Journal of Agricultural Technology 2013 Vol. 9(5): 1069-1080
Available online http://www.ijat-aatsea.com
ISSN 1686-9141

Socio-economic study of maize farmers under different production technologies in south west Nigeria

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Osundare, F.O. (2013) Socio-economic study of maize farmers under different production technologies in south west Nigeria. Journal of Agricultural Technology 9(5):1069-1080.

This study compared the socio-economic characteristics of maize farmers under different production technologies. The socio-economic variables of study were age, level of education, farming experience and cropping system, farm size, levels of outputs and income, growing seasons observed and the available sources of production technologies. Data were collected from 311 maize farmers in South West Nigeria using multi stage random sampling techniques through the use of validated and pre- tested structured questionnaire. Descriptive statistics and ANOVA were used for data analysis.Results showed that the mean ages were 45.4,49.7 and 51.1 years for farmers using traditional technology (TT) improved technololgy (IT) and Semi_improved technology (ST) respectively. The mean farm size were 0.7ha (TT), 2.63(IT) and 3.62ha (ST) while the mean values for maize output were 0.77tos/ha; 1.70tons/ha and 1.02 tons/ha for TT .IT and ST users respectively. The proportion of illiterates was highest(46.51%) among TT users. Also maize farmers under different production technologies differed in their socio-economic characteristics. The summary of ANOVA results showed that except in age, there were significant differences (at 5.0%) in the mean value of farm size, income and outputs of maize farmers using different production technologies.

Keywords: Comparative, socio-economic, maize farmers, production technologies.

Introduction

The awareness of the importance of maize in Nigeria's food economy is on the increase. Maize is particularly important for its versatility both in growth and uses. It is the most important cereal crop grown in South Western Nigeria where it attains special significance in view of the limited amount of protein-rich cereals in southern diets. The cultivation, processing and marketing of maize provide employment opportunities for several farming and non farming households. The employment opportunities in turn provide important sources of

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income and livelihood to growers, processors, and the market women who engage in maize marketing activities.

The economic and agricultural policies in Nigeria have further put maize in a prominent position in the country's food economy. The ban placed on the importation of rice and wheat flour further makes maize a very important raw material being sought after by feeds mills, flour mills and breweries in Nigeria. Also, government now compels manufacturers, notably flour mills and breweries to source their materials locally. As a result of the widening maize demand-supply gap, government formulated programmes and policies which place small holder farmers in central focus due to the fact that nations agriculture had always been dominated by small holder farmers who represent a substantial proportion of the total farming population and produce over 70% of total agricultural output.

In addition, several research institutes have been established since independence including the National seed multiplication scheme (NSMS), International Institute of Tropical Agriculture (IITA) and Agricultural development project [ADP] established to undertake research activities that will generate improved production technologies particularly the production and distribution of high yielding varieties (HYVs) of seed so that the present annual maize production of 8 million tons can be raised by 12 million tons annually as predicted by Ogara (2011) .All these not withstanding, the problem of wide maize demand-supply gap has remained largely unresolved mainly because farmers who are the central focus of technology and who hold the key to agricultural production have been seriously neglected in policy formulation and implementation strategies.

Agricultural production technology may be defined as an art of obtaining farm produce from the synthesis of natural and man-made resources under specific managerial organization (Aken'ova, 1987; Akinyosoye, 1989). Natural resources for agricultural development include land, labour, water and traction of animal origin while man-made resource (capital) include farm equipment, planting devices, fertilizers, herbicides seeds etc.The various combination of these resources (natural and capital) give rise to different production technologies. Several technological practices are involved in the production of maize in Nigeria and a number of factors seem to account for the existence of these technologies of production. These factors include differences in resource endowment, level of technical and managerial capacity of the farming population, quality and degree of available scientific information, ecological characteristics of production areas, factor and output prices and the last but obviously not the least are the characteristics of farmers who are the users of

technologies. The study of farmers and their socio-economic background is very important in the use of maize production technologies.

