farmers (60.17%) fall into the medium group, which includes extension operations aimed at improving farmer capacity. Method, material intensity, and extension capacities are all aspects of extension efforts that go into improving farmers' ability to cultivate lowland rice. Farmers will require creativity to meet both technical and social farming challenges despite generally adequate extension competence in completing their tasks owing to a shortage of agricultural extension staff field (PPL).

According to the Law System of Agriculture Fisheries and Forestry Extension No. 6 of 2006, the main purpose of these kinds of events is to better prepare business owners and other key players to join the market at large. Method, material, and extension capacities were all described as moderate in Figure 1. The corresponding percentages were 64.00% and 76.66%. At the same time as the new extension achieves a medium intensity of 50.67 percent in the category, the capacity and the quantity of extension of current staff must be increased.

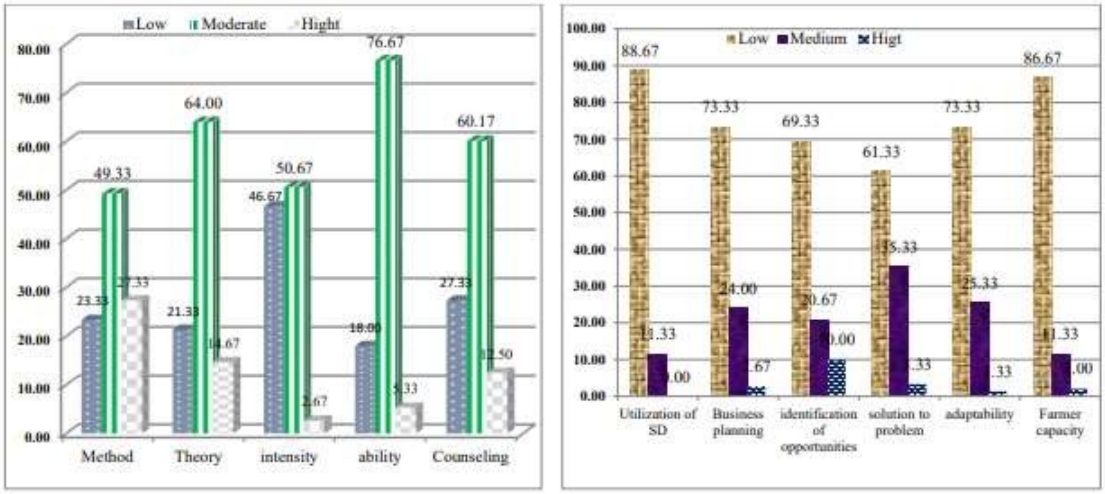

Figure 1. The education function in supporting the capacity of lowland rice farmer

Performance of rice marketing: Net returns and marketing margins are the two primary measures of market success. When a buyer receives a net return that is much more than his fair amount, this is an indicator of an exploitative character that may be gleaned by estimating net returns and marketing margins. The marketing profit shared by the various channel participants is summarized in (Table-3). Total gross marketing margin (full distribution channel) was around 54%, while participation in farmer's markets was determined to be 46%, which is below the median. The gross marketing margin for rural assemblers is higher than it is for the rest of the market.

Table 3. Summary of Gross marketing margins of traders in rice marketing

	Market participants	Buying price (average)	selling price (average)	Gross marketing margin (GMM) (% share)
i	Farmers	-	387.63	46%
ii.	Rural Assemblers (collectors)	393	592.37	24%
iii.	Millers	619.54	656.63	8%
iv.	Wholesalers	670	708	6%
v.	Urban distributors	696	782	9%
vi.	Retailers	724.5	844.08	7%
vii	Consumer	844.08	-	100%

CONCLUSION

There is a pressing need to improve farmers' capability in the areas of resource usage and business planning in light of the scarcity of arable land. As a result of environmental changes, farmers who cultivate lowland rice are not at a disadvantage. Age, formal education, tenure, and extension efforts are all factors in a farmer's ability to grow lowland rice. At the same time, farmers' official and informal levels of education limit the extent to which lowland rice may be grown. Wholesalers were the first to obtain rice in the rice marketing chain, followed by Millers, rural assemblers, and finally urban assemblers.

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