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IMPACT OF GOVERNMENT SPENDINGS AND TOTAL FACTOR PRODUCTIVITY IN AGRICULTURE ON NIGERIA's ECONOMY: Implications for Africa's 2025 and 2063 Agenda

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ABSTRACT

Employing the Computable General Equilibrium (CGE) static model, four economic impact simulations were undertaken, covering current situation and expected standards. These covers crop-based productivity of 4.75% and 20%; government spendings of 2% and 10% to represent current and best practices under each scenario. While the study noted that agricultural expenditure and crop productivities were below par compared to best practices, it established that enhanced total factor productivity for crop sub-sector and government expenditure impacted differently on various economic indicators. Export was the key beneficiary with significant impact of 39.7% and 46.4% under the total factor productivity and government spendings respectively, while prices were dampened with - 3.1% and -3.2% under both parameters respectively. Except for exchange rates and output prices which depreciated, other economic parameters appreciated. Looking beyond Vision 2020 therefore and towards meeting the continental agenda for 2025 and 2063, there is the need to enhance investments into the agriculture sector, through targeted innovative agribusiness financing and investments to complement budgetary sources. It also becomes imperative to enhance total factor productivity in the agriculture sector through technology driven, sustainably and affordable practices. It is also imperative to exploit the synergy among country visions, regional and continental agenda on agriculture investments and productivity enhancement, with the view to effectively harmonizing development efforts within the African continent, towards ensuring that the 21st Century is African Century.

Key words: Econometric impact; Government expenditure, Total factor productivity, Agriculture, CGE Model, Nigeria, Africa.

INTRODUCTION

Appreciation: We express sincere appreciation to USAID/Feed the Future Nigeria Agriculture Policy Project, IFPRI, Rob Davies and Dirk van Seventer and the Federal University of Technology, Minna, Nigeria for capacity building support for this study.

In-spite of Africa's relatively strong economic growth performance, put at 5.3 per cent between 2000 and 2010 (United Nations Conference on Trade and Development (UNCTAD) (2014), which though, dropped to 3.7 per cent, but higher than the global average of 2.4% (United Nations Economic Commissions for Africa, 2016), many countries within the continent are still grappling with several development challenges, particularly, issues pertaining to low agricultural productivity and limited public investment support for agricultural development (Federal Ministry of Agriculture and Rural Development (FMARD), (2011); UNCTAD, (2014); Federal Government of Nigeria, (2016). Recognising these challenges, the African Development Bank (AfDB) incorporated increased productivity, enhanced investment and improved capital flow amongst the key enablers of the Feed Africa Strategy for the African Continent (AfDB, 2016). From the home front, the Federal Ministry of Agriculture and Rural Development (FMARD) (2011) affirmed that productivity raises living standards, given that additional incomes enhances social welfare, with the industries being able to meet stakeholders' obligations. AfDB (2016) further argued that successful transformation that is business-led, must encompass large-scale dissemination of productivity increasing technologies and inputs, with the public sector having a role to play. These were reinforced by the Comprehensive African Agriculture Development Programme (CAADP) goals and Malabo commitments. Researchers like Hayami and Ruttam (1970) have long established that agricultural productivity was necessary for agricultural output to meet extensive population growth, in addition to being a driver of agricultural competitiveness. FMARD (2011) and United States Agency for International Development (USAID) (2018) affirmed that Nigeria's crop yields are far lower than best practice, put at 20-50% of what obtains in similar developing nations. In a related development, AfDB (2016) noted that the average cereal yields in Africa grew less than 40 per cent since 1990 relative to the 164 per cent, 81 per cent, 69 per cent and 43 per cent recorded in Brazil, Uruguay, Chile and Malaysia respectively. Specifically, Africa's yields were put at 56 per cent of the international average. Estimated yields of key crops in Nigeria were observed to be lower compared to potentials (Figure 1).

