EFFECTS OF RISK ON TECHNICAL EFFICIENCY ON RICE PRODUCTION IN EKITI STATE

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ABSTRACT
Agricultural activities are ventures that are faced with many risks, varying from sowing, to harvesting and through post-harvest activities. It has been contended that agriculture is an activity burdened with multiple risk factors, some of which are related to the biological nature of production. Farmers have to deal with a significant amount of uncertainty every day from not knowing what the weather will be like, wondering about instability in market prices among others. Hence, agricultural producers are forced to make decisions based on imperfect information. The major purpose of the study is to analyze the effect of production risk on technical efficiency of rice farming sector and to find a solution to the risk. Data were collected through the use of multi-stage random sampling. Descriptive statistics and Stochastic production Frontier Model were used. Results showed that drought, price spikes, birds' infestation among others are major production risks affecting rice production in the areas of study. The study indicated an average efficiency score of 0.90 suggest a technical inefficiency of 0.0977 (1-0.9023/0.0977). Moreover, results for Production Function as determined by the maximum likelihood estimates (MLE) of the Cobb-Douglas model revealed hired equipment required for rice production has significance level of 10% for rice farmers. Moreover, elasticity for depreciated value of equipment is the largest (0.173), followed by the use of agrochemical (-0.112). In addition, farm size (0.108), family labour (-0.026), seed (0.015) and fertilizer (0.012) had a positive influence on the technical efficiency of rice farmers. The results of technical inefficiency effects deduced that membership of cooperative, age, and extension access significantly and positively influenced technical inefficiency. The research also indicated the serious constraint faced by the rice farmers such as high cost of transportation, birds' infestation, inaccessible to discounted farm inputs, credit access among others. The study deduced that there is substantial difference in the mean levels of technical efficiency of rice farmers. Hence, policies that will help address these inefficiency scores and constraint issues should be pursued if Nigeria is to achieve self-sufficiency in rice production.

Keywords: Production risk, Technical Efficiency, Constraints in Rice Farming, Ekiti State
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INTRODUCTION
Agricultural operations, including planting, harvesting, and post-harvest procedures, comes with a number of threats (Sulewski *et al.*, 2014). Agriculture has been characterized as a risky industry due to a number of risk factors, some of which are connected to the biological component of production (Ayinde *et al*, 2018). Two of the many everyday sources of uncertainty that farmers

must handle are anxiety about the weather condition and the worries about changes in market prices. As a result, agricultural producers are compelled to make judgments based on incomplete information (Jankelova *et al*., 2017). Every business has certain dangers, challenges, or hazards, just as the agricultural industry. All aspects of agriculture including the weather, crop yields, inputs to commit to production and product pricing are unpredictable. Farm revenue often varies as a consequence of changes in governmental policy, global market patterns, and a variety of other reasons, including general inflation. Therefore, managing various risks is crucial for preserving a healthy profit margin and farm revenue (Bornhofen *et al*, 2019).

Risk is the possibility of unfavorable events brought on by uncertainty and ignorance (Jankelova *et al*., 2017). There are many dangers associated with agricultural production that might reduce output and result in large losses. The strategic management of any agricultural organization will always need the capacity to identify risks early and manage them successfully. The agricultural sector is quite risky (Nadezda *et al*., 2017). Prior research first linked the year 2007–2008 global food price crisis to production risk brought about by extreme droughts, but export limitations in certain countries compounded the effects of the price increases that followed (Aschalew, 2020; Adam *et al*., 2019). Farmers faced three key types of risk during this crisis: institutional risk (unexpected changes in governmental policy), market risk, and production risk (drought). One category's existence causes the occurrence of another, which raises the possibility that risk outcomes may have cascading effects. For instance, there can be extra dangers if it rains a lot during harvest, such as financial risks related to not being able to make payments to creditors (Pelka, 2015; Adam *et al*., 2019).

Farmers must constantly manage a number of agricultural hazards (Adam *et al.*, 2019). The possibility of greater rewards/high production yield is a benefit of risk taking. Risk may have terrible outcomes like starvation, financial collapse, and health issues; even risk by definition includes downsides like poor returns and revenues (Laura 2012). Therefore, farmers must manage a variety of hazards that might have overlapping consequences (Van Winsen *et al.*, 2013; Wauters *et al.*, 2014; Adam *et al.*, 2019). Compounding effects may significantly influence choices and results in ways that are beyond the farmer's control. Since it is conceivable for many agricultural hazards to exist simultaneously, a number of policy-driven efforts have evolved to address these risks in more detail. Programs that highlight the many dangers farmers face are also starting to get more support from sources for agricultural researches. The SURE-Farm program and the INFORM index for risk management are two examples (Bornhofen *et al.*, 2019).

