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AN EMPIRICAL ANALYSIS OF THE DETERMINANTS OF AGRICULTURAL PRODUCTIVITY AND ITS EFFECT ON AGRICULTURAL OUTPUT: A STUDY OF SOKOTO, KEBBI AND ZAMFARA STATES

¹Abdul Sabur Hassan, ²Sadiq Abubakar Ciroma

^{1&2} Department of Business Administration and Management, Federal Polytechnic, Kaura Namoda.

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Abstract: The paper examined the effect of agricultural productivity in the direction of farmers' experience, access to extension agent, access to credit and farmers; gender on agricultural output of farmers in Sokoto, Kebbi and Zamfara states. The objective of this study is to ascertain the relationship between farmers' experience, access to extension agent, access to credit and farmers' gender and agricultural output in the region. For the purpose of this study, primary data was adopted through questionnaire. The population of the study consists of one thousand (1000) respondents across Sokoto, Kebbi and Zamfara states. The data were analyzed using both descriptive and inferential statistics. Descriptive statistics such as tables and percentages were used to present and analyze the data. On the other hand, inferential statistics was used in testing hypothesis using multiple regression model. The result shows that agricultural productivity in the direction of farmers' experience, access to extension agent and access to credit influences agricultural output in the area.

Keywords: Agricultural, farm produce, socio economic activities, shortage of output, trading Mechanization and Technology.

1. INTRODUCTION

Agribusiness contributed 12.1 percent of Nigeria's GDP 2003-2004, and almost 25 percent of national merchandise exports (Anon, 2010). Since 1960, the agribusiness sector has played a critical role in Nigeria's economic growth and development. In fact, before the discovery and exploration of petroleum, the Nigerian economy was primarily dependent on revenues earned by agriculture exports which were then utilized to promote other sectors (Anigbogu, Agbasi & Okoli, 2015). Nigeria, the most populous country in Africa, is naturally endowed with millions of hectares of vast land, with a diverse range of unexploited minerals and wealth of human capital its estimated population of 162 million (World Bank, 2011). Despite the fact Nigerian peasant farmers relied on traditional tools and indigenous farming methods, they produced 70% of Nigeria's exports and 95% of its food needs domestically in the 1960s the agricultural sector contributed over 60% of the GDP (Matthew & Adegboye, 2016).

Though, the agricultural sector was neglected during the 1970s oil boom. Since then, Nigeria has been plagued by extreme poverty and lack of essential food supplies (Yumkella, 2012). The farm produce commercial trading is a major economic activity in Sokoto, Kebbi and Zamfara states (Akintayo and May, 2010).

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The study shows that the entire people of the area leave by farming and agric-trading, the revenue contribution from agrictrading is vital to the states development and Federal government of Nigeria. The declining of farm product commercial activities in the states brings about social depravities like unemployment, poverty, armed bandits, kidnappings, loss of revenue. (Dunmoye, 2016).

1.1 Statement of the Research Problem

Previous studies have shown that, despite the North West rich in agricultural resource endowment, the states under study have experienced in increase in revenue generation, economic activity, favorable conditions and job creation. However, agricultural production in the North West Nigeria is gradually declining (Olaoye, 2014). Agriculture provided for 65-70 percent of overall exports through rail transport to the Lagos Seaport in the 1960s. Conversely, major agricultural products such as beans, groundnut, cotton, onions, rice and wheat began to decline in alarming proportion 1970s (Lawal & Oluwatoyin, 2011). It was around 40% in the 1970s, and by the late 1990s it had

dropped to less than 2% (Olajide, Akinlabi & Tijani, 2012). Consequently, a significant decrease in agricultural output is highly recorded and consequently resulted in an increase in unemployment rate, loss of revenue, poverty rate and social depravities like cattle rustling, kidnapping, armed robbery and banditry in the affected areas (Adubi, 2002). According to a United Nation report on poverty index 2017, the poverty rate in Sokoto, Kebbi and Zamfara is on the high increase as sokoto 85.3%, kebbi 86% and zamfara 91.1% with low farm produce trading, low economics activities, underutilization of human and farm resources. Therefore, the study wanted to investigate the impact of farming experience, extension agent, access to credit and farmers' gender on agricultural output in Sokoto, Kebbi and Zamfara states.

