SOCIOECONOMIC FACTORS INFLUENCING RICE PRODUCTION IN NIGER STATE, NIGERIA

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ABSTRACT

This paper investigated the factors influencing rice production in Lavun Local Government Area of Niger state. The specific objectives of the study were to describe the personal and socio-economic characteristics of the farmers, identify rice production constraints, and determine factors associated with rice production. Purposive and random sampling procedures were used to select 100 respondents used for the study. Validated and structured interview schedule was used to elicit quantitative data. Frequency counts, percentage distribution, mean and standard deviation were used to summarize and describe the data collected, while correlation and regression analyses were used to make analytical deductions. Findings revealed that 92 percent of the rice farmers were male, mean age was 45 years and majority (89%) were married The land ownership pattern showed that 68 percent obtained their farm through inheritance and about 70 percent sourced finance through personal saving, with no farmer borrowing from Nigeria Agricultural Co-operative and Rural Development Bank (N.A.C.R.D.B). The constraints faced by the farmers include lack of capital, problems of input procurement, lack of adequate extension services and drought problem being the major one. While the correlation analysis indicated that significant relationships exist between output of rice and all the variables considered in the analysis at $p<0.01$, the regression analysis further showed that only years of formal education, farm size and use of improved/quality seeds significantly influenced the output of rice production at $p \leq 0.05$. Thus, in order to boost local rice production and enhance food security in Nigeria, prominence should be given to these three variables.

Key words: Rice, production, food security, regression, Niger state.

INTRODUCTION

Nigeria is the most populous country in Africa, with a population of over 140 million people (NPC, 2006). Its domestic economy is dominated by agriculture, which accounts for about 40% of the Gross Domestic product (GDP) and engages two-thirds of her labour force. Agriculture supplies food, raw materials

and generates household income for the majority of the people. The major food crops produced in Nigeria are: Cereals (sorghum, maize, millet, rice, wheat); tubers (yam, potatoes and cassava); legumes (groundnut, soybean and cowpeas) and vegetables. These commodities are of considerable importance for food security (Akande, 2002).

Of all these commodities, rice consumption has been on the increase since the 1970s to date, which has made this staple food assume position of prominence at the household level. For instance, Akpokodje et al. (2001) reported that, due to increasing population growth rate (2.8% per annum) and increasing per capita consumption (7.3% per annum), rice consumption has risen tremendously by 10.3% per annum. FAO (2002) argued that, only 3% of the increase in rice consumption can be explained by population growth, with the remainder, being natural shift in diet towards rice at the expense of the coarse grains (millet and sorghum) and wheat, and other traditional staples such as gari and yams. A major reason for the continued increase in rice consumption is that it is no longer a luxury food in Nigeria, and that it has become a major source of calories for the urban poor, adding that the poorest third of the urban household obtained 33% of their cereal-based calories from rice (FAO, 2002).

According to Osiname (2000), Nigeria is West Africa's largest producer of rice, producing an average of 3.2 million tonnes of paddy rice for the past 5 years. Consistently during the period of 2000-2003, Kaduna State was the largest producer of rice, accounting for about 22% of the country's annual production of rice, followed by Niger state (16%), Benue state (10%) and Taraba State (7%). Despite Nigeria's potential capacity to be self-sufficient in rice production, as virtually all ecologies in the country are suitable for rice cultivation, domestic production has never been able to meet local demand, as only a limited proportion of the locally grown rice is available for key urban markets. Predictably, rice is thus largely imported in order to meet consumer demand both in urban and rural areas, which, according to FAO (2000), has increased from 2,630 metric tonnes in 1970 to 1.876 million tonnes in 2002. Quantifying rice imports in monetary terms, Akpokodje et al. (2001) asserted that, about $4 billion was spent on rice importation alone between 1961 and 1990, giving an annual average of $102 million, during the period. In addition, they found out that, whereas Nigeria spent only about $100,000 on rice importation in 1970, the value of rice imports had increased to $259 million by 1999.

In January 2001, the Nigerian government raised the rice import duty on rice from 50 percent to 75 percent in order to protect local producers. Despite this laudable attempt, Akande (2002) submitted that, rice imports still accounts for approximately one third of Nigeria's rice supplies, with import quantity and value, on annual basis currently above 1,000,000 metric tonnes and $300million respectively. This importation, as earlier noted, becomes unavoidable as the gap between consumption demand and local production continues to widen.