Production is the process of committing a choice variety seed of crop into cultivation per season using the right combinations of inputs (labour, fertilizers, herbicides etc.) plus other management practices with the expectation of a quantifiable measure of output. Rice Farmers cultivate yearly with great expectations of high tonnages despite the risks involved, it is noticeable in Ekiti state that there is increase in the number of farmers going into rice cultivation (Agricultural Development Programme Eliti State). The recent rise in rice production rates in Ekiti State as well as Nigeria may be due to the country's partial prohibition on rice imports as well as the country's ongoing population growth, which makes rice the major daily staple meal (Folaranmi *et al*., 2016).

The production risks that rice farmers must manage include flood, drought, low yield, bird infestation, expensive equipment, increased sustainability of production (when accounting for modified varieties), cost of crop management, and chain costs of quality control to meet various customer satisfaction requirements, to name just a few (Ayinde *et al.*, 2013). The rice sector in Nigeria is plagued by several issues with money, production, marketing, and conflicting laws. Nigeria's poor output of rice is mostly due to insect assaults (International Institute of Tropical Agriculture, 2020). Regardless of how many resources are used in the production process, the dangers that Nigerian rice farmers must deal with might have a negative influence on the crop. There is a possibility that the yield per hectare may drop. Managing Nigeria's food security requires an understanding of the risks involved with rice production.

Political and social risks were found to be the two primary risk variables when examined (Kamai *et al* 2020). Kamai *et al* (2020) indicated the guidelines on rice production, are drought, poor soil fertility, and insect assaults in the Northern part of Nigeria. The fundamental reasons of risk vary by place, according to research trends. However, not enough attention has been paid to the technical viability and production risk of rice growing in Ekiti State Nigerian. The production risks that affect the technical efficiency of rice farmers in Ekiti State are identified and examined in this research. Hence, this paper examines the production risks that the rice farming industry encounters and how they impact rice farmers' technical efficiency.