1.2 Objectives of the Study

The general objective of the study is to examine the determinants of farm shortage and decline of trading activities in Sokoto, Kebbi and Zamfara States.

The specific objectives include:

- 1. To determine whether farming experience have significant influence on agricultural output in Sokoto, Kebbi and Zamfara States.
- 2. To determine whether or not access to extension agent significantly influence agricultural output in Sokoto, Kebbi and Zamfara States.
- 3. To examine whether access to credit have significant influence on agricultural output in Sokoto, Kebbi and Zamfara States.
- 4. To determine whether or not farmers' gender significantly influence agricultural output in Sokoto, Kebbi and Zamfara States.

2. REVIEW OF EMPIRICAL STUDIES

To support the claims of any study, there is need for an empirical review of authorities who conducted studies in the area of discussion. In the course of conducting this study, similar studies were consulted as follows:

Emmanuel, Emmanuel, Zaku and Thomas (2011) conducted a study on Biodiversity and Agricultural Productivity Enhancement in Nigeria: Application of Processed Moringa *Oleifera Seeds* for Improved Organic Farming. The result from the analysis discovered that organic farming based on the use of processed *Moringa Oleifera seed* as fertilizer on a maize farm achieved significant improvement on soil nutrients as shown in the plant yield as compared to the control. However, organic agriculture through biodiversity manages locally available resources to optimize competition for food and space between different plant and animal species. The study recommended that organic farmers, Moringa fertilizers should be produced using locally available technologies. Moreover, abundant raw material for organic fertilizer should be made available through large-scale plantation of Moringa trees.

Kassali, Ayanwale and Williams (2009) conducted a research to assess the effects of farm location on food farmer's technical efficiency. The study was carried out in the Oke Ogun Area of Oyo State. The study selected the three Local

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Government Areas (LGAs) purposively and a multistage random sampling technique was used to collect data from 240 food farmers. Both descriptive and inferential statistics were employed to analyse data and a Stochastic Production Frontier Approach was used to estimate farmer's technical efficiency and its socio-economic determinants. The results revealed that the majority of farmers travelled an average of 6 km between the farm location and the village and resided mostly in the village. Food producers were full-time farmers practicing mostly crop diversification and exploiting an average of 14.61 acres of land. The technical efficiency scores recorded varied between 0.2 and 0.94 with a mean of 0.73. There is a significant effect of the farm distance, farmers' place of residence, farmer's gender, experience, extension contact, access to credit, and rate of lands to tubers and fertilizer use on food farmers' technical efficiency. Meanwhile, the level of involvement into farming (full-time or part-time), the diversification index, and farm size had no significant effect on farmer's productivity. Therefore, the study recommended that no negative impact of farm distance on food farmer's productivity while highlighting the strategic importance of credit and extension services towards female food farmers.

Daniel and Ihechituru (2011). Examined determinants of agricultural production and agricultural sector output in Nigeria. The findings from the analysis show that agricultural mechanization, funding, agricultural credit/loan as well as exchange rate have positive relationship with agricultural production output.

Imahel and Alabi (2005) assessed the productivity of agricultural sector in Nigeria using the Ordinary Least Squares regression technique. The measurement of the productivity of the sector followed agricultural gross domestic product, aggregate index of agricultural production, output of major agricultural commodities and other output of major agricultural commodities excluding staples. It was observed from the results that technological transformation are the major predictor in explaining the systematic variation in the measures of agricultural productivity. The results equally indicated that Nigerian agricultural sector provides pathways to the prosperity of the country in the new millennium.

