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# SUPPLY ANALYSIS FOR MAIZE IN OYO AND OSUN STATES OF NIGERIA

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## ABSTRACT

This research analyzed the quantity of maize supplied and factors determining such quantity with a focus on maize farmers in Oyo and Osun States of Nigeria. Multistage random sampling technique was employed to sample four hundred maize farmers for the study. A structured interview schedule was used to collect primary data from the respondents. Data were obtained on socio-economic characteristics of respondents, production and marketing practices, prices and costs. Data collected were analyzed using descriptive statistics and estimation of Cobb-Douglas regression model.

Data analysis revealed that the mean age for the sampled farmers was 46 years and that more than half of the respondents were literate. The summary of marital status distribution of respondents showed that about ninety-three percent of the interviewed farmers were married while the mean household size was 7. Distribution of sampled farmers based on major source of finance showed that 58.5percent of respondents depended on personal savings in financing their maize production activities. The result further revealed that 52 percent of the maize farmers cultivated less than two hectares of land, and that most of the respondents are low income earners, with an average annual income of #116,000.00.

Regression analysis revealed the R-squared ($R^2$) as 0.734. This showed that 73.4 percent of the variation in quantity of maize supplied by respondents was explained by the estimated variables. The F value of 119.767 was significant at 1percent level of significance. Data analysis showed that significant relationships exist between market factors and agricultural household supply response in the study area.

The study concluded that in addition to price factor, marketing costs contribute significantly to agricultural household supply decisions, and consequently recommends that policies that reduce marketing costs should be formulated and implemented to serve as compliments to various price policies in ensuring adequate returns to farmers' investment and stimulate expansion in food production thereby enhancing the level of food security in Nigeria.

**Keywords**: Supply Response, Maize farmers, Food Marketing, Food Security.

## INTRODUCTION

The persistence of a high incidence of hunger and malnutrition among rural people is real and constitute a major problem among developing economies. Food insecurity is generally associated with fluctuation in household own-food production and food prices. Household food security refers to a household's ability to acquire food. The annual demand for food keeps growing (3.3percent) and may not be matched by the growth in agricultural production. Not surprisingly, per capita calorie intake remains at low levels in sub-Saharan Africa, and below the developing world average. With the present millennium, the world faces another food crisis that is just as dangerous but much more complex than the one it confronted thirty years ago (Shah and Strong, 2000). Food insecurity is

generally associated with fluctuation in household own-food production and food prices. Household food security refers to a household's ability to acquire food. A country and people are food secured when their food system operates in such a way as to remove the fear that there will not be enough to eat. In particular, food security will be achieved when those living in marginal areas have secure access to food they want (Maxwell and Fronkeberger, 1992).

Nigeria, as a developing country, has expanding population both in the Urban and rural areas. The population growth rate is getting increasingly higher than the food production rate. Oritiz (2003) submitted that if current trends continue, there will be approximately 300 million of malnourished people or 32percent of the total population in 2010, which will convert sub-Saharan Africa to being the region with the highest number of inhabitants who are chronically malnourished. According to Ndaeyo(2007), this lopsided relationship between food demand and supply had earlier compelled the Food and Agricultural organization of United Nations to opine that as the world population is increasing by approximately 1 million every four hours, we may have more than 3000 million people to feed by the year 2025. If they are to be fed adequately, the present food production level will have to be doubled and other strategies/approaches revised and/or encouraged. The significant imbalance between food production and the expanding population has resulted in an ever-increasing demand for agricultural products. It has also placed a serious stress on the marketing systems (Ojo and Imoudu, 2000).

Food security is jointly determined by availability of food and accessibility to the food. Availability of food is a function of food production, stock holding and food marketing (Von Braun *et al*, 1992). Certainly by raising agricultural productivity, (i.e. increase the land area planted and increase yield per hectare), food availability could be increased. However, availability is not enough. The food produced must be distributed efficiently at minimum costs in-order to guarantee continuous availability of the food. This is the subject of food marketing. It had been observed that food marketing is a very important but rather neglected aspect of agricultural consideration on how to distribute the food produced efficiently and in a manner that will enhance increased productivity. Each handling cost will not amount to much but the sum total of all loading can be significant, depending on the length of chain. This makes a greater difference in price paid between urban consumers and at the end of the chain and farm gate price at the beginning of the chain. This can lead to a greater or wider market margin between the producer and the final consumers. If the market margin is high, it may be used to argue that producers or consumers are being exploited (Ali *et al.*, 2008). In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to conduct negotiations leading up to a bargain, to draw up the contract, and to undertake the inspection needed to make sure that the terms of the contract are being observed.