METHODOLOGY

Study Area

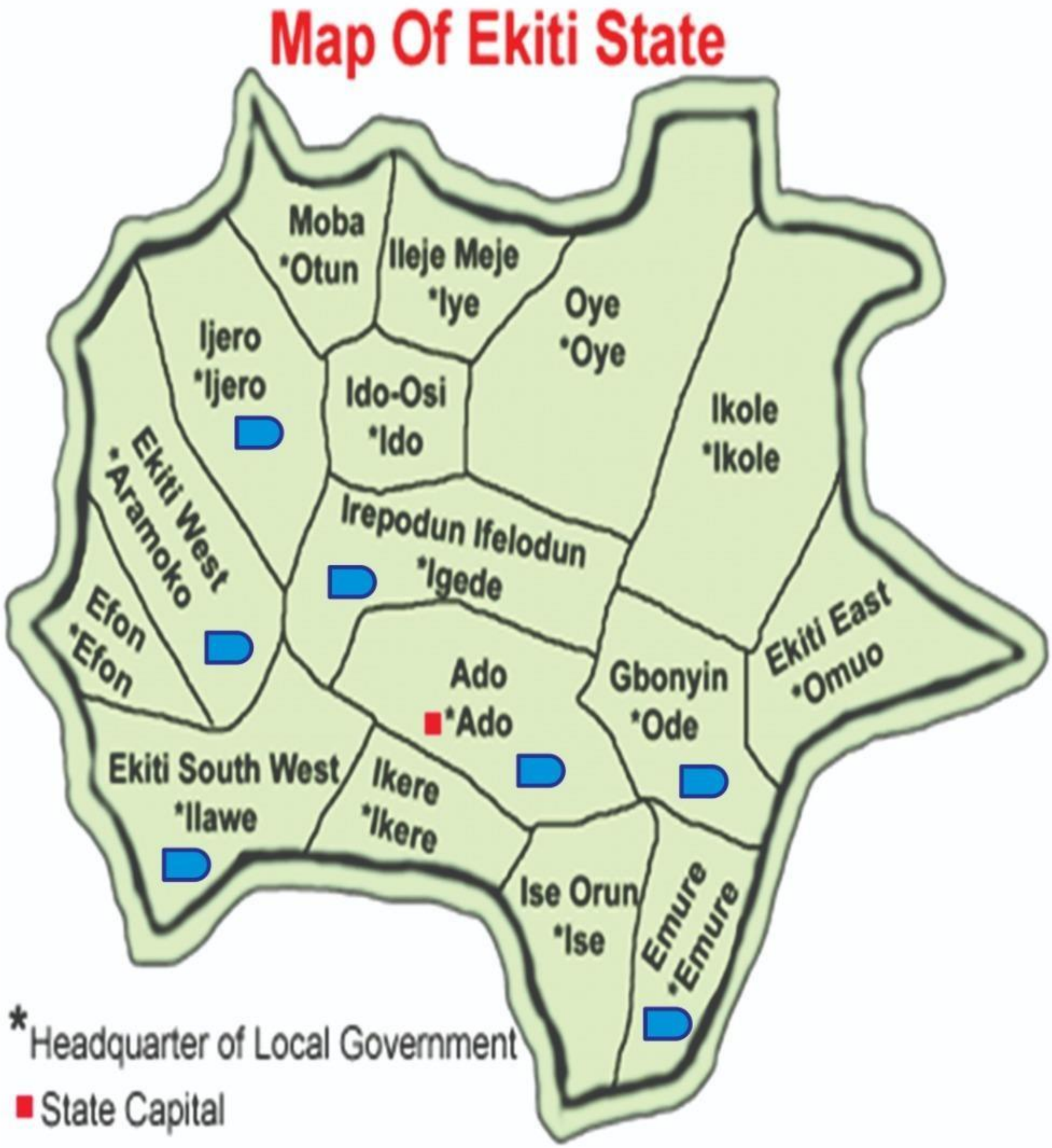
In the state of Ekiti, this research was mostly conducted in the local governments of Gbonyin, Ekiti West, Ido-Osi, and Irepodun/Ifelodun. One of the states in the southwestern, Nigeria that produces rice is Ekiti. On October 1, 1996, the old Ondo State gave birth to Ekiti state. It is situated between latitudes 7° 40' North and 5° 15' East of the Greenwich meridian and latitudes 70° 45' East and 80° 5' North of the equator. Ekiti South, Ekiti North, and Ekiti Central are the three senatorial districts of Ado-Ekiti, the state's capital. In the state, there are sixteen local governments.

The northern and eastern limits of Ekiti are defined by the states of Kwara and Ondo, respectively. The overall area of Ekiti state is 6,353 km2, and its average annual temperature is 27 oC and 1400 mm of precipitation. The state is a prominent producer of trees and food crops because to its diverse flora, which includes guinea savannah in the north and rain forests in the south. The state has a total population of 2.5 million people, the most of whom are Yoruba, and just a tiny number of individuals from other ethnic groups.

