

# ASSESSMENT OF THE EFFECT OF AGRICULTURAL PRODUCTIVITY ON RURAL HOUSEHOLD FOOD SECURITY IN KATCHA LOCAL GOVERNMENT AREA OF NIGER STATE.

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## ABSTRACT

*The study examined the assessment of the effect of agricultural productivity in rural household food security in Katcha local government area of Niger state, Nigeria. The specific objectives were to examine the socio-economic characteristics of rural household, examine the effect of socio-economic variables on household food security status of the respondents and to identify the constraints affecting agricultural output and food security. Descriptive statistics and multiple regression analysis were used. A survey conducted using 108 randomly selected respondents revealed that about 54.9% of the respondents have an average household size and 77.8% of the respondents spends 60% of their total income on purchasing food items for their household and about 58.3% of the respondents use their personal farm produce both for household consumption and sales up to 56.4% of the respondents indicated that they are in dire need of more food. 42.7% of the total variation in food security index was explained by the regression model while the remaining 57.3% of the variation was accounted for by the exogenous factors. Major problems faced by the rural household include inadequate capital, lack of good road network, marketing of farm produce and insufficient or excessive rainfall. Social infrastructures should be provided and farmers should be given concession in disbursement of loans from financial institutions.*

## INTRODUCTION

Agriculture constitutes a significant sector of Nigeria's economy. The sector is significant in terms of employment of labour, contribution to Gross Domestic Product (GDP) and until early 1970; agricultural exports were the main sources of foreign exchange earnings (Amaza and Olayemi, 2002). During the 1960s, the growth of the Nigeria economy was derived mainly from the agricultural sector. However, in more recent years, there has been a marked deterioration in the performance of Nigeria's agriculture. The contribution of agriculture to the GDP which stood an average of 56% in 1960-1964 declined to 47% in 1965, 1969 and more rapidly to 32% in 1996- 1998 (Amaza and Olayemi, 2002). The agricultural sector's changing share of GDP is partly a reflection of the relative productivity of the sector.

The Federal ministry of Agriculture (1993) estimated that the annual supply of food crops would have to increase at an average annual rate of 5.9% to meet food demand, and reduced food importation significantly. Studies have shown that aggregate productivity in Nigeria has been growing at about 2.5% per annum in recent years (Olayemi, 1998; Akinbile, 2002; Amaza and Olayemi, 2002). But the annual rate of population growth has been high (about 3%) (Akinbola, 2002). The reality is that Nigeria has not been able to attain self sufficiency in productivity despite increasing hectares put into production annually (CBN, 2000). The constraint to the rapid growth of food production seems to be mainly that of low crop yields and resource productivity. The low agricultural productivity in Nigeria is revealed by the actual yields of major crops such as rice

compared with potential yields (Federal Ministry of Agriculture, 1993).

There is a general agreement that poverty is wide spread and prevalent in developing countries. Many studies have also confirmed that the rate of poverty in the rural areas is higher than in urban areas (De Janvry and Sadoulet, 2001; Deinnger and Olinto, 2001; ES Colal, 2001). What is still a subject of debate however is the best strategy for reducing rural poverty (Lanjouw, 2001). Several poverty reduction strategies have been suggested and used in different contexts. In Africa, the focus of poverty reduction strategies has been on agricultural growth as the pathway out of extreme poverty. However, unlike in many Asians and Latin American countries, where agriculture led growth played an important role reducing poverty and transforming the economics, the same is yet to occur in Africa. But, now it has been discovered that peasant households in developing countries typically earn income from many different sources (Dercon and Krishnan, 1996; Block and Webb, 2001). Furthermore higher productivity in agriculture will indirectly lead to social improvements. Higher incomes will enable either the use of hired labour or labour saving technologies in place of the labour of school - age children in farming households, thereby contributing directly to achieving universal primary education. The linkages between agriculture and child mortality are also strong, with agricultural productivity and diversification assuring food and nutrition security, thereby, contributing to reducing child mortality (Gopinath and Roe, 1997).