3. METHODOLOGY

This study basically used descriptive survey research method. The population of the study consists of one thousand (1000) respondents across sokoto, kebbi and zamfara states. Out of the 1000 copies of questionnaire, 759 copies were retrieved by the respondents. Stratified sampling technique was used in selecting the three states for the study. On the other hand, the study used Purposive Sampling techniques to select the respondents. Both descriptive and inferential statistics were employed to analyzed data. The demographic data in this study was analysed using descriptive statistical techniques such as tables and the frequency graphs. On the other hand, the study used multiple regression model to establish the relationship between of agricultural productivity components agricultural output.

4. RESULTS AND DISCUSSION

4.1 Reliability

Questionnaires were first administered to hundred (100) respondents randomly selected for reliability testing of the instrument. Internal consistency was measured using the Cronbach's alpha, and the results were within the acceptable range of 0.70 to 0.95 (Ahmed, Burodo & Suleiman, 2022; Suleiman & Usman, 2016; Suleiman and Yasir, 2022A; Suleiman and Yasir, 2022B) as presented in Table 1.

Section	No .of items	Cronbach's alpha	
Farming experience	3	0.812	
Access to extension agent	3	0.742	
Access to credit	3	0.766	
Agricultural output	3	0.871	

Table 1:	Summary	of Cronbach	's alpha	results
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4.2 Socio-Demographic Profile of Customers

Table 2 presents the socio-demographic characteristics of 759 respondents' recovered questionnaires out of 1000 administered. It shows that 398(52.5%) and 361(47.5%) of the respondents are male and female respectively. The age distribution of the respondents shows that 84(11.1%), 348(45.8%), 246(32.4%) and 81(10.7%) aged less than 20 years, 21 to 40 years, 41 to 60 years and above 60 years respectively. Educational qualification profile of the customers shows that

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88(11.6%), 187(24.7%), 209(27.5%) and 275(36.2%) possessed Quranic/Islamiyya, Primary school certificate, Secondary School certificate and tertiary certificate respectively. Employment status profile of the customers reveals that 127 (16.7%), 77(10.2%), 239(31.5%), 249(32.8%) and 67(8.8%) of the respondents are civil servants, retired workers, self-employed, students and other specified employments respectively. Finally, marital status of the customers shows that 252(33.2%), 289(38.1%), 134(17.6%) and 84(11.1%) of the respondents are single, married, divorced and widowed respectively.

Gender	Frequency	Percentage (%)
Male	398	52.5
Female	361	47.5
Total	759	100.0
Age	Frequency	Percentage (%)
<u>≤ 20</u>	84	11.1
21-40	348	45.8
41-60	246	32.4
Above 60	81	10.7
Total	759	100.0
Highest educational qualification	Frequency	Percentage (%)
Quranic/Islamiyya School	88	11.6
Primary School	187	24.7
Secondary school	209	27.5
Tertiary school	275	36.2
Total	759	100.0
Employment status	Frequency	Percentage (%)
Civil servant	127	16.7
Retired	77	10.2
Self employed	239	31.5
Student	249	32.8
Other specify	67	8.8
Total	759	100.0
Marital Status	Frequency	Percentage (%)
Single	252	33.2
Married	289	38.1
Divorced	134	17.6
Widowed	84	11.1
Total	759	100.0

Table 2: Socio-Demographic Characteristics of Patients

Source: Field Data, 2022

4.3 Test of Hypothesis

In order to answer our research questions, the following four hypotheses were formulated.

Hypothesis 1: Farming experience has no significant impact on agricultural output.

Hypothesis 2: Access to extension agent has no significant impact on agricultural output.

Hypothesis 3: Access to credit has no significant impact on agricultural output.

Hypothesis 4: Farmer's gender has no significant impact on agricultural output.

In order to test the hypotheses, data gathered were subjected to multiple regression analysis to examine whether the determinants of agricultural productivity predict agricultural output. Tables 3, 4 and 5 present the multiple regression analysis for the hypotheses formulated.

