PROFITABILITY OF IMPROVED MAIZE SEED PRODUCTION AMONG FARMERS IN OSOGBO AGRICULTURAL DEVELOPMENT PROGAMME ZONE, OSUN STATE, NIGERIA

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ABSTRACT
The study assessed the profitability of improved maize seed production among farmers in Osogbo Agricultural Development Programme zone, Osun State. Questionnaires were used to collect relevant information as regard the study from farmers in the study area. The data were obtained from 160 maize farmers which were randomly selected. Descriptive statistics, gross margin analysis, and likert scale were used in analysing the data. The average yield per hectare obtained from maize farmers were 2644.73kg and 2164.62kg for improved and unimproved maize seed respectively. On gross margin, improved and unimproved maize farmers had ₦297, 023.68 and ₦238, 390.47 per hectare respectively. T-test result revealed that improved maize seed was more profitable with mean difference of 45277.93 and statistically significant at 1%. Also, regarding constraints, improved maize farmers have high cost of maintenance (2.76) as the major challenge affecting production while unimproved maize farmers was problem of pest and disease (2.63). The study recommended the adoption for improved maize seed production due to its high yield and profitability. This is said to improve production while other related demands could be met.

Key Words: Profitability, Agricultural Venture, Maize Farmers, Improved Farmers

INTRODUCTION

Maize (*Zea mays L.*) is recognized as one of the most important cereal crops in the world today. It originated from South and Central America and in the 10th century it was introduced to West Africa by the Portuguese (Oladeebo, 2006). The crop occupies a crucial place than other cereal crops as it is used as food, feed, fodder and other industrial raw material. In recent years, it has seen a notable growth rate and has contributed significantly to the national economy of the nation (Ibrahim and Ayinde, 2011). Large number of Nigerians depends on maize as their staple food, often eating a quarter kilo or more of maize and maize products every day. However, in terms of human consumption level, maize comes third behind rice and wheat in Nigeria. It is consumed by people as roasted and boiled maize nationwide (Abubakar, 2010).

Maize can be classified according to structure of the grain which is popcorn, dent corn, sweet corn and flour corn. Also are different varieties which include TZPB (White), TZB (white), Tsolo (yellow), Western Yellow 1096BP6 (yellow), Suwan one (yellow) to mention few (Oladejo and Ladipo, 2012). Maize is also said to contain eighty (80) percent carbohydrate, ten (10) percent protein, 3.5% fiber and 2% mineral with iron and vitamin B also present in trace element (International Institute of Tropical Agriculture, 2010). Many researchers have found improved technology to be a major factor in effort to become self-sufficient in maize production. The production potential of newly evolved maize is greater as compared to conventional varieties. According to Duvick (1999), the fact that improved maize had yielded 15% greater than unimproved was an advantage over unimproved. It also had better resistance to root and stalk lodging. Early maturity and uniformity of improved maize enhances the use of machines i.e. Mechanical pickers (planters and harvesters).

In Nigeria, improved maize seed is known for its high demand for plant nutrients and extra production inputs. It also requires additional watch or care for maximum production (Taiwo, Alamu and Ibrahim, 2011). Improved maize is highly recognized for its high leaf area index and crop growth rate. The modern varieties respond to nutrients more efficiently and bear plant population stress more than the unimproved varieties (Zamir, Tanveer and Ahmad, 2012). Maize has yielded success stories with the adoption of improved technology by increasing smallholders maize production (Akintobi, Oyekale and Owolabi, 2011). This achievement should inspire maize farmers to further increasing food production. Although additional cost on production is attributed to the use of improved maize by farmers in Osun State and Nigeria at large, all these cost is accrued by increase in the usage of fertilizer, other agro-chemicals and the seasonal use of seeds.

Since improved maize seed has been an innovation to boost maize production and play key role in solving the problem of food insecurity that have been combating the masses, this study seeks to examine the economic advantage of using improved maize seeds by farmers in Osun State, Nigeria. Thus, this study provides empirical information to the government, stakeholders, market planners and policy makers on the level of farmers utilizing improved maize seeds. Specifically, this study described the socio-economic characteristics of the farmers; examined the profitability level of improved and unimproved farming by the farmers and also identified the constraints of improved and unimproved maize farming in the study area.