Most of previous research focuses on price and its effect on agricultural supply response. Abebe (2005) measures supply response with respect to own price and cross price of cereals in Ethiopia. Mamingi (1996 and 1997) measured the impact of prices and macroeconomic policies on agricultural supply. Murova *et al.* (2001) and Leaver (2003) measured responsiveness of agricultural output for Ukrainian and Zimbabwean farmers respectively to price but did not consider any market factors. Chibber (1988) worked on raising agricultural output through price and non-price factors but never took into account any market factor. The bulk of the available research work on agricultural supply response that takes into account both the farmers' production and market participation decisions is mainly based on countries outside Nigeria. For this reason, policy makers may need to be careful in the application of their recommendations to development of agriculture at the grass root given a broad consensus among economists that improvements in both transport and institutional arrangements are important. The main objective of this work therefore is to determine the magnitude and the direction to which non-price factors influence changes in maize supply in the study area. Hypothesis of the study stated that there is no significant relationship between marketing costs and the quantity of maize supplied by respondents.

The focus on maize farmers derives from the fact that maize is one of the important grains in Nigeria both on the basis of the number of farmers who engaged in its cultivation, and also in its economic value. Maize is a multipurpose crop because every

part of its plant has economic value. The grain, leaves, stalk, tassel and cob can all be used to produce a large variety of food and non food products (IITA, 2001). As a result of competition for maize by both man and animal, there is the need to increase the supply level of the grain. Studies in maize production in different parts of Nigeria have shown an increasing importance of the crop amidst growing utilization by food processing industries and livestock feed mills (Khawar *et al.,* 2007; Abdulrahaman and Kolawole, 2008).Growing maize in farms of 1-2 hectares can overcome hunger in the household and the aggregate effect could double food production in Africa (SPORE, 2001).

It is therefore with the hope of detecting relevant market factors that could serve as incentives for agricultural households to increase their present level of maize supply in an effort to bridge the gap between production and consumption that this study was carried out.

## MATERIAL AND METHODS

This study was carried out in Oyo and Osun States of Nigeria. Combination of the two States gives a good representative of the 3 main ecological zones found in the South-Western States of Nigeria. These include the forest, guinea savannah and the derived savannah zones. The choice of Oyo and Osun States also made it possible for the researcher to test for any statistical difference in the agricultural household supply response between the two States. Literature has revealed that the two States produce 50percent of maize produced in the Southwest (Ogunbodede and Olakojo, 2001)

Osun State has an estimated population of 3,423,535(National Population Commission, 2006). The capital is Osogbo. The state which is made up of 30 local government council lies between longitude $4^0$ and $6^0$ east of the Greenwich Meridian, latitude $5^0$ and $8^0$- north of the equator. This means that the state lies entirely in the tropics. The state is bounded in the West by Oyo State, in the North by Kwara State, in the East by Ondo State and in the South by Ogun State. Agriculture is the traditional occupation of the people of Osun State. The tropical nature of the climate favours the growth of a variety of food and cash crops. The main cash crops include cocoa, palm produce, kola, while food crops include yam, maize, cassava, millet, rice and plantain. The vegetation consists of high forest and derived savannah towards the north. The climate is tropical with two distinct seasons. Usually the wet season last between March and October, while the dry season comes between November and February. Mean annual rainfall is between 2,000 and 2,2000mm. Maximum temperature is $32.5^OC$ while the relative humidity is 79.90percent.