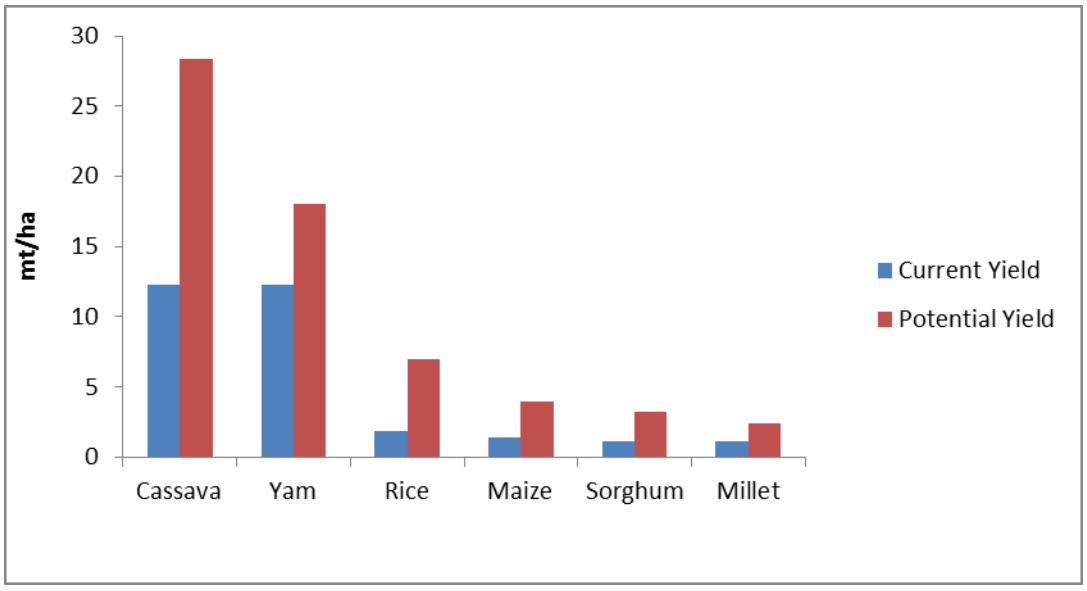

Figure 1: Current yield from FMAWR/CBN; Potential yield from ReSAKSS

With respect to agriculture sector investment, FMARD (2011) affirmed that low government investment on agriculture was largely responsible for low productivity and competitiveness.

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The source noted that Asia's investment of 16 per cent of national budget in the agriculture sector propelled its economic growth and industrialization. It further affirmed that Nigeria's agriculture sector's investment is rather too low, put at approximately 2 per cent of total government expenditures. Olomola *et al.* (2014) also showed that agricultural spending as a share of the total federal spendings in Nigeria averaged 4.6 per cent between 2008 and 2012 and has been moving downwards ever since. The study noted that the lopsided public investment is not unconnected to the current national revenue allocation for agriculture interventions, amongst the tiers of governments. The source further revealed that public spending in agriculture measured by the proportion of agriculture spendings to agriculture GDP is amongst the lowest across the globe. Table 2 details the extent of government spending on agriculture relative to other global economies. Thus, the key question in this paper is whether increased government spendings and agricultural productivity will enhance Africa's development outcomes, as it closes in on the 20:2020 visioning era and marches towards the 2025 and 2063 AU Agenda respectively, using Nigeria as a reference point. Thus, this emerging development calls for re-examination and unearthing of new evidences on the linkages between agriculture sector investments and productivity on the economy. It is hypothesized that agricultural investment and productivity will impact variedly on the various parameters of Nigeria's economy.

Table 2: Agriculture sector public spendings in Nigeria as compared with other countries average (2000-2010)

Country	Agriculture expenditure in 2005 US$ million	% share of agriculture in total spending	% of total expenditure in total GDP	% of agriculture expenditure in agriculture GDP
Brazil	4,752	2.4	21.5	8.9
Ethiopia	361	11.9	24.1	5.7
India	8,604	6.0	15.6	5.0
Malaysia	1,523	4.1	24.7	11.3
Mexico	4,123	2.7	18.0	12.5
Nepal	82	5.8	16.4	2.7
Nigeria	583	3.8	13.3	1.5
Pakistan	569	2.5	18.5	2.2
Russia	1,409	0.8	25.1	3.6
Venezuela	380	1.0	26.0	6.5

Source: Olomola *et al.,* (2014)

THEORETICAL AND CONCEPTUAL REVIEWS

Nigeria's Economic Setting

Nigeria's economic setting has for long been skewed towards the debit side of development outlook. Nigeria's Medium Term Economic Recovery and Growth Plan (2017-2020) noted that the country, like many other African countries is characterised by structural challenges which hinders growth, job creation, amongst other development outcomes. The country's economy is presently mono-commodity based for its revenue and foreign exchange with high raw material importation to sustain its industrial sector. Nigeria is consumption based, with little investment, with an investment GDP ratio of 13-14%. The plan also noted that the country's GDP grew at 6.3% between 2005 and 2015, but went into recession in 2016. For

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long, the country has been dependent on the oil and gas sector, which accounted for 94% of export earnings and 62% of government revenue between 2011 and 2015. Furthermore, foreign exchange reserve declined from USD 53 billion in 2008 to USD 25 billion in November 2016. Inflation also almost doubled between January 2012 and October, 2016, but receded to 11.37%. In addition, USAID (2018) affirmed that 53.3% of the population are poor with significant income inequalities along the north-south divide. Malnutrition is high, with about 32% national stunting rates for children under the age of five. The global organization further revealed that 52% (70.8 million ha) of the agricultural lands remained unutilised, 95% of lands is untitled, thus dis-incentivizing land management. Also, about 40% of the farming households used fertilizer, estimated 20-27% adopted improved seeds, 6% had access to tractor services, irrigation practices covers 1% of farm lands, while farming is on small-scale, with majority cultivating less than 2ha. From the down-stream sector however, post-harvest losses accounted for between 20% and 40% of total production and about 60% perishable goods (Nigeria Institute for Social and Economic Research, 2014).