Food security exists when "all people at all times have access to safe nutritious food to maintain a healthy and active life" (FAO, 1996). The main goal of food security is for individuals to be able to obtain adequate food needed at all times, and to be able to utilise the food to meet the body's needs. Food security is multifaceted (Obamiro et al., 2003). Food availability for the farm household means ensuring sufficient food is available for them through own production. However, due to lack of adequate storage facilities and pressing needs, they mostly end up selling excess produce during the harvesting period, and sometimes rely on market purchases during the hungry season (Obamiro et al., 2003).

In Nigeria, one of the major factors responsible for declining agricultural productivity is farmers' limited access to production inputs which are necessary for attaining a high level of production. Poor productivity in agriculture leads to low income of the farmers and a decline in household food security. In Nigeria, population growth has outstripped agricultural output growth thus the issue of food security is of high importance to the nation. Some other factors that contribute to the diminishing of agricultural productivity is poor soil fertility influence of weather, pest and diseases, are to be controlled before high productivity can be attained. Problem of poor productivity in agriculture can lead to low income of the farmers and household. This study intends to provide answer to the following research questions:-

- (i) What are the socio-economic characteristics of rural household in the study area?
- (ii) What are the effects of socio-economic variables on household food security status of the respondents?
- (iii) What are the constraints affecting agricultural output and food security of farmers in the study area?

The broad objective of this study is to assess the effect of Agricultural productivity in rural household food security in Katcha local government area of Niger State. The specific objectives of the study were to:

- i. examine the socio-economic characteristic of rural household in the study area.
- ii. examine the effects of socio-economic variables on household food security status of the respondents.
- iii. identify the constraints affecting agricultural output and food security of farmers in the study area.

This research result would provide ways in increasing agricultural productivity and improving income generated by rural farmers, which will likely improve their standard of living and reducing the poverty rate faced by rural people. Efforts have

been made by the research institutes and Extension organizations to improve the income generated by rural farmers and improve the nutritional status of the rural household. Research institutes have greatly increases the yields of important staple food crops. For many people this has meant more food availability and trade opportunities especially for people living in rural areas to increase the productivity and income. It is hoped that the study will assist the government and policy makers to improve productivity in future.

## METHODOLOGY

Niger State is located within latitudes 8°, 12°N – 11°, 30°N and longitudes 3°,30°E – 7°,20°E. The State is bordered to the North by Zamfara State, North west, by Kebbi State, South by Kogi State, South west by Kwara State; while Kaduna State and the Federal Capital Territory bordered the State North East and South East respectively. Furthermore, the State has over a total land area of 76,000/q/km or about 9% of Nigeria's total land area. This makes the State the largest in the country. Niger State has twenty-five Local Government Areas. Katcha Local Government is characterized by two seasons. The dry and wet seasons. The annual rainfall varies from about 1,200mm – 1,500mm, the raining season is usually between June and October, the region has a mean temperature of about 23°C, the Soil type is Alfisol and the major crops grown in the area are:- Sorghum, Rice Sugarcane, Maize, Groundnut, Cowpea, Millet, Melon and Cassava.

The purposive sampling technique was used to choose Katcha Local Government area because the people are practically farmers in the area. A systematic random sampling technique was use to select the farmers among the selected villages. The Local Government Area is divided into two districts and under these districts are Wards and villages. The districts are Katcha and Badeggi, from each district Six (6) villages were randomly sampled, which bring the total number of villages to twelve (12). The villages sampled from Katcha district were. Tsaduko Nanagia, Twaki, Boro, Emi Tsowa, and Muchita. While those sampled from Badeggi were Gara, Edotsu, Kangi, Gbakogi gugata, kangimaba and Gbakogi Kotamisu. From each of the sampled villages ten farmers was randomly selected, which bring the total sample size to 120 farmers.

Primary data was used for the study. The primary data was obtained by the use of structured questionnaires. Information collected include: (A) Socio economic characteristics of sample respondents such as: - age education level, sex. Marital status, household size etc. (B) Consumption pattern and household expenditure

such as:-total household assets and amount of food consumed in a period (C) production variable such as output of crop, labour input, capital inputs etc.

