# AGRICULTURAL DIVERSIFICATION FOR FOOD SECURITY IN SUB-SAHARAN AFRICA: EMPIRICAL EVIDENCE AND POLICY PROVISIONS UNDER NIGERIA'S AGRICULTURE PROMOTION POLICY

By

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## ABSTRACT

*The limited diversity of sub-sectors' contributions to Nigeria's GDP and the undue emphasis on traditional crops at the detriment of high valued enterprises, coupled with ignorance and/or weak enlightenment, aptly justifies the need for agricultural diversification, as an affordable, and sustainable strategy for achieving food security in Africa. Using a case study in Nigeria, with focus on the Nation's Agriculture Promotion Policy, this study empirically unearths the nexus between agricultural diversification and food security. Deploying primary and secondary data cum inferential statistics and content analytical review, the study affirmed the existence of food insecurity and low degree of enterprise diversification among the rural households. Not unexpected, enterprise diversification had a positive, though weak relationship with food security. The existing policy provision was also observed to be sufficiently robust to enhance the food security of Nigerians. These outcomes have obvious implications for the sub-Saharan African countries, given the similarity of circumstance. The study recommended the need for continuous household food security drive through targeted policy measures; innovative resource and enterprise combination orientation; encourage cooperative activities with the view to deepening awareness on enterprise combinations; deepen the food security and diversification strategies in line with the tenets of the national Agriculture Sector Road Map and regional development efforts, as detailed in the African Development Bank high 5 strategy for Africa.*

**KEYWORDS:** Agriculture, diversification, food security, Nigeria, Africa.

## INTRODUCTION

The rising wave of hunger across the globe, particularly in Africa, poses considerable threat to international commitment to ending hunger by 2030 (Food and Agriculture Organisation *et al.*, (2017). According to these development agencies, the population of undernourished people across the globe rose from 777 million in 2015 to 815 million in 2016, with food insecurity particularly endemic in sub-Saharan Africa, South-Eastern and Western Asia. It however affirmed that sub-Saharan Africa remains the region with the highest prevalence of undernourishment. FAO *et al.* (2017) estimated that 243 million Africans may not have had access to sufficient food energy, while the Federal Ministry of Agriculture & Rural Development (FMARD) (2016); Global Food and Nutrition Security (2018) and United States Agency for International Development (USAID) (2018) noted that food security situation in Nigeria is very challenging. These outcomes thus raise justification for alternative strategy towards attaining food security in Africa, and in Nigeria in particular. Agricultural diversification is viewed as an important strategy for achieving food security in Africa by Waha *et al.*, (2018); Mango *et al.*, (2018), Singh, (2006); Mehta, (2009); Sheereen and Banu (2016). Sheereen and Banu (2016) further alluded that the strategy was deployed as risk and food security instruments during the turbulent years of India's food insecurity challenges. In Nigeria, the focus on agricultural diversification soared following the drop in the prices of oil globally which impacted on the Nigerian economy and partly contributed to economic recession. The review of the sub-sectors'

contributions to the GDP in Nigeria further revealed that only seven of the forty six sub-sectors of the economy (Figure 1) accounted for over 70% of Nigeria's GDP (Federal Ministry of National Planning and Budget, 2017). Similarly, a cursory look into Nigeria's local food supplies across key crops (Figure 2), though, without prejudice to the country's comparative advantage, shows that focus was mainly on the regular staple crops (yam, maize, sorghum and rice) which accounted for over 90% of the crops considered, while high valued commodities like tomato, milk/dairy and fish represented only 4%, with cash crops like cocoa and cotton accounting for less than 2%. This further substantiated the low diversification away from the regular staple crops associated with the poor resource farmers in the rural enclave of Nigeria. Arising from the aforementioned, this study determined the effect of agricultural diversification on food security of rural households; discussed and reviewed strategic provisions for food security through agricultural diversification, as provided in Nigeria's agriculture promotion policy. The justification for this study stems from the need to inform policy makers on the alternate strategy and sustainable measures for ensuring food security through agricultural diversification. The study hypothesized that agricultural diversification does not drive food security among poor resource farmers.