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Table 3: Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.556 ^a	.310	.286	1.22231	

a. Predictors: (Constant), Farmer's Gender, Access to extension agent, Access to credit, Farming Experience

The overall predictability of the model is depicted in Table 3. The result indicated that 28.6% (R^2 =0.286) of the observed variance in agricultural output that were mutually explained by the independent variables (determinants of agricultural productivity). The remaining 71.4% unexplained variance could be due to other factors outside the regression model. It indicated that there is a strong combined positive relationship between the determinants of agricultural productivity and agricultural output (R=0.556).

Moc	lel	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	78.352	4	19.588	13.111	.000 ^b
1	Residual	174.804	117	1.494		
	Total	253.156	121			

Table 4: ANOVA

a. Dependent Variable: Agricultural output

b. Predictors: (Constant), Farmer's Gender, Access to extension agent, Access to credit, Farming Experience

Table 4 shows the goodness of fit statistics about overall significance of the regression model. The model was found to be statistically significant since the F-value gives a significant value of less than 5% alpha level of significance. This suggests that the determinants of agricultural productivity jointly predicts the dependent variable agricultural output (F=13.111; p<0.05) significantly. This means in order to enhance agricultural output, it is rational to focus on the improvement of determinants of agricultural productivity.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	В	Std. Error	Beta		
(Constant)	1.210	.445		2.720	.008
Farming Experience	.286	.094	.256	3.026	.003
1 Access to extension agent	.355	.118	.231	3.005	.003
Access to credit	.367	.092	.326	3.987	.000
Farmer's Gender	.179	.091	.159	1.980	.050

Table 5: Regression coefficients of Agricultural output

a. Dependent Variable: Agricultural output

Table 5 presents Regression model expressing the relationship between determinants of agricultural productivity and agricultural output and is thus represented by the equation below:

 $A gricultural \ output = 1.210 + 0.286 farming \ experience + 0.355 access \ to \ extension \ agent + 0.367 access \ to \ credit + 0.179 farmer's gender \tag{2}$

In this model, it is assumed that agricultural output is determined by determinants of agricultural productivity. From the results of the model in table 5, constant coefficient (1.210) is the unit change in agricultural productivity when determinants of agricultural productivity are at zero levels, significant value of the constant (0.003) which is less than 5% (level of significance is an indication that there other factors apart from determinants of agricultural productivity that determine agricultural output. Similarly, the positive coefficient values of farming experience (0.286), access to extension agent (0.355) and access to credit (0.367) with respective significant values of (0.003),(0.003) and (0.000) which is far less than 5% (0.05) level of significance means that the hypotheses of no significant impacts of farming experience, access to extension agent and access to credit on agricultural output were rejected. But, since the coefficient of farmer' gender (0.179) gives significant value of 0.05 and is equal to 5% level of significance then the hypothesis which states that there is no significant relationship between farmer' gender and agricultural output is accepted. This therefore suggests that there is

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significant positive relationships between determinants of agricultural productivity and agricultural output. In other words, improving these determinants of agricultural productivity enhances agricultural output.

5. CONCLUSION

This research analysed and determine the effect of agricultural productivity on agricultural in Sokoto, Kebbi and Zamfara states. Farming experience, access to extension agent, access to credit and farmers' gender were assumed to agricultural productivity components that can influence agricultural output in the region. Four hypotheses were tested, and the results show that the farmers' experience, access to extension agent and access to credit were positively and significantly related to agricultural output in the region. However, farmers' gender had a positive but insignificant effect on agricultural output in the region. However, farmers' gender had a positive but insignificant effect on agricultural output in the region. Hence all the hypotheses except the last one were rejected in favour of their alternative hypotheses since all p-values are less than 5% level of significance. Based on the above, this study concludes that agricultural productivity in the direction of farmers' experience, access to extension agent and access to credit are antecedents to agricultural productivity.

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