

# INFLUENCE OF HOUSEHOLD AND FARM - RELATED CHARACTERISTICS ON FARM ENTERPRISE PRODUCTIVITY: THE CASE OF GUINEA CORN IN OKENE AND KOGI LGAS OF KOGI STATE, NIGERIA

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## Abstract

To raise the productivity of guinea corn farmers' require an insight into those factors that exert a positive and significant push on farmer productivity. The geographical setting of this study was Okene and Kogi LGAs of Kogi State, Nigeria. Data was collected from 114 guinea corn producers randomly sampled from 4 communities. Data analysis reveals that age ( $b = -0.303$ ), education ( $-0.321$ ), sex ( $0.254$ ) and farming status ( $0.300$ ) were important determinants of respondents' productivity level. The average yield and productivity levels of the producers were 533kg and N4.0 respectively. Respondents productivity was constraint by important factors namely poor road network (3.82), non - availability of farm chemicals (2.65) and pest/disease infestation (2.53). Improvement of farm - market road linkage and provision of farm chemicals were among proposed recommendations.

## Introduction

Regardless of the importance of the oil sector to the Nigerian economy, the development of the agricultural sector remains crucial to the attainment of a balanced economic growth and development. One objective of the agricultural development is to expand the production base of farmers and facilitate domestic output and productivity increases (Faltisi, 1990; and Njoku, 1995).

It is asserted that unless farmers' efficiency or productivity is enhanced agriculture will continue to occupy a low relevance in national economic development, as an engine for stimulating rural economic empowerment and as a strategy for poverty alleviation among rural dwellers (Olayide and Heady, 1982).

Theoretical considerations have shown that productivity is affected by several factors, and these can be grouped into five. These are climatic factors (i.e. weather conditions e.g. rain, temperature, wind, humidity), soil/edaphic factors (soil texture, structure and fertility), biotic factors (living organisms e.g. pest, parasites, diseases and soil micro organism), technical or farm - related factors (farm implements, transport, lack of amenities, size of available farmland, capital, labour type and availability) and social factors (e.g. farmers' personal characteristics such as education, age, sex, size of household, prevailing attitude towards farming, government policies, level of rural development i.e. availability of rural infrastructures (Adegeye and Dittoh, 1985; and Omoruyi and Orhue, 1999).

Efforts have been made by soil and crop scientist to examine the influence of climatic (Ighalo *et al*., 2001), edaphic (Odewale and Eke, 2000; Omoregie *et al* 2001) and biotic factors (Onolemhenmhen, 2000) on crop productivity. There have been few attempts to investigate the influence of social and farm - related factors on farm productivity (Rahji, 2001; Omoroghee and Onemolease, 2004). None of these studies addressed guinea corn production.

Guinea corn and millet are the most important cereals in West Africa accounting for almost 70% of total cereal production (Axtell, 1998). The crop is an important staple across the Sahelian agro - ecological belt of West and Central Africa, and is grown by millions of resource - poor, mainly subsistence farmers. Despite its importance its productivity (mean yield is about 800kg/ha) has remained low even though the land area used for its cultivation has increased (Atokple, 2004). The authors note that in Nigeria, while the land area increased from 2.70 million ha between 1979/81 to 5.70 million ha between 1992/94, the yield (tonnes/ha) declined from 1.22 to 1.07 in the same time period respectively.

These figures are worrisome and call for an investigation into factors affecting guinea corn production with a view to promoting productivity increases. Hence the specific objectives of the study- are to:

1. Examine the household and farm - related characteristics of guinea corn producers in the study area.
2. Ascertain the farmers' level of production vis -a-vis output, yield and productivity levels.
3. Determine the cost/benefit analysis of guinea corn production.
4. Identify production limitations of the farmers in the study area.
5. Determine the important household and farm - related factors affecting farmers' productivity.

### **Hypotheses of Study**

1. Household characteristics of respondents have no significant influence on their productivity.
2. Farm - related characteristics of respondents have no significant influence on their productivity.

### **Materials and Methods**

Okene and Kogi Local Government Areas (LGAs) of Kogi State are areas known for guinea corn production. The major producing areas in each LGA are Okene, Obehira, Agasa and Ege (Okene LGA), and Koton - karfe, Adura, Geguleki and Giriyan (Kogi LGA).