## METHODOLOGY

### Study Area

The study is directed at the Nigeria nation, encompassing a case study, detailing empirical evidence of the nexus between diversification and food security in Oyo State of Nigeria. Nigeria is located in West Africa. The country is situated on Latitude 10.00 N and Longitude 8 00 E (Index Mundi, 2018), with estimated area of 924,000 square kilometers and estimated population of 191.8 million. Nigeria is made up of a Federal Capital Territory and 36 states, including Oyo, which is located in the South-Western part of the country. Agriculture sector contributes 22% of the Gross Domestic Product. The structure of the economy is import dependent, consumption driven and weakly undiversified. About 95% of the country's export and foreign exchange is from oil. Malnutrition is high, with a national mean stunting rate of 32% for fewer than five children (USAID, 2018).

### Sampling Techniques and Sample Size

A multi-stage sampling technique was employed in the collection of data for this study using a sample size equation at 95% confidence interval and 5% precision level, as detailed by Yamane 1967 and Eboh 2009.

### Data Sources, Collection and Analysis

Data for this study were from primary and secondary sources. Data were collected using structured questionnaires administered to 142 respondents. Data collected covered the socio-economic characteristics of farming households, data on enterprise diversification, income, etc. Simpson's diversification index was used to ascertain the extent of enterprise diversification, Foster, Greer and Thorbecke Index was deployed to determine the food security status of respondents, while the Logit Binary Regression model was employed to ascertain the effect of enterprise diversification on food security. The review on Nigeria's Policy direction on diversification was largely based on information from the Agricultural Road Map and Economic Recovery and Growth Plan.

## RESULTS AND DISCUSSION

### Degree of Enterprise Diversification

The Simpson's Enterprise Diversification model returned a mean index at 0.49, ranging from 0 to 0.72. This outcome implies that the extent of diversification was low, while considerable proportion of respondents (47.2) is mono-enterprise in nature. This may not be connected to numerous factors, such as ignorance, poverty, limited access to inputs, little consideration for risk, among other macro and micro-economic factors. Waha *et al.* (2018) showed that households with more farming diversity are more successful in meeting their consumption needs, but only up to a certain level of diversity per hectare of crop land. In addition, Singh, (2006); Ashfaq *et al.*, (2008); Mehta, (2009); Sheereen and Banu, (2016) found that diversification was largely premised on consideration of overcoming food insecurity, response to changing consumer demands and taste, changing government policies, response to external shocks, and as a coping strategy to mitigate challenges emanating from environmental dynamics.

### Food Security Status of Respondents

Towards determining respondents' food security status, food security line for all the households was calculated, following which the food-secure or food-insecure households were isolated. The incidence of food security as detailed in Table 1.0 reveal that majority (51.4%) of the respondents were food insecure. Amaza *et al.* (2006) reported an index of 0.58 (58.0%) in Borno State. Meanwhile, the food security line stands at ₦45,521.55 ($126) per month, denoting the minimum monthly household income

required to be food secure. In addition, the food security gap stood at 0.1278 (12.78%), thus indicating the extent by which households were below the food security line, while the severity of food insecurity was 0.0731 (7.3%). The results conform with that of Omolori (2017) who obtained food security gap and severity of 13.6% and 8.2% respectively.

**Effect of Diversification on Food Security Status of Respondents**

The Logit regression model was employed to empirically determine the effect of agricultural diversification on the food security status of respondents. The results indicated that the pseudo R-square stands 0.5890, implying that 58.9% of the variation in food security status was explained by the independent variables in the model. Further indications from the results revealed that six independent variables (farm size, family labour, years of diversification, cooperative membership, diversification index and farming experience) out of the ten variables in the model were statistically significant at varying probability levels (Table 2.0).

The years of involvement in agricultural diversification, age of household heads, distance to market and household size were negative implying inverse relationship with food security status of the respondents. On the other hand, farm size, number of extension visits, family labour, membership of cooperative, diversification index and farming experience had positive coefficients, signifying direct relationship with food security status of respondents in the study area. Though, diversification index and cooperative membership had weak level of significance. Omotesho *et al.* (2006); Amaza *et al.* (2006) and Oyinbo *et al*. (2015) established that socio-economic factors like household size, labour, gender and income of respondents had direct relationship with food security status of respondents. The result of the marginal effect and partial elasticity estimates of the variables presented in Table 3 shows that the variables considered were both positively and negatively elastic. However, in view of the simplicity of interpretation, the marginal effect estimates were used for this study. The results indicates that the probability of becoming food secured by the respondents increases by the values of their coefficients, with farm size (0.1099), family labour (0.0019), cooperative membership (0.1633), diversification index (0.2024) and farming experience (0.0094). On the other hand, the probability of becoming food secured decreases with the years of diversification. This outcome and the weak diversification index are unexpected, but it may have been due to the fact that diversification activities that the farming households were engaged in were not viable and profitable and thus not complementary to enhancing the food security situation of the respondents. It is also likely that there are inappropriate combinations of factors of production by the households, either due to ignorance. May (2009) established that the diversification of cropping pattern was germane to minimizing risks and overcoming food insecurity.