Theories of Public Investment and Productivity

Two dimensions of the investment theory are widely recognised. The first focused on the justification, need and effectiveness of public expenditures and the roles of government, while the second placed emphasis on resource allocation decision and the roles of actors and institutions in influencing public investment decisions. Zawojska (2013) noted that the former cover contributions from the classical, neo-classical and Keynesian schools of economic thought. While justifying public expenditure on the allocation, stabilization and distribution functions of government, Musgrave and Musgrave (1989) stressed the need for government expenditure effectiveness, given the tendency to impact negatively on growth and argued that public goods demand has positive correlation with the per capita income. Likewise, Wagner (1890), affirmed that the functions of the state correlate directly with public expenditure, while enhancement of government spendings enhances national income. On their part, Wiseman-Peacock posited that government expenditures rise in jerks and step pattern, thus increasing government expenditures. From the neoclassical point of view however, the need for government expenditure were mainly attributed to economic inefficiencies created by market failures and undesirable low material welfare amongst the poorest of the poor (Zawojska, 2013). The school affirmed that government expenditures have indirect relationship with economic growth in the long run, while also discouraging private investments. Mogues (2012) contributed several resource allocation theories, encompassing budgeting process, veto-player theory, garbage can budgeting model, budget trade-off theory and incremental budgetary model.

Agricultural Productivity and Economic Growth

The common agreement on agricultural productivity is the propensity to enhance output more economically and efficiently. Agricultural productivity has manifested in numerous forms, either as total factor productivity, multi-factor or partial factor productivity. Meanwhile, several researchers (Johnston and Mellor, 1961; Timmer (1988); Echevarria 1997, Gollin, Parente and Rogers, 2007; Gollin *et al.,* (2014)) have all linked agricultural productivity to growth. On the other hand, Baier *et al.* (2007) established that total factor productivity growth across countries is associated with negative indices. Meanwhile, Thirtle and Bottomley (1992) affirmed that factor productivity growth increased with increased aggregate output and decreased aggregate input in the United Kingdom.. In Nigeria, agricultural TFP has been on the decline since 1991, with the 1.1% recorded between 2010 and 2014, lower than those of the other countries considered (Figure 2).

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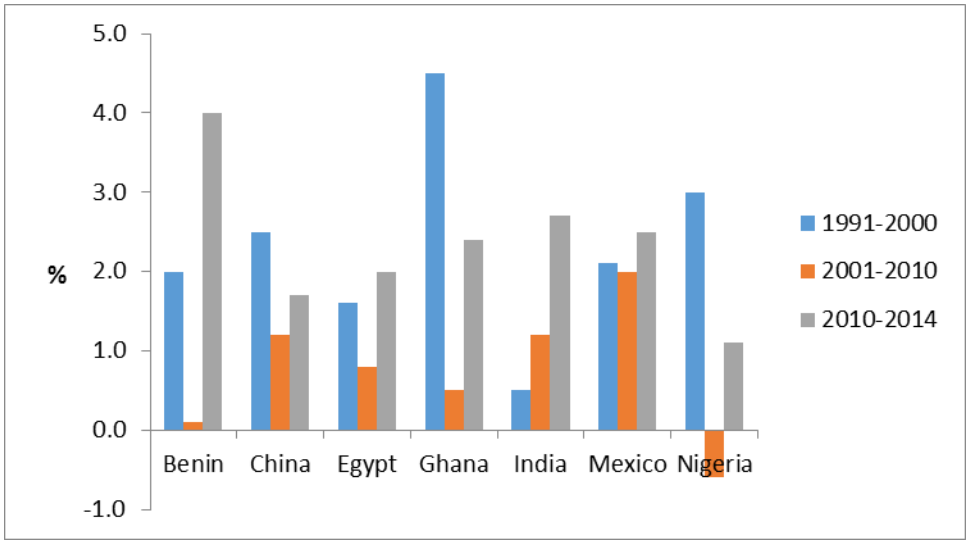

Figure 2: Agricultural total factor productivity growth of selected countries (1991-2014)
Source: Authors' derivation using data from Harvard Dataverse, IFPRI Global Food Policy Report Annex Table (2018)