Oyo State is located in the South-Western part of Nigeria. It is located between latitudes $7^03^|$ and $9^012^|$ north of the equator and longitudes $2^047^|$ and $4^023^|$ east of the Meridian. It is bounded on the West by Republic of Benin, on the North by Kwara State, on the East by Osun State and on the South by Ogun State. The population of Oyo State in 2006 was 5,591,589 by National Population Commission. The state is made up of 33 local government areas. The State Capital is Ibadan. The States covers a land area of 27, 000sq.kilometres.There are two distinct seasons namely wet and dry seasons. The rainfall pattern is remarkably constant ranging between 1,211mm in the far North and 1,264mm at Ibadan in the South over the past two decades. The average annual rainfall is estimated at between 1,194mm in the North and 1,278mm in the South. Mean temperature is $27^OC$. The area with high relative humidity favours the cultivation of tree crops such as cocoa, kola, citrus and oil palm as well as arable crops like maize, cassava, yam and rice.

The population of the study comprises all registered maize producing farmers in Oyo and Osun States of Nigeria. All agricultural zones under Oyo and Osun States Agricultural Development Projects (OYSADEP and OSSADEP) were involved.

Oyo State Agricultural Development Project has divided the state into four agricultural zones and twenty-eight (28) blocks for administrative convenience. The agricultural zones are Ibadan/Ibarapa (9 blocks), Ogbomoso (5 blocks), Oyo (5 blocks) and Saki (9 blocks). Osun State Agricultural Development Project has divided the state into three agricultural zones and twenty five blocks (25) blocks. These are Osogbo (6 blocks), Ife/Ijesha (12 blocks) and Iwo (7 blocks). Two agricultural zones were selected from each state based on the type of crops grown. These are Ogbomoso and Ibadan/Ibarapa zones from Oyo State and Osogbo and Iwo zones from Osun State.

Multi-stage random sampling technique was employed to sample four hundred maize producing

farmers. In the first stage two blocks were randomly selected from each of the four agricultural zones, making a total of eight blocks to be sampled. Each block comprised eight cells. The sampling procedure further involves random selection of 25 percent of the cells (2) in each block making a total of 16 cells for the study. Thereafter in the 3rd stage, 40 percent of the farmers' groups were selected at random. Finally, 20 percent of the maize farmers in each group were randomly sampled for the study. A total of 400 maize farmers formed the sample of the study.

**The Regression Model**

Deriving from the foregoing theoretical framework, the model employed for the study is as follows:

$\text{Log } Q = b_o + b_1 \text{ Log } P + b_2 \text{ Log } A + b_3 \text{ Log NEGO} + b_4 \text{ Log AGENTS} + b_5 \text{ Log HARVEST} + b_6 \text{ Log ASSEMBLAGE} + b_7 \text{ Log STORAGE} + b_8 \text{ Log TRANSPORT} + b_9 \text{ Log RENT}$

$b_1 > 0, b_2 > 0, b_3 < 0, b_4 < 0; b_5 < 0, b_6 < 0, b_7 < 0, b_8 < 0, b_9 < 0$

Where:

Q = Quantity of maize supplied (kg)
A = Area of land cultivated to maize (Ha)
P = Market price for maize (₦)
Harvest = Harvest Cost (₦)
Storage =Storage Cost (₦)
Transport = Cost of Transport (₦)
Assemblage = Assemblage Cost (₦)
Nego = Negotiation / Bargaining Cost (₦)
Agents = Agents Fee (₦)
Rent = Transactions land rent (₦)
$b_0$ = constant

$b_1 \ldots b_9$ represent coefficient values of independent variables and ε = error term.

The a priori expectations were based mainly on economic theory (the law of supply) and empirical findings from literature reviewed. The error term is conceived as both involving measurement error in the dependent variable (but not in the independent variables) and being a resultant of all the various causes of the dependent variable that have not been explicitly brought into the equation.

# RESULTS AND DISCUSSIONS

**Socio-Economic Characteristics of Respondents**

The summary of age distribution of respondents is shown in Table 1. The mean age for the sampled farmers was 46 years. This portrays that most of the maize farmers are in their active and productive age when they can put in their best for optimum productivity. The summary of sex distribution revealed that more males are involved in maize farming than the female gender. Table 1 also contains the educational level distribution of respondents. The result suggests that more than half of the respondents were literate. The summary of marital status distribution of respondents showed that about ninety-three percent of the interviewed farmers were married. The table shows the distribution of respondent farmers based on household size. The mean household size for respondents was 7. Distribution of sampled farmers based on major source of finance showed that 58.5percent of respondents depended on personal savings in financing their maize production activities while only 4.0percent claimed to depend on bank loans. Some (34%) claimed that Local Government, State and FADAMA loans and cooperative loans were their major source of finance. The remaining respondents indicated total financial dependence on friends and/or relatives. Most of the respondents claimed they would have loved to have access to government or bank loans but lacked required collateral. Reliance of most of them on personal savings results in inability to produce on large scale, if so desired.

