



# DRIVING AND SUSTAINING AGRICULTURAL GROWTH IN NIGERIA

## PREAMBLE

Theoretical postulations and country experiences in developing regions underscore the crucial role of agricultural growth for poverty reduction. Growth originating in agriculture could be up to four times as effective in reducing poverty as growth originating outside of the agricultural sector (World Bank, 2007). Agriculture and poverty are closely linked. Most of the poor live and work in the agricultural sector and low agricultural productivity and incomes prevent the movement out of poverty.

Over the past decades, higher incomes from agriculture and access to cheaper food have helped hundreds of millions of people to move beyond the US\$1 per day poverty line. For example, China, Vietnam, Brazil and Thailand have experienced significant agricultural growth over the last three decades with corresponding decline in poverty. In particular, estimates indicate that Vietnam and China took 40% of their population out of poverty in 10 years, on the back of aggressive agricultural investment and growth. In China, poverty dropped from 33% to 17% between 1990 and 2001 and in India, from 42% to 35%.

In Nigeria, economic growth has largely been accounted for by resilient agricultural growth. According to the Nigeria Vision 2020 First Implementation Plan for the period 2010-2013, the agricultural sector contributed 73% of GDP growth over the period 1999-2009.

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Agricultural growth is associated with performance in four constituent sub-sectors: crops, livestock, fisheries and forestry. The crop sub-sector had on average the largest share of growth, followed by livestock, forestry and fishery sector which grew substantially in the post 1974 era currently the crops subsector contribute up to 85% of the agriculture GDP, while livestock contributes about 10%, fisheries about 4%, and forestry about 1%. On a comparative basis, the share of the crop sector declined up to the early 1980s while the performance of

fisheries steadily improved over the past 50 years. Nevertheless, the crops subsector overall remains the dominant agricultural economy of Nigeria. Accordingly, the growth performance of the agriculture sector has been largely driven by the performance of the crop sub-sector.

While the agricultural sector may have in recent years contributed significantly to improved growth performance in Nigeria, its actual contribution appears to be much short of overall potential. The quality of agricultural growth remains questionable considering the ample evidence of low productivity, poor economic competitiveness and weak linkages to other sectors (Oni and others, 2009; Nkonya and others, 2010; Eboh, 2011). Moreover, evidence shows that the increase in agricultural output has been accounted for by expansion in cultivated land rather than increase in productivity (Eboh and others, 2006; UNDP, 2009). This growth pattern (mainly driven by land expansion) is not transformative but nominal in nature and merely additive.

In contrast, transformative growth occurs when increases in agricultural output are driven by structural and 'real' improvements in production functions and economic competitiveness of the agricultural value chains. Such desirable growth patterns can be brought about by improved use of more resource-efficient production inputs (improved seeds, fertilisers, agrochemicals, water, etc.) coupled with the right institutional conditions (product market, agricultural extension, agricultural credit) and efficient infrastructure. Growth of agricultural productivity and farm incomes are prerequisites for structural transformation. Increase in farm incomes pushes up demand for non-farm products, and in turn stimulates the growth of small and medium enterprises (UNECA, 2005; Timmer and Akkus, 2008).

Under the circumstances in Nigeria whereby agricultural growth is accounted for mostly by land expansion, there are lingering doubts about the longer-term sustainability of current growth records. In order to clarify the doubts and put the concerns in proper perspective, there is need for empirical research that inquires into the kind of growth being experienced, the drivers of growth and prospects for

sustainability. Against this backdrop, the study examines the drivers and sustainability of growth in Nigeria.

The study describes and explains agricultural growth drivers and the factors implicated in the observed kinds and patterns of growth. Better understanding of the range and interactions of constraining influences on agricultural growth will help to inform and stimulate more appropriate agricultural policies into the future.

## **THEORETICAL INSIGHTS AND ANALYTICAL APPROACH**

Existing studies in Nigeria focused on the yield-based determinants of productivity. Oni and others (2009) examines the trends and drivers of agriculture productivity in Nigeria. But, because factor inputs could decline without affecting agricultural value added in the economy (as was the case in US after 1980.) there is the need to look beyond increase in output when modeling growth in agriculture. This underscores the approach of this study in modeling factors that affect growth through productivity transmission and those that affect agricultural growth rate.

To measure productivity when there are multiple factor inputs, the literature provides three alternative techniques. They include (i) growth accounting or index number approach, (ii) non-parametric and (iii) econometric approach.

Growth accounting (GA) decomposes growth into components associated with increase in factor inputs usually land, labour and capital, and those accounted for by unobservable changes in factor inputs. Total Factor Productivity (TFP) index is then calculated by compiling detailed accounts of inputs and outputs, aggregating them into input and output indices. The problem with this approach among other problems highlighted in Zepeda (2001) is the fact that growth accounting methods were unable to demonstrate much of a link between the amount of physical capital formation and output growth.

