INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)

Analysis of Cost and Return of Maize Production in Numan Local Government Area of Adamawa State, Nigeria

Jimjel Zalkuwi
Research Scholar, Banaras Hindu University, India
Asabe Ibrahim
Research Scholar, Banaras Hindu University, India
Elias Kwakanapwa
Adamawa State University, Mubi, Nigeria

Abstract:
Maize (Zea mays L.) is one of the most important cereal crops in Nigerian agriculture. The crop occupies a crucial place than other cereal crops since it is used as food, feeds, fodder and other industrial raw material. The study analyzed the socio-economic characteristics of maize farmers and cost and returns per hectare. Multistage sampling technique was employed to select Ninety seven (97) maize producing farmers for the study. Data for the study were collected using structured questionnaires. The result of the analysis showed that the mean age for respondents was 46 years while more than half of them were literates. The major source of finance for the farmers was personal savings while the average land area cultivated was 2.6 hectares. The average gross margin analysis was estimated to be ₦7,228.71 per hectare indicating that maize production is profitable in the study area. Other economic indices were gross farm ratio obtained as 0.813, which indicates that the farmers got higher return/₦, also the operating ratio was 0.815 all pointing towards how profitable the venture in the study area.

1. Introduction

Maize is now widely accepted as a major source of food and cash income among it's predominantly smallholder producers in Nigeria. According to Phillip (2002), the factors which aided the rapid expansion and acceptance of maize cultivation in Nigeria are significant. First, was the development, through collaborative research, of fertilizer responsive and early maturing open pollinated and hybrid varieties. Second, was the emergence of maize as a major substitute industrial raw material, following the ban of most cereal grains import in the 1980s. Third, there was enhanced adoption of maize growing and maize-related technologies through the vigorous extension programs and activities of the World Bank assisted by Agricultural Development Projects (ADPs). Fourth, there had been prolonged concessional pricing of fertilizers, the critical input class in maize production in most part of Nigeria. And, fifth, is the relative ease of transporting and storing maize grains.

Despite the economic importance of maize to the teeming populace in Nigeria, it has not been produced to meet the food and industrial needs of the country. This could be attributed to the low productivity from maize farms or that farmers have not adopted improved technologies for maize production (Onuk, Ogara, Yahaya & Nannim, 2010). Agricultural industry was accorded scanty attention after the discovery of oil in commercial quantity in Nigeria. This has created a gap between the demand and supply of domestic food requirements. Consequently, the country has found it increasingly difficult to feed her teeming population and supply the local industries from the domestically produced food and raw materials (Zalkuwi, 2012). In the opinion of Igben (1988) as cited by Zalkuwi (2012) the annual widening gap between food and raw materials demand and supply in the country gave room for concern. This work therefore was prompted by the over dependence on other local governments to supply maize, in the study area, which is due to acute shortage and increase in the demand of maize in the area. Also, the economics of maize production in the area has not been fully examined especially its profitability

2. Methodology

2.1. Study Area

The study area is Numan Local Government Area of Adamawa State of Nigeria. Numan is situated at latitude 9.47° North, longitude 12.03° East and 137 meters elevation above the sea level. Numan local government area lies in the north-west of Adamawa state. It

shares common boundaries with Guyuk Local Government Area to the north, Demsa Local Government Area to the north-east and Lamurde Local Government Area to the south-west.

The Local Government has a number of ethnic groups. Among them are the Bwatiye, Bille, Mbula, Hausa, Wurkum and Junju who live in segmented communities. Numan Local Government Area has a population of 77617 people and it covers a land area of 2,193 square kilometers (Numan maps n.d). The soils of the study area consist of well drained sandy loam, silt and silty loam.

The study area experience high temperature of about 38.4^0C in December which rises in April-May to 43^0C. There are two distinct seasons in the area, the rainy season and dry seasons. The beginning and end of rainy season followed the migration pattern of inter tropical convergence zone (ITCZ). The rainy season is from May-October with the heaviest downpour in August. The annual average rainfall of the area is about 960.3 mm. The dry season start from November and ends in April. This is the period of harmattan when the dust laden carried by North-Eastern trade winds (continental air masses) from the Sahara desert have a marked effect on the climate of the area. The driest months are January and February with relative humidity of 13%, short grasses interspersed by short trees, shrubs and mosaic of Savannah marks the vegetation of the area (Information unit Numan L.G.A, 2013).

