GENDER ANALYSIS IN ECONOMIC EFFICIENCY OF RICE FARMERS IN KOGI STATE, NIGERIA

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ABSTRACT
*This study analyzed differences in economic efficiency of male and female headed rice farming households in Ibaji Local Government Area, Kogi State. A three (3) stage sampling technique was used to select 120 rice farmers comprising 60 Males and 60 females for the study with the aid of a structured questionnaire. Descriptive Statistics, Data Envelopment Analysis (DEA)**,** Ordinary least squares regression and a 4 point Likert-type rating scale were used to analyze the data. The result of DEA analysis revealed a mean technical efficiency under the constant returns to scale (TECRS) of 0.90 and 0.92 for households headed by male and female respectively. The mean technical efficiency under the variable returns to scale (TEVRS) was 0.95 and 0.93 for male and female headed households respectively. The allocative efficiency (AE) of male headed households was 0.72 while that of female was 0.61. Male headed households achieved a mean economic efficiency (EE) of 0.66 as against 0.56 achieved by their female counterparts. The mean scale efficiency (SE) of male headed households was 0.95 as against 0.99 achieved by female counterparts. The T- test results revealed significant differences in the mean output, AE, SE and EE scores of the rice farmers. The ordinary least square regression analysis showed that gender ($P < 0.05$) is a significant factor affecting economic efficiency of the rice farmers. High cost of transportation, inadequate capital and poor feeder roads were the major problems facing the rice farmers. We recommend education of farmers through extension services and provision of good feeder roads as a way of bridging the differences in economic efficiencies.*

Key Words: Data Envelopment Analysis, efficiency, Gender, Returns to Scale, Rice

INTRODUCTION

Rice (*Oryza sp*) is an important staple food in many countries of Africa and other parts of the world. Saka and Lawal (2009) classified rice as the most important food depended upon by over 50 percent of the World population for about 80 percent of their food need. Due to the growing importance of the crop, the Food and Agricultural Organization of the United Nation (FAO, 2001) estimated that annual rice production should be increased from 586 million metric tons in 2001 to meet the projected global demand of about 756 million metric tons by 2030.

Rice is also an important staple food in Nigeria as it is the fastest growing commodity in the Nation's food basket. Nigerian's rice consumption is projected to reach 35million tons by 2050, from 5million tons currently, rising at the rate of 7% yearly due to population growth (Ayawale and Amusan, 2012). According to the United States Department for Agriculture (2016), the annual consumption of rice in Nigeria was about 5 million MT while quantity supplied was 2.7 million MT, with a demand–supply gap of about 2.3 million MT. This means that there is a demand - supply gap in Nigeria and that Nigerian rice farmers may not be getting maximum yield from rice production. Inefficiency in the use of available scarce resources amidst rising prices could lead to insecurity in food production, low income and poor livelihood among farmers. Closing the widening demand - supply gap in the Nigeria rice industry would depend to a large extent, on how rice farmers efficiently use scarce resources. Thus, efficiency has remained an important subject of empirical investigation particularly in developing economies where majority of the farmers are resource poor. This is because the scope of agricultural production can be expanded and sustained by farmers through efficient use of resources (Udoh, 2000).

According to Oakley (1972) gender differences arise from socially constructed relationship between men and women. These differences affect the distribution of resources and responsibilities between men and women, and are shaped by ideological, religious, ethnic, economic and cultural determinants (Moser, 1989). Gender Analysis refers to the variety of methods used to understand relationships between men and women, their access to resources, their activities and the constraints they face relative to each other (Government of Canada, 2020). Men and women play different roles and face different constraints as well as opportunities in agricultural production system. However, the situation, according to Boserup (1970) is that development policies were biased against women's issues, and that women's contributions were unrecognized and unaccounted for. As a result, development outcomes meet with little successes.