Inevitable increase in food demand, because of population growth, has been demonstrated to be capable of exerting enormous pressure on the food security status of a country (Christiaensen et al., 1995; Jourbert et al., 1999). To close this gap between consumption demand and local production of rice and attain food sufficiency while at the same time, ensure that the hard earned foreign currency spent on rice importation is saved for use in other sectors of the economy, the Federal Government of Nigeria have persistently intervened in the rice sector over the past few decades. Recent of such intervention is the introduction of improved rice variety (R-Box) innovation initiative to farmers in Nigeria. The R-box initiative, according to Akinola and Adeyemo (2008), is a private-

public collaboration focussed at improving the productivity of small-scale rice farmers through reduction of high labour cost and drudgery.

In spite of these interventions, and notwithstanding Nigeria potential capability to produce enough rice for local consumption as well as export abroad, the situation has not significantly improved. Rice importation is yet to be greatly reduced in Nigeria. What then are the factors influencing rice production at farmers' level in Nigeria? Thus the main objective of the study was to analyse the factors that influenced rice production in Niger state, Nigeria, with a view to boosting local production; thereby reducing the hitherto heavy reliance on importation in meeting consumption demand. The choice of Niger state was deliberate and appropriate being the second largest producers of rice in the country, as earlier reported. The specific objectives of the study were to describe the personal and socio-economic characteristics of the farmers, identify rice production constraints, and determine factors associated with rice production

MATERIALS AND METHODS

Study area

Niger state lies between latitude 80 and 110 30' N and longitude 3030' and 6033' E. The state is situated in the middle belt zone of the country and has population of 3,950,249 (NPC, 2006). The total land area is about 85,733.17 km2, which represents about 9.3% of Nigeria's total area. Over 80% of the land is arable. The State experiences distinct wet and dry seasons, with annual rainfall varying from 1600mm in the southern part to 1100mm in the northern part. The maximum temperature is usually not more than 37.5oC (recorded in March) and minimum temperature about 30.2oC (recorded between December and January). The rainy season lasts for about 5 months (between April and October). The common crops grown in the State include maize, yam, vegetables , rice, groundnut and guinea corn, among others. Fruits such as tomatoes, pepper, melon, and okra are grown in large quantity.

Sample and sampling procedure

The population of the study comprised rice farmers in Lavun Local Government Area of Niger state, Nigeria. Purposive and random sampling procedures were used to select the sampled respondents. Five villages, Doko, Gaba, Jima, Manbe and Tafya, known for rice production were purposively selected. Twenty rice farmers were then selected from each village using simple random sampling technique. A total of 100 respondents were selected and interviewed using validated and structured interview schedule. Data were collected on personal and socio-economic characteristics of the respondents, rice input related characteristics and constraints militating against rice production amongst others.

Measurement of variables and data analysis

Variables such as sex, marital status, educational status, source of land for farming, sources of finance and labour source were measured at the nominal level. Other variables, including age, household size, years of farming experience, and farm size were measured at ratio level; and then grouped for descriptive purposes. Descriptive statistics, such as frequency counts and percentages, mean and standard deviation, were used in describing and summarizing the data collected. Use of equipment/machinery, improved/quality seed and agrochemicals were measured by scoring farmers who used them 1, and others who did not use them 0. Correlation analysis was used to establish relationship between rice output and independent variables of the study while regression analysis was used to identify which of the independent variables significantly influenced rice production.

The regression model relating the variables or factors associated with the output of rice is shown below:

$Y = a0 + b1x1 + b2x2 + b3x3 + b4x4 + b5x5 + b6x6 + b7x7 + b8x8 + b9x9 + b10x10 + bnxn$ ..... (1)

Where

a0 = model constant;
x1 = age (years)
x2 = family size (number of persons)
x3 = years of formal education (years)
x4 = years of farming experience (years)
x6 = labour (man days)
x7 = quantity of fertilizer (kg)
x8 = use of equipment and machinery (1 = used, 0 = not used)
x9 = use of improved/quality seeds (1 = used, 0 = not used)
x10 = use of agrochemicals (1 = used, 0 = not used)
Xn = error term

RESULTS AND DISCUSSION

Demographic and socio-economic characteristics of respondents

Results of personal and socio-economic of respondents in Table 1 show that majority (92%) of the respondents were male while very few females (8%) were directly involved in primary production. Others may be engaged in rice processing and marketing. The modal age of the farmers ranged from 41-50 with 45% of the respondents in this category, with a mean age of 45years. This result implies that the average farmer in the study area were in their prime production age and could still engage in rigorous rice cultivation activities.