General Equilibrium Theory and Computable General Equilibrium Model

According to Ghadimi (2007), the neoclassical general equilibrium theory drives the CGE modelling. The theory is based on the micro theory optimization assumption that demand and supply sides of all markets are specified. The general equilibrium theory serves as an instrument for the analysis of market economies and shows how all free markets move towards equilibrium in the long run, without necessarily reacting to it. General equilibrium theory focuses on a free market price system published by Adam Smith's Wealth of Nation (1776). However, Walras (1874) posited that individual market will be in equilibrium if all other markets are also in equilibrium, implying that the transactions between actors in a marketing system produces prices which allows other market actors to realign their resources and activities along profitable lines. Gollin *et al.* (2014) showed that agricultural productivity in several African countries generated positive impact on the overall growth and mostly positive poverty reduction impacts. The study resolved that the CGE model allowed for comprehensive classification of economies, thus positively supporting policy simulations. Bezabih *et al.* (2010) noted that the CGE framework enabled the isolation of the effect of specific variables on the overall growth of an economy, given that responsiveness to shock

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depends on the macroeconomic structure of the economy. Moreover, CGE is well placed to show interaction between agriculture and other sectors of the economy. It also allows easy incorporation of changes in other features of the economy. Robinson (2002) argued that the CGE models compared to other econometric models provide a consistent framework to determine the linkages and trade-offs among different policy packages and help to pass better-informed policy prescription. The study however noted that theoretical frameworks of CGE models are difficult to validate and their sensitivity to unique assumptions can be difficult to validate. The research concluded that CGE model struggle to represents institutional dynamics quality or changes in taxes, prices or technologies, with institutional changes not also easily modelled within its methodology.

Measuring Impact of Agricultural Productivity using the CGE

Towards investigating the impact of agricultural productivity on the economy, numerous researchers (Kinyondo *et al.* 2008; Reid *et al.* and Benzabih *et al.* 2010) have all worked on the impact of TFP on the economies of various countries. While some have used the regression approach, others have relied cointegration analysis, with researchers like Awan and Alam (2015) deploying the autoregressive distributed lag approach. This study used the computable general equilibrium approach premised on the 2012 social accounting matrix of Nigeria developed by Nwafor *et al.* (2012). While Reid *et al.* (2010) used the static CGE model to estimate the impact of changed agricultural productivity and altered fish availability on the Namibian economy, Benzabih *et al.* (2010) ascertained the impact of climate change and TFP on the Tanzanian economy. Cororation and Orden (2008) affirmed that 5% TFP improvement is welfare increasing for both rural and urban households, while achieving production expansion, export and poverty reduction. Berhane (2013) showed that the manufacturing sector is a determinant of economic growth in Ethiopia, while productivity increase in agro processing, non-agro processing and overall manufacturing sector largely increased real GDP and sectoral output.

METHODOLOGY

Data for this study is based on the 2012 Nigeria Computable General Equilibrium Model, calibrated by the 2012 Nigeria Social Accounting Matrix constructed by Nwafor, Diao and Alpuerto (2010) based on the circular flow of income. The model was developed by Davies, van Seventer and Thurlow (2012) based on the Standard Equilibrium Model developed by Lofgren *et al.* (2001) under the direction of IFPRI. The SAM models the economy, with assumptions covering income elasticity and trade, trade elasticity based on Armington's transformation, aggregate output and production elasticity based on factor substitution.

CGE Comprehensive and Thematic Model Specifications

The generic CGE model is in three parts, comprising real flow, prices and equilibrium conditions as detailed by Ghadimi, Devarajan, Go, Lewis, Robinson and Sinko (2007)

Real resource flow:

$$X = G(E, D^s \Omega) \quad (1)$$

$$Q^s = F(M, D^D б) \quad (2)$$

$$Q^D = C+Z+G \quad (3)$$

$$E/D^s = g_2(p^e, p^d) \quad (4)$$

$$M/D^D = f_2(p^m, p^d) \quad (5)$$

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$T=t^m \square R \square pw^m \square M$ (6)

$+ t^q \square p^q Q^D$ (7)

$+ t^y \square Y$ (8)

$+t^e \square P^e \square E$ (9)

$Y = P^X \square X + tr \square P^q + re \square R$ (10)

$S = S \square Y + R \square B + S^g$ (11)

$C \square P^t = (1-s-t^y) \square Y$ (12)

Prices:

$P^m = (1+t^m) \square R \square pw^m$ (13)

$P^e \square = (1+t^e) = R \square pw^e$ (14)

$P^t = (1+t^q) \square P^q$ (15)

$P^X = g_1(P^m, p^d)$ (16)

$R = 1$ (17)

Equilibrium conditions:

$D^D - D^s = 0$ (18)

$Q^D - Q^s = 0$ (19)

$Pw^m \square M - pw^e \square E - ft - re - B$ (20)

$p^t \square Z - S = 0$ (21)

$T - P^q \square Gtr \square P^q + ft \square R - S^g = 0$ (22)

Identities

$\mathbf{P^X} \square X + P^e \square E + p^d \square D^s$ (23)

$P^q \square Q^s = P^m \square M + P^d \square D^D$ (24)

Where:

Endogenous Variables

E: Export good

M: Import good

D^S: Supply of domestic good

D^D: Demand for domestic good

Q^S: Supply of composite good

Q^D: Demand for composite good

P^e: Domestic price of export good

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P^m: Domestic price of import good

P^d: Domestic price of domestic good

P^x: Price of aggregate output

P^q: Price of composite good

P^t: Sale price of composite good

R: Exchange rate

T: Tax revenue

S^g: Government savings

Y: Total income

C: Aggregate consumption

S: Aggregate savings

Z: Aggregate real investment

Exogenous Variables

p^{we}: world price of export good

p^{wm}: world price of import good

t^m: Tariff rate

tx: Export tax rate

t^q: Sales tax rate

t^y: Direct tax rate

t^r: Government transfers (real)

f^t: Foreign transfers to government

r^e: Foreign remittances to private sector

s: Average savings rate

X: Aggregate output (GDP)

G: Real government demand

B: Balance of trade

σ: Import substitution elasticity

Ω: Export transformation elasticity

Without prejudice to the generic model specification, the abridged model specific for this study, as operationalized within the holistic CGE model comprises three exogenous variables, namely; agricultural total factor productivity and government spendings. The endogenous variables covered included key macroeconomic variables, including absorption, export, import, gross domestic product, trade export and output prices. Others included total factor supply, total factor income, household commodity consumption and institutional incomes.

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Model Policy Simulations and Macroeconomic Closures

The study covers four simulations, excluding the base scenario. These are the (i) agriculture factor productivity shock by 4.75 per cent and 20.0 per cent, representing average current yield growth percent of select key crops and the 20 percent target stipulated under vision 20:2020 (Olomola *et al.* 2018). For the government agriculture investments, simulations covered the current 2 per cent current agriculture sector expenditure achievement (FMARD, 2016) and the 10 per cent target proposed under the ERGP (2017-2020) and the Malabo declaration(Federal Ministry of Budget and National Planning, 2017; Olomola *et al.* 2018). A combined simulation also covered the best practice of 20 per cent yield and 10 percent investment targets proposed under the Vision 20:2020 and ERGP/Malabo Declaration respectively. The essence is to compare the current situation with best practice with implications for the post 20:2020 era.

The selected macroeconomic closures considered for this analysis are that (i) the consumer price index, which is the numeraire, is fixed, while the domestic price index is flexible; (ii) savings-investment pathways assumed a uniform marginal propensity to save (MPS) rate point change for selected account institutions; (iii) current account is assumed to be flexible, while foreign savings are fixed; (iv) government savings are flexible, while direct tax rate is fixed. (v) labour as a factor of production is assumed under two scenarios, namely, unemployed and mobile for the rural labour, except for those with tertiary education, which is assumed fully employed and mobile and urban labour, which are also unemployed and mobile, except for urban tertiary labour, which is also fully employed and mobile; (vi) land is assumed fully employed and mobile; and (vii) all forms of capital (crop, livestock, mining and others) are assumed to be fully employed and activity specific.

RESULTS AND DISCUSSION

The findings of this study cover the economic impact of total factor productivity and government spendings in the agriculture sector on key economic parameters such as real GDP variables, macroeconomic indicators, sub-sectoral contributions to growth, dynamics of trade export and import, changes in domestic supply, output and export prices, factor supply, and institutional incomes.

Impact of Macroeconomic Shock on the Demand Side of Real GDP Variables

Evidence from Table 1 shows that 20% total factor productivity (TFP) and 10% enhancement of government spendings in the country significantly enhanced absorption within the economy, with increases of 1.66% and 2.00% respectively. These achievements are considerable, when compared to the current impact of 0.33 per cent and 0.02 per cent under both variables respectively (Table 1). It thus implies the likelihood of increased spendings on goods and services within the country, with implications for well-being and growth. China, in its on-going new-normal growth strategy is shifting emphasis away from export to consumption driven growth. Cororation and Orden (2008) posited that 5% TFP improvement enhanced welfare, with improvements in the rural and urban households and output expansion.

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Table 1: Impact of shock on demand side real GDP variables (Change from Base)

Economic Variables	Initial value or share	TFP - Crops 4.75%	TFP - Crops 20.0%	Government Spending 2%	Government Spending-10%
Absorption	60	0.33	1.66	0.02	2.00
Consumption	43	-0.91	2.31	0.02	1.40
Investment	11	0.00	0.00	0.00	0.00
Stocks	0	0.00	0.00	0.00	0.00
Government	6	10.00	0.00	0.00	10.00
Exports	21	0.10	0.49	0.01	0.60
Imports	(9)	0.23	1.10	0.02	1.36
GDP at market prices	71	0.281	1.40	0.01	1.68
Indirect taxes	1	0.10	0.82	0.02	0.93
GDP at factor cost	70	0.28	1.41	0.01	1.70