According to Andre, Markus and Nina (2013) Women as farmers and through their labour on family farms, other farms and agricultural enterprises make essential contributions to agriculture in developing countries. FAO (2011) reported that women make up approximately 43% of the agricultural labour force of developing countries, ranging from 20% in Latin America to almost 50% in Eastern and southern Asia and Sub- Saharan Africa. The situation is not different in Nigeria as they are found in the production of crops such as yam, maize, cassava, rice, vegetables and other food crops. They are also engaged in processing as well as marketing of food crops. Saito, Mekonnen and Spurling (1994) reported that women now constitute majority of smallholder farmers, providing most of the labour and managing many farms on a daily basis. However, the prevailing condition in Nigeria is characterized with gender blindness, deafness and dumbness in the formulation and implementation of most rice productivity policies (Okoruwa, Rahji and Ajani, 2008). Recognition of gender disaggregated constraints, gender imbalances, differentials in gender roles and decision making as related to rice production, technological transfer; input used, method of farming and processing is important for any transformation of Nigeria rice sector.

Empirical studies that examined gender differences in agricultural productivity reported mixed results. Earlier reports by Udry, Alderman and Haddad (1995); Udry (1996); Quisumbing (1996); Tiruneh , Tesfaye, Mwangi and Verkuijl (2001); Akresh (2005); Horrell and Krishnan (2007); Goldstein and Udry (2008), among others found that women often achieve lower yields or outputs than men in agriculture. They attributed such differences to women having lower quality land, less access to fertilizer and other inputs, less credit and extension support inputs. Others find no statistically significant differences in yield between men and women farmers (Mastersm, 2007; de Brauw *et al*., 2008; Quisumbing, 1995; among others). Difficulty often arise when comparing productivity of different households, distinguishing between male and female headed households because this methodology ignores the contributions that women make to farms in household headed by men, conversely the contributions that men make to farms in households headed by women. However, Boserup (1970) reported that it is feasible to estimate technical efficiency differences between male and female farmers in farming systems where men and women manage separate plots, as in many African societies.

In view of the forgoing, this study seeks to determine whether there are differences in efficiency of plots managed by men and women rice farmers in Ibaji Local Government Area of Kogi State. Analysis of gender differentiated economic efficiency is essential for planning, policy formulation and targeting if efficient and sustainable food production that provides food security is to be achieved.

There is a prevailing rice demand – supply gap of about 2.3MT in Nigeria which is today filled in by importation (Obih and Baiyegunhi 2017). Based on this figure, Nigeria ranks third with Iraq (after the Philippines and China) in the group of major rice importing countries in the world. The importation of rice to bridge the demand-supply gap is worth N365 billion (Ayanwale and Amusan, 2012) and this implies a loss of considerable foreign exchange for the country.

The productivity of rice in Nigeria is low and about half of that obtained in Asia. The average yield of rice in Nigeria is about 1.5 – 2 tons/ha compared with a potential yield of 3.0- 6.0 tons/ha and 1.0 – 1.7 compared with a potential of 2.0 – 4.0 tons/ha for low and upland rice respectively (Thrive Agric: Rice production in Nigeria, 2020). This means that farmers in Nigeria are not obtaining maximum yield from their investment.

Previous studies on gender analysis in crop productivity such as Awoyemi, 2000; Oladebo and Fajuyigbe, 2007, among others, used the Stochastic Frontier Analysis while a few others Alderman *et al.,* 1995; Adeleke , Adesiyan, Olaniyi, Adelalu and Matanmi*.,* 2008; Peterman, Quisumbing, Behrman and Nkonya *,* 2010; Ali , Derick, Klaus and Marguerite , 2015 e.t.c. used ordinary least squares (OLS) to estimate the effect of gender on crop productivity while controlling for other household characteristics. According to Udry *et al*. (1995) technical efficiency measure by sex dummy may not imply allocative or economic efficiency. Against this study gaps in the literature, this study used Data Envelopment Analysis to examine whether there are gender differences in economic efficiency of rice farmers in Ibaji Local Government Area of Kogi State.