METHODOLOGY

The study was conducted in the Osogbo Agricultural Development Programme (ADP) zone of Osun State. This zone is located around Latitude 6.07ºN and Longitude 4.014ºE (Adapted from Osun State Local Government council's dividend of democracy 2016). According to the 2016 National population census, the zone had an estimated population of 1,143,144persons. Osogbo ADP zone is made up of thirteen Local Government areas namely Ifedayo, Ila, Boluwaduro, Boripe, Ifelodun, Osogbo, Olorunda, Orolu, Irepodun, Ede-south, Ede-north, Odo otin and Egbedore.

The study made use of primary data which was collected through questionnaire. The target population were farmers involved in improved and unimproved maize seed production in Osogbo ADP. A three stage sampling technique was used for this study. The first stage was a purposive selection of eight Local Government Areas which included Odo-otin, Boripe, Ila, Ifedayo, Ifelodun, Egbedore, Orolu and Osogbo Local Government Areas. This was done based on the high agricultural activity in the area. The second stage was a purposive selection of eight agricultural settlement (one per Local Government Area); these included Igbaye, Ororuwo, Ila-orongun, Oluponna, Iba, Oyere, Ifon-Owa, Oke-Osun. This was done based on information of farmers accessible from the ADP. The third stage was a selection of one percent from each village for improved and unimproved maize farmers making a total of 80 improved maize farmers and 80 unimproved maize farmers. A total of 160 maize farmers were sampled for this study. This was done from a population of 8,135 registered maize farmers. This was obtained from the Agricultural Development Programme zone, Osogbo. The analysis of data was done using descriptive statistics (frequency and percentages), gross margin analysis and likert scale analysis.

Model specification

Gross Margin: is the difference between the Gross Farm Income/ha and the Total Variable Cost (TVC)/ha. It is a useful planning tool in the situations where fixed capital is negligible portion of the farming enterprise as in the case of small scale subsistence agriculture.

GM/ha = TR/ha – TVC/ha

Where, GM = Gross Margin/ha.

TR = Total Revenue/ha.

TVC = Total Variable Cost/ha.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

Table 1 showed that majority (86.9%) of the improved maize farmers fell within an aggregate age range of 31-60years, implying that the farmers are in their productive ages. The unimproved maize farmers also showed this feature as majority (78.2%) fell within the active ages of 31-60years. These findings were in line with (Akintobi et al, 2011), who stated that the result of age distribution of the active force in the Nigeria were chosen among the ages of 30-50years. The gender distribution showed 85.2% male for improved maize farmers and 96.2% male for unimproved maize farmers, which signified that maize production in the study area is dominated by male farmers. Also, the study revealed that a higher percentage (81.5% and 75.6%) of the farmers were married for both categories, which indicated that agriculture is a core source of sustenance for most families. Household size of 4-6persons majorly (75.9% for improved and 60.3% for unimproved maize farmers) stood out as number of persons per household, indicating an availability of labour. The distribution for the contact with extension agent favoured the negative as 75.9% of the improved maize farmers and 73.1% of the unimproved maize farmers had no contact with extension agent. Ibrahim and Ayinde (2011), attributed this inadequacy in extension services to low manpower and underequipment. Being a member of farmers' association is something of interest amongst the farmers in the study area as 90.7% of the improved maize farmers and 61.5% of the unimproved maize farmers belonged to one farmers' association or the other. The educational levels of the farmers in the study area showed that on aggregate 64.8% of the improved maize farmers and 65.4% of the unimproved maize farmers had one form of formal education (primary/secondary/education) or the other. This implied that the larger percentage of farmers had atleast a basic education, which translated to the farmers' capacity to adopt modern day technology.

