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Profitability and Socio-economic Effects of Fertilizer use in Maize (*Zea Mays*) Production in Demsa Local Government Area, Adamawa State, Nigeria

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Abstract – **The study examined the profitability and socio-economic effects of fertilizer used on maize production in Demsa Local Government Area of Adamawa state. 67 farmers were interviewed through structured questionnaires using simple random sampling and data were analyzed using descriptive statistics. These consist of means, percentages and frequency distribution. Majority of the farmers interviewed were found to be young and ready to adopt innovations as 45 (54.69%) fall within the ages of 20 and 39 years. The major source of land ownership in the study area was through inheritance as was indicated by 38 (59.38%) respondents. On marital status, also 44 (68.75%) of them were married as against 20 (57.81%) who were either single or widowed. However, majority of the farmers 37 (57.81%) got their fertilizer from the open market while the ministry of Agriculture, ADP and other sources constitute 27 (42.19%). It is recommended that,Government should establish and intensify better agricultural extension services to educate the farmers on the recommended fertilizer to use, methods and time of application, affordability and guaranteed sources of credit should be established community levels.**

Keywords – **Profitability, Socio-economic, Fertilizer, Maize, Production.**

I. INTRODUCTION

Due to increasing population pressure and declining soil fertility, there is need for profitable alternatives to the slash-and-burn (SB) practice for food crop production in the humid lowlands of sub-Saharan Africa[8].Nigeria, been one of the sub-Saharan African countries is a food-deficit country that on manyoccasions have been dependent on food imports [2]. However, in the past and present, various agricultural programmes and policies were developed by the Federal Government and were meant to improve sustainable productivity, food security, profitability as well as farmers' income and consequently the quality of lives of the rural households [5]. Yet productivity and profitability of farmers in the country has been very low despite these government un-relenting efforts [1].

Agricultural economists have long questioned whether farmers follow the behavioral assumptions of the profit-maximizing hypothesis as put forth in the neoclassical theory of the firm. Several studies have shown that other economic and social factors are important to farmers.

In order to realize the objective of self-sufficiency in food and fibre production in Nigeria, a number of combined strategies are being employed to increase the productivity of cultivated land. Nigeria's huge agricultural resource base offers great potential for growth. Since maize isan important cereal crop, efforts are being made tonarrow the yield gap between potential yield and actualfarm yield[7].Recent government policies have started to show results: between 2003 and 2007. The area of land under cultivation could be increased by as much as 100 per cent. Nowadays, technology/technological advancement have made possible that use of modern inputs such as improved agronomic practices to achieve this aim.

Hence, chemical fertilizer have been recognized as one of the input that hold the key to accelerate agricultural production in Nigeria, [9].

Prior to 1976, individual state governments were responsible for the procurement of their fertilizer. State government orders fertilizer in bulk (large quantities) and distributed these through sales agents and extension services provided by the states ministry of Agriculture. Each state managed its own fertilizer regimes independently. This arrangement was plagued by numerous problems, the most serious of this problems include: State made separate importation arrangements, thus large differences were observed in prices paid by different state for the same brand and quantity of a particular fertilizer, Fertilizer ordered for different states arrived the seaport at the same time leading to bunching of ships and causing great difficulties in the coordination of bathing as a result of delay and there was wide control over the quantity and type of the material fertilizer being imported as well as quality of packaging material.

The focus of this studies however is to assess the profitability in maize production and how best can yield increase under fertilizer usage to improve the income of the farmers realizing from the increase in yield thereby leading to improved social and economic wellbeing of the farmers. The choice of maize is basically predicated by the number of reasons and the rate of its production in the study area.

It is the world's third leading cereal crop after wheat and rice, while its productivity surpassess all other cereal crops. Hence, maize is one of the most important staple foods in Nigeria, and one of the most popular food crops on the domestic market [7]. It is consumed by both human beings and livestock alike alone with its use in many processing industries (alcohol).Several million peoples of

developing world consume maize as an important source of protein. The poor nutritional value of maize grain was improved by the introduction of 'opague-2' gene and developed Quality Protein Maize (QPM).

Hence, the need to find ways of boosting the production of the crop and at the same time to ensure economic production and profitability is important. Maize is also a major component of livestock feed. According, FAO, 1986, maize constitutes about 61% of chick ration, 71.7% of pullets ration and 65.5% of layers and breeder ration. The high nutritive content of maize makes it an excellent fattening feeds, preferable to other cereals in preparing livestock feeds. Hence the nutritional value is clearly indicated in the table 1 above.