A random sample of 3 communities was made in each Local Government Area (LGA). Thus Koton-Karfe, Giriyan and Adara were sampled from Kogi LGA while Okene, Agasa and Ege were sampled from Okene LGA. Selection of respondents was made by a random selection of 20% of farmers registered with the Agricultural Development Programme (ADP). This yielded a total 124 sample units i.e. Koton-Karfe (25), Giriyan (20) and Adara (23), Okene (21), Agasa (18) and Ege (17).

To this end, 124 respondents were administered the data collection instrument. The assistance of ADP extension workers was sought in this regard. The validity of the instrument was verified through experts' judgment. The reliability of the instrument was, ascertained through the test -retest method on a sample of 25 farmers in a community not included in the final sample.

The data collection period lasted for about 2 months i.e. early February to late March, 2004. Only 109 of the 124 administered question instrument were found useful. Data analysis was accomplished through frequency counts, mean scores and multiple regression analysis.

### **Model Description (Multiple Regression)**

The model was used in evaluating the effect of farmers' household and farm - related characteristics on productivity. The interrelationship between these variables is specified as  $Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n + e$

Where:

Y = productivity (value of output divided by value of inputs)

X<sub>1</sub> = household size (number of people living together and feeding from same pot) X<sub>2</sub> = age  
(measured in years)

X<sub>3</sub> = education (years)

X<sub>4</sub> = sex (dummy: female= 0; male=1)

X<sub>5</sub> = marital status (dummy: married = 1; single = 0)

X<sub>6</sub> = farming experience (years of involvement in guinea corn production)

X<sub>7</sub> = farm size (size of farm holdings in hectares)

X<sub>8</sub> = farming status (full - time farmers = 1; part - time = 0) a =

intercept

e = error term which accounts for measurement errors in (Y)

Four functions (linear, semilog, double-log and exponential) were evaluated in terms of the magnitude and statistical significance of adjusted R<sup>2</sup> (given by the F value), the significance of the individual coefficients (indicated by the t values), the logical signs of the coefficients and the standard error of the regression equation to select the best fit or most appropriate function as suggested by Olayemi (1998).

### Variable Measurement

1. Production constraints: this was measured on a 4 -point likert scale with a range of 'very serious' (coded 4), 'serious' (3), 'not serious' (2) and 'not very serious' (1). The mean value was used in ranking the constraints in order of seriousness.
2. Profit: income from guinea corn sales less total expenses
3. Productivity: a measure of efficiency; it is given as the ratio of value of output to value of inputs
4. Yield: ratio of output to size of production unit (farm)

### Results and Discussion

**Table 1: Household Characteristics of Respondents (N = 109)**

Variables	Categories	Frequency	Percent
Age Range	<26 yrs	2	1.8
	26-35	25	22.9
	36-45	30	27.5
	46-55	19	17.4
	>55yrs	33	30.3
	mean	47.7	
Education range	no school	35	32.1
	incomplete primary	11	10.1
	complete primary sell	30	27.5
	incomplete sec sell	10	9.2
	complete sec sch	23	21.1
Sex	female	7	6.4
	male	102	93.6
Marital status			
	married	100	91.7
	divorced	7	6.4
	widow/widower	2	1.8
Household size	4 and below	22	20.2
	5-9	44	40.4
	10-14	25	22.9
	>14	18	16.5
	Mean	8	

Field Survey, 2004.

Household characteristics of guinea corn producers are presented in table I. The results for age reveals that a greater proportion of the farmers (27.5%) lie within the 36 - 45 years age bracket. With an average age of about 48 years the farmers can be described as old. Otumanra (2000) classified farmers above 45 years as old. This finding supports Ekong's (2003) assertion that most farmers in the rural areas are old because of the out - migration of youths to urban centres in search of white - collar job opportunities.

Their educational level, with the modal range falling in the no formal education experience (32.1%), suggests that majority were illiterates. Similar findings have been obtained by other researchers regarding the educational status of farmers in other states in the country (Abiodun *et al*, 2000; Agbamu, 1993). A poor formal educational background tends to limit the receptivity of farmers to improved farming technologies.

The dichotomy in frequency status for sex strongly suggests that guinea corn production is a male affair. Almost 94% of the respondents were male with female constituting just 6% of the total sample. This result probably implies that female farmers play little role in guinea corn production in the study area. Almost all the farmers interviewed were married with a percentage of 91.7%, with the average household being 8. Members of the farming household constitute an important and costless source of labour which if availed by the farmer can reduce production cost and enhance profit margins.