Costs and Returns on Improved and Unimproved Maize Seed Production

Table 2 revealed that the total cost of production used in improved and unimproved maize was ₦17,473.92/ha and ₦15,412.3/ha, respectively while the average revenue for both improved and unimproved maize are ₦314,497.6/ha and ₦253,802.77/ha respectively. The result further revealed that the mean difference in gross margin in improve and unimproved maize was ₦297,023.68 and ₦238,390.47 per hectare, respectively. This showed that improved maize production was more profitable than unimproved maize production. This higher yield and profitability of the improved farmers can be attributed to the advantages of advanced technological production such as the use of improved seeds relative to this study. This is in line with Iken and Amusa, (2004) which reported higher yield advantage in relation to production with improved seeds.

Table 1: Socio-economic characteristics of the farmers

	IMPROVED			UNIMPROVED			
Characteristics	Freq	Percentage	Mean	Freq	Percentage	Mean	
Age (years)							
≤30	9	11.3	28.5	13	16.3	23.5	
31-40	16	20		21		26.3	
41-50	25	31.2		24		30	
51-60	22	27.5		18		22.4	
≥60	8	10		4		5	
Total	**80**	**100**		**80**		**100**	
Gender							
Male	67	83.7		76		95	
Female	13	16.3		4		5	
Total	**80**	**100**		**80**		**100**	
Marital Status							
Single	4	5		16		20	
Married	64	80		59		73.7	
Divorced	12	15		5		6.3	
Total	**80**	**100**		**80**		**100**	
Religion							
Muslim	39	48.7		48		60	
Christian	41	51.3		32		40	
Total	**80**	**100**		**80**		**100**	
Household Size							
≤3	12	15	6	25		31.3	5.5
04-06	61	76.2		49		61.2	
≥7	7	8.8		6		7.5	
Total	**80**	**100**		**80**		**100**	
Contact with Extension Agent							
Contact	19	23.7		21		26.3	
No Contact	61	76.3		59		73.7	
Total	**80**	**100**		**80**		**100**	
Membership of farmers Association							
Member	73	91.2		52		65	
No member	7	8.8		28		35	
Total	**80**	**100**		**80**		**100**	
Educational Qualification							
No Formal Education	15	18.8	9.5	13		16.3	8.5
Quranic Education	13	16.3		14		17.5	
Primary Education	39	48.7		38		47.5	
Secondary Education	10	12.5		14		17.5	
Tertiary Education	3	3.7		1		1.2	
Total	**80**	**100**		**80**		**100**	

Source: Filed survey data, 2019

Table 2: Costs and Returns Structure (₦/Ha)

	Improved		Unimproved	
Item	Unit/ha	Average(₦/ha)	Unit/ha	Average(₦/ha)
Gross Margin		**297,023.68**		**238,390.47**
Total Revenue	2644.73(kg)	**314,497.6**	2164.62(kg)	**253,802.77**
Seed	28.88(kg)	3,212.68	26.93(kg)	3,602.2
Fertilizer	202.15(kg)	8,110.05	169.92(kg)	6,870.42
Herbicides	1.43(lit)	1,281.10	1.17(lit)	1,044
Pesticides	0.08(lit)	83.73	0.03(lit)	32.60
Labour	11.93man-day	4,386.36	11.24man-day	3,863.10
TVC		**17,473.92**		**15,412.3**

Source: Authors computation, 2019

Furthermore, Table 3 showed that there is significant difference in the yield between improved and unimproved maize farmers with a t-value of 1.061 significant at 0.01 level of significance. Findings from the study showed that improved maize farmers had a mean yield of 38090.8kg greater than that of the unimproved maize farmers with 33562.9kg mean yield. Thereby, improved maize seed had substantial effect on yield.

Table 3: T-test analysis showing difference in the yield between improved and unimproved maize farmers

Group	N	Mean	Std Dev	Mean Diff.	t-value	df	Sig
Improved	54	38090.8	36665.7	45277.933	1.061	130	0.01
Unimproved	78	33562.9	72102.94				

Source: Authors computation, 2019

Constraints of improved and unimproved maize seed farming

Likert scale was used to determine the constraints of maize farmers in the study area. These constraints vary based on the effect on production from one farmer to the other. Likert scale shows the level of severity of maize farmers in the study area.

Result of constraints of improved and unimproved maize farmers is presented in table 4 and 5 below. Major constraints denoted by improved maize farmers is high cost of maintenance with a mean of 2.76 while problems of pest and disease (2.63) was reported by unimproved maize farmers. Other constraints reported for improved maize farmers includes lack of access to credit facilities (2.24), poor communication network (2.22), and pest and diseases (2.20).