The table further summarized the distribution of sampled farmers according to years of experience in maize production. The mean value was 20 years. The result portrays a picture that as we have experienced farmers in maize production, new ones are still joining the venture. Table 1 groups the respondent farmers according to farm size. Mean value was 1.7 hectares. The result revealed that 52 percent of the maize farmers cultivated less than two hectares of maize while only 11 percent cultivated above 5 hectares of maize. This could be as a result of low accessibility to land and formal loans. The result obtained shows that most of the respondents are small scale farmers. According to Aliyu and Shaib's (1997) classification, Nigerian farmers fall in to three broad categories, namely, small scale with 0.10 to 5.99 hectares, medium scale with 6 to 9.99 hectares and large scale holdings with 10 hectares upward. The finding is in agreement with Alimi and Awoyomi (1995), Toulmin (2003), and Azih (2004). Their findings revealed that small scale farm holdings predominate

in Nigeria, and account for up to 81percent of the total area and produce about 95percent of agricultural output. Table1 revealed that most of the respondents are low income earners, with an average annual income of #116,000.00.

**Table I:** ***Socio-Economic Distribution of Respondents***

| **Age** | **Frequency** | **%age** |
|---|---|---|
| 20 –29 | 23 | 5.8 |
| 30 -39 | 51 | 12.7 |
| 40 – 49 | 185 | 46.3 |
| 50 -59 | 99 | 24.7 |
| 60 and above | 42 | 10.5 |
| **Total** | **400** | **100** |
| **Level of Education** | **Frequency** | **%age** |
| No Formal Education | 65 | 16.3 |
| Primary Education | 104 | 26.0 |
| Secondary Education | 97 | 24.3 |
| Tertiary Education | 109 | 27.2 |
| Adult Education | 20 | 5.0 |
| Islamic Education | 5 | 1.2 |
| **Total** | **400** | **100** |
| **Marital Status** | **Frequency** | **%age** |
| Single | 16 | 4.0 |
| Married | 270 | 92.5 |
| Widow(er) | 14 | 3.5 |
| **Total** | **400** | **100** |
| **Household Size** | **Frequency** | **%age** |
| ≤5 | 88 | 22.0 |
| 6 - 10 | 296 | 74.0 |
| 11 – 15 | 07 | 1.8 |
| 16 – 20 | 09 | 2.2 |
| **Total** | **400** | **100** |
| **Major Source of Finance** | **Frequency** | **%age** |
| Personal Savings | 234 | 58.5 |
| Friends and Relatives | 14 | 3.5 |
| LG/STATE/FADAMA LOAN | 07 | 1.7 |
| Cooperative loan | 129 | 32.3 |
| Bank loan | 16 | 4.0 |
| **Total** | **400** | **100** |
| **Year of experience** | **Frequency** | **%age** |
| 1 – 10 | 104 | 26.0 |
| 11 – 20 | 164 | 41.0 |
| 21 – 30 | 88 | 22.0 |
| 31 – 40 | 44 | 11.0 |
| **Land Size (Ha)** | **Frequency** | **%age** |
| < 2 hectares | 208 | 52.0 |
| 2 – 5 hectares | 148 | 37.0 |
| >5 hectares | 44 | 11 |
| **Total** | **400** | **100** |
| **Annual Income (#)** | **Frequency** | **%age** |
| <100,000 | 270 | 92.5 |
| 100,000 – 200,000 | 16 | 4.0 |
| > 200,000 | 14 | 3.5 |
| **Total** | **400** | **100** |

***Source: Field Survey, 2010***

**Cost of Marketing Maize**

Table 2 showed the descriptive statistics of marketing costs incurred by the respondents per annum. Variables found to be associated with marketing costs in the study area include: harvesting, assemblage, storage, negotiation and/or bargaining, agents fee, transactions land rent and transportation to point of sale. Table 2 revealed the costs distribution of respondents as obtained from the data collected. It showed the minimum amount as well as maximum amount claimed by the respondents for each of the marketing costs variable. It also showed the mean