METHODOLOGY

This research was carried out in Ibaji Local Government area of Kogi State. It is located on Latitude $6^0 52^1$N $6^0 48^1$E and Longitude 6.867^0N 6.800^0E along the east of River Niger, directly facing Edo State on the west of the River; and shares boundaries with the eastern states of Anambra and Enugu. The land mass is about 12,800 square kilometer, and a population of 127,572 with male 64,423 and female 63,149 at 2006 national census but presently with over 200, 500 (Apeh, 2014).The predominant occupation of the people is farming and the major crops produced are rice and yam.

A three (3) stage random sampling technique was used to select 120 rice farmers, ten (10) each from twelve (12) communities comprising of five (5) male headed households and five (5) female headed households. Thus, a total of sixty (60) each of male and female headed households were used for the study. Data were collected using a well - structured questionnaires administered by trained enumerators. Descriptive statistics, Data Envelopment Analysis and Student's T-test were used to analyze the data.

Data Envelopment Analysis (DEA)

DEA is a non-parametric, deterministic procedure for evaluating the frontier and employs the best-practice frontier (Bates, Baines and Whynes, 1996). Unlike the stochastic frontier analysis, DEA does not impose any a priori parametric restriction on the underlying technology (Fletschner and Zepeda, 2002 and Wu and Prato, 2006). Therefore, the DEA approach is less sensitive to misspecification relative to SFA (Watkins, Hristovska, Mazzanti, Wilson and Schmidt, 2014). Thus DEA does not account for noise in the data. All deviations from the frontier will thus be accounted for as inefficiencies. DEA was used to obtain the technical efficiency, allocative efficiency, scale efficiency and economic efficiency scores of rice farmers.

The technical efficiency (TE) score of a given farmer n is obtained by solving the following input oriented linear programming (LP) problem:

$$TE_n = \min \theta_n \quad (1)$$

Subject to:

$$\sum_{i=1}^{1} \lambda_i x_{ij} - \theta_n x_{nj} \leq 0 \quad (2)$$

$$\sum_{i=1}^{1} \lambda_i y_{ik} - y_{nk} \geq 0 \quad (3)$$

$$\sum_{i}^{1} \lambda_i = 1 \quad (4)$$

$$\lambda_i \geq 0 \quad (5)$$

Where:

i = one to I farmer; j = one to J inputs; k = one to K outputs; x_{ij} = the amount of input j used by farmer i; ; x_{nj}= amount of input j used by farmer n; y_{ik} = amount of output k produced by farmer i ; y_{nk} = amount of output k produced by farmer n ; λ_i = non-negative weights for I firms; θ_n= a scalar ≤ 1 that defines the TE of farmer n. If θ_n= 1 , it means the farmer is technically efficient and if the value is less than one , it means a technically inefficient firm with the level of technical inefficiency equal to 1 - TE_n.

The economic efficiency (EE) score for a given farmer *n* is obtained by solving the following input-oriented DEA model to obtain the minimum cost:

$$MC_n = min\lambda_i x_{nj}^* \sum_{j=1}^{J} p_{nj}\, x_{nj}^* \quad (6)$$

Subject to:

$$\sum_{i=1}^{j} \lambda_i\, x_{ij} - x_{nj}^* \leq 0 \quad (7)$$

$$\sum_{i=1}^{I} \lambda_i\, y_{ik} - y_{nk} \geq 0 \quad (8)$$

$$\sum_{i=1}^{I} \lambda_i = 1 \quad (9)$$

$$\lambda_i \geq 0 \quad (10)$$

Where:

MC_n= the minimum total cost for farmer n; p_{nj} = the price for input j for farmer n ; x_{nj}^*= the cost minimizing level of input j for farmer n given its input price and output levels; all other variables are as previously defined. The economic efficiency for each farmer n can then be estimated using Eq. (11)

$$EE_n = \frac{\sum_{j=1}^{J} P_{nj} x_{nj}^*}{\sum_{j=1}^{J} P_{nj} x_{nj}} \quad (11)$$

Where:

The numerator is the minimum total cost obtained for farmer n based on eqs. (6) to (10) and the denominator is the actual total cost observed for farmer n. When EE_n =1, the firm is economically efficient and EE_n < 1 means the firm is economically inefficient.

