Economics of White Maize Production in Fufore Local Government Area of Adamawa State, Nigeria

Jalaludeen Usman , Jimjel Zalkuwi, U.M. Bakari and Musa Hamman

1,2Department of Agricultural Economics,Institute of Agricultural science, BHU, Varanasi-221005

3,4Department of Agricultural Economics, MAUTECH,Yola.Nigeria

Abstract

The research work was undertaken to examine the Economics of White Maize production in Fufore LGA of Adamawa State. Primary data were collected from 110 White Maize Farmers, using multi-stage sampling techniques. Descriptive Statistics, Gross Margin, Regression analysis as well as Marginal Value Product were used in the analysis of data collected with the aid of well structured Questionnaires. Majority of the respondents were young Married Men who are educated and acquire their land through renting (82.73%, 59.09%, 70.91%, 81.82% and 54.55%) respectively. The result of the average gross and net farm income per hectare of ₦52, 118.03 and ₦49, 116.53 respectively, revealed that white maize production is profitable venture in the study area. The linear production Function revealed that 91.2% of the total variation in the output of white maize was accounted by variables input (age, fertilizer, farming experience and seed) that were statistically significance at 5 and 10% level respectively and positively affect the output of white Maize. The Marginal value product (MVP) analysis indicates that seed and fertilizer were Under Utilized; therefore increase in these inputs would increase the output of white Maize. Shortage/high cost of input, shortage of labour as well as Clashes with pastoralists were the major problems faced by white Maize farmers in the study area. The study therefore, recommends among others that farmers should be educated on the need to associate with one another to avoid unnecessary conflicts between them and herdsmen in the study area.

Key Words: Clashes with Pastoralists, Economics, Gross Margin, Linear production Function, Under Utilized, White Maize.

Introduction

White Maize belongs to the Family Poaceae. It is a large grain plant also known as Corn domesticated by many people (wikipidian 2013). Scientists believe that maize is derived from an earlier ancestral plant called Teosinte. Maize was domesticated in Meso America in the region that is now Mexico at approximately 6000 years (Paleontrological Research Instituted, 2013). White Maize was introduced in to Africa in the 1500s and has since become one of Africans dominant food crops. White Maize is said to be an important staple food for more than 1.2 billion people in sub-Saharan Africa and Latin America. The grain is rich in Vitamin A, C

and E, carbohydrates, essential minerals and contains 9% protein. It accounts for 30-50% of low –income house-hold expenditures in Eastern and southern Africa (FAO, 2013).

World wide production of maize is 785 million tons, with the largest producer, the United States producing 42%. Africa produces 6.5% and the largest African Producer is Nigeria with nearly 8 million tons followed by South Africa, 90% of white Maize consumption is in Africa and Central America (IITA 2013). In Nigeria, it is grown mainly as food crop but research has shown that it is used as a feed for all classes of livestock because of its soluble and digestible starch (Channya 2008).White maize production in Nigeria is on the increase and in Adamawa but with the rapid increase in population in Fufore LGA the demand for white Maize is increasing as most people cannot afford to buy rice.

In Fufore LGA is one of the major areas in the production of both white and yellow Maize. The choice of varieties will depend on market requirements, environmental conditions, whether the crop is irrigated and the level of disease resistance requirement. Although most of the farmers in the study area produce white Maize very few of them mostly in verre Batta district produces yellow Maize they traditionally inherited from their for-for fathers. The Yellow Maize produced by few small-scale farmers were mostly eaten as boiled or roasted as it is sweater than white Maize. This study was therefore, undertaken to carry out the Economics of white maize production in Fufore Local Government of Adamawa State, Nigeria.

The specific objectives of the study were to:

i. describe the socio-economic characteristics of white Maize farmers in the study area,
ii. determine the cost and return of white Maize enterprise in the study area,
iii. estimate the resource use efficiency in white Maize production,
iv. Identify the problems of white Maize production in the study area.

