Agricultural production in rural communities: Evidence from Nigeria

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Agricultural Production in Rural Communities: Evidence from Nigeria

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Abstract

This study examines the implication of economic and socioeconomic factors on agricultural output in rural communities of Nigeria. The analyses were carried out in two models using descriptive statistics and least square estimation technique. The first model was specified for four major crops; the second model was the extended form on the aggregated output. Evidence from both the first and extended models showed that the socioeconomic factors are important as the economic factors to promote agricultural output in the rural area. In the first model, capital, fertilizer, and chemicals were insignificant while family labour, hired labour and family size are significant. The elasticity values for all the variables are less than one. This implies that, response of outputs in the four crops to each of the variable is less responsive. Also, all the factors are significant in explaining the response of the output of the crops to inputs in model one. The extended model showed that socioeconomic factors such as sex, age, educational and farming experience have significant effect on the aggregated output. Based on the findings, needs to increase access to farm inputs; extension education and financial support to rural famers among others were recommended.

Keywords: agricultural production; rural farmers; regression model; farmers output

JEL Classification: C22; Q11; Q12; R1

Introduction

The importance of the agricultural sector in developing economies, most especially in Nigeria to achieve sustainable and inclusive growth cannot be undervalued. Dated back to 1960 in Nigeria, agricultural sector played an important role relative to other sectors in terms of contribution to domestic production, foreign exchange earnings and

employment generation. After the discovery of oil in the 1970s till date, the sector remained stagnant despite different programmes and policies by Nigerian government to revamp the sector. Asaleye, Olurinola, Oloni and Ogunjobi (2017) noted that problems of Nigeria economy can as well be traced to inconsistency in policies and economic programmes, mismanagement of resources and political instability among others. Nigeria, like most developing countries has large percentage of people living in rural areas where agriculture serves as a lucrative means to improve their welfare (Lagokos and Waugh 2012). According to World Bank (2016) Nigeria is one of the fastest growing economy in the world with an average growth rate of about 7 percent between the periods of 1995 to 2015. Inspite of this growth rate, high unemployment rate, low income and high poverty rate still remain unsolved issues (Asaleye *et al.* 2017; Oloni, Asaleye *et al.* 2017). To promote pro-poor growth, Nigerian government has identified the agricultural sector as one of the predominant sectors in achieving this goal (Economic Recovery and Growth Plan ERGP 2017).

1. Literature Review

Theoretically, the long run rate of growth in neoclassical model is determined exogenously. The model predicts that an economy will always converge towards steady state which depends only on the rate of technological progress and the rate of labour force growth (Solow 1956). In the model, emphasis has been placed on economic factors in production. This has generated substantial debate in literature, in which the rate of technical progress, growth rate of labour and other economic factors can be analysed with less emphasis to socioeconomic factors (Senger *et al.* 2017, Wang *et al.* 2016; Blaug 1998, Debreu 1974, Selten 1986, Sonnenschein 1972, Mayntz 1999). The new growth model takes another perspective from the neoclassical model by emphasizing on the knowledge-based economy. Knowledge and information are incorporated into the model; there are dynamic linkages or feedback to growth. As such, both direct and indirect effects were stressed by Romer (1986). The indirect impact could be measured by productivity improvement which is embodied in the investment of human capital, while the direct impact is as the result of labour and capital (Zhang *et al.* 2016, McMahon 1998). From the model, it can be deduced that education in terms of research and development can promote growth.

Alternatively, to the neoclassical theory, Fleetwood (2011) built on the initial model by Archer (1995; 1998; 2003) to develop 'socioeconomic model of labour market'. Fleetwood (2011) stressed on the role of institution to ensure coordination in the labour market. According to the scholar the institution can be used in portmanteau terms. In reference to the work of Archer (2003), that presented the 'Morphostatic-Morphogenetic (M-M) approach. The basis of the approach is that agents and socioeconomic phenomena are not the same over time. It can be presumed via this process that socioeconomics factor has implication on output. It was concluded by Fleetwood (2011) that the labour market behaviour can be explained by the socioeconomic phenomena that are constituted in the allocation of resources in the market. The scholar did not specify the socioeconomic phenomena because there are too many of them to be included by his definition.