The characteristics of farmers would determine awareness of the type of technologies to be adopted, conceptualization and perception of the technology, quantities to purchase and when, efficient utilization of purchased inputs, results obtained and their general economic wellbeing. Since farmer's characteristics differ from farmer to farmer, the type of technologies used would also differ significantly.

For instance, education is a strong factor that could improve the quality of labour and the ability to derive, decode and evaluate information on production technologies. Available empirical evidences show that farmer's socio-economic characteristics such as age, level of education, farm size, farming experience etc are important determinants of farmers' technical inefficiency.

Oladeebo (2006); Osundare (2008) concluded that farmer's socio-economic characteristics affect their inefficiency in the use of modern technology. Socio-economic characteristics such as age, years of schooling, farming experience, farm size etc were specified in their inefficiency model. They found out that old farmers tend to be more conservative and less receptive to modern and newly introduced agricultural technology. Irrespective of the signs, the socio-economic variables specified in the models were significant determinants of inefficiency (inherent) in the use of production technologies.

From the above, the socio-economic background of farmers can negatively, influence, farmers's level of production if care is not taken. This study therefore intends to describe and compare the socio-economic characteristics of maize farmers using different production technologies in the study area with the aim of coming up with the (best) technology that is suitable with farmers socio-economic characteristics.

Hypothesis

Farmers' socio-economic variables had no significant effect on the type of technology used by maize farmers in South West Nigeria.

Materials and methods

The study was carried out in South Western Nigeria which consists of six states namely Ondo, Oyo, Ekiti, Osun, Lagos and Ogun.

A purposive sampling technique was used to select two states (Ondo and Oyo) from the study area. Ondo and Oyo states were purposively selected from the southern states . Two agricultural zones were also purposively selected from the four zones in each state . From each zone, two local government areas were

randomly selected making a total of 8 local governments . Five communities were also randomly selected from each local government making a total of 20 communities . Systematic sampling technique was used to select twenty (20) farmers from the list of different technology users made available by the state ADPs .A total sample size of 311 was used for the study.

Data Analysis

Descriptive statistics consisting of frequency distribution, mean, percentages and mode and inferential statistcs that is ANOVA were used to analyse the primary data.

Results and discussions

Socio-economic Characteristics of maize farmers using different production technologies in South Western Nigeria.

Age, level of education, household size, farming experience, farm sizes, maize output and income levels were the socio-economic characteristics of maize farmers under different production technologies discussed in this study.

Age

As shown in Table 1, the respondents using different maize production technologies fell within different age brackets. With mean ages of 45.4, 49.7 and 51.5 years for farmers using the TT, ST and IT for maize production respectively, the *apriori* expectation that farmers using the TT are usually the aged were found inapplicable. This is probably due to the fact that farmers using St and IT were mostly serving/retired civil servants who could pay for purchased inputs such as fertilizer, tractor services, high yielding seed varieties and herbicides. The age distribution (Table 1) showed that farmers using the TT had no distinctive modal class while the modal class of farmers using ST and IT were 50-59 and 40-49 years respectively. Farmers employing ST and IT were 225 representing 83.9% of pooled farmers while the remaining 86 while TT users.

Level of Education

This is one of the determinants of farmer's awareness, interest and ability in the use of new technologies. Table 2 shows the proportion of farmers that had no formal education was highest among the TT users. For instance 46.51% of them had no formal education while only 12.8% had secondary school and

above education. On the other hand, about 58% of maize farmers using improved technology were literate. Generally, the number of maize farmers that had formal education was high in all the technologies accounting for about 66%. This can be attributed to the fact that some of the maize growers were civil servants and teachers both serving and retired. This educated percentage was high enough to encourage the adoption of improved maize production technologies.

It is interesting to note that although the proportion may be small, illiterate farmers now use improved and semi improved technologies contrary to the earlier reports in adoption studies that farmers with no formal education are conservative and resistant to innovations. This is an indication that extension services were very effective in pursuing the goal of increased maize production in the study area.