Methodology

Study Area
The study was conducted in Fufore Local Government Area (LGA) of Adamawa state. Fufure is one of the largest of the 21(LGAs) in the state, with seven Districts. It has land area of 5078.14(sq. km) with an estimated growing population figure of 209,460 comprised 105,626males and 103,834 female, respectively,(NPC 2006). The study area lies in the humid climatic zone of Nigeria with mean annual rainfall from 700mm – 1000mm. The rainy season lasts for four- five months with an average temperature of about 39^0C (Adebayo 1999). The predominant ethnic groups found in the area includes: Verre, Bwatiye and Fulani. The local government is situated in the northern guinea savannah. The major economic activity of the inhabitant is agriculture (farming, fishing and live-stock production).

Data Collection
Primary data were collected with the help of structured questionnaires. Multi-stage sampling procedure was employed in the collection of the data. Four (4) districts namely: Gurin, Ribadu, Daware and Nyibago, were selected from the seven Districts based on their relative importance in White Maize Production. Two (2) villages namely: (Shigari, Filigo, Fufore, Wafago, Diggino, Bagale, Gaturo, and Babuba) respectively were selected from each of the four districts making the total of twelve (12) villages. Then One hundred and ten (110) white Maize farmers were randomly selected in the four Districts.

Methods of Data Analysis

The statistical tools used include descriptive (frequency tables and percentages) in determining socio-economic characteristics as well as problems associated with white maize production. Gross margin analysis was used to determine the cost and return of white maize. It is mathematically expressed as:

$$GM = TR - TVC \quad \ldots\ldots\ldots\ldots\ldots \quad (2.1)$$

Where;

GM = Gross Margin (₦/Ha)

TR = Total Revenue (₦/Ha)

TVC = Total Variable Costs (₦/Ha)

And

$$NFI = GM - TFC \quad \ldots\ldots\ldots\ldots\ldots(2.2)$$

Where;

NFI = Net Farm Income (₦/Ha)

GM = Gross Margin (₦/Ha)

TFC =Total Fixed Cost (₦/Ha)

In determining the input and output relationship, regression analysis were used. In trying to achieve this, four functional forms namely linear, exponential, double logarithm and semi-logarithm were tried. However, the linear production function gave the best fit and was selected for analysis based on economic, statistical and econometric criteria. The general form of the model is given by

$$Y = f(X1, X2, - - - + X7 + e)$$

It can be implicitly written as follows:

$$Y = b0 + b1X1 + b2X2, - - - - +b7X7 + ei$$

Where:Y=output of white Maize

X1=Age of farmers (in years)

X2=Quantity of seeds (in kg)

X3= Quantity of fertilizer (in kg)

X4=Farming experience (in years)

X5= labour (in mandays)

X6=Farm size (in ha)

X7=Education (in years)

ei= Error term

bo= Constant

b1= Parameter estimated

Furthermore, in the analysis of resource use efficiency of white maize production, Marginal value product was used as follows:

$$r = \frac{MVP}{MFC}$$

$$MVP = b.\frac{\bar{Y}}{\ddot{x}}.Py$$

Where:

r= Efficiency level

MVP= marginal value product

MFC= marginal factor cost

$\bar{Y}$ = Arithmetic Mean of output

$\ddot{x}$= Arithmetic Mean of input X considered

b= Regression coefficient of the input

P_y= Price per Unit of output

Results and Discussion

Socio-economic Characteristics of Respondents

Table 1 presented the socio-economic distribution of the respondents. The table showed that the age distribution of the respondents 26-45 years occupied 82.73%.This figure represent Youth who are highly energetic and venturing in to agricultural production, this implies that the so called drudgery in agriculture have drastically reduced and the level of agricultural productivity in terms of white maize will be greatly boosted. The result corroborates the findings of Jougur (2008) who reported majority of maize marketers were youth. The table also showed that 70.91% of the respondents were male, although 29.09% of women too participated. The reason for this as pointed by Panin (2009) is that male farmers are stronger, more active and have the potentials to work longer hours on the farm than their female counterpart.