Studies have shown the connection between socioeconomic factors and productivity. For example, Rahman (1975) demonstrated the relationship between farm size and productivity in Robinson - Eatwell (1973) framework. Rahman (1975) concluded that farm sizes are inevitable in development theory and promoting agricultural product. The same argument has been documented by Mansfield (1961), that stressed the importance of firm size, type of enterprise, occupation, income and education in promoting production activities. Some scholars also believe that age influences production (Baidu -Forson 1999, Lapple and Hennessy 2014, Okuwuche and Ogunwale 1998). Adesina and Baidu-Forson (1995) showed that there is significant relationship between age and production in Burkina Faso, while Bortamuly and Goswami (2015) emphasise the importance of education in production. Also, study by Mupawaenda, Chawatama and Muvavarirwa (2009) found that gender disparity affects production, the scholars concluded that the dominance of male over female shows up in decision making and production system. Although, research has shown that socioeconomic factors effect on agricultural production are indecisive. Studies by some scholars contradicted the findings of Mupawaenda *et al.* 2009; Adesina and Baidu-Forson (1995). For example, Overfield and Fleming (2001) stressed that gender disparity is insignificant in Guinea. Recent study by Wang *et al.* (2017) showed that socioeconomic factors influence productivity in China.

Empirically, most of the recent studies in relations to impact of farmers on productivity had focused on climate change, diversification and production among others with less emphasis on rural farmers (See: Ameur *et al.* 2017, Ayal and Filho 2017, Ameur *et al*. 2017, Lee 2017, Mulenga *et al.* 2017; Senger *et al*. 2017; among others). Though, some studies focused on rural farmers with less attention to social economic factors and agricultural production. Few among others include the studies of the following scholars; Rajaee *et al.* (2017) that investigated the connection between pulmonary function and respiratory of rural farmers in small scale gold miners in Ghana.

Chen *et al*. (2017) investigated the factors that influence the willingness of farmers to withdraw from rural areas in China. Rezaei *et al.* (2017) examined the impact of some factors on adaptation behaviour in a water scared rural communities in Iran. Abbas *et al.* (2017) examined the implication of economic analysis of biogas adoption technology on rural farmers in Faisalabad district in Pakistan. Wang *et al.* (2017) investigated the impact of the governing with emphasis on representatives on rural farmers' organization in Australia. Tambo and Wunscher (2017) examined the relationship between Farmers – led innovations and rural household welfare in Ghana. Msoffe and Ngulube (2016) accessed farmers' poultry information management in rural area of Tanzania while the study by Stojcheska *et al.* (2016) investigated farmers' response to rural development policy challenges in Macedonia, Serbia, Bosnia and Herzegovina.

From the foregoing, large volume of literature published in this area focused on climate change, migration from rural areas, innovation, welfare among others with studies on agricultural output and socioeconomic factors are still growing. Two channels are identified from the theoretical perspectives in which output can be affected; the 'neoclassical model' and 'socioeconomic model of labour market' placed emphasis on the economic factors and socioeconomic factors respectively. This study attempted to fill the gap by investigating the efficacy of both theories on agricultural production among rural farmers. Primary source of data is used for this study. Weyer (2002) pointed out that most secondary data on socioeconomic factors are collected for reason uncounted to the environment. Also, the existing socioeconomic data are often inadequate or inappropriate for modeling rural human-environmental interactions. The main objective of this study is to examine the implication of the neoclassical theory and socioeconomic model of labour market on agricultural output in rural communities of Nigeria. The analyses were carried out in two models using descriptive statistics and least square estimation technique. The first model was specified for four major crops, namely: cassava, maize, yam and rice; the second model was the extended form on the aggregated output

2. Materials and Methods

2.1 Data and Description of the Study

The occupation of majority of people of the communities is farming on a small scale for subsistence, sales or both. Population statistics of the State Ministry of Agriculture and Kogi State Agriculture and Rural Development Project (2015) showed that rural farmers in Ankpa LGAs total population was 107,000 consisting of 70,000 Males and 37,000 Females, Ibaji LGAs total population of rural farmers was 72,000 consisting of 48,000 Males and 24,000 Females, Okene LGAs total population of rural farmers was 93,000 consisting of 55,000 Males and 38,000 Females, Adavi LGAs total population of rural farmers was 68,500 consisting of 42,000 Males and 26,500 Females, Yagba East LGAs total population of rural farmers was 62,463 consisting of 45,200 males and 17223 females and Yagba West LGAs total population of rural farmers was 63,000 consisting of 40,322 males and 22,678 females. A total population of 466,963 rural farmers in the three senatorial zones made up of six local governments was used as a basis for this study to draw a sample size that will give true socioeconomic characteristics of the rural farmers in the communities.