Source: CGE software output, 2019

Impact of Macroeconomic Shock on the Demand Side of Real GDP Variables

The impact of the targeted shocks on selected macroeconomic variables is detailed in Table 2. The results show that enhancement of TFP and government spendings by 20% and 10% respectively reduced exchange rates, while increasing domestic price index insignificantly by 0.5% and 0.62% respectively. Normally, depreciation of exchange rate implies that the Naira is worth less that the Dollars, thus making export cheaper. Dornbusch (1976) revealed that monetary expansion depreciates exchange rate. In addition, output responds to monetary expansion in the short run, thus acting as a dampening effect on exchange rate depreciation and may lead to enhancement of interest rate. The expansion of interest rate will likely reduce investments, even though, on-going interventions of the Federal Government of Nigeria in the Agriculture sector supports several financial inclusion initiatives with single digit interest rate, with little or no collateral. The insignificant effect on the domestic price index suggests that inflationary pressures are likely to be minimal, with implications for increased households' consumption and welfare.

Table 2: Impact of shock on macroeconomic variables (Change from Base)

Economic Variables	Initial value or share	TFP - Crops 4.75%	TFP -Crops 20.0%	Government Spending 2%	Government Spending-10%
Real exchange rate	90.5	0.01	(0.69)	(0.00)	(0.72)
Nominal exchange rate	100.0	0.11	(0.19)	0.01	(0.10)
World export prices	100.0	-	-	-	-
World import prices	100.0	-	-	-	-
World price index	100.0	-	-	-	-
Domestic price index	110.5	0.11	0.50	0.01	0.62
Consumer price index	100.0	-	-	-	-
Terms-of-trade	100.0	-	-	-	-

Source: CGE software output, 2019

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Impact of Macroeconomic shock on the contributions to national GDP growth

Table 3 shows the impact of varying levels of targeted economic shock on the contributions to the national GDP growth rate. The results show that the current TFP growth within the crop sub-sector exacted an insignificant impact of 0.3% and 0.0% on the GDP and government spendings. However, the scaled up shocks on both variables produced impacts of 1.4% and 1.7% respectively. Other details are provided in the table.

Table 3: Impact of shock on contributions to national GDP growth (Change from Base)

Economic Variables	Initial value or share	TFP - Crops 4.75%	TFP - Crops 20.0%	Government Spending 2%	Government Spending-10%
GDP	100.0	0.3	1.4	0.0	1.7
Agriculture	20.3	-0.1	1.0	0.0	1.0
Mining	18.2	0.0	-0.3	0.0	-0.3
Manufacturing	8.0	0.0	0.1	0.0	0.1
Other Industries	19.7	0.0	0.4	0.0	0.4
Private Services	29.8	0.3	0.2	0.0	0.4
Public Services	4.0	0.1	0.0	0.0	0.2

Source: CGE software output, 2019

Impact of shock on Trade Export Quantities

The results in Table 4 evidently shows that targeted shock increases on TFP and government spending will provide impact highly on the agriculture sector, as reflected by 39.7% and 46.4% under both variables, respectively. However, the shock had dampening effect on most of the other sectors of the economy.

Table 4: Impact of shock on trade export quantities (Change from Base)

Economic Variables	Initial value or share	TFP - Crops 4.75%	TFP - Crops 20.0%	Government Spending 2%	Government Spending-10%
Agriculture	1	5.1	39.7	0.1	46.4
Mining	14	-0.2	-1.7	0.0	-1.9
Manufacturing	2	-0.2	-1.7	0.0	-1.9
Other Industries					
Private Services	1	-0.5	0.3	0.0	-0.2
Public Services					

Source: CGE software output, 2019

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Impact of shock on Output Prices

Table 5 shows that enhancement of TFP and government spending as simulated dampened output prices significantly in the agriculture sector, but weakly in the mining sectors. However, significant impact was observed in the manufacturing and service sectors. The depreciation of prices may not be to the favour of the primary producers like farmer, but also has positive impact on consumption, savings and raising household welfare. Fuglie *et al.,* (2007) affirmed that low cost of agricultural output and productivity growth had positive effect on the farmers, food manufacturers and consumers.

Table 5: Impact of shock on output prices

Economic Variables	Initial value or share	TFP - Crops 4.75%	TFP - Crops 20.0%	Government Spending 2%	Government Spending-10%
Agriculture	1	-0.2	-3.1	0.0	-3.2
Mining	1	0.1	-0.3	0.0	-0.2
Manufacturing	1	0.1	1.2	0.0	1.3
Other Industries	1	0.2	1.5	0.0	1.7
Private Services	1	0.2	1.1	0.0	1.2
Public Services	1	0.9	0.8	0.0	1.7

Source: CGE software output, 2019

Nominal Impact of Varied Levels of Shock on Household Incomes across Quintile Categorizations

Figure1 shows the impact of the TFP 4.75% shock on households' across quintile categorization. The results show that the existing status benefitted the rural non-farming households, particularly, those of quintile 3 even though, it was insignificant. Of note however, is that the impact on the urban households was negative. The current development may be attributed to the focus on the value chain strategy, particularly the down-stream actors who may likely be benefitting from value addition related and service associated activities like processing, marketing, transportation and probably, the middlemen. The trend noticed for the urban households may have been due to their little involvement and benefits from agribusiness related activities.