The marital status of the respondents showed that 59.09% of the respondents were married, while 22.73% were widows. Single constituted the least as only 18% were engaged in the production. The over dominance of white maize production by married farmers implies that family labour will be adequately supply. It can also seen from the table that about 81.82% of the respondents had one form of education or the other, while only 18.18% had no formal education. Many studies have shown that the level of education helps in efficient use of minimum production resources available to farmers. Also innovations can be adopted by educated farmers much easier than uneducated ones.

The same table revealed that majority 65.45% had 10-20 and above farming experience. This indicate that white maize production is not a new business in the study area as majority of the respondents have being in to the business for long and are therefore, conversant with all agronomics practices. Hence are likely to achieve higher level of output. Furthermore, the table reveals that about 26.37% of the respondents cultivate up to 2 hectares of farm land, while majority (73.63%) of the respondents cultivated farm size ranging from 2.1-3.1 and above. This reveals that most of them produce white maize in relatively large quantity. In other words they take it more than just for family consumption. This in line with what (joungur and Ahmed,2008) reported that maize is one of the most important staple food in the diet of the people as well as source of income followed by sorghum. Lastly, the table reveals that 32.72% of the respondents acquired their farm land through inheritance, 54.55% hired, while purchase and gift accounted 12.73% of farm land used in the production of white maize in the study area. The farmers pay for hired land either in cash or kind after harvest, depending on the size of the farm.

Table 1. Socio-economic Characteristics of Respondents

Variables	Frequency	Percentage (%)
Age(years)		
16-25	07	6.36
26-35	60	54.55
36-45	31	28.18
≥46	12	10.91
Total	**110**	**100.00**
Gender		
Male	78	70.91
Female	32	29.09
Total	**110**	**100.00**
Marital Status		
Married	65	59.09
Single	20	18.18
widowed	25	22.73
Total	**110**	**100.00**
Educational Background	20	18.18
No. Formal	23	20.91
Primary	50	45.46
Secondary	10	09.09
Tertiary	07	06.36
Adult education	**110**	**100.00**
Total	38	34.55
Farming Experience	61	55.45
1-9	11	10.00
10-19	**110**	**100.00**
≥20	10	9.10
Total	19	17.27
Farm Size(ha)	29	26.36
≤1.0	52	47.27
1.1-2.0	**110**	**100.00**
2.1-3.0	36	32.72
≥3.1	60	54.55
Total	09	08.18
Land Acquisition	05	4.55
Inheritance	**110**	**100.00**
Hired		
Purchased		
Gift		
Total		

Average Cost and Returns per hectare

Table 2 revealed the average cost and return associated with white maize production in naira per hectare. The result showed that hired labour (24.12%) ranked first of the total cost of production, followed by family labour (20.98%) and cost of ploughing (12.40%). While the overall total variable and fixed costs were estimated to be ₦45, 381.97 and ₦3001.50 respectively. The average revenue generated by white maize farmers was estimated as ₦97, 500 while the average gross margin and net farm income of the farmers were ₦52, 118.03 and ₦49, 116.53 respectively. These figures explained that white maize production is a profitable venture in the study area. This result is in line with what Maurice (2007) found in his study on maize grain.

