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Comparative Economic Analysis of Rainy and Dry Season Maize Production among Farmers in Ekiti State, Nigeria

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Abstract

The study focused on the comparative Economic Analysis of Rainy and Dry Seasons' maize production among farmers in Ekiti State of Nigeria. The main objective of the study is to analyze the economics of rainy and dry seasons maize production in Ekiti State, Nigeria. A multi-stage sampling technique was employed to select one hundred and ten farmers who produce maize during rainy and dry seasons in the study area. Instrument of data collection was via well-structured and pre-tested questionnaire. The results of the analysis show that the mean age of the farmers was 39.2 years and greater proportion of the respondents (87.3%) were married. The average household size was 7 persons and majority of the respondents (84.5%) were male. The mean age of farming experience was 17.3 years and large proportions of the respondents (80.9%) were literates. The result further reveal that production efficiency of maize during the rainy season was higher than that of the dry season in the study area with the total annual revenue of N2,016,442.12 and N1,806,592.43 respectively. The results of the regression analysis shows that f-statistics for both rainy and dry season maize production were 8.380 and 37.851 respectively with probability values of 0.000 indicating that farmers socio-economic characteristics such as age, income, level of education, jointly had influence on maize yield. The major constraints to maize production during the rainy season were disease and pests infestations and dry season maize production witnessed poor weather conditions. An inadequate credit facility was the main problem confronting rainy and dry season maize production. The study therefore recommends that maize producers should be encouraged at all seasons through the provision of improved farm inputs subsidized rate, repairs of bad roads by the government, provision of credit facilities through farmers cooperative group will also enhance production efficiency of maize in the study area.

1.0 Introduction

Maize (zea mays) is the third most important staple food in the World today and a staple food of great socio-economic importance in the sub-sahara Africa (Food and Agriculture Organization, 2003). It has been recognized to be one of the longest ever cultivated food crops. Maize over-time does not only serve as the source of food for man and livestock, but also as a source of income and foreign exchange. Maize has been in the diet of Nigerians for centuries. It started as a subsistence crop and has gradually become a more important crop. Maize has now risen to a commercial crop on which many agro-based industries depend for raw materials (Iken and Amusa, 2004). According to FAO (2000), about 4.7 million tonnes of maize were produced on the average, between 1980 and 2003 in Nigeria and the contribution of maize to total grains produced in Nigeria increased from 8.7 percent in 1980 to about 22 percent in 2003. About 561,397.29 hectares of Nigeria land were planted with maize, which constitutes about 61 percent of total cultivable land in Nigeria. Economically, the price of maize increased from N2,500.00 in 1980 to N3,600/tones in 2003. This means the price increased more than the price of 1980. All these data emphasized the importance of maize in the diet and the economy of Nigeria. Also, the demand for maize as a result of the various domestic uses shows that a domestic demand of 3.5 million metric tones outstrips domestic supply of 2.5 million, metric tons (Akande, 1994). Every part of maize plant has economic value. The grains, leaves, stalk, tassels and cob can be used to produce large varieties of food and non-food products (IITA, 2009). Maize is prepared and consumed in a multitude of ways which vary from region to region and from one ethnic group to the other. Industrial utilization of maize include: production of flour, starch, alcohol, spirit and other value added resulting from milling of corn. Maize is a major raw material for livestock feeds.

Maize is usually under cultivation as a mixed crop and thus only very small quantities are being produced for farmers' families. However, with the rapid expansion of livestock industries in the country and the higher food demand by the ever – increasing population, the need to increase and improve on maize production is imperative.

The higher demand for maize as food and industrial raw materials has placed high stress on supply of the commodity. The production of maize is basically done during rainy season, particularly in the Southern part of Nigeria. This result in land lying fallow, labour and time wasted in areas where rainfall is inadequate and unevenly distributed as we have in some part of the semi-arid areas (IITA, 2007).

Irrigation practices are labour and capital intensive and require high technical know-how (skills) for

their uses. Furthermore, many farmers in developing countries cannot afford to practice these various irrigation practices because of the cost of the equipment needed for their operations. This study therefore tried to inquire on whether local farmers in Ekiti State embrace cultivation of maize both at rainy and dry seasons. Hence, the study attempted to proffer answers to the following research questions: What are the socio-economic characteristics of maize farmers in the study area? How profitable are the rainy and dry seasons maize production in the study area? How efficient are the rainy and dry season maize? and what are the constraints facing rainy and dry season maize farmers in the study area?

2.0 Objective of the study
The main objective of the study is to comparatively analyze the economics of rainy and dry seasons maize production in Ekiti State, Nigeria. Specifically, it aimed at: describing the socio-economic characteristics of maize farmers in the study area; determining the costs and returns of production of rainy and dry season maize in the study area; analyzing the production efficiency of rainy and dry seasons maize in the study area; and determining the effects of socio-economic characteristics of maize farmers on maize yield or output.