The major occupations of the people in the study area are farming, fishing, hunting and civil service. Major crops grown in the area include maize, guinea corn, rice and beans. Also livestock like pigs, goats, cattle and sheep are reared in the area. Social amenities available in the study area are electricity, police station, schools, market, sporting centers, banks etc.

2.2. Source of Data

The data for this study were collected from primary source. The data were collected from maize farmers through the use of structured questionnaire that was administered to the producers in the study area.

2.3. Sample Size and Sampling Procedure

Multistage sampling techniques were used to select the respondents. Five wards were purposively selected from the ten (10) wards of the local government area. From each of the selected five wards, two villages were purposively sampled giving an overall total of ten villages. Under this arrangement, a total of 97 maize farmers were randomly selected from the ten villages according to the proportion of the maize farmers and to whom questionnaires were administered to, data were collected for the study from their responses. The information collected includes the socio-economic background characteristics of farmers, production costs and returns, inputs used in the production, production constraints etc.

The table below gives the summary of sampling procedure and the number of questionnaire distributed to the selected respondents.

Selected Wards	Selected Villages	No of Questionnaire Distributed
Kodomti	2	23= 23%
Imburu	2	25= 25%
Gamadiyo	2	17= 17%
Numan I	2	17 = 17%
Vulpi	2	18 = 18%
Total	**10**	**100**

Table 1: Distribution of Questionnaire in the Study Area

2.4. Methods of Data Analysis

Descriptive statistics such as frequencies tables, means, percentages and inferential statistics such as multiple regressions and gross margin (GM) were considered in the analysis of data collected from the field.

2.5. Descriptive Statistics

- Percentage (%) = $\frac{observed\ frequency}{total\ frequency} \times 100$
- Mean of ungrouped data (x) = $\frac{\Sigma X_i}{N}$

Where X = mean
N = number of variables
ΣXi = summation of variables

- Mean for grouped data (X) = $\frac{\Sigma f X_i}{\Sigma X_i}$

Where *f* = frequency
Σ*f*Xi = summation of the product of frequency and variable (1,2,3,…n)
N = number of variables

Σf = summation of all frequency
Frequency tables were used to summarize the data collected.

2.6. Gross Margin (GM)
Gross margin can be defined according to Rahman, Haruna & Alamuu (2002) as the difference between total revenue and total variable costs. This tool was used to estimate respondents' costs and returns in maize production. It is expressed as
$GM = Q_yP_y - \Sigma x_iPx_i$
Where:
GM = Gross Margin (N/ha)
Q_y = output (kg)
P_y = unit price of the output (N/kg)
Q_yP_y = total revenue derived (or gross returns)
x_i = quantity of the i^{th} input used
Px_i = price per unit of the i^{th} input
x_iPx_i = total cost associate with i^{th} input
Σ = summation (over all inputs 1 to n, to give total variable costs)
Thus, GM = GR – TVC
Where, GR = gross returns and TVC = total variable costs

