AGRICULTURAL GROWTH RESPONSE TO HUMAN CAPITAL DEVELOPMENT IN NIGERIA

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Abstract

This study evaluated agricultural growth response to human capital development in Nigeria. Annual time series data covering a period of 1993-2017 were utilized to analyse the objectives. The result shows that recurrent expenditure on education contributed above 10% and capital expenditure on education contributed above 2% to agricultural growth in the long run. Primary school enrolment contributed above 20% and tertiary institution enrolment contributed above 1% to agricultural growth in the short run. The impulse response result shows that agricultural growth responded negatively capital expenditure on education but responded significantly to recurrent expenditure. There was minimal response of agricultural growth to both capital and recurrent expenditures on health. It was therefore recommended that capital expenditures on education and health be increased and channelled appropriately.

Key words: *human capital, education, health, agricultural growth*

INTRODUCTION

The role of agriculture cannot be overemphasized in economic development, particularly in the developing economies of all regions as it constitutes about one-third of GDP. In addition to ensuring food and nutritional security, it serves as the major source of rural employment and backbone of rural economies. Yet, in Africa as a whole, growth in this sector has been sluggish in recent years. Improving this growth rate is an item of increasing concern for both governments and international organizations [1]. In countries where agriculture accounts for majority of the employment their citizens increased growth in agricultural incomes is essential to facilitate growth in the overall economy since the goods and services have the ability to generate overall GDP growth from agriculture including the non-farm sectors. This ability and the comparative advantage in reducing poverty vary among the different countries [3].

According to [10] "The concept of human capital refers to the abilities and skills of human resources of a country, while human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience that are critical for economic growth and development of a country's economy". [2] posited that human capital refers to the human factor in the production process consisting of the combined knowledge, skills and abilities of the workforce employed to carry out the various activities required to generate income. Development of human activities, however, requires a holistic participation from the government, the private sector and the research institutions. It is no doubt that the government is actively promoting human development activities by providing funds and infrastructures [11]. With increasing globalisation, attention is being drawn towards human capital development because

of the productivity of the job market due to the recent recession in the various economies of the world. Developed nations emphasize on human capital development by devoting necessary time and efforts and for the developing countries to develop, emphasis should be more on human capital development towards accelerating the economic growth as this will project them into the international arena [6]. Thus human capital development is not limited to education and health. In Nigeria, Human capital is produced mainly in the education and health sectors. In providing the necessary resources, both physical and human using public resources, the government in the process develops human capital [9]. The objectives of this study were to: ascertain the contributions of human capital development indicators to agricultural growth in Nigeria; and analyse the response of agricultural growth to human capital development agricultural growth in Nigeria.

MATERIALS AND METHODS

The study was conducted in Nigeria. Federal Republic of Nigeria is located in West Africa between latitude $9.0820°$ N and longitude $8.6753°$ E. Nigeria has a total land area of 909,890sqkm. The projected population of Nigeria in 2019 is 196,056,444 from the 2006 population census of 140,431,790 using the annual growth rate of 2.6% [8]. Nigeria's human capital development has remained weak due to underinvestment in it. The country has been ranked 152 out of 157 by World Bank in the human capital index [12]. Data for this study were obtained entirely from secondary sources. Annual time serial data covering the period of 1993 to 2017 for growth in agricultural production, the expenditure of government on education and health were obtained from various issues of the Central Bank of Nigeria Statistical Bulletin while primary school enrolment, secondary school enrolment and tertiary enrolment were obtained from Nigeria Bureau of statistics. Data collected were analysed using variance decomposition and impulse response analyses.

The variance of any given dependent variable (Y_t) in response to the orthogonal shocks to it can be thought of as the variance of the errors in forecasting it using equation (1) because without the shocks we would forecast the variable to remain unchanged.

$$Y_t = Z_0 e_t + Z_1 e_{t-1} + Z_2 e_{t-2} + \cdots +$$

$$Z_n e_{t-n} + Y_0 \tag{1}$$

The vector of one step ahead forecast errors is given by $Z_0 e_t$ [4].
The OLS model used to estimate the AR(p_n) model which are the basis for the conventional impulse response estimation was specified as:

$$\text{LnAG} = \alpha_0 + \alpha_1 \text{LnPRY} + \alpha_2 \text{LnSEC} + \alpha_3 \text{LnTER} + \alpha_4 \text{LnREDU} + \alpha_5 \text{LnCEDU} + \alpha_6 \text{LnRHLT} + \alpha_7 \text{LnCHLT} + \alpha_8 \text{LnL} + u \tag{2}$$

where:
AG = Agricultural Growth
PRIM = Primary School enrolment
SEC = Secondary School Enrolment
TER = Tertiary School Enrolment
REDU = Recurrent Expenditure on Education
CEDU = Capital Expenditure on Education
RHLT = Recurrent Expenditure on Health
CHLT = Capital Expenditure on Health
L = Labour force
α = coefficients to be estimated and their a-priori signs indicate that all the coefficients are positively related to AG
u = the random error, with mean zero and constant variance.