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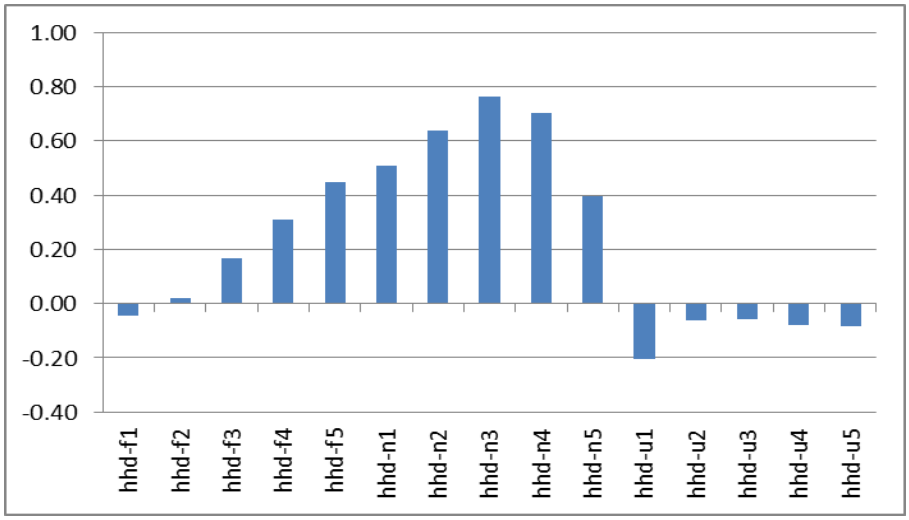

Figure 1: Nominal impact of 4.75% increase in crop productivity on household incomes

Evidence from figure 2 shows that 20% crop related TFP shock administration had an encompassing impact on all categories of households in the economy. It thus implies that households within the economy are likely to benefit more from enhanced TFP within the crop sub-sector of the economy. This does not come as a surprise given that increased productivity is likely enhance efficiency and output, with implications for rural household income though in terms of magnitude of sales without prejudice to dampening prices. The rural households on the other hand are likely to increase savings arising from cheaper food items, while earning extra income from value addition of farm product at the urban centres. Gollin *et al.* (2014) posited that agricultural productivity increased rural incomes, lowered food prices in urban areas, increased savings. In a related development, Kinyondo (2008) affirmed that productivity increased earnings for all skilled workers, while Irz *et al.* (2002) established the linkage between agricultural growth and poverty reduction. On a generic note however, Matsuyama (1992); Awan and Alam (2015) showed that agricultural productivity had an effect on the economy.

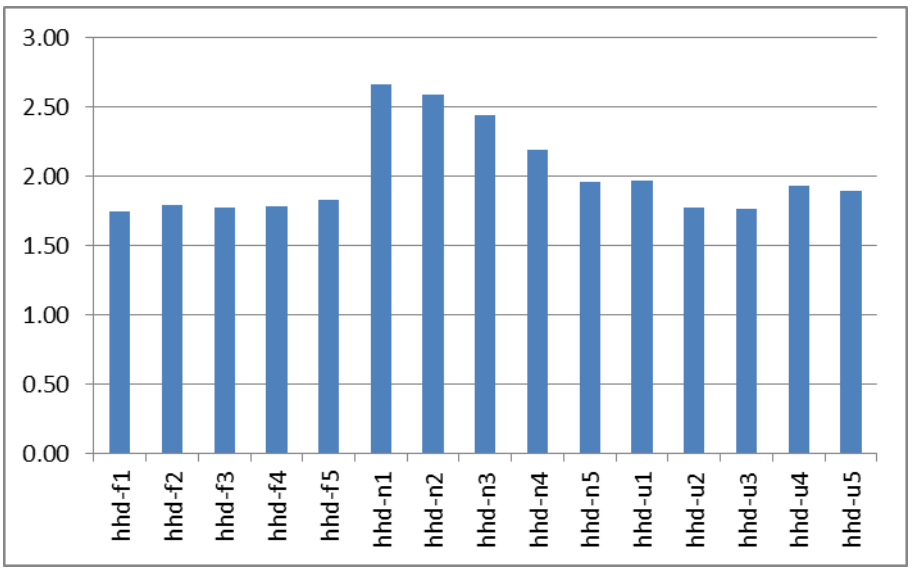

Figure 2: Nominal impact of 20.0% increase in crop productivity on household incomes

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Meanwhile, while 2% increase in agricultural investment will likely benefit all households' incomes, though, insignificantly (Figure 3), the impact of 10% government expenditure investment shock is likely to be significantly beneficial to all categories of households, as detailed in figure 4. Thus, it becomes evident that enhancement of agriculture sector's investment will likely benefit the economy through increased livelihood and poverty reduction. Singh *et al*. (1986) argued that investments are designed to increase production and their primary impact is on the incomes of agricultural households. Meanwhile, the result is also a pointer to a rising middle class encouraged by increased investment in value added activities in the agriculture sector.