Table 1. Age distribution of maize farmers in South-western Nigeria

Class Intervals (Years)	TT		IT		ST		Pooled Data	
	Frequency	percentage(%)	Frequency	percentage (%)	Frequency	Percentage (%)	Frequency	percentage(%)
Less than 30			1	1.6	4	2.5	5	1.61
30-39	17	19.1	5	7.8	24	14.9	46	14.79
40-49	25	29.1	22	34.4	31	19.3	78	25.08
50-59	25	29.1	12	18.8	48	29.8	85	27.33
60-59	13	15.1	18	28.1	43	26.7	74	23.79
Above 70	6	5.8	6	9.4	11	6.8	23	7.40
Total	86	100	64	100	161	100	311	100

Source: Data Analysis

Table 2. Level of formal education of maize farmers in South-western Nigeria

Level of Education	TT		IT		ST		Pooled Data	
	Frequency	percentage.(%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	percentage(%)
No formal education	40	46.51	27	42.2	30	18.63	97.0	31.19
Primary school	35	40.70	20	31.3	60	37.27	115	36.98
Secondary school	6	6.98	15	23.4	51	31.68	72	23.15
Tertiary institution	5	5.81	2	3.1	20	12.42	27	8.68
Total	86	100	64	100	161	100	311	100

Source: Data Analysis

Farming Experience and Cropping System

Results show that the modal class for respondents farming experience lied between 21-30years for farmers using TT and IT while that of ST was between 11-20years (see Table 3). Generally speaking, maize farmers were more experienced in the use of TT than any other type of production technologies. For instance about 33% of them had above 30years of farming experience while

IT and ST were 23.5% and 20.5% respectively. This could be pattributed to the fact that TT had been part of them before improved technologies were introduced. Besides, previous studies have shown that some maize farmers grow traditional seeds alongside with improved because of the inherent qualities in the former (Osundare, 1998). The major reason advanced by maize farmers was that the traditional seeds were cheap and more adaptive to the local environment.

Table 3. Farmers Distribution according to farming experience

Farming Experience (Years)	TT		IT		ST		Pooled Data	
	Frequency	Percentage (%)	Frequency	percentage (%)	Frequency	percentage(%)	Frequency	Percentajge (%)
1-10	16	18.60	14	21.9	32	19.9	72	23.15
11-20	20	23.26	15	23.4	52	32.3	95	30.55
21.30	21	24-42	20	31.3	44	27.3	85	27.33
31-40	18	20.93	2	18.8	22	13.7	42	13.50
41 & above	11	12.79	3	4.7	11	6.8	17	5.47
Total	86	100	64	100	161	100	311	100
Mean	23.6		21.0		20.5			

Source: Data Analysis

With respect to the cropping system, results show that maize was grown sole by some respondents and intercropped with others among different categories of maize farmers interviewed in the two states. Both farmers (sole cropper and inter croppers) gave reasons for doing so. Discussions with the farmer revealed that maize sole crop was common among large scale farmers using improved technologies. For instance, 43.5% of farmers using IT grew maize sole while TT was just about 11%. This is because sole cropping in improved crop cultivation allows the application of other technologies like fertilizer unlike multiple cropping where the type fertilizer suitable for one crop may not be suitable for others on the same crop land.

On the other hand, about 86% of farmers using TT intercropped maize with one crop or another in an attempt to guide against risks of crop loss to drought, meet family food needs, keeps farmers busy and control pests and disease spread.

Household size

A large proportion of the respondents (93.7) were married while the remaining 6.8% were single. The household size typically includes farmer, wives, children and other relations/dependants living with the farmer.

The household size of the respondents was generally large with majority (70%) having 6 members and above (Table 4). Large household could be advantageous in Nigeria's agriculture where there is dependence on family

labour. On the other hand, it could constitute a threat to commercialization of agricultural produce because of increase large household consumption.