II. METHODOLOGY

The Study Area

The study area is Demsa Local Government Area of Adamawa State, Nigeria consisting of 2 chiefdoms; Batta and Mbula. This is made up of six (6) districts, four (4) and two (2) from Batta and Mbula chiefdoms respectively. About 90% of the people in the Local Government depend on farming for their livelihood; [6].

The Local Government Area is located on latitude 10^0 04' N and longitude 12^0 10'E. it has an altitude of 192.0 meters with rainfall of 919.2mm per annum. The soil of the area is characterized by sandy loam; [4]. The Local Government shares boundaries with Numan and Shelleng from the South, Mayo Belwa and Yola South from the North-east and Girei from East. Hence, Adamawa state as is located at the Northern part of Nigeria. It lies between latitude 7˚ and 11˚ North of the equator and between longitude 11˚ and 14˚ east of the Greenwich meridian. It shares boundaries with Taraba state in the Southwest; Gombe state in the Northwest and Borno state in the North. Adamawa state has an international boundary with the Cameroun Republic along its Eastern border. The state covers a land area of about 38.74km^2 with a current projected population of about 3.2 million people according to 2006 National Census figure using the annual estimated population growth rate of 2.8%. [2]. The state is divided into three (3) political senatorial districts comprising of twenty one (21) Local Government Areas.

Data Collection, Sampling Techniques and Data Analysis

A total of 64 respondents were randomly selected for the study. Structure questionnaires were developed and administered for collection of primary data that was used in the study. Descriptive statistics were employed using mean, media, frequency distribution ranges and percentages.

III. RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents.

The information on table 1 shows the age distribution of farmers in the study area. It was found that none of the respondent was less than 20 years of age. About 34.33 percent of the respondents accounted for 22 respondents fall within the age range of 30-39 years, 26.56 percent accounting for 17 respondents fall within the age range of 40-49 years. The results also revealed that, about 20.31 percent of the respondents numbering 13 falls within the age bracket of 20-29. Respondents with the age limit of 50-59 accounting for 8 respondents were 12.50 percent while those above 60 years of age were 6.25 percent and thus accounted for 4 percent. The analysis further shows that, majority of the farmers in the study area were young and possibly healthy and strong enough to meet the challenges of labour demand and intensive farming system being practiced in Nigeria.

On the marital status of the respondents, the analysis revealed that, the study area was dominated by married farmers. This is because, about 68.75 percent resulting to 44 respondents were married, while 25 percent constituting 16 respondents as unmarried. Thus, about 6.25 percent constituting 4 respondents were widows. The results of the analysis obtained also revealed that, male farmers dominated the study area with about 65.63 percent accounting for 42 respondents were male while 34.37 percent resulting to 22 respondents were female. This therefore clearly demonstrated that, most of the farming activities in the study area is undertaken by males.

Similarly, on the educational status of the respondents, the results generated shows that, only about 15.63 percent constituting 10 respondents had non-formal education, while 17.19 percent accounting for 11 respondents had primary school education. However, those with secondary and post-secondary levels of education were about 28.12 about 39.06 percent comprising of 18 and 25 respondents respectively. This indicates that, the respondents educational level is adequate to comprehend the importance of and use of fertilizer, methods and time of application on their farms.

Land as a factor of production is one of the most important inputs in agricultural production. The system of land use, control and ownership tends to have great influence on agricultural production in any give society. However, from the research results obtained, most of the respondents in the study area acquired their land through inheritance and thus accounted for about 59.38 percent of the total respondents. 12 respondents who constituted about 8.75 percent acquire theirs through communal sources, while about 7.81 percent resulting to 5 respondents acquire their lands through lease and purchase methods. Since inheritance type of ownership predominates the mode of ownership in the study area, this shows that, the total output may be low due to the problems of possible land fragmentation that may likely arise from the heirs of the land. Similarly, there is the tendency that, large scale agricultural production in the study area maybe hindered.

Table 2 below shows the detailed analysis of the socio-economic variables of the respondents in the study area.