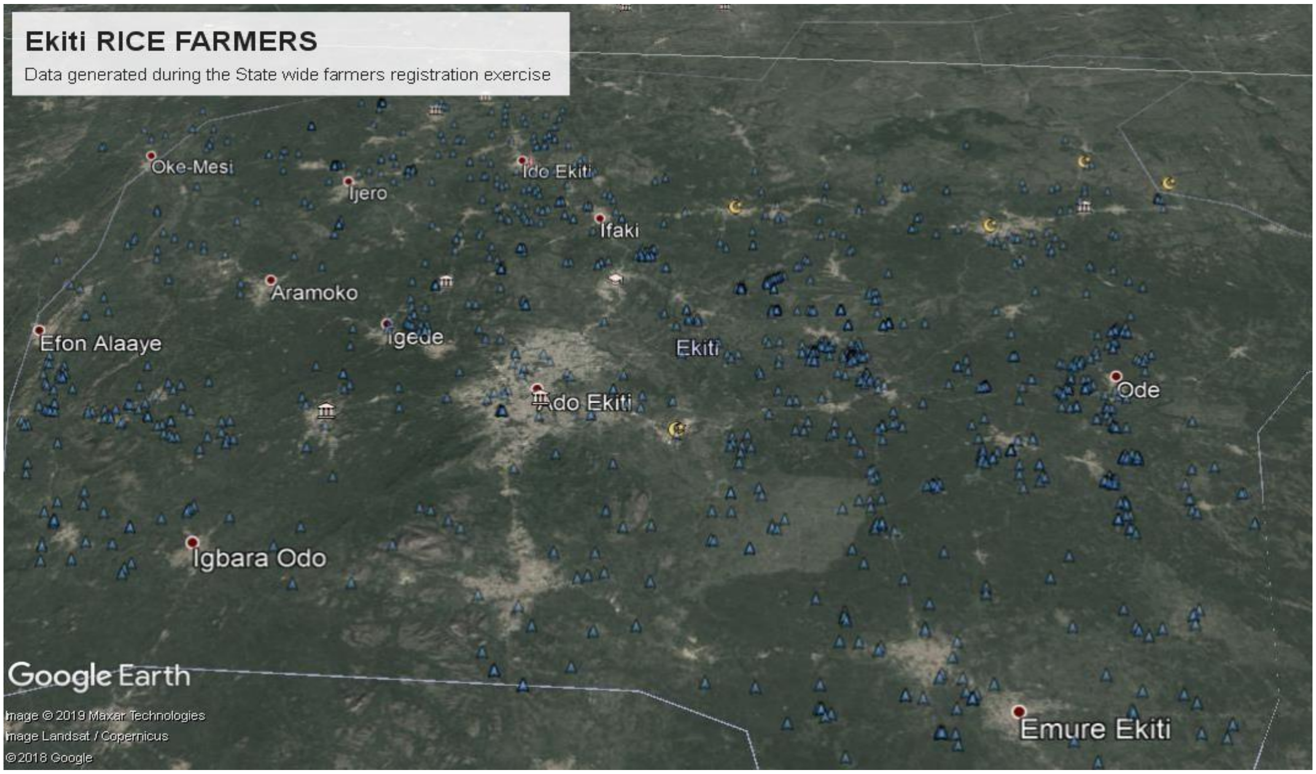
The dry season lasts from November to March, while the rainy season lasts from April to October. There are many rice-growing seasons each year as a consequence of the distribution of rainfall along this axis. The state is also abundant in water resources, including the Benin Owena Dam, which connects the northern and southern regions of the nation, the Ero Dam, the Osun River, the Ose River, the Ogbese River, and other streams that are suitable for lowland rice farming.

In the state, farming is the most prevalent employment. Food crops including rice, cassava, yams, and maize are being developed. According to Olaosebikan and Akinwamide (2018), Ekiti State has been producing rice since 1945. The local government areas of Gbonyin, Ekiti West, Ijero, Irepodun/Ifelodun, Emure, and Ekiti Southwest cultivate the most rice that is produced in Ekiti State. Currently, rice production and processing has practically made its way to each and every local government in the state.

Map of Nigeria Showing Ekiti States



: represents the local governments leading in rice production



Source: Ekiti state RIFAN

3.2 SAMPLING PROCEDURES AND SAMPLE SIZE

3.2.1 Multistage sampling

The study adopted multi-stage sampling technique for its data collection. The first stage was to identify areas where rice is produced and processed in the state. Hence, four local government areas were identified as a high rice production area. In the second stage, two towns/villages are randomly chosen from each of these selected four local governments areas listed, to give a total of 8 (eight) communities. The selected towns/villages are regarded as the top rice-producing areas. In the 3rd stage, twenty (20) rice farmers were randomly selected from each towns/village, totaling one hundred and sixty (160) rice farmers that responded to the questionnaires (Table 1).

Table 1: Communities and Local governments of respondents

State	Local government	Community	Number of farmers
Ekiti state	Irepodun/Ifelodun	Igbemo Igede	20 20
	Ido-osi	Ido-Ekiti Ifaki-Ekiti	20 20
	Gbonyin	Aisegba-Ekiti Ode-Ekiti	20 20
	Ekiti-West	Okemesi Aramoko-Ekiti	20 20
	Total		160

Source: Field Survey, 2022

3.3 Method of Data Collection

Primary data were gathered from rice farmers using standardized questionnaires and in-person interviews. The purpose of the questionnaire was to collect information on the risks associated with rice farming in the selected local government districts in Ekiti State. The questionnaire was also created to collect information on a range of pre-determined lists of dangers from which the farmers may choose the one that most closely relates to their rice crop. The questionnaires are produced to provide needed information from the respondents in order to achieve the study stated objectives. The list of compiled production risks, coping techniques, and risk managements was ranked according to the occurrence in %.