**Table 2: Farm - Related Characteristics of Respondents (N = 109)**

Variables	Categories	Frequency	Percent
Farming Experience	<4 yrs	11	10.1
	5-8	33	30.3
	9-12	19	17.4
	>12	46	42.2
	Mean	10	
Farming Status	part - time farmer	21	19.3
	full - time farmer	88	80.7
Farm Size (ha)	0.5 and below	1	.9
	0.6 - 1.0	8	7.3
	1.1-1.5	22	20.2
	1.6-2.0	15	13.8
	2.1-2.5	24	22.0
	>2.5	39	35.8
	Mean	2.07	

Field Survey, 2004.

Table 2 shows the farm related characteristics of respondents. The results of the table indicate that the respondents have been growing guinea corn for about 10 years with more than 12 years being the modal class (42.2%). The fact that the farmers have been growing the crop for a decade shows how important the crop is to their livelihood. Its importance is further amplified by the knowledge that 81% of them are full - time farmers i.e. depend solely on the produce from their farms. Thus any interventionist programme targeted at their farm enterprise will greatly improve their welfare. The farm scale operated by the average guinea corn farmer is about 2 ha which is small. This may probably limit their productivity.

**Table 3: Cost/Benefit Analysis of Guinea Corn Production (Per Annum)**

S/N	Variables	Minimum	Maximum	Sum	Mean	Std. Deviation
A	Total fixed cost	300.00	5600.00	200450.00	1839.0	946.6
B	Variable cost					
i	Planting materials	60.00	25000.00	384330.00	3526.0	6415.6
ii	Labour cost	.00	60000.00	765350.00	7021.6	11713.4
iii	Fertilizer cost	.00	14000.00	287900.00	2641.3	2859.2
iv	Herbicide/pesticide cost	.00	10800.00	259050.00	2376.6	3378.3
v	Transport cost	.00	10000.00	262350.00	2406.9	3203.3
	Total variable cost	1560.00	97800.00	1962580.00	18005.3	22475.5
C	Total cost	2360.00	100450.00	2163030.00	19844.3	22871.4
D	Income	8800.00	150000.00	5279050.00	48431.7	41722.8
E	Profit	600.00	104190.00	3116020.00	28587.3	27339.2

Field Survey, 2004.

To determine the profitability of guinea corn production in the study area Table 3 reflects the production costs and economic benefits. The minimum, maximum and mean expenditures and returns of the variables are indicated. The results show that total fixed and variable costs expended by the average farmer was £41,839.0 and £41 8,005.3 respectively. The most important cost items were labour cost (£47,021.6) followed by planting materials (£43,526) and fertilizer (£42,376.6). The average income was £448,431.7. The small profit margin (£428,547.3) suggest that the farmers were involved in the production of other crops since the value is too little to sustain them for the year. This result has shown that guinea corn production is profitable though the profit margin was small.

**Table 4: Output, Yield and Productivity of Respondents**

Variables	Minimum	Maximum	Sum	Mean	Std. Deviation
Output (kg)	160.00	10000.00	118866.00	1090.51	1487.9
Yield (kg)	57.143	3571.429	58122.18	533.23	633.6
Productivity	1.02	15.11	427.45	3.9	3.1

Field Survey, 2004.

The mean production (output) by respondents was 1090.5 kg while the average yield was 533.23 kg (Table 4). An analysis of farmers' productivity indicates the average productivity was about £44 (i.e. 3.9) with a range of £1.02 to £15.11. This implies an efficient utilization of production resources by the farmers. The productivity value means that every £41.0 invested in guinea corn production yields an economic benefit of almost £44.0.

**Table 5: Factors Affecting Productivity Level of Guinea Corn Producers (Multiple Regression)**

Explanatory Variables	Standardized Coefficients	T - Value	Probability Level
Constant		6.537	0.000
Education	-0.321	3.079	0.003
Age	-0.303	2.207	0.030
Farming status	0.300	2.468	0.015
Sex	0.254	2.182	0.031
Marital status	-0.208	1.747	0.094
Farming experience	0.130	0.783	0.435
Household size	-0.090	0.722	0.472
Farm size	0.060	0.481	0.632
<i>Statistics</i>			
F statistic	3.876		
Adjusted R <sup>2</sup>	0.487		
S. E.	0.657		

To determine those household and farm - related factors that have a significant influence on productivity levels the multiple regression analysis was done (Table 5). The semi-log regression function (by taken the natural log of Y, the dependent variable) was considered the best - fit model and subsequently chosen as the lead equation. The reliability of the model is given by the F statistic (3.87). The adjusted R square value (0.487) indicates that the explanatory variables account for about 49% variation in respondents' productivity.