Table I: Socio-Economic Characteristics of Farmers

Variables	Number of Farmers	Percentages
Age Range (yrs.)		
20-29	13	20.31
30-39	22	34.38
40-49	17	26.38
50-59	8	12.50
> 60	4	6.26
	64	**100.0**
Marital Status		
Married	44	68.75
Single	16	25.00
Widowed	4	6.25
Divorced	0	0.00
	64	**100.00**
Sex		
Male	44	65.63
Female	22	34.37
	64	**100.0**
Educational Attainment		
Non-formal	10	15.63
Primary	11	17.19
Secondary	18	28.12
Post-Secondary	25	39.06
	64	**100.0**
Land Ownership		
Inheritance	38	59.38
Communal	12	18.75
Lease	5	7.87
Purchase	9	14.06
	64	**100.0**

Source: Field Survey, 2012.

The labour situation in the study area reveals that, family and hired labours were the main sources of labour in the study area. Farmers also used communal labour which is a form of informal farmers' cooperative while family labour alone is a more prominent source of labour in the study area. The results obtained from the study further reveals that, farmers that used family labour were at the majority with about 46.88 percent constituting 30 respondents, the communal and hired labour alone represents about 12.50 percent with 8 respondents and 17.18 percent with 11 respondents respectively. Those that combine both family and hired labour accounted for about 10.94 percent representing 7 respondents with the family and communal combined amounting 4.69 percent accounted for 3 respondents whereas those that combined both the family, hired and communal were about 7.81 percent resulting to 5 respondents.

The study further demonstrated that, majority of the respondents financed their farming business through personal savings which is often from the proceeds of the previous harvest. It is easy to deduce from the analysis that, about 71.87 percent representing 46 respondents acquired their credit from personal savings, 1.86 percent accounting for 1 respondent from agricultural loans, about 3.13 percent resulting to 2 respondents from commercial banks while about 9.3 percent totaling to 6 respondents got their credit from friends and relations. Thus, some respondents have multi-variete sources.

Table 3 below shows the production activities, labour source and credit acquisition of the respondents in the study area.

Table II: Use of Fertilizer

Application/Type	Number of Farmers	Percentages
Inorganic Fertilizer	53	82.81
Organic Manure	11	17.19
	64	100.0

Source: Field Survey, 2012.

The analysis further revealed that, majority of the respondents about 57.81 percent representing 37 respondents got their fertilizer from the open market in which the cost of procurement is relatively high while about 4.69 percent accounting for 3 respondents and 9.37 percent constituting 6 respondents procured their fertilizer from the Ministry of Agriculture and Agricultural Development Programme (ADP). The multivariate source from Ministry of Agriculture and ADP and the open market were about 4.69 percent resulting to 3 respondents and 6.25 percent accounting for 4 respondents respectively. Similarly, those from other sources like friends and relations, organic manure accounted for about 17.19 percent constituting 11 respondents.

Table 5 below also shows the various sources of fertilizer that were available to the respondents in the study area.

Table III: Farmers Source of Fertilizer

Source	Number of Farmers	Percentage
Ministry of Agriculture (MOA)	3	4.69
Agricultural Development Programme (ADP)	6	9.37
Open Market	37	57.81
MOA and ADP	3	4.69
ADP and Open Market	4	6.25
Others	11	17.19
	64	100.0

Source: Field Survey, 2012.

IV. Conclusion

Increased fertilizer use, particularly on maize, is essential to increasing per capita food production in Africa. Although region-wide growth in fertilizer consumption has slowed, fertilizer use on cereals in general, and on maize in particular, has become relatively more important. From the results of the study, the returns and profitability of fertilizer used on maize production in Demsa Local Government Area of Adamawa State shows that, the increase output of maize obtained by the respondents in the study area was due to the returns in maize which induced many into farmers maize production. However, despite the high number of maize farmers in the study area, the farmers do not get the much needed increase in output even after the use of fertilizer. This was due to the fact that, the fertilizers were applied to the crops

lately as a result to the late supply of the input. Also, many farmers do not use fertilizer in the right quantities due to the non-availability and the cost of incurring the needed fertilizer as against the market price of the produce, which has been discouraging. Similarly, the high returns from maize production in the study area depicts that farmers get increased output which translate into high income thereby leading to improve living standard and livelihood.

On the basis of the results obtained from the study, it is therefore recommendations that: Government should establish and intensify better agricultural extension services to educate the farmers more on the recommended fertilizers to be applied, methods and time of application. In addition sources of credit should be established at community levels with affordable interest rates. This is to be done in both cash and kind which should be channeled to the farmers through cooperative organization. Sourcing of fertilizers at the appropriate time should be encouraged. Task force committee should be formed to check and control the price escalation and diversion of fertilizer.

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