The socio-economic characteristics of farmers include age of the farmers, their farm size, educational attainment, household size, farming experience. The age of the farmer was measured by asking the farmers what their age was and their level of education the farmer had their household size that is the number of people that depends on them for livelihood. The farm sizes of the farmers were based on the hectares and the farming experience they had.

The following analytical techniques were used to achieve objectives stated:- Descriptive statistics and multiple regression Analysis.

This involves the use of mean, frequency distribution and percentages. The percentage was used to determine the proportion of respondents to a response.

$$X = \frac{\text{I.e percentage} = \frac{\text{Number of respondent}}{\text{Total number of respondent}} \times 100$$

This is used to achieve objective 1, and 3.

This was used to determine the extent to which the inputs used explained the variability in the output. To estimate the production function, the linear, semi-log and the Cobb-Douglas regression function were employed. The best regression fit is determine by a combination of R<sup>2</sup>, the level of significant of the overall equation (F- statistic) the level of significance of each coefficient (T- statistics) and the correct signs of the coefficient relative to a prior expectation (Olayemi and Olayide, 1981). The model in general form is:-

$$Y = F(X^1 X^2 X^3 X^4 X^5 \text{ et})$$

Where. Y= Food Security (index)

X<sup>1</sup> = Age (years)

X<sup>2</sup> = Educational Level

X<sup>3</sup> = Output (N)

X<sup>5</sup> = Household Size

et = Error term

Explicitly, these functions take the following forms:-

$$Y = a + b_1X^1 + b_2 + X^2 + b_3 + X^3 + b_4 + X^4 + b_5 + X^5 + \text{et (Linear)}$$

$$\text{Log} Y = a + b_1 + X^1 + b_2 + X^2 + b_3 + X^3 + b_4 + X^4 + b_5 + X^5 + \text{et (Semi - log)}$$

$$\text{Log} Y = a + b_1 + X^1 + b_2 + X^2 + b_3 + X^3 + b_4 + X^4 + b_5 + X^5 + \text{et (Double - log)}$$

This was used to achieve objective two (2)

## RESULTS AND DISCUSSION

Table 1: Distribution of respondents by Socio economic characteristics

Characteristic	Frequency	Percentage
Gender	84	77.78
Male	24	22.22
Female	108	100
Total		
Marital Status		
Married	102	94.44
Single	6	5.56
Total	108	100
Age Distribution		
Less Than Or Equal		
To 20	2	1.85
21-30	24	22.22
31-40	43	39.81
41-50	23	21.3
51-60	9	8.33
Above 61	7	6.49
Total	108	100
Educational Level		
Primary Education	29	26.85
Secondary Education	39	36.11
Tertiary Education	1	0.93
No Formal Education	6	5.56
Arabic Education	33	30.54
Total	108	100
Household Size		
40188	22	21.57
40502	56	54.9
21-30	21	20.59
31 And Above	3	2.94
Total	108	100
Occupational Distribution		
Farming Only	89	82.41
Trading	2	1.85
Civil Servant	11	10.18
Student	6	5.56
Total	8	100
Years Of Farming Experience		
40188	27	25
40502	42	38.89
21 And Above	39	36.11
Total	108	100

Source:- Field Survey, 2009

Results from Table 1 reveal that 77.78% of respondents were male while 22.22% of respondents were females. This implies that in household production patterns men play a critical role in food security through farm labor, food preparation and day to day family subsistent. 94.44% of the respondents were married. Also 5.56% of respondents were single. There were no cases of divorced or widowed in the study area. The implication of this is that family labour would be the bulk source of labour for farming activities.

Respondents whose ages range is between 31-40 years accounted for 39.81% of the rural farming household whereas between 41-50 years accounted for 21-30%. Rahman *et al* (2002) believed that farmers' age may influence adoption in several ways. The active group here is between the age of 31-40 years which indicates that able bodied men were the active labour force engaged in food production activity. Results in Table 1 show the distribution of the rural farming household according to their level of education. 36.11% of the respondents had secondary education. 30.54% with Arabic education while 26.85% with primary education. Njoku (1991) observed that formal education has a positive impact on food security. This implies that education fastens understanding and adoption of improved technology which will rapidly increase food production. About 54.90% of the respondents have an household size of 11-20. This implies that family labour is a vital source for farming operation and that most of the farmers have a large family size. This is according to (Oyekanmi, 2004). Farmers in the rural areas are predominantly large families.