2.2 Study Variables and Model Specification

Model 1: Specification Model for Selected Crops Enterprises

The theoretical framework for this study is built on the standard growth model (Solow 1956). The standard form for production function of a single good with two factors is given as:

$$Q_t = f(HLAB, CAP) \tag{1}$$

where Q_t is the total production (the real value of all goods produced at a given period usually one year defined by t); $HLAB$ is the Labour input (the total number of person at a period of time); CAP is the Capital input[3]. Explicitly equation (1) can be given as:

$$Q_t = AHLAB_t^{\alpha_1} CAP_t^{\alpha_2} \tag{2}$$

[3] Land was not included in the model because availability to fertile land for framing was not a problem as indicated by the respondents, but farm size was included.

A = Total factor productivity, α_1 and α_2 are the output elasticities of capital and labour respectively. The output of the elasticity measures the responsiveness of output to a change in levels of either labour or capital used in product (Hanushek and Jackson, 1977). Equation (2) is modified to include other economic factors, given as

$$Q_t = AHLAB_t^{\alpha_1} CAP_t^{\alpha_2} FLAB_t^{\alpha_3} FER_t^{\alpha_4} SEED_t^{\alpha_5} CHE_t^{\alpha_6} FSIZE_t^{\alpha_7} \quad (3)$$

where: $FLAB_t$ = family labour, FER_t = quantity of fertilizer, $SEED_t$ = seed in kg, CHE_t = chemical used in litres, $FSIZE_t$ = farm size. Taking double log of the equation (3), we have:

$$\ln Q_t = \alpha_0 + \alpha_1 \ln HLAB_t + \alpha_2 \ln CAP_t + \alpha_3 \ln FLAB_t + \alpha_4 \ln FER_t + \alpha_5 \ln SEED_t + \alpha_6 \ln CHE_t + \alpha_7 \ln FSIZE_t + u_t \quad (4)$$

where: $\alpha_0 = \ln A$ and u_t is the error term. The production functions were separately to four major crops in the state as follows: cassava, yam, rice and maize. The choice of these crops is based on the predominant crops being cultivated in the area. Equation 2.4 is estimated to examine the impact of the economic factors on the output of the four selected crops. Capital is measured in Naira, Farm size in hectares, Chemical in litres, Seed in kilogram, and fertilizers in Kilogram

Studies by Wang *et al.* (2017), Blaug (1998), Debreu (1974), Selten (1986), Sonnenschein (1972), Mayntz (1999) among others have shown that socioeconomic factors also influence production. The metrics for socioeconomic factors that were used in Model 1 included sex, age, household size, farmer education and years of farmer experience. The socioeconomic factors are examined separately; this is done to isolate the effects of the economic factors. The gross margin analysis method was employed to determine the overall gross margin per hectare and the Net Factor Income (NFI) per hectare. The essence was to measure the profitability of the various crop enterprises. The Gross margin and net farm income is estimated using equations (5) and (6) below.

$$GM = TVP - TVC \quad (5)$$

$$NFI = GM - TFC \quad (6)$$

where: GM = Gross margin, TVP = Total value of production, TVC = Total variable cost, NFI = Net farm income, TFC = Total fixed cost.

Model 2: Specification for the Extended Model

Based on the theoretical framework of the study, the model specification for the extended model is modified and given implicitly as follows;

$$Q = f(X_1, X_2, X_3, X_4, ..., X_n) \quad (7)$$

The explicit form of the model can also be specified as;

$$Q = \alpha_0 + \alpha_1 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4, ..., + \alpha_k X_k \quad (8)$$