RESULTS AND DISCUSSIONS

Contributions of human capital development indicators to agricultural growth in Nigeria

Employing a 10 year forecasting horizon, the forecasting error variance decomposition determines the proportion of the movement in the time series that are due to the shocks in their own series as opposed to shocks in other

variables. The result on Table 1 reveals that in the first year, agricultural growth accounted for 100% changes in itself, 38.56% in the fifth year and 35.43% in the tenth year. Focusing on the impact on agricultural growth, the estimated decompositions suggest that capital expenditure on education explain only between 0% and 4.45% of future variation in agricultural growth over the forecast horizon. Recurrent expenditure on health and secondary school enrolment accounted for less than1% throughout the period. This might be as a result of constant industrial actions by medical personnel due to poor working conditions and non-availability of modern health facilities.

Result further shows that shocks to the recurrent expenditure on education had the second highest influence on agricultural growth throughout the period of analysis as it increased steadily and significantly overtime. Labour, primary school enrolment and tertiary institution enrolment contribution to agricultural growth dropped from 1.82%, 20.53% and 2.9% in the short run period to 1.76%, 19.17%, and 2.86% respectively in the long run period. The contributions of capital expenditure on education and recurrent expenditure on education to agricultural growth increased from 1.41% and 33.28% in the short run period to 4.45% and33.93% in the long run period respectively.

Response of agricultural growth to human capital development agricultural growth in Nigeria

The impulse response functions are based on a moving average of the VAR model and the dynamic responses of one variable to another are evaluated. Figure 1 presents the impulse response of agricultural growth to capital expenditures on health and education; recurrent expenditures on education and health; primary school, secondary school and tertiary institution enrolment and labour.

The red dotted lines represent a two deviation band around the point estimates while the point estimates of the impulse response functions are plotted on solid line. If the bands cross zero, point estimates are considered to be significant. The result on the graphs shows that a simple deviation in capital expenditure on health will positively affect agricultural growth. Agricultural growth follows a positive path after a deviation in capital expenditure on health, recurrent expenditure on education and health, primary school and tertiary institution enrolment and labour. Agricultural growth response to capital expenditure on education, secondary school enrolment is negative at the beginning before becoming positive later.

This result agrees with [5] who found that agricultural production responds positively to human capital in Nigeria because of the positive coefficient of human capital development (proxied by total government expenditures on social and community services) which was statistically significant at 1%. Therefore as human capital development increases; agricultural output also increases. It makes intuitive sense, in that as farmers get equipped with innovation information generated from research and development, it helps to boost their productivity.

Table 1. Variance decomposition

Period	SE	LNAGRIC OUTPUT	LNCEDU	LNCHLT	LNLABOU R	LNPRY	LNREDU	LNRHLT	LNSEC	LNTER
1	1.058898	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.716211	77.17599	0.288681	0.088025	3.997446	17.17665	0.356235	0.063100	0.045055	0.808821
3	2.252232	54.81012	1.668387	0.244278	2.689857	21.94117	15.78889	0.046951	0.646963	2.163388
4	2.634496	43.29717	1.402106	0.187088	2.051370	21.51585	27.59032	0.613705	0.577272	2.765116
5	2.820654	38.56763	1.405027	0.172675	1.827692	20.53212	33.28865	0.767403	0.537157	2.901640
6	2.892774	36.86408	2.206878	0.190998	1.771562	19.95408	34.72079	0.834751	0.519903	2.936961
7	2.921834	36.16906	3.196018	0.305727	1.785974	19.60448	34.67619	0.821138	0.521411	2.920002
8	2.937445	35.80619	3.922526	0.508573	1.777765	19.39879	34.35177	0.812436	0.526777	2.895168
9	2.948010	35.57664	4.293210	0.774457	1.765934	19.26200	34.10689	0.806755	0.539020	2.875089
10	2.956005	35.42863	4.449605	1.035153	1.759150	19.17497	33.93137	0.806488	0.554206	2.860426

Source: Eviews data analysis output, 2019.