According to Taiwo, Alamu and Ibrahim (2011) improved maize production require additional care which might come with its attendant cost. On the other hand, unimproved maize farmers said lack of access to credit facilities (2.52), high cost of fertilizer (2.49) and irregular rainfall (2.36) were noted. If these issues are not properly managed, it could be a factor for low productivity in the level of output on maize seed production.

Table 4: Distribution of respondents by production constraints for improved maize farmers

Constraints	Severe (%)	Mild (%)	Less Severe (%)	Mean	Rank
Irregular rainfall	12(22.2)	19(35.19)	23(42.59)	1.80	6
Availability of seed	5(9.26)	27(50)	22(40.74)	1.69	8
Tax policy	2(3.7)	3(5.56)	32(59.26)	0.81	9
Transportation problem	8(14.81)	26(48.15)	19(35.19)	1.76	7
Lack of access to credit facilities	23(42.60)	21(38.90)	10(18.52)	2.24	2
Problem of pest and disease	29(53.7)	7(12.96)	18(33.33)	2.20	4
High cost of fertilizer	11(20.4)	36(66.67)	7(12.96)	2.07	5
High cost of maintenance	43(79.63)	9(16.67)	2(3.7)	2.76	1
Poor communication network	19(35.19)	28(51.85)	7(12.96)	2.22	3

Source: Authors computation, 2019

Table 5: Distribution of Respondents by Production problem for unimproved maize farmers

Constraints	Severe (%)	Mild (%)	Less Severe (%)	Mean	Rank
Irregular rainfall	52(66.67)	18(33.33)	8(10.26)	2.36	4
Availability of seed	2(2.56)	5(6.41)	71(91.03)	1.12	9
Tax policy	23(29.49)	14(17.95)	41(52.56)	1.77	8
Transportation problem	39(72.22)	21(26.92)	18(23.08)	2.27	5
Lack of access to credit facilities	52(66.67)	15(19.23)	11(14.10)	2.52	2
Problem of pest and disease	61(78.20)	5(6.41)	12(15.38)	2.63	1
High cost of fertilizer	47(60.26)	22(28.20)	9(11.54)	2.49	3
High cost of maintenance	19(24.36)	42(53.85)	17(21.8)	2.03	7
Poor communication network	28(35.9)	37(47.44)	13(16.67)	2.23	6

Source: Authors computation, 2019

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study showed that improved maize production was more profitable compared to unimproved production in the study area. This resultant higher profitability is also a factor of higher yield associated with the usage of improved seeds for maize production. Furthermore, constraints such as high cost of maintenance, lack of access to credit facilities, poor communication network, pest and diseases were identified as impeding factors to an efficient and effective improved maize production.

Recommendations

Based on the findings of this study, the following recommendations were made for improvement in maize production in Osogbo ADP zone of Osun State, Nigeria.

i. Due to the high cost of improved maize seeds, Government and other relevant agencies (NGO) should ensure that improved seeds are available to farmers at subsidized rate as at when time needed.

ii. Training of farmers should be done from time to time. Farmers should train on modern farming techniques. This could address issues of high cost of maintenance, pest and diseases and other issues that has been identified.

iii. Low participation of extension agent which could be as a result of understaffed or underequipped, necessary amenities should be provided and more staff should be recruited to be able to touch the farmers need.

REFERENCES

Abubakar S. Z., (2010); Farm Power Utilization in Agriculture; *Invited presentation of National Workshop on Tractors and Farm Machinery Management for Sustainable Agriculture Production in Nigeria*. Held at NAERLS, Abu, Zaria. Conference Hall between 28th june to 2nd july.

Akintobi, D. C. A., Oyekale, K. O. and Owolabi, O. O. (2011): Comparative Performances of Progenies from Crosses between some Open-Pollinated Maize (Zea *mays L*) Varieties. *Moor Journal of Agricultural Research*, 12(2), 73-80.