**Table 2:** ***Distribution of Respondents Marketing Cost Variables***

| Cost Variable | Cost (₦) | | | | |
|---|---|---|---|---|---|
| | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** | **Variance** |
| Harvesting Cost | 720 | 51480 | 5143.94 | 3334.746 | 11120529 |
| Assemblage Cost | 120 | 8580 | 929.20 | 573.199 | 328556.86 |
| Storage Cost | 360 | 27440 | 2798.06 | 1857.502 | 3450313.3 |
| Negotiation /Bargaining Cost | 230 | 6220 | 761.66 | 434.677 | 188944.31 |
| Agents Fee | 300 | 7780 | 956.78 | 546.069 | 298190.81 |
| Transportation Cost | 960 | 68540 | 7035.38 | 4604.020 | 21196667 |
| Transactions Land Rent | 300 | 10360 | 1242.38 | 729.800 | 532607.42 |

***Source: Field Survey, 2010.***

**Result of the Regression Analysis**

The Cobb-Douglas functional form linearized by log transformation was specified as:

$$\text{Log } Q = b_0 + b_1\text{logP} + b_2\text{logA} + b_3\text{LogNEGO} + b_4\text{logAGENT} + b_5\text{logHARVEST} + b_6\text{logASSEMBLAGE} + b_7\text{logSTORAGE} + b_8\text{logTRANSPORT} + b_9\text{logRENT}$$

The results obtained are summarized below:-

As could be seen from Table 3, the $R^2$ was 0.734. This means that 73.4percent of the variation in the dependent variable, Q, was explained by its associations with the independent variables. The F-value was 119.767 and significant at 1percent. This means that the null hypothesis 1 should be rejected and the alternative hypothesis accepted. As such, there is a significant relationship between quantity of maize supplied and the explanatory variables.

**Table 3:** ***Regression Results***

**Dependent variable: Log Q, n = 400**

| Independent Variable | Coefficient | t-value |
|---|---|---|
| Constant term | 3.683*** | 3.670 |
| Log (P) | 0.624** | 2.538 |
| Log (A) | 1.046*** | 24.472 |
| Log (NEGO) | 0.108 | 0.437 |
| Log (AGENT) | 0.725*** | 2.864 |
| Log (HARVEST) | 0.320 | 1.033 |
| Log (ASSEMBLAGE) | 0.014 | 0.343 |
| Log (STORAGE) | -0.205* | -1.658 |
| Log (TRANSPORT) | -0.182 | -0.720 |
| Log (RENT) | -0.600*** | -3.097 |

***$R^2$ = 0.734***
***F - Statistics = 119.767 (0.0000) *****
***** Significant at 1percent level***
****** Significant at 5percent level***
*****Significant at 10percent level***
***Source: Survey Data, 2010***

From the regression analysis of data, price of maize, area of land, agents fee, cost of storage and transactions land rent were found to significantly affect the quantity of maize supplied by the respondents. Price of maize and area of land cultivated to maize have a direct (positive) relationship with the quantity of maize supplied by the respondents. This means that the higher the price of maize and the more the area of land cultivated to maize, the higher the quantity of maize supplied. The result is in line with the a-priori expectations of the study and it corresponds with findings from empirical results of other related studies reviewed in the course of this study. These include Stifel et al (2003), Abebe (2005), Murova et al., (2001), Oni (2000), MacInnis (2003) and key et al., (2000). Leaver (2003) however found that Zimbabwean tobacco farmers are relatively unresponsive to output prices. The coefficient values revealed that a 0.624 unit increase (or decrease) in price of maize will result in 1 unit increase (or decrease) in quantity of maize supplied; while a 1.046 unit change in land hectrage will result in 1 unit change in quantity of maize supplied.