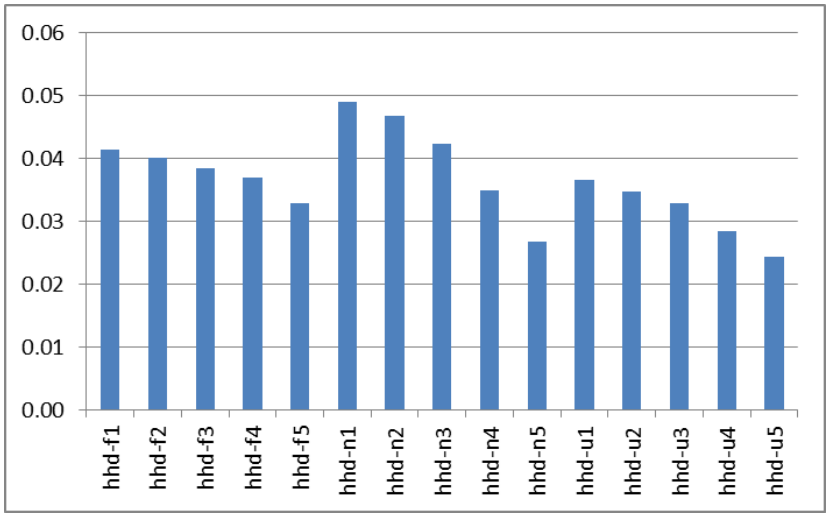

Figure 3: Nominal impact of 2.0% increase in agricultural investment expenditure on household incomes

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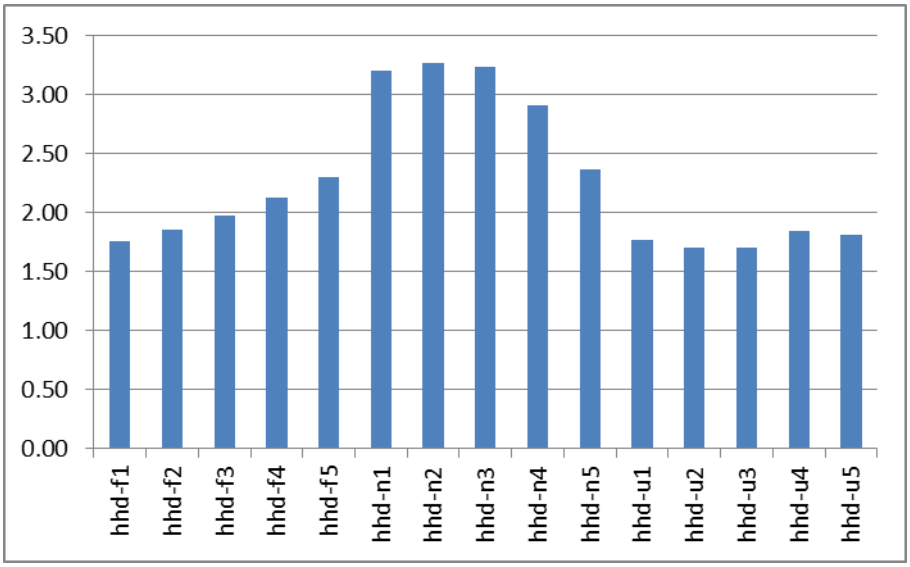

Figure 4: Nominal impact of 10.0% increase in agricultural investment expenditure on household incomes

CONCLUSION AND RECOMMENDATIONS

The study noted that agricultural productivity and government spendings were low in Africa and particularly, Nigeria compared to best practice. It was also established that increased agricultural productivity and increased government spending had varied impacts on the economy, particularly on government expenditures, exchange rates, contributions to GDP, trade export, household incomes and prices. To move Africa forward and achieve it continental agenda for 2025 and 2063, there is the need to enhance investments into the agriculture sector, through targeted innovative financing and investments to complement budgetary sources. It also becomes imperative to enhance TFP in the agriculture sector through technology driven, sustainably and affordable practices. It may also be necessary to exploit the synergy of investments and agricultural productivity interventions at the national, regional and continental levels, through existing agenda towards ensuring that the 21st Century is African Century

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