Ayinde, Taiwo. B., Omolehin, Rahhel. A., Ibrahim, Usman. (2011): Efficiency of Resources Use in Hybrid and Open-pollinated Production in Giwa local Government Area of Kaduna State. *American Journal of Experimental Agriculture,* 1(3), 86-95.

Bangladesh Bureau of Statistics. (2003): Yearbook of Agricultural Statistics of Bangladesh, Bangladesh Bureau of Statistics, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka. 285pp.

Bangladesh Bureau of Statistics. (2006): Yearbook of Agricultural Statistics of Bangladesh. Bangladesh Bureau of Statistics, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka. 326pp.

Borbala B and Johannes S. (2006): Distorted prices and producer efficiency-Romanian maize. A paper presented at the 46th Annual meeting of the German Association of Agricultural Economist (Gewisola) in Giessen 4-6 October. 56pp

Carifio J. and Perla R. J. (2007): Ten Common Misunderstandings, Misconceptions, Persisted Myths and Urban Legends about Likert Scale and Likert Response Formats and their Antidotes. *Journal of Social Science,* 3(3), 106-116.

Doebley J.F. (1994): Morphology, Molecules and Maize corn and culture in the historic new world, Geneva, Switzerland. 154pp.

Duvick N. Donald, (1999): Commercial Strategies for Exploitation of Heterosis, for presentation to 'The Genetics and Exploitation of Heterosis in crops. An international Symposium' 17-22 August, Mexico City, Mexico. 78pp.

FAO and ILO (1997): Maize in human nutrition intermediate level handbook. FAO and ILO Publication, Rome, Italy. 203pp

Ibrahim U and Ayinde B.T. (2011): Efficiency of Resource Use in Hybrid and Open-Pollinated Maize Production in Giwa Local government area of Kaduna State, Nigeria; *Libyan Agriculture Research Center Journal International,* 2(5),215-220

IITA (2010): Research to nourish Africa. Research to boost Agricultural production. Agric news, Tuesday, 30 March. 3pp.

Iken, J.E. and Amusa, N.A (2004): Maize Research and Production in Nigeria; African *Journal of Biotechnology* 3(6), 302-307.

International Institute of Tropical Agriculture (2009): Importance of Maize Utilization and Processing; http: www.iita.org/cms/details/tm-mat/irg351.html accessed on 9th june 2013.

Likert, R. (1932). NY: Archives of Psychology.

Magulama, E.E., Silote, C.C., Madriaga, W.Q. (2007). Morphology-based grouping and heterotic patterns in white maize varieties. 60pp.

Oladeebo J.O (2006): *Text book on Agric business finance and management*. Department of Agricultural Economics and Extension. Lautech, Ogbomoso. 254pp

Oladejo, J.A and Ladipo, O.O. (2012): Supply Analysis for Maize in Oyo and Osun States of Nigeria: *international Journal of Life Science and Pharma Research* 2(2), 6-11

Onuk E.G, Ogara I.M, Yhahaya H and Nannim N. (2010): Economic Analysis of Maize Production in Mangu Local Government Area of Plateau State, Nigeria. *Academic Journal of Plant Sciences*, 6(1), 1-11

Onyenweaku C.E and Nwaru J.C (2005): Application of stochastic frontier production functions to the measurement of technical efficiency in crop production in Imo State Nigeria. *Journal of Nigeria Agricultural* 36(2), 19-24.

Oyekale A.S. and Idjesa E. (2009): Adoption of Improved Maize Seeds and Production Efficiency in Rivers State, Nigeria. *Academic Journal of Plant Sciences*, 2(1), 44-50.

Taiwo Bintu Ayinde, Alamu Josiah Fola and Ibrahim U., (2011): Economic Advantage of Hybrid Maize over Open-Pollinated maize in Giwa Local Government Area of Kaduna State; *American journal of Experimental Agriculture.* 1(3), 101-109.

Zamir M.S., Saqib M., Tanveer A. and Ahmad A.U. (2012): Agro-Economic Evaluation of Various Maize Hybrids Under Different Planting Patterns; *Evaluation of Maize Hybrids Under Different Planting Patterns; Cercetări Agronomice în Moldova,* 65(3), 151-159.