Age (b = -0.303), education (b = -0.321), sex (b = 0.254) and farming status (b = 0.300) were important determinants of farmers productivity being significant at the 5% probability level. The interpretation of the beta coefficients is as follows:

Age: productivity is enhanced by as much as 30% when there is a unit reduction in age. Thus younger farmers were considered more productive than older farmers. This finding is rational since younger farmers are assumed to be more energetic than older farmers.

Education: the results for education suggest that farmers with lower education background were more productive than the educated ones at a rate of about 32%. An explanation for this could be that the educated farmers take guinea corn production as a part - time or secondary occupation and may therefore not have invested sufficiently in its production unlike the full - time farmer whose livelihood depends on it. Education is expected to facilitate productivity increases as it promotes improved technology adoption which enhances farm productivity (Falusi, 1990).

Sex: productivity is enhanced by as much as 25.4% when the farmer is a male. A reason for this observation may be because only few females were involved in guinea corn production in the study area (see Table 1). A similar result was obtained by Rahji (2001). Other reasons adduced for women low level productivity in agriculture include limited access to productive resources such as land, credit and technologies (Olawoye and Didomenico, 1993; Agboola, 1990).

**Table 6: Production Limitation of Respondents**

Variables	Mean	Std. Deviation	Rank
Poor road linkage	3.82*	1.27	1
Inadequate capital	3.31*	1.23	2
Low market price	3.00*	1.33	3
Lack of farm chemicals	2.65*	1.22	4
Pest/disease attack	2.53*	1.27	5
Theft of produce	2.49	1.18	6
Low yield	2.46	1.08	7
Poor storage	2.46	1.22	7
Inadequate labour	2.45	1.25	8
Inadequate farmland	2.21	1.50	9

Field Survey, 2004.

Table 6 shows the drawback on guinea corn farmers. Five (5) items were considered serious by the respondents. These are poor road infrastructure (with a mean value of 3.82), inadequate capital (3.31). low market price (3.0), non - availability of farm chemicals (2.65) and pest/disease infestation (2.53). Such limitations usually exert a downward push on respondents' productivity level.

## Conclusion

To boost the productivity of guinea corn in the study area and ultimately in the country require an

understanding of those factors that exerts a positive push on farm enterprise productivity level. The low profitability of guinea corn producers is likely to limit and discourage other farmers or individuals from engaging in its production. Those already involved may be reluctant to produce the crop at a larger scale. Thus the potential income and improvement in personal and community welfare that could have accrued to these farmers will be lost.

### Recommendations

The study thus recommends the development and targeted focus of guinea corn production programme by the relevant state and federal agencies. While not neglecting other socio — economic groupings, the programme should focus on those farmers who recorded low productivity. These include the educated, older, part - time and female farmers as shown by the result of multiple regression.

More women should be encouraged to engage in guinea corn production as an economic empowerment strategy as well as to improve their contribution to its production.

Guinea com production was seriously constrained by several factors ( fable 6). The study therefore proposes that relevant government agencies should improve conditions of existing road network to facilitate farm - market produce transportation. Efforts should equally be intensified to make farm chemicals available to the farmers to boost soil fertility and reduce pest/disease incidence. Capital constraint can be ameliorated when fanners organise themselves into cooperatives to pool their financial resource.