EE for each firm can also be estimated as a product of technical efficiency and allocative efficiency, expressed as:

$$EE_n = TE_n \text{ X } AE_n \quad (12)$$

The allocative efficiency (AE) score for farmer n can be estimated given both TE and EE for the farmer as follows:

$$AE_n = \frac{EE_n}{TE_n} \quad (13)$$

Where: EE_n = economic efficiency calculated for farmer n using Eq. (11) and TE_n = technical efficiency calculated for farmer n using Eqs. (1) to (5). When the value of AE_n = 1, the farmer is allocatively efficient and an AE_n < 1 means it is allocatively inefficient.

The scale efficiency (SE_n) for a farmer n is estimated as follows:

$$SE_n = \frac{TE_{CRS_n}}{TE_{VRS_n}} \quad (14)$$

Where: TE_{CRS_n} = technical efficiency of a farmer n under constant returns to scale and TE_{VRS_n}= technical efficiency under variable returns to scale. When SE_n = 1, it means the firm is operating at an optimal scale and when SE_n < 1, the firm is scale inefficient. Scale inefficiency arises as a result of the presence of increasing returns to scale (IRS) or decreasing returns to scale (DRS). The computer program DEAP version 2.1 developed by Coelli (1996) was used to estimate technical, allocative, cost and scale efficiency of rice farmers.

The OLS was used to examine factors affecting TE or EE of rice farmers. It is expressed as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (15)$$

Where: Y = EE scores; α = constant; $\beta_1 \ldots\ldots \beta_4$ = parameters to be estimated; X_1 = age; X_2= household size ; X_3 = experience ; X_4 = Gender ; ε = error term.

RESULTS AND DISCUSSION

Technical, Allocative and Economic Efficiency Indexes of Rice Farmers

The mean of output, inputs and prices of some variable inputs used in the analysis are presented in Table 1. The summary statistics of technical, allocative, economic and scale efficiency indexes of rice farmers are presented in Table 2. As shown in Table 2, technical efficiency are presented under constant returns to scale ($TECRS$) and variable returns to scale ($TEVRS$). The mean (overall) $TECRS$ for male rice farmers is 0.90 with a minimum of 0.74 and a maximum of 1.0 compared to 0.92 of female rice with a minimum of 0.72 and a maximum of 1.0. About 6.67% (4) of male rice farmers achieved full technical efficiency (TE = 1) compared to 30% (18) of female rice farmers under the $TECRS$. Using stochastic frontier analysis Oladebo and Fajuyigbe (2007) obtained a mean TE of 0.904 and 0.897 for women and men upland rice farmers in Osun State, Nigeria. Awoyemi (2000) obtained a mean TE score of 87.4 and 95.0 percent for male and female cassava farmers. The mean $TEVRS$ (pure) for Male rice farmers is 0.95 with a minimum of 0.77 and a maximum of 1.00 compared to 0.93 of female rice farmers with a minimum of 0.72 and a maximum of 1.00. The percentage of rice farmers that achieved full technical efficiency (TE = 1) under the TEVRS are 18.33 and 36.67 for male and female respectively. The mean allocative efficiency of male rice farmers is 0.72 while that of female rice farmers is 0.61. Only about 1.67 % of both male and female rice farmers achieved full allocative efficiency (AE = 1). This means that both male and female rice farmers are not using inputs in a cost – minimizing level given the prices of inputs they face and that cost may be reduced by 28% and 39% respectively on average to attain the level of the best allocative efficient farmer. The mean economic efficiency of male rice farmers in the study area is 0.66 compared to 0.56 of female rice farmers. The Scale efficiency as shown in Table 2 revealed that male rice farmers in the study area had a mean of 0.95 compared to female rice farmers with a mean score of 0.99. Linn and Maenhout (2019) obtained estimates of 0.75 and 0.90 under TECRS and TEVRS respectively and 0.83, 0.57, and 0.43 for AE, EE and SE respectively for rice farmers in Myanmar.