Equation (8) is in log form, written in econometric form it is given as:

$$Q = \alpha_0 + \alpha_i \sum_{i=n}^{n} (\ln X_i) + u \quad (9)$$

In equation (9), $i = 1, 2, 3, ..., 14$ and α_1 to $\alpha_{14} > 0$ are parameters to be estimated and the elasticity of response of the X_{th} variable factors. Where: Q = Quantity of output produced by the rural farmers in the year 2016 farming season. The variables to be estimated are as follows; X_1 = Sex of the rural farmers male and female headed, X_2 = Age, X_3 = Marital status, X_4 = Farmers educational Qualification, X_5 = Number of years of experience in farming, X_6 = Farmers Household size , X_7 = Farm size in hectares, X_8 = size of income, X_9 = Credit obtained from credit institution and government in Naira, X_{10} = Seedling in kg, X_{11} = quantity of Fertilizer in kg, X_{12} = Nature of the technology adoption(labour or capital intensive), X_{13} = predominant crop cultivated by the Farmers (Food crops), X_{14} = Soil fertility and μ is the random error term. Studies have shown the importance of the variables on output (Adesina *et al.* 2000, Ramji *et al.* 2002).

2.3 Technique of Analysis

Primary data were obtained for this study with the use of questionnaire, interview and personal observation. Two main method of data analysis were used for this study. The first is the simple descriptive statistics. These involve the use of distribution table and percentages to describe the socio-economic characteristics of the rural farmers in the state (Mann 2016). The second method is the use of production function which provides measurement of useful economic sense in examining the implication of economic factors on agricultural productive in rural environment. The purpose of the production function is to determine the relationship between variable inputs used in the production and output. The least square technique was used to estimate the parameters in the production function (Green 1993, Maddala 2001).

A multistage sampling method was employed in this study while collecting the primary data. A multistage sampling method is the combination of other sampling methods; indeed, it combines two methods (McBurney and White 2009). The first stage involves the random selection of two local government areas from each senatorial zone. The second stage demands the random selection of villages proportionate to the village population of the identified local governments.

3. Results

Table 1. Stock Breakdown of Questionnaires

Area Covered	Administered Questionnaires	Returned Questionnaires	Questionnaires not returned	Total
Ankpa	195	180	15	195
Ibaji	81	65	16	81
Okene	150	134	16	150
Adavi	81	65	16	81
Yagba East	90	74	16	90
Yagba West	78	62	16	78
Total	**675**	**580**	**95**	**675**

Source: Field Survey 2016

Table 1 above, shows the breakdown of the stock of the questionnaire administered to the sampled respondents. The data used for the analysis were collected in a survey in 2016 among 675 household farmers. Responses from 580 farmers were finally used in the analysis, 95 questionnaires were not returned.

Presentation of Result for Model 1

Table 2. Least Square Estimation of Production Function for the Selected Crops Enterprise

Dependent Variable is Total Output in log							
Cassava Production Function							
Constant	**HLAB**	**FLAB**	**FER**	**SEED**	**CHE**	**CAP**	**F-SIZE**
1.302 (0.280)	0.285* (0.068)	0.307* (0.087)	- 0.019 (0.079)	0.386* (0.094)	0.142 (0.099)	- 0.118 (0.091)	0.458* (0.140)
R^2 = 0.657			DW = 1.650			Prob. (F- Stat.) = 0.0528	
Yam Production Function							
Constant	**HLAB**	**FLAB**	**FER**	**SEED**	**CHE**	**CAP**	**F-SIZE**
1.177 (0.606)	0.129** (0.182)	0.008 (0.123)	- 0.095 (0.362)	0.242* (0.090)	- 0.030 (0.097)	- 0.153 (0.101)	0.451* (0.121)
R^2 = 0.748			DW = 1.792			Prob. (F- Stat.) = 0.0119	
Maize Production Function							
Constant	**HLAB**	**FLAB**	**FER**	**SEED**	**CHE**	**CAP**	**F-SIZE**
0.102 (0.454)	0.046* (0.006)	0.418* (0.092)	0.325 (0.268)	0.429* (0.040)	0.286* (0.094)	- 0.018 (0.096)	0.497* (0.025)
R^2 = 0.629			DW = 2.193			Prob. (F- Stat.) = 0.0001	
Rice Production Function							
0.829* (0.247)	0.045 (0.082)	- 0.043 (0.053)	0.164 (0.160)	- 0.055 (0.161)	0.039 (0.062)	- 0.115** (0.068)	0.211* (0.082
R^2 = 0.739			DW = 2.268			Prob. (F- Stat.) = 0.0000	

*indicates significant at level of five percent **indicates significant at level of ten percent