Also it corroborates [9] findings that human capital positively affects economic growth using education component of human capital. [7] study findings show that education is an

imperative HCD indicator, which has a significant influence on the growth of TFP of the agriculture sector as education indicated a positive influence on the growth of total factor productivity.
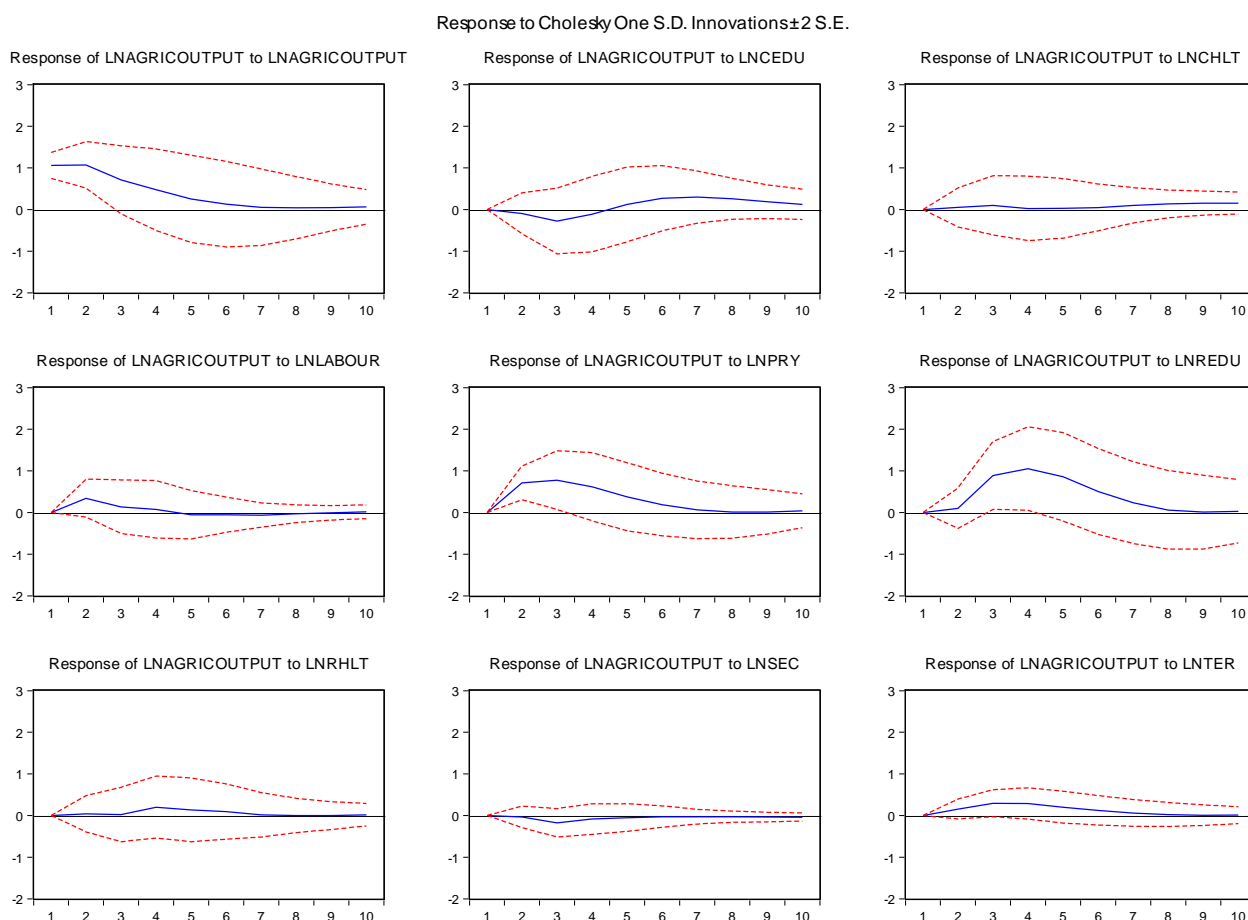

Fig 1. Impulse response of agricultural growth to human capital development
Source: Eviews data analysis output, 2019.

CONCLUSIONS

The contribution of human capital development to agricultural growth and response of agricultural growth to human capital development was evaluated in this study using time series data spanning a period of 25 years (1993-2017). It were capital and recurrent expenditures on education, primary school enrolment to agricultural growth, tertiary institution enrolment and labour contributed significantly to agricultural growth in the long and short run. The response of agricultural growth to capital expenditure on education and secondary school enrolment in the short run was negative but positive in the long run. There was significant response of agricultural growth to recurrent expenditure on education; primary school enrolment and tertiary institution enrolment while the response to capital and recurrent expenditures on health were minimal.

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