Table 2: Average Cost and Returns per hectare

Inputs	Value(₦/Ha)	Percentage(%)
Variables		
Family	10,150.50	20.98
Labour	11,670.08	24.12
Hired	500.23	1.03
Labour	4,500.25	9.30
Seed	3,300.90	6.82
Fertilizer	2600.02	5.37
Agrochemical	6000.11	12.40
	5,100.05	10.54
Transportation	1,560.08	3.22
	45,381.97	**93.80**
Ploughing		
Harvesting		
Empty bag	2500.58	5.16
Total	500.92	1.04
Variable	3001.50	6.20
Cost (TVC)	**48,383.47**	**100**
Fixed		
Rent on land		
Depreciation	97,500	
of fixed	52,118.03	
Assets	49,116.53	

Total Fixed cost (TFC)		
Total cost of production		
(TVC+TFC)		
Returns		
Gross Revenue (GR)		
Gross Margin (GR-TVC)		
Net Farm Income (GM-TFC)		

Production Function

The result of the regression coefficients and the related statistics for the regression equation were presented in table 3. The production function that was used to determine the nature of input-output relationship in white maize production was linear as a lead equation. The coefficients of determination (R^2) reveals that 91.2% of the total variation in the out-put of white maize is accounted by variables in puts used in the regression model. The result of the regression analysis showed that variables such as: age, fertilizer, farming experience and seed were statistically significance at 5 and 10% level respectively and positively affects the output of white maize. This implies that an increase in each of these variables would lead to an increase in the level of output of white maize produced

Table 3: Production Function

Variables Input	Coefficient	F-ration
Constant	2082.098	
	3.761	3.390***
Age(X1)	155.554	
	1.747	0.454***
Seed(X2)	121.113	
Fertilizer(X3)	-2.427	5.648*
Farming	522.573	
Experience(X4)	-21.981	1.8111***
Labour(X5)		
Farm Size(X6)		3.845***
Education (X7)		-3.780NS
		3.099NS
		-1.173NS

Source: Field survey (2012)

F value = 47.32

R^2 = 0.912

*** Significance at 1% level

* Significance at 10% level

NS Not Significance

Marginal Value of Input Utilization in White Maize production The results of Marginal value product analysis of input utilization were presented in table 4. The result indicates that the white maize farmers were not efficient in the use of the farm inputs, where seed and fertilizer were underutilized. This indicates that any increase of these variables will increase the output of the farmers.

Table 4: Marginal Value of Input Utilization

Inputs	MVP MPP	MFC	r= MVP/MFC
Seed			28,408.7
	227,269,500 30302.6	8,000	56.78
Fertilizer			
	283,875 37.0		
		5,000	

Source: Field survey, 2012.

Table 5: Problems Associated with White Maize production

Problems	Frequency	Percentage (%)
Shortage	140	25.45
/high cost	130	23.64
of inputs	100	18.18
Shortage of	92	16.73
labour	88	16.00
Clashes	550•	100
with		
Pastoralist		
Inadequate		
farm credit		
High cost		
of		
transportati		
on		
Total		

Source: Field survey, 2012
• Multiple responses

Problems Associated with White Maize production

The analysis of the problems associated with white maize was presented in table 5. The result indicated that the major problems confronting white maize farmers in the study area were shortage /high cost of input (25.45%), shortage of labour (23.64%) and clashes with pastoralist (18.18%). While inadequate farm credit as well as high cost of transportation been the leased of the problems with 16.73% and 16.0% respectively in the study area.

Conclusion and Recommendations

The study examined the economics of white maize production in Fufore LGA. Multi-stage sampling techniques were used in the analyses. The result indicates that educated young men who were mostly married were gainfully engaged in white maize production. The enterprise was found to be profitable in the study area. The result of the regression analyses

showed that 91.2% of the total variation in the output of white maize is accounted by variable inputs such as Age, Seed, Fertilizer and Farming experience. While the resource used efficiency analysis showed that inputs such as Seed and Fertilizer were underutilized, therefore, any increase in these variable inputs will definitely increase farmers output. Furthermore, shortage /high cost of input, shortage of labour and clashes with pastoralist were identified as the major problems faced by white maize farmers in the study area.

The study therefore, recommend that agricultural inputs such as seed and fertilizer should be subsidized and be supply at a required time. Farmers should be educated on the need to associate and understand with one another to avoid unnecessary conflict between them and herdsmen.

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