Returns to Scale of Rice Farmers

Analysis of the return to scale as shown in Table 3 revealed that about 13.33% of the male farmers operated at increasing returns to scale (sub-optimal scale) compared to the female farmers which is 8.33%. This means that the farms are too small and therefore would benefit from an increase in scale. The number of male farmers that operated at constant returns to scale (optimal size) were 4 (6.67%) compared to 34 (56.67%) of female farmers while 48 (80.00%) of male farmers compared to 21 (35%) female farmers operated at decreasing returns to scale (i.e. operating above optimal size).

T-test of Differences in Means

The Table 4 shows that the T-test of the differences in means of Output, Allocative efficiency, Economic efficiency and scale efficiency of the male and female rice farmers were significant while the T-test of the differences in means of technical efficiency was insignificant.

Analysis of Input Slacks for Achieving Optimum (Technically Efficient) Rice Output

The results of analysis of input slacks for achieving optimum (technically efficient) rice out is presented in Table 5. As shown in Table 5, agrochemical is the input used by farmers with the highest slack. This means that about 35.85% of the input was used in excess. Labour is the input with the highest slack (about 11.48%) used by female rice farmers. According to Sivasankari, Vasaanthi and Prema (2017) expenditures can be reduced by decreasing the inputs by the amount of slack without reducing its output. This implies that male and female rice farmers should reduce the use of agrochemical and labour respectively by the value of the inputs slacks. Table 6 shows the analysis of excess inputs as well as the optimal input combination that minimizes input costs. As shown Table 6, all the inputs were used above their cost minimizing quantities. Agrochemical is the highest for both male and female rice farmers with 43.95% and 57.92% respectively. Labour is the next input used by both male and female rice farmers above their cost minimizing quantities with 37.86% and 49.27% respectively. Since input prices are taken into consideration in cost minimization, rice farmers should manage the quantities of agrochemical and labour used in order to be economically efficient.

Factors Affecting Economic Efficiency of Rice Farmers

The summary statistics of some of the variables used in the regression analysis is presented in Table 7, while Table 8 shows the ordinary least squares regression estimates of factors affecting economic efficiency of rice farmers. As shown in Table 8, household size, experience and sex are positively related to economic efficiency while age is negatively related to economic efficiency of the rice farmers. The variables that are positively related to economic efficiency implies that economic efficiency of rice farmers increases as these variables increases. It is generally expected that productivity increases with years of experience (Umar, 2013). The longer the years of farming, the more the knowledge acquired, the more efficient the farmer is expected to be. Experienced farmers master the techniques of production and avoid previous mistakes. They are likely to make better decisions to enhance productivity and income. The importance of household size in agriculture hinges on its supply of labour for farm production which in turn increases farm output. The availability of land and household composition are equally important. According to Okoruwa and Ogundele (2006) large family size does not necessarily translate to higher use of family labour because some of the young able bodied family member may prefer other jobs than farming. The variable that is negatively signed implies that economic efficiency decreases as this variable increases. Age has been found to determine how active and productive the head of the household would be. Age has also been found to affect the rate of household adoption of innovations, which in turn, affects household productivity and livelihood improvement strategies (Dercon and Krishnan 1996: Amaza, Abdoulaye, Kwaghe and Tegbarn, 2009). Productivity of the farmer declines with age. Sex is the only significant factor affecting economic efficiency of rice farmers. It is expected that male rice farmers will be more active in terms of labour and are more likely to spend more time on their farms than their female counterparts because of household chores and other social and economic engagements.