Results also indicated that 89 percent of the respondents were married, 5 percent single while 6 percent were either widow or widower. The mean family size was 8..The results indicate that majority of the respondents (totalling 72%) had large household size, with 6 and 15 members. This is a potential source of labour for the respondents in rice production.

8 percent of the respondents had no formal education. 23 percent had adult education and 10 percent had Qur'anic education. Another 21 percent had primary education, 22% had secondary education and 16% had tertiary education. A total of 92% of the respondents had some kind of education. This is an important finding, because education tends to make farmers more responsive and willing to adopt innovations, which will ultimately lead to increase in farm productivity. The mean year of farming experience was 19.2 years with standard deviation of 2.4 years. The results indicate that the farmers had sufficient farming experience in rice production.

Input related characteristics

Data in Table 2 show that five percent of the respondents had farm sizes ranging between 0.1 and 2 ha while 12 percent had between 2 and 4 ha. The remaining (83%) cultivated above 4 Ha of land. The average farm size cultivated was 5.6 Ha. Majority (68%) of the farmers got their land through inheritance, 20 percent cultivated community owned land, 9% made use of rented land while 3% used purchased and borrowed land. About 54 percent made use of both family and hired labour, 26% made use of family labour only, 7% made use of hired labour only and 13% made use of communal labour. In the study area, family and hired labour were very critical for rice production.

Table 1: Personal and socio-economic characteristics of respondents (%)

Variables	Frequency (N =100)	Percentage (%)
Sex		
Male	92	92
Female	8	8
Age		
21 – 30	5	5
31 – 40	24	24
41 – 50	45	45
51 – 60	23	23
Above 60	3	3
Mean	45	
Standard deviation	9	
Marital status		
Single	5	5
Married	89	89
Widowed	6	6
Household size		
Number of individuals		
1 – 5	26	26
6 – 10	54	54
11 – 15	18	18
Above 15	2	2
Mean	7.8	
Standard deviation	3.6	
Educational level		
No formal education	8	8
Adult	23	23
Quranic	10	10
Primary education	21	21
Secondary education	22	22
Tertiary education	16	16
Farming experience (yrs)		
1 – 5	12	12
6 - 10	4	4
11 – 15	23	23
16 – 20	29	29
Above 20	32	32
Mean	16.3	
Standard deviation	6.5	

Source: Field survey, 2007

70 percent of the respondents made use of their personal savings, 14% sourced fund from relatives and friends, 11% from co-operative society, and 5% of the respondents from village money lenders. No farmer obtained fund from the Nigeria Agricultural Co-operative and Rural Development Bank (NACRDB). This could be due to the small nature of farm holdings or due to absence of collateral security demanded by the banks before granting loan to the farmer. 60 percent of the respondents bought fertilizer from Niger State Agricultural Development Project, 12 percent from the Local Government Area and 38 percent of the respondents obtained fertilizers from local contractor at a very exorbitant prices.

Table 2: Showing Input related characteristic of respondents

Variables	Frequency	Percentage
Farm size (Ha)		
Below 2.00	5	5.0
2.00 – 4.00	12	12.0
4.00 – 6.00	39	39.0
6.00 – 8.00	36	36.0
Above 8.00	8	8.0
Mean	5.6	
Source of land for farming		
Inherited	68	68.0
Purchase	1	1.0
Rented	9	9.0
Community owned	20	20.0
Borrowed	2	2.0
Source of finance		
Personal saving	70	70.0
Relative and friends	14	14.0
Coop society	11	11.0
Money lenders	5	5.0
NACRDB	0	0.0
Sources of fertilizer		
NSADP	60	60.0
LGA	12	12.0
Contractor	28	28.0
Labour source		
Family labour	26	26.0
Hired labour	7	7.0
Family and hired labour	54	54.0
Community labour	13	13.0

Source: Field survey (2007)

Constraints faced by farmers.
Problems encountered by rice farmers in their farms incldue pests and diseases (20%) on their rice farms, soil infertility (23%), drought problems (51%) and fire outbreak (6%). The results indicate that drought is a major environmental factor that affects rice cultivation in the study area. With rice being a water-loving plant, this finding portends a major setback for successful rice cultivation.