3. Result and Discussion

3.1. Socio-Economic and background Characteristics of Respondents
The socio-economic and background characteristics of the farmers were examined as they have the potential to influence the efficiency of their production. These characteristics includes; gender, age, marital status, household size, educational level, occupation, years of farming experience, farm size, land acquisition, access to credit facilities, and number of visit by the extension agent.
Table 2 shows the gender distribution of the respondents in the study area. About 72.2% of the respondents were male, while 27.8% were female. This could be because men are mostly the bread winners of their families' coupled with the fact that they are capable of handling the vigorous work involved in maize production while the low percentage of women involvement may be explained by socio-cultural factors affecting women such as unequal access and control over land as well as high cost of production inputs. This finding agrees with that of Oladejo and Adetunji (2012) which states that about 70.9% of the respondents are male in the study area.
Table 2 revealed that majority of the maize producers are young ranging from 20 – 40 years which accounted for 74.2% of the respondents, with the mean age of 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. This category of people tend to have much responsibilities of shouldering their household basic needs, hence, they engage more in the production of maize to cater for those needs.
The result in table 2 shows that about 55.67% of the maize farmers in the study area were married, 39.18% were single, 2.06% were divorce, and 3.09% widowed. This implies that majority of the respondents were married and within the productive and child bearing age, thus have children and other dependants, and also married people tend to engage in farming activities more than the unmarried. This finding is in consonance with Oladejo and Adetunji (2012) who found that about 93% of farmers in Oyo state were married.
Family size in traditional agriculture determines the availability of family labour in crop production and possibly the total land area cultivated which has effect on output. Table 3 reveals that about 52.57% had household size of 1 – 5 which are the majority, 42.26% of the respondents had 6 – 10 household size and the remaining 5.15% of the respondents had 11-15 household size. This study is in contradiction with Oladejo and Adetunji (2012) who found that about 73.2% of maize farmers in Oyo State had between 6 – 10 household members.
The result in Table 2 revealed that only 6.19% of the respondents had no formal education, 14.43%, 43.30% and 36.08% had primary, secondary and tertiary education respectively. This is an indication that majority of the respondents are literate having at least one form of formal education or the other. This could have a positive impact on adoption of new agricultural innovation
Table 2 also showed that 58.76% of the respondents took farming as their full time main occupation. About 18.56% and 15.46% engage in other activities such as civil service and trading respectively, while 7.22% engage in other activities. This implies that the majority of the respondents depend mainly on farming as their major source of food and income to cater for themselves and their families.
Table 2 reveals the farming experience of the respondents in the study area. It revealed that 35.05% of the respondents had 1 – 5 years farming experience and about 64.95% had farming experience above 5 years. This result shows that majority of the respondents had much farming experience to improve their production techniques. Because this could positively influence their management capabilities on the crops. Farmers with more years of farming experience may likely to adopt new innovation and are likely to be technically efficient in their farm practices.
Table 2 shows that about 74.23% of the respondents cultivated farm size ranging from 0 – 3 hectares of land. This indicates that majority of the respondents' are peasants' farmers (subsistence farmers) cultivating only for the family consumption and little to sell out. This may attribute to high level of poverty where the poor farmers can only afford small parcel of land for subsistence farming

coupled with high cost of farm inputs, and inadequate credit facilities. Only 25.77% of the respondents cultivated above 3 hectares of land i.e from 4 and above 10 hectares which could be term as commercial farming.

The mode by which the respondents acquire their farm lands in the study area was also investigated. Table 2 shows that 94.85% of the respondents acquired their farm land by inheritance. The negative effect of majority using inherited land is that it would lead to fragmentation of farm land as a result of sharing among siblings hence reducing the size of farm land for agricultural practices. Only 5.15% acquired their farm land either through rent or leasehold.

Extension is one of the major tool through which new agricultural innovations are transmitted to practicing farmers and usually has significant effect on the economic efficiency level of farmers. Table 2 shows that extension visit was very poor as only 14.43% of the respondents were visited by extension agents, and the remaining 85.57% of the respondents which constitute the majority were not visited by the extension agents. According to Bzugu and Gwary (2005), the use of agricultural technologies is believed to be a strategy for making small scale farmers economically viable.

Gender	**Frequency**	**Percentages (%)**
Male	70	72.2
Female	27	27.8
Total	97	100
Age	**Frequency**	**Percentages (%)**
Below 20	3	3.1
21 – 30	38	39.1
31 – 40	31	32.0
41 – 50	10	10.3
Above 50	15	15.5
Total	97	100
Marital status	**Frequency**	**Percentages (%)**
Single	38	39.18
Married	54	55.67
Divorce	2	2.06
Widowed	3	3.09
Total	97	100
Household size	**Frequency**	**Percentages (%)**
1 – 5 people	51	52.57
6 – 10 people	41	42.26
11 – 15 people	5	5.15
Total	97	100
Educational level	**Frequency**	**Percentages (%)**