2.1 Hypothesis: Ho: There is no significant relationship between farmers' socio-economic characteristics and rainy and dry seasons maize production in the study area.

3.0 Methodology:
A multi-stage sampling technique was employed to select the sample for the study. At the first stage, two local government areas (LGAs) were purposively selected based on where maize is being grown predominantly in the study area. At the second stage, five communities were randomly selected from each of the LGAs selected. At the final stage, eleven farmers were randomly selected from each of the communities selected for the study. A total of one hundred and ten respondents who produce maize during rainy and dry seasons were selected for the study. Data for the study were collected primarily using structured interview schedule. Descriptive statistics such as means, frequency distribution, and percentage were used to analyze the data while multiple regression analysis was used to test the socio-economic characteristics of maize farmers which influence yield performance or production. Gross margin analysis was also used to determine the costs and returns of maize production as well as analysis of production efficiency in both rainy and dry seasons. The gross margin model is stated as:

GM = TR – TVC

π = GM – TFC

Where GM = Gross Margin

TR = Total Revenue

TVC = Total Variable Cost

π = Profit

4.0 Results and Discussion of the Study.
The analysis of the socio-economic characteristics of maize producers in the study area show that the mean age was 39.2 years indicating that maize farmers in the study area were young and still in their productive age. A greater proportion of the respondents (87.3%) were married with an average mean of 7 persons per household. This is a clear indication that family labour could be employed to supplement the quantity of labour received from outside. Majority of the respondents (84.5%) were also male while only 15.5 percent were female. This indicates that male seemed to dominate farming in the study area. Majority of the respondents (80.9%) were literates. This implies that their levels of education might have assisted in boosting their production through the adoption of improved farming techniques. The result is in line with Ironkwe, Asiedu and Chinaku (2007) with assertion that education increases the ability of the farmers to understand and evaluate new production techniques. The mean age of farming experience of the respondents was 17.3 years. This implies that the respondents had gotten considerable farming experience, although their mean farm size was 2.6 ha which might probably been that majority of them practiced mixed cropping having other farm lands allocated to other crops or that they were local farmers. The result of the product efficiency of rainy season maize was 55.8 percent while that of dry season maize was 45.7 percent. Also the total revenue of rainy season maize was N2, 016,442.12 while that of dry season maize was N1, 806,492.43. From this, it could be deduced that production efficiency of maize during the rainy season was higher than that of dry season maize. This finding is in tandem with Onyeabor (2009) who opined that the higher the co-efficient, the higher the marketing and production efficiency.

The results in Table 3 show the constraints encountered by the respondents. The major constraints encountered by the respondents with regard to production of maize in both seasons (i.e. rainy and dry seasons) were inadequate credit facilities (63.6%), inadequate extension contacts (62.7%), high prices of inputs (74.5%) and inadequate processing facilities (84.5%). Disease and pest infestations, 56.4% and 52.7% respectively were the major problems during the rainy season because more than half of the respondents in each case had these

problems. Poor weather conditions were the major problem of maize production during the dry season in the study area as submitted by 91.8 percent of the respondents. The findings on constraints facing maize farmers are in tandem with Onuk et al (2010) who stated that farmers are generally faced with constraints that can limit maize production.

The result of the regression analysis on the socio-economic characteristics of maize producers and rainy and dry seasons maize production are presented in Table 4. The coefficient of multiple determinant R^2 value of 0.75 indicates that about 75 percent variation in the socio-economic characteristics could be explained by explanation variables in dry season maize production. Such variables which jointly influenced the production during this season are age, income, sex, level of education. Also, the remaining 25 percent was due to other factors not specified. Furthermore, the coefficient of multiple determinant R^2 value of 0.40 indicates that bout 40 percent variation in the socio-economic characteristics could be explained by explanation variables in the rainy season maize production. Such variables as listed in the dry season maize production jointly influenced the production in the rainy season too. The remaining 80 percent could be due to other factors not specified in the model.

The reported f-statistics of 37.851 and 8.380 with the probability values of 0.000 for both dry and rainy seasons maize production reveals that identified farmers' socio-economic characteristics such as age, income, sex, level of education, jointly and significantly influenced maize yield. Thus, there is enough evidence to reject the null hypothesis that farmers' socio-economic characteristics have no significant relationship with rainy and dry season maize production in Ekiti State.