Constraints to Rice Production

As shown in Table 9, the major constraints faced by farmers are high cost of transportation (2.78), inadequate capital (2.66), poor feeder roads (2.59) and high cost of inputs (2.52). High cost of transportation might be as a result of poor feeder roads reported by the farmers. Madugu and Edward (2011) had earlier reported that cost of transportation has great influence upon agricultural production, product supply, prices and income received by African farmers. Damola (2010) reported that inadequate capital or high cost of inputs were the major constraints that hinder/affects farmer's ability to clear land, purchase inputs, introduce irrigation and pay for machinery services. Also inadequate capital after harvest limits farmers' capacity to buy and process farm produce. High cost of inputs such as fertilizer, improved seed varieties, agrochemicals, among others, restrict farmers in adopting such appropriately. This agreed with Awotide, Diagne and Omonona (2012) who reported that access to agro – inputs positively influence the adoption of improved technologies.

CONCLUSION AND RECOMMENDATION

This study used DEA to estimate TE, AE SE and EE scores and OLS to examine factors affecting EE of male and female rice farmers. The result of the analysis revealed that there were significant differences in the mean output and, AE, SE and EE scores of male and female rice farmers. These efficiency scores also showed high level of inefficiency and a considerable room for improvement. Gender is the most important and significant factor affecting economic efficiency of rice farmers in the study area. The major constraints to rice production in the study area are inadequate capital, high cost of transportation as a result of poor feeder roads, inadequate capital and high cost of inputs. Based on these findings we recommend access to credit at low or affordable interest rates, training of farmers through extension services, construction / rehabilitation of rural feeder roads by private individuals, government and non-governmental organizations as a way of closing the differences observed in efficiency of male and female rice farmers.

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Table 1: Mean of Output, Input and Prices of some variable Inputs used in the Analysis

	Male	Female
Variables		
Seed (Kg)	55.18	42.32
Labour (Man-days)	46.33	37.24
Agrochemical(L)	6.12	5.18
Paddy rice (Kg)	266.45	148.53
Price of Seed (₦)	477.96	521.94
Price of Labour(₦)	1,000.07	700.03
Price of Agrochemical (₦)	2701.67	2800

Source : Field Survey,2021

Table 2: Summary of Technical, Allocative And Economic Efficiency Indexes

Class	**TECRS**		**TEVRS**		**Alloc. Eff.**		**Eco. Eff.**		**Scale Eff.**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
1	4	18	11	22	1	1	1	1	4	34
0.9 - 0.999	26	21	43	23	5	1	2	1	53	22
0.8 - 0.899	29	16	5	12	11	6	8	5	3	4
0.7 - 0.799	1	5	1	3	14	11	8	3	0	0
0.6 - 0.699	0	0	0	0	21	14	18	20	0	0
0.5 - 0.599	0	0	0	0	6	13	15	7	0	0
0.4 - 0.499	0	0	0	0	2	4	6	11	0	0
0.3 - 0.399	0	0	0	0	0.00	6	2	7	0	0
0.2 - 0.299	0	0	0	0	0	3	0.00	4	0	0
0.1 - 0.199	0	0	0	0	0	1	0.00	1	0	0
Total	60	60	60	60	60	60	60	60	60	60
Mean	0.90	0.92	0.95	0.93	0.72	0.61	0.66	0.56	0.95	0.99
Min	0.74	0.72	0.77	0.72	0.42	0.17	0.35	0.17	0.82	0.84
Max	1	1	1	1	1	1	1	1	1	1

