Feed the Future Innovation Lab for Food Security Policy

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The Nexus between Malnutrition and Agricultural Subsector Outputs in Nigeria

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Introduction

Malnutrition occurs when people consistently do not consume or absorb the right amounts and types of food and essential nutrients required for a good and healthy life. Malnutrition is a problem that spans from one generation to the next, creating physical problems for affected individuals and economic problems for the society. Malnutrition affects brain development in children, causes stunted growth, leads to poor academic performance and produces adults with low future economic prospects (Adeshina, 2018). Nigeria has one of the highest rates of acute malnutrition in the world. In 2013, UNICEF ranked Nigeria 13th in its global classification of countries with the highest rates of Global Acute Malnutrition (GAM). At 14%, Nigeria's GAM rate is higher than the West and Central African mean, and 5 % higher than the sub-Saharan average of 9 % (ACF International, 2015). Promoting good nutrition has become a global priority because of the linkage between agriculture and malnutrition. Since agriculture is the mainstay of the Nigeria population, employing over 70% of her population, this makes agriculture the main source of food, nutrients and income for the majority of the people, therefore agriculture's impact on nutrition is multi-faceted. While consensus exits on pathways through which agriculture can improve nutrition- related outcomes, evidence is still very weak. It is against this backdrop that this study was conceived.

This paper hypothesizes that increase in agricultural production (crop, livestock and fish) would reduce the malnutrition rate in Nigeria. Although many factors affect malnutrition, this paper focuses on factors affecting malnutrition from the agricultural perspective and also looks at factors that drive agricultural subsector output production in Nigeria.

In this paper, secondary data consisting of annual time series for seventeen years were used. Data on malnutrition were obtained from world fact fish database, data on agricultural outputs (crop, livestock and fisheries) and labor were obtained from the World Bank Development Indicators database while data on government spending on agriculture and foreign direct investment in agriculture were obtained from Central Bank Statistical Bulletin. Data obtained were analyzed using ordinary least square regression to find the effect of agricultural subsector output on malnutrition and the drivers of change in each subsector with R statistical package.

Key Findings

- Agricultural subsectors outputs can reduce the rate of malnutrition in Nigeria by 35 percent.
- Foreign direct investment had a negative effect on output.
- An increase in labor in all agricultural subsectors will bring about a positive effect on the yield of all the subsectors.
- Government's public spending and foreign direct investment will boost the output of the livestock sector in Nigeria.

Agricultural Output Production and Malnutrition

Agriculture plays a major role in combating malnutrition in any society. However agriculture continually faces a challenge of low outputs particularly in developing countries. Agricultural outputs majorly consumed by Nigerians range from crops to livestock and fisheries products. A multiple regression analysis was carried out and the three subsectors explained 35 percent of the variation in the malnutrition rate of Nigerians. The three subsectors all significantly impacted the malnutrition rate of Nigerians as shown in Table 1 but its worthy of note that the crop and livestock subsectors had a positive association with nutrition as an increase in crop and livestock output is associated with lower rates of malnutrition in Nigeria, only the fish subsector had a negative relationship with nutrition as an increase in the output of the fish subsector is associated with higher malnutrition rates in Nigeria. This is contrary to the apriori expectation. It could be that malnutrition rate decreases with more of crop and livestock products but not having more available fish.

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Table 1. Factors affecting malnutrition in Nigeria

	Dependent variable:
	Malnutrition rate
Crop	-0.006
	(0.006)
livestock	-0.022*
	(0.011)
fish	1.244**
	(0.570)
Constant	2.414
	(6.123)
Observations	17
R2	0.352
Adjusted R2	0.202
Residual Std. Error	0.137 (df = 13)
F Statistic	2.351 (df = 3; 13)

Note: *p<0.1; **p<0.05; ***p<0.01

Drivers of change in Agricultural Output Production in Nigeria

The factors used in assessing drivers of change in agricultural output production are government's public agricultural spending, foreign direct investment in agricultural production in Nigeria and the amount of labor in agriculture in Nigeria. Government's agricultural spending can directly increase agricultural output by shifting upward the production frontier as in the case of irrigation (Binswanger et al., 1993; Omigie et al., 2013). It therefore implies that government agricultural spending increases the rate of return to private agricultural investment and thereby leads to greater investment and output in the agricultural sector of the economy (Abdullah, 2000; Al-Yousif, 2000; 2008; Corray, 2009; Omigie et al., 2013). Foreign direct investment in any sector can bring about significant effect in the output of that sector as seen in the literature and no sector produces without the use of labor, hence, our choice in the use of these three factors in assessing drivers of change in output in the agricultural subsector of crop, fish and livestock in Nigeria.