5.0 Conclusion and Recommendations

The study concluded that the production efficiency of rainy season maize production was higher than that of dry season maize production with difference in the Gross Margin by N181, 900.92. The study also shows that age, sex, income, level of education had significant relationships with production of maize both at rainy and dry seasons in the study area. Poor weather conditions, high price of inputs were the major constraints of maize producers during the dry seasons in the study area. Poor weather conditions high price of inputs were the major constraints of maize producers during the dry season while disease and pest infestations, inadequate extension contacts were the major constraints peculiar to rainy season maize production. Inadequate fund and processing facilities and mildly poor transport facilities affected maize production both at rainy and dry season in the study area. The study recommends that maize producers should be encouraged at all seasons through Government efforts at supplying improved farm inputs at subsidized rates, repair of bad roads or provision of access roads to markets and to maize farmers. Provision of sufficient funds to maize farmers in the forms of loans through cooperative societies by the government can also go a long way.

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Table 1: Distribution of respondents based on their socio-economic characteristics

Variable	Frequency	Percentage	Mean (x)
Age			
20 – 30	13	11.8	
31 – 40	24	21.8	39.2
41 – 50	38	34.5	
51 – 60	19	17.2	
> 60	16	14.5	
Sex			
Male	93	84.5	
Female	17	15.5	
Marital status			
Single	14	12.7	
Married	96	87.3	
Educational level			
No formal education	21	19.1	
Primary education	34	31.0	
Secondary education	40	36.3	
Tertiary education	15	13.6	
Household size			
1 – 3	16	14.5	
4 – 6	58	53.0	6.5
7 – 9	27	24.5	
> 10 and above	09	8.0	
Religion			
Christianity	80	72.7	
Islam	30	27.3	
Farm size (in hectares)			
Less than 1 ha	56	51.0	
1 – 3	36	32.7	2.6
4 – 5	16	14.5	
> 5	02	1.8	
Farming experience (years)			
1 – 5			
6 – 10	28	25.5	
11 – 15	25	22.7	17.3
16 and above	41	37.3	
	16	14.5	

Source: Field Survey, 2015

Table 2: Comparative analysis of production efficiency of Rainy and Dry Seasons' Maize per annum

Parameter	Rainy season maize production		Dry season maize production	
	₦	K	₦	K
Variable cost				
Transportation	89,800.00		86,700.00	
Storage	77,300.00		64,500.00	
Fertilizers	4,743.33		4,543.68	
Seeds	50,008.00		39,101.00	
Labour	2,906.66		1,864.54	
Total variable cost	224,757.99		196,709.22	
Fixed cost				
Farm implements	901,007.40		628,911.30	
Total costs (TVC + TFC)	1,125,765.39		825,620.52	
Total revenue	2,016,442.12		1,806,492.43	
Percentage of total cost (%)	55.8		45.7	
Gross margin (₦)	1,791,684.13		1,609,783.21	

Source: Field Survey, 2015

Table 3: Distribution of respondents on the basis of constraints encountered at different seasons

Constraints	Rainy season	Dry season	Both seasons
Inadequate credit facilities	22 (20.0)	18 (16.4)	70 (63.6)
Inadequate extension contacts	28 (25.5)	13 (11.8)	69 (62.7)
Poor weather conditions	05 (4.6)	101 (91.8)	04 (3.6)
Disease infestations	62 (56.4)	10 (9.0)	38 (34.6)
Pest infestations	58 (52.7)	21 (19.1)	31 (28.1)
Theft	29 (26.4)	41 (37.3)	40 (36.4)
Poor marketing	39 (35.5)	25 (22.7)	46 (41.8)
High price of inputs	16 (14.6)	12 (10.9)	82 (74.5)
Inadequate storage/processing facilities	10 (9.1)	07 (6.4)	93 (84.5)
Poor transport facilities	51 (46.4)	24 (21.8)	35 (31.8)

Source: Field Survey, 2015

Table 4: Regression analysis of socio-economic characteristics of respondents and rainy and dry season maize production

Variables	Dry season maize production		Rainy season maize production	
	Parameters	Coefficients	Parameters	Coefficients
Constants	α_0	27.923 (0.379)	$\beta 0$	164.058 (0.095)
Age	$\alpha_1{}^0$	-9.341 (0.383)	$\beta 1$	0.485 (0.660)
Income	$\alpha_2{}^0$	0.002 *(0.000)	$\beta 2$	0.002 *(0.000)
Sex	$\alpha_3{}^0$	28.875 *(0.033)	$\beta 3$	-31.269 (0.480)
Level of education	$\alpha_4{}^0$	9.880 (0.055)	$\beta 4$	-20.111 (0.144)

R^2 adjusted = 0.752   **R^2 = 0.401**
F – statistics 37.851   **F – statistics = 8.380**
PROB (F – STATISTICS = 0.000)   **PROB (F – STATISTICS = 0.000)**
*Connotes significant at 5%
Probability values are presented in parenthesis