Table 4. household size distribution of maize farmers in South-western Nigeria

Household sizes	TT		IT		ST		Pooled Data	
	Frequency	percentage(%)	Frequency	Percentage (%)	Frequency	percentage (%)	Frequency	percentge (%)
0-5	26	30.2	16	25	50	31.1	92	29.58
6-10	47	54.7	38	56.3	87	54.4	170	54.66
11-15	11	12.8	7	10.9	18	11.2	36	11.58
16-20	2	2.3	5	7.8	6	3.7	13	4.18
Total	86	100	64	100	161	100	311	100

Source:Data Analysis

Farm sizes

Farm sizes were generally small but still varied among the different technology users. Findings showed that farm sizes of maize growers in south western Nigeria ranged between 1.00 to 5.0 with mean of 2.92 ha. Considering the farm sizes according to the technology types, it is obvious that the type of technology adopted is a determinant of farm size as the farm sizes differ significantly from technology to technology. For instance the mean farm size among farmers using semi improved technology was 3.62ha, improved technology 2.63ha while half of those using traditional technology had less than 1.0ha (Table 5). It will also be observed that the standard deviations were high in all types of technologies under consideration. The standard deviations were 2.28, 1.51 and 2.33 in TT, IT and ST respectively implying that there was a great dispersion between actual farm sizes and their mean.

Table 5. Farm size distribution of maize farmers in South-western Nigeria

Farming Size (ha)	TT		IT		ST		Pooled Data	
	Frequency	Relative Frequency (%)	Frequency	Percentage (%)	Frequency	percentage. (%)	Frequecy.	Percentage (%)\
<1.00	43	50.0	4	6.39	13	8.10	60	19.29
1.00-2.00	18	20.90	41	64.10	86	53.40	145	46.62
2.01-2.00	4	4.70	7	10.90	9	5.60	20	6.43
3.01-4.00	6	7.00	6	9.40	22	13.70	34	10.93
4.01-5.00	7	8.10	4	6.30	7	4.30	18	5.79
5.01 & above	8	9.30	2	3.20	24	14.91	34	10.93
Total	86	100	64	100	161	100	311	99.99

Source: Data Analysis

Sources and varieties of maize seeds grown

The sources of maize seeds available to farmers are very important determinant of the quality of seed grown and consequently crop performance. In the area of study, ADP was the most common source of seed available to the

respondents growing improved seeds while farmers using TT got their seeds mostly from the market.

The major reason for the low patronage of ADP by the maize seed growers (Table 6) was their inability to meet farmers seed requirements at the on-set of the cropping seasons. Investigations from the ADP confirmed that seed supply was always late. The reason given in addition to logistic problems and bureaucratic red-tapeism was that it was risky to plant when the rain is not yet steady as this may lead to crop failure and seed wastage. Farmers on the other hand, wanted to plant as soon as rain starts so that their maize grains would be ready for sale early enough. This explains the reasons some respondents stored seeds from previous harvest for planting. Another reason given for planting stored seeds rather than making fresh buy was the fear of not having enough money to buy maize seeds at early part of the season. However this practice has been seriously criticized because of likelihood of genetic breakdown.

Table 6. Source of Maize Seeds in South-western Nigeria

Farming Size (ha)	TT	IT	ST	Pooled Data	percentage	Frequency	percentage(%)	
IITA	-	-	10	9.52	40	18.78	18.78	11.68
IAR & T	-	-	5	4.76	10	4.69	15	3.50
Friends	10	9.09	5	4.76	15	7.04	30	7.01
ADP	15	13.64	48	45.71	90	42.25	153	35.75
Market	60	54.55	10	9.52	20	9.39	90	21.03
Other storage	25	22.73	27	25.71	38	17.84	90	21.03
Total	110	100.00	105	99.98	193	99.99	311	100.00

Source: Data Analysis

Only 30 and 15 maize farmers got their seeds from IITA and IAR&T respectively because they claimed the research institutes were not accessible to them. Downy Mildew resistant (DMR) was the most common maize variety grown by the ST and IT users due to the frantic efforts made by seed institutions including National Seed Service (NSS) and ADP (responsible for seed multiplication and distribution) following the incidence of Downy Mildew disease outbreak in Nigeria particularly in Oyo and Ondo States between 1989 and 1990. Majority of the TT users got their maize seeds from the open market.

Maize Growing Seasons

Maize production in Nigeria particularly in the south west is characterized by glut during the raining season and scarcity during the dry season because of inadequate storage facilities. As a result, rational farmers try to avoid the period of glut by planting early or late in order to increase farm income.