**Nigeria's Policy Thrust and Strategies for Food Security and Diversification**

Nigeria's Agricultural Promotion Policy (Road Map) is a strategic direction that focuses on redressing food insecurity, import substitution, job creation and economic diversification. Without prejudice to the fact that these priorities are complementary and essentially aimed at reaching same goal, this review is directed at strategies aimed at achieving food security and diversification. The key strategic hub for achieving these goals encompasses productivity enhancement, private sector inclusion and institutional reforms. The focus on productivity enhancement places emphasis on strategies covering enhanced land access to support title recognition and entitlement of land ownership, agro-input access and productivity concerns through priority crops and activities (rice, wheat, meat, fish, dairy milk, soya beans, poultry, horticulture (fruits and vegetables) and sugar), information dissemination to redress market failure, storage, processing, marketing and trade. The private sector strategic focus entails increased access to finance, agri-business and value chain investment development, enhancement of distribution system, reduction of post-harvest losses and increased nutritional outcomes, priority for export market, collaboration with network of value chain actors and the tiers of government and collection of credible data to support policy making and investor planning. The institutional reforms on the other hand, direct attention at institutional setting and roles, cross cutting issues of youths and gender, environment and research. Efforts towards agricultural and economic diversification, as detailed in Nigeria's Economic Recovery and Growth Plan (ERGP) were to be multi-sectoral in approach, covering agriculture, energy, enterprise-led industrial growth, manufacturing and services via science and technology. The FMBNP, (2017) affirmed that these sub-sectors will help restore growth, create jobs, cause structural changes in the economy and of course support food security. The strategic focus of the ERGP (2017-2020) on the other hand, is to be through transformation of the agriculture sector by boosting sub-sector productivities, integrating commodity value chain, enhancing market access and

irrigation expansion. A review of these strategic thrust shows a shift in the focus of the sector for bias towards business orientation and commercialisation, with little emphasis on the traditional development focus of the earlier policy framework, though, without losing sight of the food security objective of the agriculture sector. While not viewing the policy document as a comprehensive and fit for all strategy, it is envisioned that if these policies are holistically implemented, backed with the requisite fiscal requirement, sustained institutional reforms and ethical change, political will and stability, the existing agriculture sector-related challenges will be a thing of the past.

**CONCLUSION AND RECOMMENDATIONS**

Arising from the outcome of the analysis, it is concluded that substantial population of the rural populace in the study areas are food insecure, degree of agricultural diversification is low, while enterprise diversification and other social economic factors were established to drive food security within the rural households. This conclusion closely aligns with the situation across the sub-Saharan African continent, given the similarity of circumstance. Arising from this, the study recommended the need to: redress the food insecurity situation within the rural setting through specific policy measures directed at farm size expansion, without prejudice to productivity

enhancement, but with emphasis on intensification; embark on continuous sensitization of the farming households on appropriate resource and enterprise combinations, premised on sound enterprise appraisal, with the view to unearthing the benefits of diversification; encourage cooperative activities and group education on enterprise combination, given the need to enhance enterprise diversification and rural household food security. It is also imperative to deepen the food security and diversification strategies in line with the tenets of the national Agriculture Sector Road Map and regional development efforts, as detailed in the African Development Bank high 5 strategy for Africa.

**Table 1.0: Food security status of respondents**

| Variable | Frequency | Percentage |
|---|---|---|
| Food secure | 69 | 48.6 |
| Food insecure | 73 | 51.4 |
| Total | 157 | 100.0 |
| Food security line / month | ₦45,521.55 | |
| Food security incidence | 0.4814 | |
| Food security gap | 0.1278 | |
| Severity of food insecurity | 0.0731 | |