Method of Data Analysis

Descriptive statistics and Inferential Statistics were used to explore the socioeconomic data and production data collected. Also, these data were analyzed using the stochastic production Frontier Model (SFM). Descriptive statistics and cross tabulation were used to explore the socioeconomic data and also to better understand the effects of the identified production risks influence on rice production in in the study area. While the stochastic production Frontier Model (SFM) was used to evaluate the technical proficiency of rice producers in the study area.

Model Specification

Cobb Douglas model can be specified as follows:

$Y=AL^{\beta}K^{\alpha}$

Where:

- Y = total output (the real value of all goods produced in a year)
- L = labour input
- K = capital input
- A = total productivity factor
- α and β are the output elasticity of capital and labor, respectively. These values are constants determined by available technology.

The stochastic frontier production function model for estimating farm level technical efficiency is specified as:

$Y_i = f(X_i ; \beta) + \varepsilon_i \quad i= 1,2,\ldots n$ (1)

Where;

Y_i = output,

X_i = denotes the actual input vector,

β = vector of production function and,

ε = the error term that is composed of two elements.

$\varepsilon = V_i - U_i$ (2)

Where;

Vi is the symmetric disturbances assumed to be identically, independently, and normally distributed as N (0, σ^2_v given the stochastic structure of the frontier.

Ui is a one-sided error term that is independent of V_i and is normally distributed as (0, σ_u), allowing actual production to fall below the frontier but without attributing all shortfall in output from the frontier as inefficiency.

Following the work of Parikh A, and Shah M. (1994), technical efficiency estimation is given by the mean of the conditional distribution of inefficiency term U_i given ε; and thus, defined by:

$E (U_i/\varepsilon_i) = \sigma_u\sigma_v/\sigma[\, f(\varepsilon_j \lambda/\sigma)/1\text{-}F(\varepsilon_i \lambda/\sigma) - \varepsilon_i\lambda/\sigma]$ (3)

Where; $\lambda= \sigma_u /\sigma_v$, $\sigma^2 = \sigma^2_u+\sigma^2{}_v$

While f and F represent the standard normal density and cumulative distribution function respectively evaluated at $\varepsilon_j \lambda/\sigma$

The farm-specific technical efficiency is defined in terms of observed output (Y_i) to the corresponding frontier output (Y_i *) using the available technology derived from the result of equation 3 above as:

$TE_i = Y_i/ Y_i^* = E(Y_i ui,X_i)/E(Y_i u_i =0,X_i) = E [\exp (-U_i)/ \varepsilon_i]$ (4)

TE takes the value on the interval (0.1), where 1 indicates a fully efficient farm. The stochastic frontier cost functions model for estimating farm level overall economic efficiency is specified as:

$C_i = g (Y_i ,P_{i;} \alpha) + \varepsilon_i$ where,i = 1, 2, … (5)

Where C_i represents total production cost,

Y_i represents output produced,

P_i represents the cost of input,

α, represents parameters of cost function and

ε_i represents the error term that is composed of two elements. That is: $\varepsilon_i = V_i +U_i$ … (6)

The Cobb-Douglas functional form for the rice farm in the study area is specified as follows for the production functions:

$\ln Y_i=\beta_0 + \beta_1\ln X_{1i} + \beta_2\ln X_{2i} + \beta_3\ln X_{3i} + \beta_4\ln X_{4i} + \beta_5\ln X_{5i} + \beta_6\ln X_{6i} + \beta_7\ln X_7 + V_i – U_i$ …….(10)

Where:

Ln =denote natural logarithm.

Y_i = Rice output (kg)

X_1 = Farm size (hectares)

X_2 = Hired labour (man days)

X_3 = Family labour (man days)

X_4 = Quantity of rice seeds planted (kg)

X_5 = Quantity of agrochemicals used in liters

X_6= Quantity of Fertilizers used in kilograms

V_i = random variability in the production that cannot be influenced by the farmer.

U_i = deviation from maximum potential output attributable to technical inefficiency.

β_0 = intercept.

β = Vector of production function parameters to be estimated;

Also, the Cobb-Douglas cost frontier function for rice farms in the study area is specified as:

$\text{In } C_i =\alpha_o +\alpha_1 \text{ In}P_{1i} +\alpha_2 \text{ In}P_{2i}+\alpha_3 \text{ In}P_{3i} + \alpha_4 \text{ In}P_{4i}+\alpha_5 \text{ In}P_{5i} + V_i +U_i$ ... (11)

Where,

C= total production cost per annum;

P_1 = cost of labor,

P_2 = cost of seed

P_3 = cost of agrochemicals,

P_4 = cost transportations

P_5 = cost of harvesting

Y_i = Output.