Results revealed that in almost all the rural areas in Nigeria, people engaged in different economic activities to earn a living. 82.41% of the respondents take farming as their primary occupation. 10.18% of sampled farmers are in civil service with farming. This corroborates the finding of Olayemi (1998) that rural areas are the food basket of the nation.

Table 1 revealed that 38.89% respondents had farming experience between 11-20 years. About 36.11% of sample farmers had more than 21 years. The average (mean) year of experience is about 36 years which implies that respondents had acquired production skills.

Table 2: Distribution of income generated by respondents.

Income (N) per month	Frequency	Percentage
5000 and below	15	13.89
6000 – 15000	47	43.52
16000 – 25000	16	14.81
26000 and above	30	27.78

Total 108 100.00  
Source:- Field Survey, 2009

Table 3: Percentage of income expended on household feeding

% of income	Frequency	Percentage
Household feeding		
29% and below	04	3.70
30% - 59%	84	77.78
60% and above	20	18.52
Total	108	100.00

Source:- Field Survey, 2009

From Table 2: about 43.52% of the respondents generate between 6000 – 15000 in a month while 27.78% of the respondents generate 26000 and above. This implies that average real incomes of rural farmers are likely to rise as a result of increases in productivity. The results indicate future prospect in productivity. As can be seen from Table 3, 77.78% of the respondents spent between 30 – 59% of their total income in purchasing food items for the household, thereby contributing their quarter to household food security.

Table 4: Farm size (in Hectares) of respondents

Size of farmland	Frequency	Percentage
1 – 5	68	62.96
6 – 9	40	37.04
Total	108	100.00

Mode of land acquisition by respondents

Sources	Frequency	Percentage
Inheritance	91	84.26
Lease	-	-
Purchase	02	1.84
Borrowing	15	13.89
Total	108	100.00

Types of labour used by respondents

Types of labour	Frequency	Percentage
Family labour	63	58.33
Hired labour	19	17.59
Family labour	18	16.67
Communal labour	08	7.41
Total	108	100.00

Sources of initial capital by respondents.

Sources of capital	Frequency	Percentage
Personal saving	86	79.63
Loan from family friends	12	11.11
Loan from cooperative	10	9.26

Credit from bank		
Total	108	100.00
Purpose of growing crops by respondents		
Uses of crops	Frequency	Percentage
Market/sale	15	13.89
Household consumption/sale	63	58.33
Mainly for household consumption	30	27.78
Total	108	100.00
Purpose of rearing livestock by respondents.		
Purpose of rearing	Frequency	Percentage
Livestock For sale	17	15.74
For festivals/sales	76	70.37
Household consumption	15	13.89
Total	108	100.00
Household food requirement by respondents		
Need for more food	Frequency	Percentage
Yes	61	56.48
No	47	43.52
Total	108	100.00

Source:- Field Survey, 2009

Table 4 indicated that 62.96% of the sampled respondents had less than five (5) hectares of land. Furthermore, 37.04% of sampled respondents had 6-9 hectares of land. This result implies that very few proportions of the respondents are ready to expand their farm size while majority of the respondents continually practice the traditional small scale of production.

Land is a major factor of production 84.26% of the sampled respondents acquired land by inheritance while 13.89% by borrowing. The implication is that for agriculture to be fully mechanized and commercialized method of land acquisition has to be liberalized.

58.33% of respondents used family labour, Also 17.59% of respondents used hired labour. The implication is that family labour is commonly used on small farms generating incomes for farmers whose spending is predominantly on locally produced goods.

Table 4 Indicated that 79.63% of respondents acquired their capital for production through personnel saving, 11.11% of respondents acquired capital through loans from family and friends. Rahman *et al.*,(2003) indicated that access

to capital in farming may explain the tendency to improve in productivity.