Primary school	14	14.43
Secondary school	42	43.30
Tertiary institution	35	36.08
Others	6	6.19
Total	97	100
Occupation	**Frequency**	**Percentages (%)**
Civil servant	18	18.56
Trader	15	15.46
Farmer	57	58.76
Others	7	7.22
Total	97	100
Years of experience	**Frequency**	**Percentages (%)**
1 – 5	34	35.05
6 – 10	23	23.71
11 – 15	12	12.37
16 – 20	11	11.34
Above 20	17	17.53
Total	97	100
Farm size (ha)	**Frequency**	**Percentages (%)**
0 – 3	72	74.23
3.1 – 6	21	21.65
6.1– 9	1	1.03
9.1 Above	3	3.09
Total	97	100
Land acquisition	**Frequency**	**Percentages (%)**
Purchased	1	1.03
Rented	2	2.06
Leasehold	2	2.06
Inherited	92	94.85
Total	97	100
Access to credit facilities	**Frequency**	**Percentages (%)**

Yes	20	20.62
No	77	79.38
Access to extension visit	**Frequency**	**Percentages (%)**
Yes	14	14.43
No	83	85.57
Total	97	100

Table 2: Socio-economic and background characteristics of respondents

3.2. Average Cost and Returns per Hectare of Maize Production

The distribution of cost and returns involved in maize production is presented in table 3. The table revealed that, the average total cost of production per hectare was ₦31, 781.42 out of which ₦31698.79 is a variable cost accounting for 99.74% of the total cost of production. This was largely attributed to the high cost of labour in the study area having cost family labour at prevailing market price. The fixed cost was negligible and cannot be involved in calculating the gross margin. The average output of the respondents was 1148.46kg per hectare and the total revenue generated was ₦39, 092.76 per hectare. That is the farmers had gross margin of ₦7,228.71/hectare. The farm gross ratio which also measures the profitability of the farm reveals the gross ratio of 0.813 which indicates that the farmers got higher return/₦. The operating ratio was low at 0.815 which shows that maize production was a profitable venture in the study area.

Production Variables	**Maize Value in (₦/ha)**
Variable Cost	
Hired labour	11154.67
Family labour	5089.72
Seed	2075.25
Fertilizer	3472.89
Herbicide	2375.91
Pesticide	857.98
Ploughing	4664.15
Transportation	1880.64
Storage	127.59
Total variable cost	**31698.79**
Returns	
Average output of Maize (kg)/ha	1148.46
Average price of Maize (₦/kg)	53.73
Total Revenue	**39092.76**
Gross Margin (TR – TVC)	7228.71
Gross Ratio (GR)	0.813
Operating Ratio	0.815

Table 3: Cost and return Analysis of Maize Production in the Study Area
Source: Field Survey, 2013

4. Conclusion

Maize production among farmers was found to be profitable.

5. References

1. Bzugu, P.M; and Gwary, M.M. (2005). Effective Communication by Extension Agents As Determinant of Farmers Adoption of Recommended Agricultural Technologies in Adamawa State, Nigeria. Journal of Sustainable Development in Agriculture and Environment 1:55-59
2. Information Unit Numan L.G.A (2013). Brief history of Numan Local Government, Adamawa State. Unpublished article.
3. Oledejo, J.A., and Adetunji, M.O. (2012).Economic Analysis of maize (Zeamays) production in Oyo State of Nigeria. Agricultural Science Research Journals,2(2): 77-83
4. Onuk, E.G., Ogara, I.M., Yahaya, H., and Nannim, N. (2010).Economic Analysis of maize production in Mangu Local Government Area of Plateau State, Nigeria.PAT, 6(1):1-11

5. Phillip, D. (2002). Evaluation of Social Grains from Maize Research in the Northern Guinea Savanna Zone of Nigeria. ASSET Series A, 2(2): 11-20. Department of Agricultural Economics and farm management, University of Agriculture, AbekutaOgun State, Nigeria.
6. Zalkuwi, J. (2012). Comparative Economic Analysis of Sole Sorghum and Sorghum Mixed with Cowpea Production Systems in Guyuk Local Government Area of Adamawa State, Nigeria. Unpublished M. Sc thesis, Department of Agricultural Economics and Extension, SAAT, FUT, Yola, Adamawa State, Nigeria