Agents' fee was revealed to have a direct relationship with quantity of maize supplied by respondents, suggesting that the higher the fees charged by marketing agents the more maize the respondents will supply. This is at variance with the a-priori expectation of the study, as well as Stifel et al., (2003) finding that transactions costs and agricultural productivity were significantly inversely related in Madagascar. The finding of this study could be explained that in Nigerian market, the better the marketing agent is, the more quantity the producers are willing to supply to the market. This suggests that with an efficient marketing agent, the producers will be able to sell at a better price and make better profit. Thus the effect of higher fees paid to efficient marketing agents is canceled by better profits made and thus the producer is willing to produce more for the market. The regression coefficient revealed that a 0.725 unit change in agents' fee will result in 1 unit change in quantity of maize supplied.

According to the respondents, teaming up to employ effective agent(s) is even more desirable, as it results to better profit at the long run. This issue of team marketing is supported by various economics theories. There is the potential to increase the effectiveness of marketing because by bulking the produce the average transactions costs are lowered. The bargaining power of the cluster is higher and access to information is better and cheaper. Furthermore, it will decrease uncertainty caused by the disguised information and there is less risk of opportunistic behaviour by the buyer ( Dijkstra et al., 2001). In the cluster, the firms can expand and integrate the organization of the marketing of maize. The extra transactions costs that this would incur are less than the costs of the same transaction by means of an exchange on the spot market (Coase, 1937).

In addition, teaming up to employ marketing agents (s) may increase efficiency. Schmitz and Nadvi (1999) advocate that clustering enhances collective efficiency. Joint action will substantially decrease the average costs of harvest, post-harvest and transport of maize.

The quantity of maize supplied was found to have an inverse (negative) relationship with cost of storage. This finding corresponds with the a- priori expectation of the study and also with the findings of Minot (1999) and Stifel et al., (2003) that transactions costs decrease market surplus. The regression coefficient for storage cost was – 0.205, indicating that a 0.205 unit increase in storage cost will lead to 1 unit decrease in maize quantity supplied.

Maize quantity supplied was also found to have an inverse significant relationship with transactions land rent. Transactions land rent includes all the toll and local government fees paid by suppliers. The finding corresponds with the study's a-priori expectation as well as Minot (1999) and key et al., (2000)'s empirical result that transactions costs negatively affect agricultural household supply response. The regression result indicated that 0.6 unit increase in transactions land rent will result in 1 unit decrease in quantity of maize supplied.

Contrary to empirical results from Hobbs (1997), Key et al., (2000), Stifel et al., (2003) and MacInnis (2003), analysis of data revealed transportation and negotiation costs to be statistically insignificant to quantity of maize supplied by agricultural households in the study area. Costs of harvesting and assemblage were also found not to be statistically significant to agricultural household supply response in the study area.

**Calculation of Elasticity of Supply**

For a functional form involving the logs of both dependent and independent variables such as Cobb-Douglas function which was employed for this study, the elasticity is simply the coefficient of the log of the independent variable i.e $^{dy}/_{dxi}$

Table 4 revealed the elasticity of supply with respect to each of the estimated variables in the study.

**Table 4:** ***Elasticity of supply with Respect to Estimated Variables***

| Estimated Variable | Elasticity of supply |
|---|---|
| P | 0.62 |
| A | 1.05 |
| NEGO | 0.11 |
| AGENT | 0.73 |
| HARVEST | 0.32 |
| ASSEMBLAGE | 0.04 |
| STORAGE | 0.21 |
| TRANSPORT | 0.18 |
| RENT | 0.60 |

**Source: Survey Data, 2009.**

Table 4 revealed the price elasticity of supply response for maize as 0.62, meaning that a 10percent increase in price of maize will lead to a 6.2percent increase in quantity of maize supplied. This finding compares with the finding of Bond (1983) who estimated output elasticities of sub-saharan Africa, and reported that price elasticities range from 0.1 to 0.5 in the short run and from 0.6-1.8 on the long run. Also in Shumway and Lim's (1993) study, the own-price elasticity for crops was 0.42. Oni (2000) also reported that empirical studies on crop price responsiveness in less developed countries have shown that price elasticities for staple food crops range from 0.0 to 0.4; Key et al., (2000) found that the net effect of an increase in the selling price is an increase in output by 0.5percent.

The finding also showed the hectrage elasticity of supply response for maize to be 1.05 in the study area. This means that a 10percent increase in area of land cultivated will lead to 10.5percent increase in quantity of maize supplied. This finding contradicts Abebe (2005)'s finding that Hectrage elasticity of supply response is not elastic.