There are three groups of farmers identified on the basis of maize growing season observed. They are early maize growers, late maize growers

and farmers who observed the two seasons. The early maize farmers planted between late February and May. Late maize growers planted between July and September. Majority (69.8%) of TT users grew early maize while 11.6% grew late maize. The major reasons given for the preference were:

TT users were inter-croppers who grew more than one crop of different maturity period on a crop field thereby making relay cropping impossible'

Traditional seeds are readily available at the open market and so farmers could plant at their own convenience; Early crops command high market price especially when sold fresh; Soil nutrients are retained at this time before leaching occurs which is a big advantage to the non-fertilizer users; Lower cost of production at this period because the downy mildew disease is not prevalent while the use of fertilizer is unnecessary; Farmers who grow early maize have the opportunity of cultivating late maize, thereby enjoying two maize seasons within a year.

The proportion of farmers growing both early and late maize was higher among IT and ST users probably because improved varieties are early maturing.

Annual income and outputs from maize

The annual income from maize varied from technology to technology as presented in Table 6.The table shows that farmers using IT had the highest level of income from maize. The mean values were ₦39,877, ₦58,677 and ₦46,569 for TT, IT and ST respectively. Although the income from maize is not a good measure of the economic performance of farmers under the different technology types because of the exclusion of total cost, but it gives an impression of the economic well being of those farmers more also that most of them are not technically skillful to carry out an economic analysis of maize production.

The level of outputs in all the technology types were low. The mean outputs were 0.79, 1.70 and 1.02 metric tones per ha for TT, IT and ST users respectively. Although the IT users had the highest yield per ha because of the high yielding maize variety planted but this yield was still small when compared with the potential yield obtainable in the experimental stations and developed countries. According to Usman *et al*. (1992), the mean. actual yield of maize is. 1, 7ton/ha while the mean potential yield is 6.75tons/ha in Nigeria .

Test of Hypothesis

The summary of the results of ANOVA is presented in table 8. The table shows that the null hypothesis concerning the ages of maize growers was

accepted (at 5% level) implying that there were no significant differences in the ages of maize growers under the different production technologies. However, the null hypothesis concerning farm sizes, maize outputs and annual income from maize were rejected (at 5.0% level) implying that there were significant differences in the mean values of these selected parameters under the different production technology types. For instance, there were significant differences between the mean farm sizes under TT (O.7 ha), IT (2.63 ha) and ST (3.62 ha). Similarly, maize growers in south western Nigeria had different yield per hectare depending on the type of- production technology adopted. The reports were the same for mean annual income from maize under the different technology types because the output level would to a large extent determine the annual value of output from maize.

Table 7. Distribution of Maize Farmers According to Annual Income fromMaize Under Different Production Technologies

Annual Income from Maize (₦)	**TT**		**IT**		**ST**		**Pooled Data**	
	Freq	%	Freq	%	Freq	%	Freq	%
<20,000	15	17.4	4	6.3	10	6.2	29	9.3
20,000-39,000	35	40.7	7	10.9	50	31.1	92	29.6
40,000-59,000	20	23.3	11	17.2	62	38.5	93	29.9
60,000-79,000	6	6.97	20	31.3	22	13.7	48	15.4
80,000-99,000	8	9.3	12	18.64	12	7.5	32	10.2
100,000 and above	2	2.3	10	15.6	5	3.1	17	5.5
Total	86	100	64	100	161	100	311	100
Mean Income	39,877		58,677		46,569		47,128	

Source: Data Analysis

Table 8. Yield/Hectare Distribution of Maize Farmers Under Different Production Technologies

Annual Income from Maize (₦)	**TT**		**IT**		**ST**		**Pooled Data**	
	Freq	%	Freq	%	Freq	%	Freq	%
<5000	20	23	-	-	27	16.8	47	15.1
500-799	38	44.2	-	-	31	19.3	69	22.2
800-1099	10	11.6	4	6	31	19.3	45	14.5
1100-1899	6	6.8	6	9.8	90	24.8	52	16.7
1400-1699	10	16.6	6	9.8	16	9.9	43	13.8
1700-1999	2	2.3	-	-	7	4.3	9	2.9
2000-2299	-	-	16	18.6	4	2.5	20	6.4
2300-2599	-	-	5	8.2	1	0.6	6	1.9
2600-899	-	-	10	16.4	3	1.9	13	4.2
2900 and above	-	-	6	9.8	1	0.6	7	2.3
Total	86	100	61	100	161	100	311	100
Mean Income	0.79		1.70		1.02		1.13	