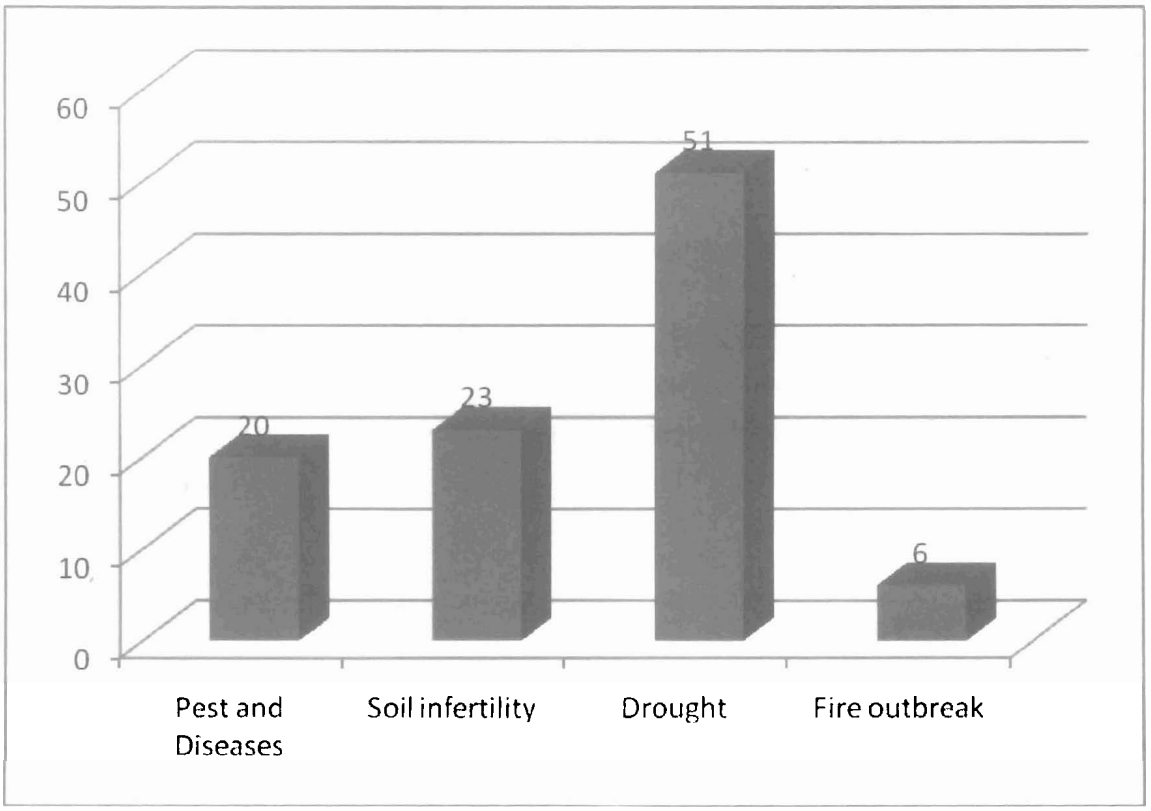

Fig 1: Constraints inhibiting rice production Source: Field survey (2007)

Results of correlation analysis
Correlation coefficients shown in Table 3 indicate that significant relationship exist between output of rice and all the variables considered in the analysis at 0.01 level of significance. The coefficient for years of formal education (r = -0.322**) was negatively correlated to the output of rice. This implies that, contrary to expectation, increase in the year of formal education of the respondents leads to decrease in level of rice output. It may be that education acquired is not qualitative and relevant to farmers' needs with respect to their activities involved in rice production, or that the educated ones may be investing their time and efforts in other activities.

The coefficients for age of respondents (r = 0.643**), family size (r = 0.506**), years of farming experience (r = 0.408**), size of crop farm (r = 0.947**) and labour (r = 0.382**) were positively related to the output of rice. This implies that, the output of rice increases with increase in family size, age, years of farming experience, farm size cultivated and labour supply.

Table 3: Results of correlation analysis

Variables	r-value
Age of farmers	0.6430**
Family size	0.5060**
Education	-0.3220 **
Farming experience	0.4080**
Farm size	0.9470**
Labour	0.3820**
Fertilizer	0.6650**
Use of equipment and machinery	0.3610**
Used of improved seeds	0.7150**
Use of agrochemicals	0.5650**

Source: Data analysis (2007)

r - Correlation coefficient values of corresponding variables.