Source: Author's Computation using SPSS

Table 2 presented the production function for the four crops examined. The R^2 shows the coefficient of determination; from all the result, it can be deduced that variation in the independent variables is been explained in the variation in the dependent variable. The probability of the F-statistics is statistically significant for all the equations; which mean the independent variables jointly explained the dependent variables. The values in parentheses are the standard errors. The elasticity values for all the variables are less than one. Labour, family labour, seed and family size are significant at level of 5 percent in cassava and maize production function. The variables sign follows the a-prior expectation. The result in yam production is almost the same with cassava and maize but the family labour is insignificant. In rice production function, family sizes and capital are significant at the level of five and ten percent respectively.

Table 3. Cross Tabulation of Socioeconomic Factors on Crops (Percentage)

Output (tonnes) / Factors	Cassava	Yam	Maize	Rice
Sex				
Male	53.4	66.7	64.4	62.9
Female	46.6	33.3	35.6	37.1
Age				
15 – 49	57.9	53.8	59.6	56.4
50 above	42.1	46.2	40.4	43.6
Household Size				
1 to 2	0.9	0	0.9	0
3 to 4	3.5	2.5	3.6	1.8
5 to 6	10	10.8	10.1	9.6
7 to 8	15.7	15.8	18.3	30.5
9 above	70	70.8	67.2	58.1
Farmers Educational Qualification				
Primary	52.7	46.8	49.6	41.3
Secondary	26.9	28.9	28.1	30.8
Institution	16.8	16	17.9	24.5
Others	3.6	7.4	4.4	3.5
Years of Farming Experience				
1 to 5	9.7	4.2	9.7	7.9
6 to 10	17.2	13.4	15.4	13.9
11 to 15	10.1	9.2	9.4	12.1
16 to 20 years	10.6	10.9	12.7	16.4
Above 20 years	52.4	62.2	52.9	49.7

Source: Field Survey 2016

Table 3 presents the effect socioeconomic factors such as sex, age, household size, farmers' educational qualifications and years of farmer experience on the four crops. The Chi-square statistics of the various crop enterprises show that all the factors are significant in explaining the response of the output of the crops to inputs in the production process. The Chi-square result is present in appendix 1.

Presentation of Result for Model 2 (Extended Model)

Table 4. Socioeconomic Characteristics of Rural Farmers on the Farmers Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-279.746	116.546	-2.414	0.018
Sex	-212.085	63.736	-3.354	0.001
Age	101.227	37.435	2.671	0.009
Marital Status	58.152	40.673	1.372	0.174
Farmers educational qualification	51.141	12.871	3.944	0.000
Years of farming experience	22.894	12.863	1.781	0.078
Farmers farm size	23.302	26.495	.883	0.382
Farmers Household size	-14.882	21.455	-696	0.490
Size of the farmers income	.000	.000	2.852	0.005
Credit obtained by farmers	.000	.000	.869	0.389

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Quantity of seedling obtained	264.312	45.650	5.650	0.000
Quantity of fertilizer obtained	73.115	35.727	2.088	0.050
Nature of the technology used	114.824	68.770	1.658	0.100
Soil fertility	103.357	48.400	2.119	0.037
Predominant crop cultivated	127.001	96.814	1.299	0.198
R^2	.969			
Adj.R^2	.965			
F-statistic	214.438			0.000

Source: Field survey 2016

In table 4, the dependent variable is the output level of the rural farmer. The findings show that coefficient of determination R^2 indicate the jointly effect of the explanatory variable in the model which account for about 96.9% of the variations in the socioeconomic factors influencing the rural farmers output. The regression result shows that the coefficients of eight explanatory variables in the model are significant. It can also be depicted that out of the fourteen explanatory variables; twelve of the coefficients have positive relationship with the rural farmers output in the communities. Also, two of the coefficients have a negative relationship with output of the farmers.