Maximum likelihood Estimation method was used to estimate the parameters.

RESULTS AND DISCUSSIONS

Description socio-economic characteristics of Rice farmers in the study area

The demographic data of the respondents from the study area are shown in this section.
The study deduced that Males (75%) dominated agricultural activities in the area of study, whereas women represented only (25%) of the respondents. Due to the labor- and time-intensive nature of rice cultivation and the fact that women are more involved in household tasks than men, it is obvious that male farmers predominate the rice cultivation industry in the studied area. In contrast, Kadiri *et al*, (2014) indicated that there were more female than male rice farmers in their study. This study is in agreement with the work of Fawole and Rahji (2016) finding that men predominate the rice farming sector in the Ekiti State.

The study deduced a mean age of 44 years, where a higher percentage of respondents are in the category of between the ages of 31 and 50, which is termed by many studies as the productive age range. This may be useful for efficient risk management, in the opinion of Olawuyi and Olawuyi (2015), who believe that a farmer's age, the size of their farm, and their degree of expertise all impact the risk management technique they choose to utilize.

The cross-tabulation analysis indicated that 90.6 percent of the respondents were married and while 86.3 percent of the respondents had farms with an average size of 4.5 acres. This finding thus revealed that rice production in Ekiti state is dominated by small holder farmers. Hence, these small areas (small farm sizes) cannot permit or enhanced farm mechanization and hence, making it difficult to expand. This resulted into limiting output of rice to be on the subsistence level leaving little for commercial.

In their examination of the technical efficiency of paddy rice production in Nigeria's Niger Delta areas, Kadiri *et al*. (2014) had similar conclusions. This study deduced that a greater percentage of respondents (19.4%) had a University degree, follow by respondents who had a secondary education. The study also deduced that education and experience levels had a big impact on technical efficiency. This study revealed that respondents in the study areas are fairly literate, hence, information can be easily understood and adoption of technology easily adopted.

This study supported past studies findings that the value of technical efficiency can be enhanced when the farmers gain knowledge and expertise. This suggests that successful farming requires an understanding of agricultural methods. This result is in line with Aschalew's findings from 2020, who found that differences in production efficiency were influenced by levels of experience, education, and training.

The study indicated that most popular method for growing rice in the studied regions is low-land farming; as the study reveals 44.4% of the population practices low land exclusively, while 10% also practices upland farming and 45.6% practices both. This is consistent with the study conducted by Ibitoye *et al* (2012) that low land rice production pattern dominates among Nigerian rice farmers. The farmers possess reasonable farm experiences with the mean of 15 years. Also, labour used for agricultural purpose were jointly sourced from the family and hired respectively, with the mean household size of 6.73. 35.6% uses personal savings to sponsor farm activities, this implies that 57 out of 160 farmers had enough income and do save for the next production, 44.4%

borrowed from microfinance bank, 14% sourced fund from cooperative while others sourced from local money lenders and commercial banks.

Rice crop typically takes four months to mature, only fewer varieties may be harvested in three months, 12.7% of farmers completely lacked access to extension visits; the majority of farmers who had access did so once every four to six months. This research depicts that the Ekiti state's rice farmers lack access to quality and effective extension services.

Table 2: Descriptions of the Selected Demographics variables of the respondents

Description	Frequency (%)	Percentage	Mean
Sex: Male	120	75	
Female	40	25	
Marital Status: Single	11	6.9	
Married	145	90.6	
Divorced/Separated	2	1.3	
Widowed	2	1.3	
Education: No formal education	15	9.4	
Primary/SSCE	66	41.3	
NCE/OND	48	30	
HND/BSC	19	11.9	
MSC/MBA	12	7.5	
Age-grouping: 21-30	13	8.1	44.2
31-40	28	17.5	years
41-50	70	43.8	
51-60	34	21.3	
61-70	15	9.4	
Farm size grouping (Acres): 1.1-3	103	64.4	4.5
3.1 – 5	35	21.9	Acres
5.1 – 7	11	6.9	
7.1 – 10	2	1.3	
10.1 – 15	2	1.3	
15.1 – 20	7	4.4	
Farm experience (Years): 1 – 5	4	1.7	15.37
6 – 10	60	25.0	
11 – 15	96	40.0	
16 – 20	12	5.0	
21 – 30	56	23.3	
31 – 40	12	5.0	
Household size (No.)			6.73
1	4	2.5	
2 – 3	38	23.8	
4 – 7	80	50.0	
8 – 11	31	19.4	
12 – 15	7	4.4	
Rice Production pattern: Lowland	71	44.4	
Upland	16	10.0	