**Source:** Field Survey, 2018

**Table 2.0: Logit regression results on the effect of agricultural diversification on respondents' food security status**

| Variables | Coefficients | Standard Error | z – value |
|---|---|---|---|
| Constant | -8.3145 | 2.0909 | -3.98*** |
| Farm size ($X_1$) | 1.2268 | 0.4591 | 2.67*** |
| Extension visits ($X_2$) | 0.2082 | 0.3208 | 0.65 |
| Family labour ($X_3$) | 0.0212 | 0.0091 | 2.34** |
| Years of diversification ($X_4$) | -0.1213 | 0.0431 | -2.82*** |
| Age ($X_5$) | -0.0133 | 0.0452 | -0.29 |
| Distance to market ($X_6$) | -0.1960 | 0.1339 | -1.46 |
| Cooperative membership ($X_7$) | 1.8238 | 0.9626 | 1.89* |
| Household size ($X_8$) | -0.0672 | 0.0620 | -1.08 |
| Diversification index ($X_9$) | 2.2587 | 1.2972 | 1.74* |
| Farming experience ($X_{10}$) | 0.1045 | 0.0486 | 2.15** |
| | | | |
| **Pseudo R-squared** | 0.5890 | | |
| **Chi-squared** | 0.0000 | | |
| **Log likelihood function** | -40.429264 | | |

**Source:** Field survey, 2018.
*Significant at 10%, ** significant at 5%, *** significant at 1%

**Table 3.0: Estimates of marginal effect and partial elasticity**

| Variables | Marginal effect | Partial elasticity |
|---|---|---|
| Farm size ($X_1$) | 0.1099 | 1.5032 |
| Family labour ($X_3$) | 0.0019 | 1.1355 |
| Years of Diversification ($X_4$) | -0.0109 | -1.3734 |
| Cooperative membership ($X_7$) | 0.1634 | 0.6807 |
| Diversification Index ($X_9$) | 0.2024 | 0.8458 |
| Farming experience $X_{10}$ | 0.0094 | 1.2724 |