About 58.33% of the respondents use their personal farm produce for household consumption and for sales to generate some income. While about 27.78% of the respondents use their personal farm produce mainly for household consumption. Majority (70.37%) of the respondents reared livestock mainly for the purpose of festivities and for sales to generate some income. 56.48% of the household in the study area are in dear need of more food at the family levels, this points to the fact that many household are experiencing food crises.

Table 5: MULTIPLE REGRESSION ANALYSIS

Variable	Double log
Constant	0.296
	(0.159) N.S
Age (Years) (X1)	0.248
	(0.482) N.S
Educational level (X2)	-0.457
	(-2.444)**
Output (₦) (X3)	0.164
	(1.413) N.S
Farm size (ha) (X4)	0.447
	(2.704)***
Household size (X5)	-1.102
	(-6.078)***
R square	0.427
R <sup>2</sup> adjusted	0.399
F-ratio	15.231***

Source:- Computed from field survey data, 2009

Note: \*\*\* Significant at 1%

\*\* Significant at 5%

\* Significant at 10%

N.S- Not Significant

Figures in parenthesis are the respective t-ratios.

The regression analysis that was used to determine the socio-economic relationship in food security as shown in the Table 17 the Double log regression was chosen as the lead equation. The value of coefficient of determination, R<sup>2</sup> indicated that about 42.7% of the variation in dependent variable was explained by the independent variables included in the regression model. The regression coefficient Age (X1), Output (X3), Farm size (X4), are positive indicating that an increase in any of these independent variable will lead to an increase in food security index implying that the variables significantly explained variation in the food security index. Conversely the regression coefficient level of education (X2), and Household size (X5) are negatively indicating that an increase in any of these independent variable will lead to a decrease in food security index. Educational level (X2) are significant at 5%, farm size (X4), Household size (X5) and F- value

were significant at 1%, level of probability. According to Damodar, (1995) the fundamental psychological law is that men are disposed, as a rule and on average to increase their consumption as their income increase, but not as much as the increase in their income.

**PROBLEMS/ CONSTRAINTS ENCOUNTERED BY RESPONDENTS**

Table 6: Production problems encountered by respondents

Production problems	Frequency	Percentage
Inadequate capital input	100	52.08
Marketing of farm produce	64	33.33
Lack of road network	08	4.17
Insufficient/excessive rainfall	20	10.42
Total	192*	100.00

Source:- Field Survey, 2009

\*Multiple Responses

Table 7: Storage problems encountered by respondents

Storage problems	Frequency	Percentage
Insect/pest attack	95	87.96
Diseases	09	8.33
Theft	04	3.70
Total	108	100.00

Source:- Field Survey, 2009

Table 6 reveal that inadequate capital input is the biggest problem encountered by the rural farming with 52.08% while marketing of their produce which is 33.33% followed by insufficient or excessive rainfall and finally lack of good road network. All these affect their household living. These problems can drastically reduce the impact of agricultural development.

Table7 show that 87.96% of respondents had problems of insect/pest infestation in storage; 8.33% of respondents had problems of diseases attack on their production, while 3.70% of respondents had problems of theft.

**CONCLUSION AND RECOMMENDATIONS**

Based on the findings of study, assessment of the effect of agricultural productivity in rural household food security, the study identified some constraints which it overcome would ameliorate conditions of the people, improve the general standard of the rural dwellers and Boost agricultural productivity.

Based on the findings, the following recommendations are made:-

Government should provide good road network for the deposition of agricultural produce of these rural household, Stakeholders at various levels

should embark on investing in social infrastructures development of the rural area, Government should impact the ideas and knowledge about cooperatives societies in their various groups (Awareness), Government should provide credit facilities (loan) to the farmers through agricultural banks, There should be a deliberate effort in enhancing rural activities in the study area, this can be achieved by posting extension workers to the area to help rural household in their activities and Extension agents should be adequately trained and equipped to help the farmers imbibe the culture of sound agronomic practices that would ensure increased productivity in the study area.

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