Both Lowland and upland	73	45.6
Access to Fund for farming purposes through		
Personal savings	57	35.6
Local money lender	11	6.9
Micro-finance bank	71	44.4
Commercial bank	7	4.4
Cooperative	14	8.8
Extension services access is		
Regular (Monthly visit)	10	6.3
Moderate (Quarterly visit)	75	46.9
Poor (Once in six months)	55	34.4
No access	20	12.5

Source: Field Survey, 2022

Examination of Farmers Experience with Production System

Table 3 explains that farmers with reasonable years of experience practice lowland rice production system for its higher yield and diversifies with lowland and upland production system for effective utilization of resources that enhances technical efficiency of rice production.

Table 3: Rice production experience grouping and Rice production system

		Rice production practice			
		Lowland	Upland	Both lowland and upland	Total
Rice production experience grouping	1-2	7	3	1	11
	3-5	11	5	4	20
	6-10	27	4	18	49
	11-15	10	2	11	23
	16-20	8	0	9	17
	21-55	8	2	30	40
Total		71	16	73	160

The Technical efficiency of rice farmers in the study areas

Table 4 provides sample information on technical efficiency rendered as percentiles for rice farmers; the distributions of the technical efficiency scores for rice farmers are compared. The farmers' technical efficiency ratings varied from 0.529 to 1.000. This study revealed that rice farmers produce rice with an average level of technical efficiency of 0.9023. Accordingly, the average efficiency ratings of 0.90, suggest a technical inefficiency of 0.0977. Hence, a typical rice farmer in the study area would need 10% more resources to generate the same amount of output (or achieve the same objectives) as an efficient rice farmer on the frontier (1-0.9023).

Table 4: **Distributions of Technical Efficiency**

s/n	Estimation	Values
	Mean	0.9023
	Minimum	0.5612
	Maximum	1.0000
	Standard Deviation	0.0977
	Percentile	
	1	0.529
	5	0.618
	10	0.818
	25	0.916
	50	0.946
	75	0.972
	95	1.000

Results of the production function estimate demonstrating how the risks are affecting rice producers' technical proficiency in the research region.

Table 4 displays the maximum likelihood estimates (MLE) for the Cobb-Douglas model. According to the study, all of the inputs' anticipated output elasticities deviated from zero at the 1% level of significance. According to the study, rice farmers give rented agricultural equipment a 10% relevance rating. Additionally, the value of depreciated equipment may be calculated with the most latitude (0.173). Therefore, a 10% rise in the depreciated value of the used equipment would result in a 1.73% increase in production. The use of agrochemicals follows (-0.112), the relationship appears unfavorable, indicating that rice growers are not taking full advantage of it or do not apply the right quantity. Additionally, production is negatively correlated with family labor (-0.026).

Moreover, the quality of family labor used, such as utilizing children to do tasks that adults should be able to execute well, might be one cause for this. Next is the size of farm land (0.108). As a result, a 10% increase in farm size will result in a 1.08% rise in production; this explains that large farm size has positive relationship with higher production yield. The next two are seed (0.015) and fertilizer (0.012), both of which, as was expected, had a positive impact on the yield. Hired labour has the least elasticity of 0.003 (Table 5). The higher elasticity of family labour than that of hired labour for rice farmers is consistent with the findings of Chang (2011)

Table 5: **Stochastic Production Frontier Estimates Variables**

Variables	Coefficients	Standard error
Lnseed	0.015***	0.011
Lnfertilizer	0.012***	0.000
Lnfarmsize	0.108***	0.012
Lnfamilylabour	-0.026***	0.000
Lnhiredlabour	0.003*	0.000
Lnagrochemical	-0.112***	0.005
Lnequipment	0.173***	0.002
Constant	1.918***	0.108
Risk function		
Lnfamilylabour	1.266***	0.183
Lnhiredlabour	-0.061	0.089
Lnequipment	-11.782***	1.394
Constant	95.048***	10.162
Inefficiency function		
AvgNoAsso	0.518***	0.109
Age	0.319***	0.702
Household size	0.086	0.205
Educational level	-3.748***	0.615
Extension access	3.083***	0.916
Constant	-37.107***	4.783
Log-likelihood	82.634	