3. Discussion

The challenge that is currently confronting Nigeria's agriculture is related to the problem of low production resulting from both economic and socioeconomic factors. On that basis, this study carried an empirical analysis of rural farmers in Kogi State, Nigeria. Six hundred and seventy-five rural farmers across the six local governments in three senatorial zones were selected and used for the study. The data were analyzed using descriptive statistics and the regression technique. The study examined the various socioeconomic factors affecting the agricultural production of farmers in rural communities in Nigeria. Evidence from the extended model findings indicated that; sex has an inverse relationship in crop production. Variables such as age, marital status, educational qualification, farming experience, farm size all have positive relationship with output and statistically significant at level of five percent. Which means a percentage increase in any of this independent variable will result to a given percentage increase in the dependent variable (agricultural output). The size of household has opposite relationships which signify that an increase in the household size will increase output of the farmers. This is an indication of increase in the number of dependency ratio that may not necessarily contribute to the growth of the farmer output. Though credit obtained by the rural farmers in the community has positive relationship with output, but it exhibited a constant return to scale. This is undesirable to the farmers in the rural communities. It can also be attributed to low level of income of the rural farmers as a result of insufficient credit.

Furthermore, seedling used, quantity of fertilizer, level of technology acquired, fertility of the soil, all these factors have a positive relationship with farmer output signifying too that an increase in any of these factors will lead to increases in output. Thus, quantity of seedling used, fertilizer used, and fertility of the soil have significant relationship with output of the rural farmers in the state. More so, the result showed that socioeconomic and economic factors significantly influence the productivity of rural farmers in the study area; these are in accordance to the principle of neoclassical theory and socioeconomic model of the labour market. Majority of the rural farmers were men with low educational qualification and had low contact with the extension services. This was in line with the study of Chawatama and Muvavariwa (2009), who documented the dominance of male over female in production process. Evidence from the first model showed that output of the various crop enterprises was less responsive to inputs in the study area. The response of the output of the various crop enterprises to inputs variable was low. This were attributed to untimely and inadequate application of inputs, management practices, agronomic factors, size of farm land, financial constraints, and adoption of modern production technique among others. The study also found that family labour and hired labour were under-used.

Conclusion

Agricultural sector can help developing economies, most especially in Nigeria to achieve sustainable and inclusive growth. Though, the problems of Nigeria economy can be traced to inconsistency in policies and economic programmes, mismanagement of resources and political instability among others. Nigeria, like most developing countries has large percentage of people living in rural areas where agriculture serves as a lucrative means to improve their welfare. Evidence from the official statistics has shown that Nigeria experienced increase in economic growth before the recent recession in second quarter of 2016. Inspite of this growth rate, high unemployment rate, low income and high poverty rate still remain unsolved issues. To promote pro-poor growth, Nigerian government

has identified the agricultural sector as one of the predominant sectors in achieving this goal. The neoclassical model stressed the important of economic factors in production, while the socioeconomic model of labour market stressed that both economic and socioeconomic factors are important in production.

Most studies have focused on the economic factors; this study examined the efficacy of both neoclassical theory and socioeconomic model of labour market on agricultural output in rural communities of Nigeria. The analyses were carried out in two models using descriptive statistics and least square estimation technique. The first model was specified for four major crops, namely: cassava, maize, yam and rice; the second model was the extended form on the aggregated output. Evidence from both the first and extended form models showed that the socioeconomic factors are important as the economic factors to promote agricultural output in the rural area. Also, increases in agricultural production of the rural famers are central to growth, income distribution, improved food security and alleviation of poverty most especially in developing economies. The question of efficiency of resources used in agricultural crop production is one theme that has generated tremendous interest among economic scholars for decades.

Based on the findings, this study suggested recommendations through which agricultural production of the rural farmers could be improved: Priority should be given in the provision of effective and affordable power sources, good farm route, water and most importantly, health facilities that could improve the perceptions of the rural farmers toward orthodox medical care and hence, enhancement in their standard of living and productivity; Commercial and Microfinance Banks should make their services available in form of credit facilities to the rural farmers especially through the farmers cooperatives; Efforts should be made by government and agricultural development agencies in the state to give effective training and research regularly to the rural farmers. Good orientation should be given regularly to farmers on the timely application of farm inputs such as fertilizer for maximum crop yield and increase in production; Government should make effort in subsidizing fertilizer as agricultural inputs to boost the demand by rural farmers in the state.