The non-parametric approach is similar to (GA), but it is estimated by using linear programming. It

is sometimes cited as alternative to GA and can be used to identify input-output combination that defines production frontier, and can use either micro- or macro-level data. It is credited to be flexible since it does not make any assumption about the technology that generates agricultural output, Zepeda (2001). But, like a typical non-parametric technique, it has an inherent limitation of not being able to identify determinants of production within a testable hypothesis.

The study adopted an approach based on the traditional Solow residual growth model by econometrically estimating a global production function of agriculture value added. The use of econometric method makes up for the deficiencies in alternative approaches and gives room for validation of estimation results. The approach is criticised on two grounds: (i) that it requires more robust data than the other approaches and (ii) that the number of observations may not be available to permit its use. Moreover, it faces the usual challenge of general econometric approach like measurement error and time variation.

## ISSUES RAISED AND POLICY IMPLICATIONS

The study examined factors that drive growth in the agricultural sector with the intent to inform and influence agricultural policies. The factors are decomposed into production-level (traditional production function variables) and policy-level factors (market and non-market variables).

The results of the global production function analysis has confirmed existing evidence that Nigerian agricultural sector is characterised by increasing return to scale, meaning that farmers are operating at the low end of the production function. This finding underscores the huge potential to raise agricultural output through increased use of more efficient inputs, rather than by mere expansion of cultivated land. Agricultural policies and measures to enhance increased applications of better and more efficient agricultural inputs are essential to break the lingering 'low-input low-output' cycle.

Within the framework of the estimated global

production function, the relatively more important factors that influence Nigeria's agricultural value added include rainfall, technology (efficiency parameter) and fertiliser use. Land area is the least important factor. The finding that output-labour ratio is relatively lower than output-capital ratio indicates the preponderance of labour-intensive agriculture and underlines the large scope to increase output and productivity through the application of more capital inputs, rather than incremental amounts of labour.

The estimated model of global total factor productivity and its growth rate shows that capital expenditure on agriculture, price of agricultural commodities, per capita income and investment rate in agriculture, human capital and access to credit are positive influences. On the other hand, agricultural trade (openness), environmental degradation and agricultural output variability have negative influences. Among the strongest positive influences are human capital in agriculture, price of agricultural commodities, per capita income (reflecting aggregate demand) and access to credit. Government spending on agriculture and investment rate in agriculture are the weakest positive influences in terms of magnitude and time lag of impacts.

The negative and unstable outlook of the trend of total social factor productivity calls attention to the salient fact that the growth rate in agriculture appears not sustainable in the longer term. This is not unexpected, considering the poor quality of the growth milieu. The growth of aggregate output is less than proportionate to the growth of aggregate inputs, a situation that can be linked with the predominantly labour-intensive and or land-expanding character of agricultural growth.

Further evidence from the study shows that labour productivity (in terms of output per man day) has tended to stagnate and that land expansion is not a sustainable and stable pathway for agricultural growth. Implicit in the analysis is the huge potential for boosting agricultural growth through irrigated agriculture. The estimated potential contribution of irrigation to growth of total factor productivity exceeds the combined effects of all the included

production factors, less rainfall and technology (efficiency parameter). The huge potential role of irrigation in accelerated and sustainable agricultural growth poses critical challenge for public policy to harness the vast water resources across the country.

Overall, the study has shown that Nigerian agricultural output growth is directly related to the growth of factor input, implying a positive TFP. But, the negative outlook of the trend of TFP shows that growth might not indeed be sustainable in the long run. The low capital-labour ratio further underscores the sustainability concerns about TFP growth. Also, the negative Total Social Factor Productivity growth apparently underscores the adverse environmental externalities that have been associated with the kind of agricultural growth experienced in the country over the years. Continuous expansion of cultivated lands to compensate for 'constrained yield increases' and meet additional demand for agricultural output cannot be the sustainable trajectory for Nigeria's agricultural sector.

The sustainability risk to Nigerian agriculture is more aptly substantiated by the fact that while the average nominal growth rate of agricultural value added is estimated at 20.2%, the average growth rate of TFP is estimated at 9%. This confirms the pieces of evidence from the study which implies that the agricultural growth in Nigeria has been accounted for largely by growth rate in agricultural value added, much more than growth in productivity.

Tackling the empirical growth sustainability challenges and setting the agricultural sector for transformative growth call for interrelated policy and programmatic measures. Importantly, capacity building at the farm level is crucial for improving crop, soil and water management. It enhances the demand for and use of better and more efficient production inputs and increasing the financial absorptive capacity of farmers.

Tied to the farm level capacity building is the need to reinvent public agricultural sector institutions for effective and efficient delivery of agricultural financial services, agricultural extension and education, agro-inputs, irrigation water and market support/development. The institutional strengthening of public agricultural sector institutions will however make optimal sense, if it is done within the overarching motivation to address economic externalities and influence, not supplant decision-making by private economic agents.

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