Source: Data Analysis

Table 9. Summary Result of ANOVA on Selected Socio-Economic Characteristics of Maize Farmers Under Different Production Technologies

Type of Technologies and F-values	Age and Mean Values	Farm size (ha) Mean value	Maize output (ton) mean Value	Mean Annual Income from maize (₦)
TT	45.4	0.7	0.77	39,877
IT	51.5	2.63	1.70	58,671
ST	49.7	3.62	1.02	46,569
F-calculated	2.129	324.50	11.690	112.0
F-tabulated	3.047	3.01	4.661	3.10
Decision	Accepted	Rejected	Rejected	Rejected

Source : Data Analysis

Conclusion and Policy implications of Findings

The study described and compared the socio-economic characteristics of maize farmers under different production technologies. It showed that maize farmers using different production technologies differed greatly in the selected parameters. The type of technology adopted by farmers greatly influenced some. of their socio-economic characteristics and vice versa. The socio-economic characteristics like age, level of education, household size and farming experience influenced the type of production technologies maize farmers adopted. On the other hand, some parameters such as farm size, level of output, income from maize farming and maize growing seasons depended on the production technology used by farmers. Maize production depended solely on rain thereby limiting the growing seasons. River Basin and rural Development should make artificial water available to elongate the growing reasons.

Contrary to apriori expectation, there were no significance difference in the mean ages of farmers using the three technology types implying that both young and old farmers used all the technology types. However maize farmers differed significantly in their farm sizes, level of output and annual income notwithstanding, the level of income and outputs were highest among the improved technology users. The fact that the proportion of farmers using semi-improved technology in south west Nigeria was highest implies that maize farmers in south west Nigeria were in the transition period of adoption probably on the paths to modern agriculture. In this wise, the use of improved production technologies should be more vigorously pursued in the region so as to encourage more farmers into total adoption of improved technology. The extension arm of the ministry of agriculture should be strengthened and the

existing service centres invigorated so that farmers will desist from using stored seeds that are likely to breakdown genetically when planted year in year out. Based on these findings, efforts to promote expansion and commercial maize production should be targeted at improved production technology which has shown to exhibit good economic attributes.

References

Aken'ova, M.E. (1987). "Agronomy Working Paper Nigerian Tarrif Review Study, Fed. Min. of Agric. Lagos.

Akinyosoye, V.O. (1988). "Rates of Protection in Nigerian Agriculture under the New Foreign Exchange Trade and Pricing Regimes, Circal 987 Dept of Agric. Economics, University of Ibadan (mimed)

Oladeebo, J.O. (2006). Economic Efficiency of Rain, Food Upland Rice Production in Osun and Oyo States of Nigeria. Unpublished Ph.D. Thesis in the Dept. of Agricultural Economics and Extension, FUT, Akure, pp. 104.

Ogala, Emmanuel (2011). Nigeria to Raise Maize Production by 12million tons Annually Daily Times September13, 2011.

Osundare F.O. (1998). Analysis of the Demand for Certified Rice and Maize Seeds in Ondo State. Unpublished Masters Thesis Submitted to the Dept of Agricultural Economics and Extension, FUT, Akure.

Osundare, F.O. (2008). Comparative Efficiency of Maize Production Technologies in Southwestern Nigeria. Unpublished Ph.D Thesis at the Department of Agricultural Economics and Extension, Federal University of Technology, Akure

Usman, I.A., Maini, N.S., Joshua, A. and Falusi, A.O. (1992). Strategies for National Seed Subsector Development Plan, National Seed and Quarantine Project Report, National Seed. Service, Federal Department of Agriculture, pp. 7.

(Received 23 July 2013; accepted 31 August 2013)