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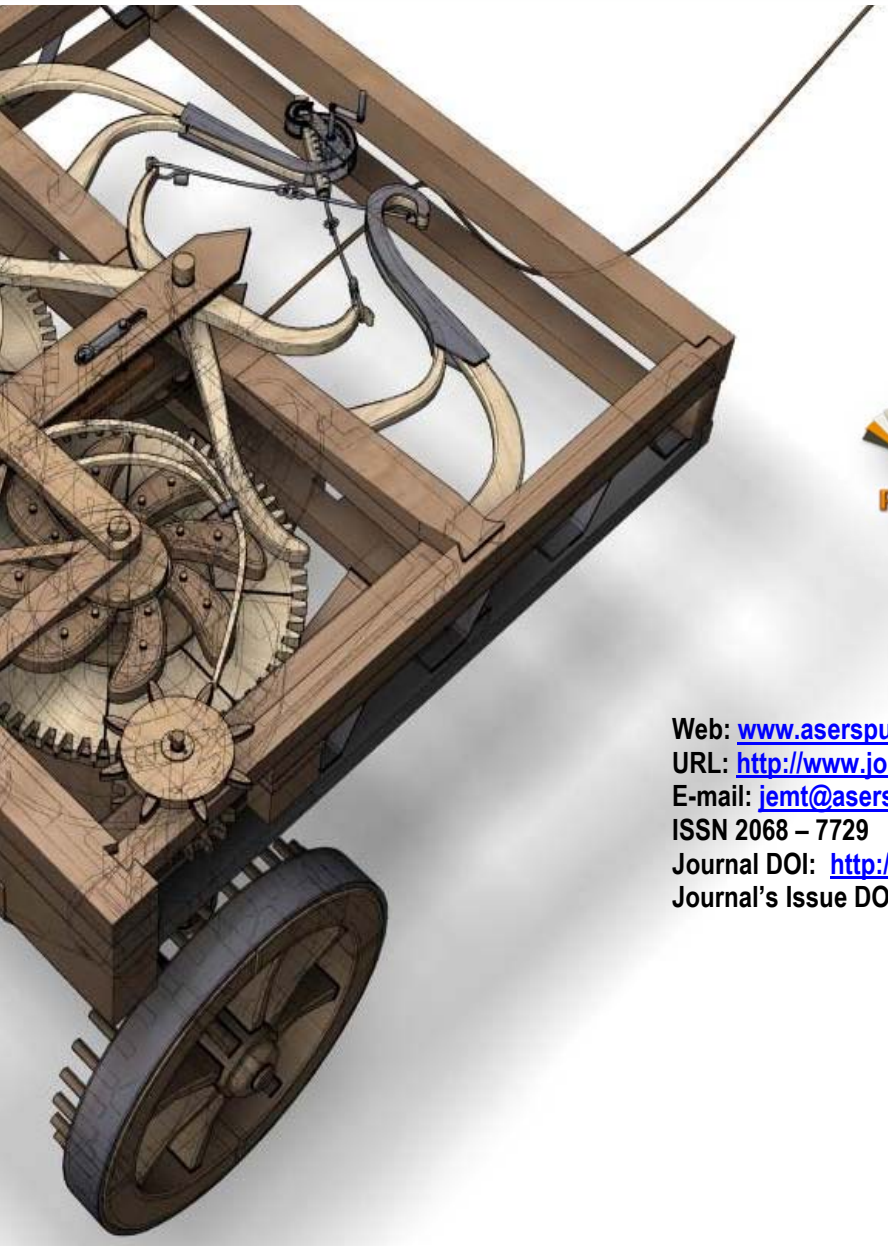
Appendix 1

Table 1. Chi-Square Statistics Result

Production Function	Chi–Square Calculated	Chi–Square Tabulated	DF
Cassava			
Sex	3.077	0.71	4
Age	13.523	7.96	16
Household size	19.614	7.96	16
Education qualification	17.672	10.9	20
Farming experience	21.066	2.73	16
Yam			
Sex	0.994	0.71	4
Age	9.242	5.23	12
Household size	13.582	5.23	12
Education qualification	14.934	10.9	20
Farming experience	14.923	7.96	16
Maize			
Sex	6.010	0.71	4
Age	31.546	7.96	16
Household size	9.117	7.96	16
Education qualification	15.352	10.9	20
Farming experience	27.198	7.96	16
Rice			
Sex	7.841	0.71	4
Age	25.483	7.96	16
Household size	9.539	5.23	12
Education qualification	24.018	10.9	20
Farming experience	10.139	7.96	16

Source: Author's Computation using SPSS

ASERS



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