** implies correlation is significant at $p < 0.01$

Also, the coefficients for use of fertilizer (0.665**), equipment and machinery (r= 0.361**), value and quality of seeds (r= 0.715**) and use of agro-chemicals (r= 0.565**) are positively related to output of rice. The results indicate that rice output could increase with consistent and correct application of fertilizer, use of modern equipment and machinery, use of improved/quality seeds and appropriate use of agrochemicals. These support the findings of Baker and Anden (1973) that, fertilizer application improved rice yield, and also affirmed the expectation that use of modern equipment and machinery, use of quality seeds and appropriate use of agrochemicals could lead to increased rice output.

Table 4 : Result of regression analysis showing crucial variables that significantly influenced rice production.

Variables	Sub standardized coefficient beta	Standard Error	Standard Co - efficient beta	T-ratio
Constant	5.694	5.081	-	1.121
Age (x_1)	- 0.152	0.127	-0.084	- 1.196
Family size (x_2)	5.981E -02	0.235	0.013	0.255
Years of formal education (x_3)	- 0.232	0.119	- 0.076	- 1.953*
Years of farming experience (x_4)	9.673E-02	0.120	0.046	0.809
Farm size (x_5)	7.102	0.501	0.825	14.166***
Labour (x_6)	- 1.974E-02	0.470	- 0.002	- 0.042
Fertilizer (x_7)	6.063E-03	0.006	0.045	1.045
Use of Equipment /machinery	- 7.934E-05	0.000	- 0.037	-0.728
Use of improved Seeds (x_9)	5.086E-03	0.001	0.162	3.530***
Use of Agrochemicals (x_{10})	4.077E-04	0.001	0.021	0.522
Model summary: $R^2 = 0.920$, F = 102.96***				

Source: Data analysis(2007)

***sig. at 1%; **sig. at 5%; *sig. at 10%

The summary of the regression estimates indicate that the model has a coefficient of determination (R2) of 0.920. This implies that 92 percent of the variation in output of rice was accounted for by the variables considered in the study. The remaining 8.0% could be due to factors not investigated in this study. However, of all the variables, only coefficients of year of formal education (b = -0.076), farm size (b =0.825) and use of improved/quality seeds (b=0.162) significantly influenced output of rice production at $p < 0.05$. While year of formal education had a negative influence, size of crop farm cultivated and quality/value of seeds positively influenced rice output. Without contradiction of the earlier results from the correlation analysis, these results established that, there could be several factors influencing rice production, in the study area however, the variables that significantly influenced production were those indicated in the regression analysis result. These findings indicate that in order to improve local production of rice, all these variables are

important factors for consideration, that is, provision of qualitative education relevant to farmers' production needs, encouraging use of high quality seeds and ensuring cultivation of larger acreage of land.

Conclusions and recommendations

Conclusions

It could be concluded from the major findings of the study that, majority of the farmers were male, married, and had some kind of formal education, and average farm size cultivated was 5.6 ha. Also, land acquisition was mainly through inheritance, and majority (70%) of the respondents sourced finance through personal savings, with no one borrowing from the Nigeria Agriculture Cooperative and Rural Development Bank (NACRDB). Problem of drought constituted the major constraints to rice production. There was significant relationship between the output of rice and age of farmers, farm and family size, years of farming experience, years spent on formal education, amount of labour used, fertilizer application, use of equipment/machinery, improved/quality seeds, and agrochemicals, as established by the correlation analysis. However, the regression analysis revealed that only years of formal education, farm size and use of improved/quality seeds significantly influenced rice output.

Hence, from the foregoing, the following recommendations were made:

1. The rice farmers should be encouraged to access funds from governmental agenices, like the Nigeria Agriculture Cooperative and Rural Development Bank (NACRDB). This will help improve famers' financial capabilities and may enhance increased production, through cultivation larger acreage of land.
2. There should be adequate and timely provision of improved/quality seeds for use by rice farmers to facilitate production.
3. There should be provision of simple irrigation system in rice production areas of Lavun LGA to reduce the effect of drought. This will help reduce loss of yield and provide adequate water for all season production.
4. Emphasis should be laid on provision of qualitative and relevant adult educations to farmers in order to increase their technical know, thereby increasing production.

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