**Source:** Field Survey, 2018

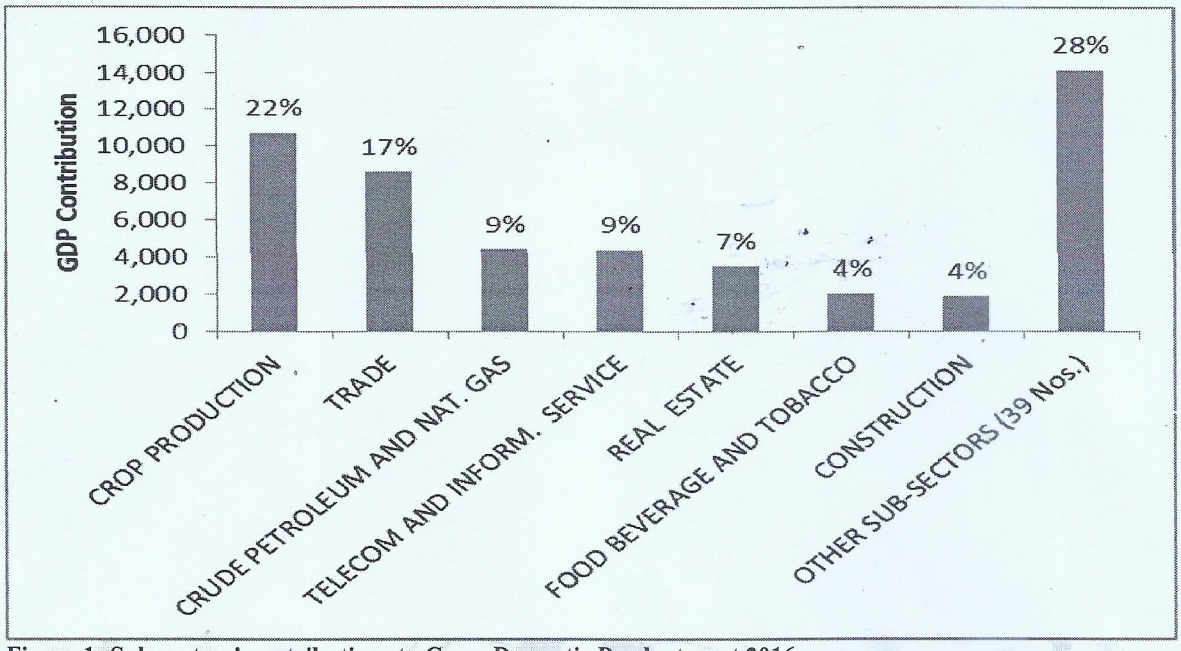


**Figure 1: Sub-sectors' contributions to Gross Domestic Product as at 2016**
**Source: FMNPB (2017)**

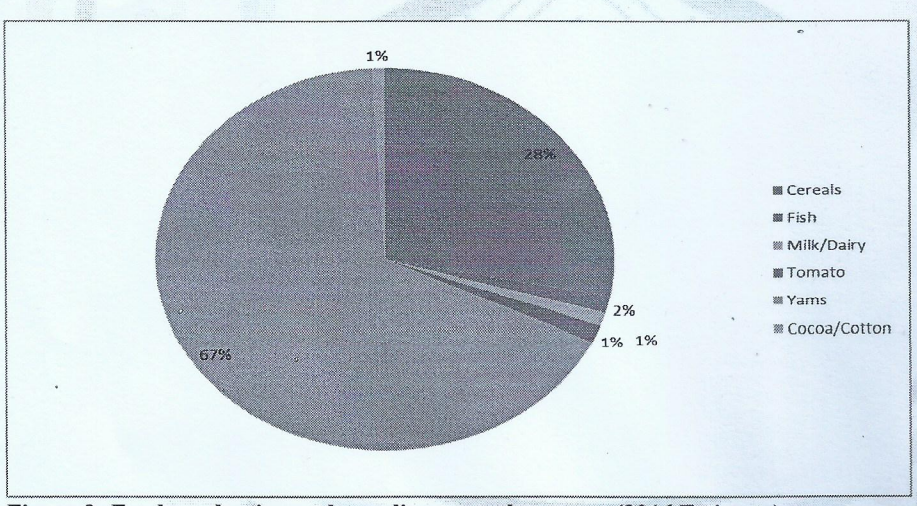


**Figure 2: Food production and supplies across key crops (2016 Estimate)**
**Source: Federal Ministry of Agriculture & Rural Development (2016)**

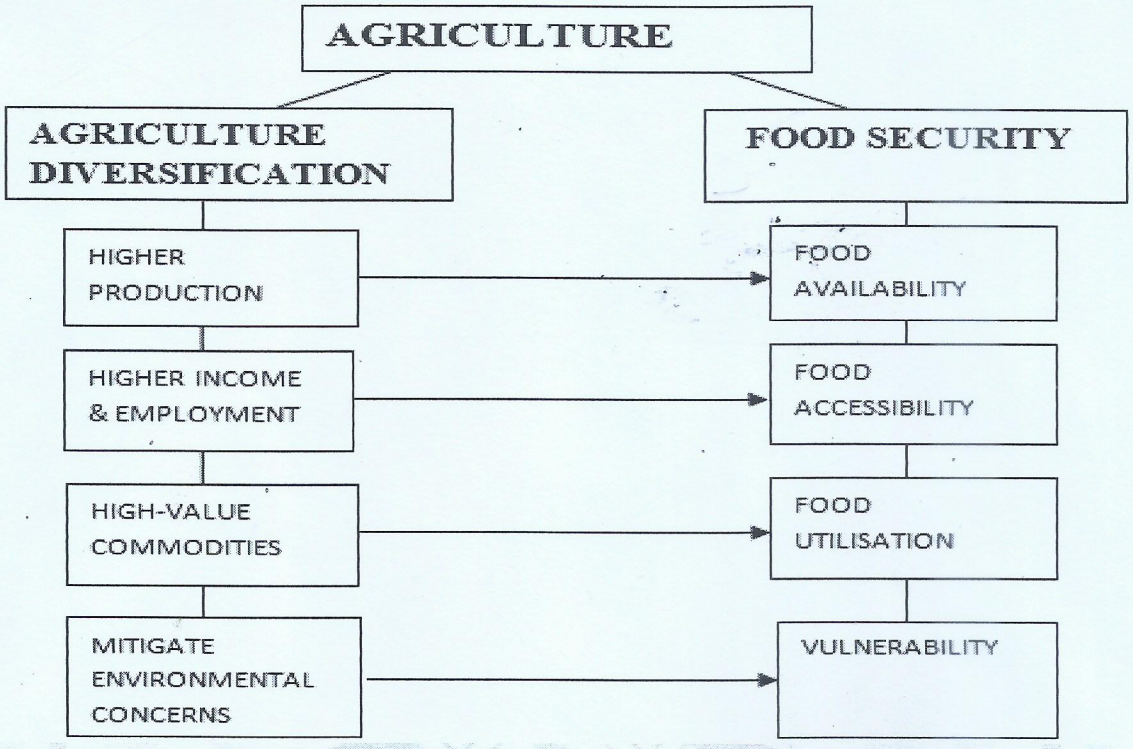


**Figure 3: Agriculture Diversification and Food Security**
**Source: Sheereen, Z. and Banu, S. (2016)**

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