***& * indicate significance level of 10% and 1% respectively. Note: A negative sign of the parameters in the inefficiency function means that the associated variable has a positive effect on technical efficiency, and vice versa.
Source: Field survey, 2022

Results of the estimation of the technical inefficiency function

The effects of technical inefficiency are also reflected in the table's bottom section. The average number of associations, age, and extension access significantly and positively influenced technical inefficiency effects. The inability of the extension agents and their association to provide farmers with current, appropriate information or the failure of the farmers to put that knowledge to use are both responsible for this conclusion's unexpected outcome. The results of this study are in line with those of Tijani (2006), who found that efficiency and longer service (experience) had a bad relationship. The fluctuating household size has a significant and negative influence on technical inefficiency.

Factors influencing technical efficiency/inefficiency rice production in the areas of study

Multiple regression analysis was carried out to look into the factors influencing the technical efficiency/inefficiency of rice producers in the study location. The results of the analysis are shown in the table below. The findings indicated that 68% of the independent variables included in the equation explain the technical efficiency or inefficiency of rice growers.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.690[a]	.681	.623	73725.04031	.681	13.984	12	4	.007	2.061

a. Predictors: (Constant), Production input: Land quantity, Sex, Educational qualification, Source of input, Production risk: Drought, Marital Status, Coping strategies adopted: Crop Insurance, Source of capital, Rice production experience, Farm size, Age, Family size
b. Dependent Variable: Net revenue

Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	101951.569	348688.014		.292	.785
	Sex	-40692.656	68152.714	-.075	-.597	.583
	Age	-21322.509	5688.551	-.984	-3.748	.020
	Educational qualification	67786.481	32982.325	.175	2.055	.081
	Family size	71652.019	29900.590	.868	2.396	.075
	Rice production experience	4045.082	5889.857	.139	.687	.530
	Farm size	12998.429	5291.013	.552	2.457	.070
	Marital Status	18351.944	105745.897	.030	.174	.871
	Source of capital	90661.339	36495.160	.497	2.484	.068
	Source of input	75386.079	62330.224	.334	1.209	.293
	Production risk:	-71278.076	34032.628	-.021	-2.094	.074
	Coping strategies adopted: Crop Insurance	212746.542	76227.876	.120	2.790	.042
	Production input: Land quantity	138004.149	15507.461	1.387	8.899	.001

a. Dependent Variable: Net revenue

CONCLUSION

The study uses descriptive statistics and the stochastic production frontier model to analyze the data collected. Multi-stage sampling technique was adopted to collect the data of 160 rice farmers that cut across four selected local governments in Ekiti State. The study revealed that rice output in the study areas is impacted by main production risks such as drought, price spikes, birds' infestation, low yield, difficulty in getting labour among others. These are major production risks affecting rice production in the areas of study.

In the results of the analysis of rice farmers' technical efficiency scores, the study deduced that technical efficiency varied from 0.529 to 1.000. According to the study, rice farmers often produce rice with an average technical efficiency of 0.9023. Accordingly, the average efficiency scores of 0.90, this thus implies that the indicator of a technical inefficiency of 0.0977 (1-0.9023), suggest that a rice farmer in the study area would require around 10% more resources than a rice farmer on the border in order to generate the same amount of output (or to accomplish the same objectives).

Moreover, the estimation results for Production Function as determined by the maximum likelihood estimates (MLE) of the Cobb-Douglas model revealed that hired equipment required for rice production has significance level of 10% for rice farmers. Elasticity for depreciated value of equipment is the largest (0.173), followed by the use of agrochemical (-0.112). Farm size (0.108), family labour (-0.026), seed (0.015) and fertilizer (0.012) had a positive influence on the technical efficiency of rice farmers. The results of technical inefficiency effects deduced that membership of cooperative, age, and extension access significantly positively influenced technical inefficiency.

Rural infrastructure, such as roads, market buildings, inputs such as Fertilizer, financing, and other agricultural inputs must be given at the right time and at a fair price to the real farmers rather than to political officials and middlemen. The interest rate should also be decreased to encourage farmers to borrow. Farmers may also create cooperatives to have access to financing and other resources required for production. Establishment of a processing factory would boost outputs and facilitating improved rice seeds that would boost output and boost production.

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