Data analysis revealed that a 10percent change in agents' fee will lead to 7.3percent change in quantity of maize supplied. A 10percent change in storage cost will lead to 2.1 unit change in quantity of maize supplied while 10percent change in transactions land rent will lead to 6.0 unit change in quantity of maize supplied by agricultural households in the study area.

The results further revealed that a 10percent change in negotiation cost, harvesting cost, assemblage cost and transportation cost, will lead to 1.08percent, 3.2percent 0.4percent and 1.82percent change respectively in the quantity of maize supplied by agricultural households in the study area.

In summary, elasticity of maize supply response with respect to land hectrage was found to be highly elastic, those with respect to price, agent fee and transactions land rent were found to be moderately elastic while those with respect to negotiation cost, harvesting cost, assemblage cost, storage cost and transportation cost were found to be inelastic in the study area.

## CONCLUSION

**The study concluded that:**

1. Maize supply responds to transactions costs in the study area in that coefficients of transactions costs were statistically significant.
2. Maize supply responds positively to market price and area of land cultivated in the study area.
3. Contrary to a-priori expectation and the belief held by most people, marketing agents' roles and services are important and positive in the study area.

Therefore, supply response has a lot to do with not only output prices but also with the quantity, quality and the way of organization of efforts (inputs, management, market institutions etc). It has to be stressed that the importance of transactions costs in determining supply behavoiur cannot be overemphasized. It is important to realize that both market and non-market factors should be seen as complementary rather than as substitutes in matters relating to agricultural household supply response.

**POLICY IMPLICATIONS AND RECOMMENDATIONS**

(1) Based on the finding of this study that agricultural households respond to non-price in making maize supply decisions in the study area, policies that reduce food marketing costs will consequently complement price policies in affecting supply response. Better roads could reduce marketing costs, effective policy interventions can come in the form of improving road quantity (i.e. building new roads and maintaining existing ones). This should be jointly implemented by the three tiers of government

(2) Based on the finding of this study that agricultural households respond to marketing costs variables identified in the study area not exactly in similar magnitude and direction the same as those presented in most foreign literatures reviewed, a strong case can be made that agricultural marketing research needs to focus greater attention on the marketing situations as affecting our local environment. This is because most findings made outside Nigeria are not likely to fit into our own peculiar setting. There is therefore no point applying foreign theories that have not been locally tested and proved to solve local economic problems and challenges. Such approach will only make any country a 'developing' and never a 'developed' country. Nigerian researchers should therefore be empowered to rise up to the challenge and, instead of the idea of theory and technology transfer, carry out local research to make findings which could result in to development of local tools useful in solving local economic problems and appropriate for policy formulations.

(3). Based on the finding that most agricultural households depended on their meager personal savings in financing their activities, this study recommends that agricultural households should strengthen themselves financially by forming cooperative groups whereby members could have access to loans at a very low rate and farm inputs could be purchased in bulk to be shared among members at a reduced cost. The produce could also be sold in bulk, thereby lowering the average cost of marketing. Clustering the harvest and post-harvest handling and the marketing, may increase efficiency. Even if the farmer members of local cooperative groups do not present higher technical efficiency, their revenue from maize is higher, resulting in a higher allocative efficiency. Teaming up will increase equity and increase the bargaining power of the farmers. Farmers as a group are less at risk from opportunistic behaviour by the buyer, who would otherwise dictate the contract. Hence farmers become able under the auspices of the local cooperatives to bargain and haggle for the sales contract. Local farmers' cooperative groups could act as catalyst to complement the market and correct for market failures. The team action enhances trade through decreasing uncertainty and creating benefits from reduced marketing costs. It gives the farmers new incentives to produce and increase the trade frequency, and has the potential to promote as well as sustain economic development in the farming areas by increasing agricultural households' income and generating producer and consumer linkages to the benefit of the community.

(4) Based on the finding that both price and non-price factors significantly affect agricultural household supply decisions in the study area, the policy implications of this is that to serve as compliments to various price policies being made and implemented by the government, there is the need to improve land scheme, credit scheme (rural finance), pricing and distribution of inputs.

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