### References

- Abiodun, A.A.; Oluwole, O.O.; Adewumi, F.A.; Ogundele, B.O.; Bakare, I.O.; Balogun, S.A.; Ahmed, S. and L. Agidi, (2000). Adoption of Homestead Grain Storage Technology in the Southeast Agricultural Zone of Nigeria. *Journal of Environmental Extension / (1)*, 82 - 88.
- Adegeye, A.J. and Dittoh, .I S. (1985). *Essentials of Agricultural Economics*. Ibadan: Impact Publishers Nig. Ltd.
- Agbamu, J.U. (1993): Analysis of Fanners' Characteristics Associated With Adoption of Soil Management Innovations in Ikorodu Local Government Area of Lagos State. *Nigeria Journal of Rural Extension and Development 1 (2)*, 51 - 67.
- Agboola, T. (1990). The Participation of Rural Poor in Rural Development: A Theoretical Construct *Nigeria Journal of Economic and Social Research 30 (2)*. 1 67 - 1 76.
- Ajani, O.I.Y. and Olayemi, J.K. (2000). Relative Efficiency of Food Crop Farmers in Oyo North Area of Oyo State, Nigeria: A Profit Function Analysis. *Journal of Rural Economics and Development 14 (3)*, 151 - 170.
- Atokple, I.D.K. (2004). *Sorghum and Millet Breeding in West Africa in Practices*. Ghana: Savanna Agricultural Research Institute.
- Axtell, J.D. (1998). Opening Comments. In *Proceedings of the West African Hybrid Sorghum and Pearl Millet Seed Workshop in Sept. 25<sup>th</sup> - October 2<sup>nd</sup>*. Palaise de Congress. Niamey. Niger.
- Chaiyanu, J.N.; Atobatele, J.T. and Akintola, J.O. (2001). A Comparative Analysis of Labour Productivity in Cassava/Maize Production Under Different Fallow Systems in Southwest Nigeria. *Nigeria Agricultural Development Studies Journal 2 (1)*, 97 - 109.
- Ekong, E.E. (2003). *An Introduction to Rural Sociology*. Uyo: Dove Educational Publishers.
- Falusi, A.O. (1990): Promoting Small Scale Agriculture Sector in Nigeria: The ADP Experience A *Valedictory Lecture Delivered at the University of Ibadan*. Ibadan.
- Ighalo, S.O.; Omoregie, A.U. and Ofotokun, M. (2001). Preliminary Evaluation of Vegetative Characters and Yield Performance of Rice Cultivars in a Tropical Flumid Zone of Edo State. *Journal of Applied Science 4 (2)*, 1766 - 1771.
- Njoku, Z.C. (1995). Sustainable Rural Development in Nigeria: A Challenge for Education in Science and Technology. In Eboh, E.C.(Pp. 37-48): *Rural Development in Nigeria: Concepts, Processes and*

*Prospects*. Enugu: Century Publishers Ltd,

- Odewale, J.O. and Eke, C.R. (2000). Effects of Nitrogen Potassium Concentrates and Ratios on Callogenesis of Oilpalm (*Elaeis guineensis* Jacq.) Leaf Explants. *The Nigeria Journal of Agriculture and Forestry* 1(1), 9-18.
- Olawoye, J.E. and Didomenico, C.M. (1996). Empowerment for Rural Women. In Layi, F.; Babatunde, O. and Olawoye, J.E. (Eds.) *Women's Empowerment and Reproductive Health*. Ibadan: Book Craft Ltd:
- Olayemi, J.K. (1998). *Elements of Applied Econometrics*. Ibadan: Elshaddai Global Ventures Ltd.
- Olayide, S.O. and Heady, E.O. (1982). *Introduction to Agricultural Production Economics*. Ibadan: University of Ibadan Press.
- Onolemhenmhen, P.O. (2000). Oviposition Patterns of Tomato Fruitworm (*Helicoverpa armigera*) Hubner on Tomatoes in Nigeria. *Nigeria Journal of Economic and Social Research* 30 (2), 167 - 176.
- Omoriegbe, A.U.; Ifejokwu, V.C. and Ogedegbe, F. (2001). Evaluation of Cocoa Soils for Food Crop Production in Nigeria. *Journal of Applied Science* 4 (2), 1823 - 1829.
- Omorogbee, F.E. and Onemolease, E.A. (2004). Empirical Analysis of Factors Affecting Productivity among Fadama Farmer in Edo South Zone of Edo State, Nigeria. *Journal of Social and Policy Issues* (in press).
- Omoruyi, S.A. and Orhue, V.X. (1999). *Prescribed Agricultural Sciences*. Benin City: Iddoh Umeh Publishers.
- Otumara, J. (2000). Youth Harassment. Paper Presented at the *Awareness and Re-Orientation Seminar for Youths of Oil Producing Communities of Delta State Organized by Shell Petroleum Development of Nigeria* 26<sup>th</sup> June, 2000 6 Pp.
- Rahji, M.A.Y. (2001). Gender Productivity Differentials and Returns to Schooling in Farm Households in Southwestern Nigeria. *Nigeria Agricultural Development Studies Journal* 2 (1), 13-22.