Source: Field Survey 2021 and EAP 2.1

Table 3: Returns to Scale of Rice Farmers				
	Male		Female	
Class of Scale Eff.*	**Freq.**	**Perc.**	**Freq.**	**Perc.**
IRS	8	13.33	5	8.33
CRS	4	6.67	34	56.67
DRS	48	80.00	21	35
Total	60	100	60	100
* CRS: Constant Returns to Scale; IRS: Increasing Returns to Scale; DRS: Decreasing Returns to Scale				
Source :Computed from DEAP 2.1				

Table 4: T-test of differences in means

Gender	Output	TE	AE	EE	SE
Male	266.45	0.90	0.72	0.66	0.94
Female	148.53	0.92	0.61	0.56	0.99
t-stat (two-tail)	3.13	1.63	3.88	2.95	-6.38
t-critical (two-tail)	1.98	1.98	1.98	1.98	1.98
Remarks	significant	Insignificant	Significant	Significant	Significant

Source: Computed from DEAP 2.1

Table 5 : Analysis of Input Slacks for Achieving Optimum (Technically Efficient) Rice Output								
		Male				**Female**		
Input	**Mean Slack**	**Mean Input Used**	**Excess Input used over Mean input Used (%)**	**No. of Farmers**	**Mean Slack**	**Mean Input Used**	**Excess Input used over mean Input Used (%)**	**Number of Farmers**
Labour	12.764	46.33	27.55	46	4.277	37.24	11.48	32
Seed	0	55.18	0	0	0.045	42.32	0.11	2
Agrochemical	2.194	6.12	35.85	11	0.572	5.18	11.04	28
Source: Field survey and DEAP 2.1								

Table 6 : Analysis of Input used for Achieving minimum(Economically Efficient)costs of Rice production

	Male				Female		
Input	**Mean cost Minimizing input used**	**Mean Input Used**	**Excess input used**	**Excess input used Out of mean input used (%)**	**Mean cost Minimizing input used**	**Mean Input Used**	**Excess input Used**
Labour	28.79	46.33	17.54	37.86	18.89	37.24	18.35
Seed	53.29	55.18	1.89	3.43	41.59	42.32	0.73
Agrochemical	3.43	6.12	2.69	43.95	2.18	5.18	3

Source: Field survey and DEAP 2.1

Table 7: Descriptive Statistics of Socioeconomic Variables of Rice Farmers

		Male				Female			
Variable	**Unit**	**Min.**	**Max**	**Mean**	**Std.Dev.**	**Min.**	**Max**	**Mean**	**Std.Dev.**
Age	Years	25	65	49.3	10.04	25	65	47.72	10.5
Household Size	Numbers	1	8	4.23	1.48	1	8	3.78	1.42
Experience	Years	2	21	6.83	4.4	1	23	7.12	4.32
Farm Size	Numbers	0.09	3	0.77	0.67	0.09	3	0.59	0.59

Source: Field Survey, 2021

Table 8: Factors Affecting Economic Efficiency of Rice Farmers

Variable	**Coefficient**	**Std. Error**	**T-statistic**	**Prob.**
Constant	0.48	0.08	6.38	0.00*
Age	-0.00	0.00	-0.24	0.81
Household Size	0.02	0.01	1.36	0.18
Experience	0.00	0.00	1.15	0.25
Gender	0.09	0.03	2.73	0.01*
Model				
R-squared		0.1049		
Adj. R-squared		0.0738		
F(4,115)		3.37		
Prob. > F		0.012*		
No. of Observ.		120		

Source: Field Survey 2021 and STATA 13. *p < 0.01

Table 9: constraints to rice production

Constraints/Response	SA	A	SD	Mean
1. High cost of transportation	95	24	1	2.78
2. Inadequate capital	81	37	2	2.66
3. Poor feeder roads	81	32	4	2.59
4. High cost of inputs	72	38	10	2.52
5. Pest and diseases	60	53	7	2.44
6. Poor storage facility	44	64	5	2.21

Source: Field Survey 2021.

NB: SA=Strongly Agreed, A=Agreed, SD=Strongly Disagreed