Drivers of change in Crop Output in Nigeria

The regression result on the factors affecting changes in the crop output in Nigeria showed that the three explanatory factors explained 83 percent of the variation in the output of crop production in Nigeria as shown in Table 2. Specifically, only foreign direct investment and labor had a significant effect on the output of crop production. Foreign direct investment had a significant but negative effect on the output of crop production implying that an increase in foreign direct investment will lead to a decrease in output of crop production in Nigeria. This is not surprising as foreign direct investment can only contribute to growth only when the host country has reached a developmental level capable of absorbing the advanced technology that it brings. This could be as a result of the elementary methods still employed in crop production in Nigeria and the large number of small scale farmers that dominate crop production in Nigeria, this can be solved by improving infrastructures and encouraging farmers to increase their scale of production. Labor had a significant and positive relationship on the output of crops in Nigeria implying that an increase in labor will bring about an increase in the output of crops. Employment of labor in crop production should be encouraged and incentivized to attract more labor into the sector.

Drivers of Change in Fish Output in Nigeria

The result of the regression on the factors that affects the output of the fish sector in Nigeria shows that 98 percent of the variations in the output of the fish sector are explained by the independent factors used in the mode as shown in Table 2. Specifically, only labor had a positive and significant relationship on the output of the sector while public agricultural spending and foreign direct investment had a positive relationship with fish production, however they showed no significant effect on the output of fishes. An increase in labor will lead to an increase in the output of fishes. Since decline in the malnutrition rate was associated with increase in crop and livestock outputs, an increase in the output of fish will be significant when the challenges in the fish sector is properly handled.

Drivers of Change in Livestock Output in Nigeria

The regression result shows that 91% of the variations of changes in the output of livestock are explained by the explanatory variables used in the regression as shown in Table 2. An increase in public agricultural spending, foreign direct investment and labor all led to an increase in the output of livestock in Nigeria. Therefore, public agricultural spending, foreign direct investment and labor are all positive drivers of change in the output of livestock in Nigeria.

Challenges like diversion of fertilizers, small scale farming, lack of funds, etc. leading to negative impact in the crop and fish sectors be sorted out for a positive result in the sectors.

Table 2: Drivers of change in agricultural subsector outputs

Ind. Variables	Dependent Variables		
	Crop	Fish	Livestock
Agric. expenditure	-1.594 (2.325)	0.016 (0.021)	2.908* (1.538)
Fdi	-4.219* (2.317)	0.029 (0.019)	2.678* (1.414)
Labor	133.944*** (28.365)	1.863*** (0.253)	46.114** (18.763)
Constant	-2,135.684*** (426.812)	-20.513*** (3.805)	-837.454** (282.334)
Observations	17	17	17
R^2	0.833	0.976	0.912
Adjusted R^2	0.794	0.970	0.891
Residual std. error	5.811 (df=13)	0.052 (df=13)	3.844 (df=13)
F statistics	21.578*** (df = 3;13)	174.539*** (df = 3;13)	44.666*** (df = 3; 13)

Note: *p<0.1; **p<0.05; ***p<0.01

Conclusion

Agriculture has the potential to reduce the malnutrition rate in Nigeria. Efforts should be geared towards 1) increasing crop and livestock production and 2) addressing the challenges in the fish sector since fish is a known source of protein and Omega 3, vital nutrients needed by the body. 3) Agriculture should also be incentivized by bringing infrastructures to rural areas where farming is dominant to prevent migration and also attract more labor which has been shown to drive positive change in all the agricultural subsectors studied.

Our level of crop production must advance from the elementary methods to absorb the development that comes with foreign direct investment for a positive impact in the sector.

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