



## NEXUS BETWEEN OFF-FARM INVESTMENTS, SAVINGS AND EXPENDITURE ON FARM ASSETS

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### Abstract

Off-farm income has the potential to assist in enhancing farm investments, however very little is known regarding the exact nature of the relationship between the off-farm investments and agricultural development. Current research in agriculture has beamed its search light on off-farm investment embarked upon by farmers as an alternative and sustainable source of savings. Several studies have reported a substantial and increasing share of off-farm income in aggregate households' income. This study analyzed the relationship between the multivariate factors (off-farm income, savings and expenditure on farm assets). Stratified and simple random sampling techniques were adopted in selecting 445 respondents for this study. Data collected was analyzed using descriptive statistics and multivariate correlation techniques. The result revealed that the most prevalent type of off-farm investments among the respondents was agricultural wage employment on other people's farm (18.2%). The largest income share contribution of off-farm activity in the study area was agricultural wage employment on other people's farm (25.7%). The correlation analysis revealed that the estimated correlation coefficient between x and z ( $r_{xz}$ ) was 0.69; y and z ( $r_{yz}$ ) was 0.73 and y and z ( $r_{xy}$ ) was 0.71. This suggests that a strong and positive linear relationship between the multivariate factors exists; at 1% level of significance, hence the null hypothesis is rejected. Formulating policies that will improve availability and access to off-farm investments, income diversification strategies, financial inclusion and non-agricultural skillsets among rural farmers are strongly recommended.

**Keywords:** Correlation, expenditure, farm households, farm assets, Off-farm investments, off-farm Income, expenditure

### 1.0 Introduction

Off-farm investments have become an important component of livelihood strategies among rural households in most developing countries (Fernandez-Cornejo *et al.* 2007). Over the last two decades, it has become widely accepted both in academics and policy research that off-farm investments make up a significant component of rural means of livelihood in Nigeria



(Dejanvry and sadoulet, 2001; Ruben and Van den Berg, 2001; Haggblade *et al.*, 2007). Several studies have reported a substantial and increasing share of off-farm income in aggregate households' income (Fernandez-Cornejo *et al.* 2007; Jolliffe, 2004). In most cases substantial shares of households' income are earned from off-farm investments and off-farm income was somewhat positively correlated with farm income. This positive relationship between off-farm income and farm income in particular has become very significant overtime (Lanjouw, 2001). Blank *et al.* (2009) reported that rural off-farm income is important for agricultural development as it assists households in overcoming cash constraints when making farm investments. Reasons for these investments and income diversification include declining farm income and the desire to insure against agricultural production and market risk (Barry, 2004). Therefore, when farming becomes less profitable and more risky as a result of population growth and crop market failures, households are pushed into off-farm activities leading to "distress-push" diversification. However, households may tend to be pulled into the off-farm sector especially when returns to off-farm investments are higher or less risky than in agricultural investments, resulting in "demand-pull" diversification. While both effects have been recognized in principle (Fernandez-Cornejo *et al.* 2007), some studies implicitly assume that distress-push effects dominate: shrinking per capita land availability is often considered the main reason for increasing off-farm activities (Van den Berg and Kimhi, 2006). In the United States of America for example, off-farm income accounted for over 90% of farmers' households' income (Babcock *et al.*, 2000). Blank *et al.*, (2009) and Briggeman (2011) asserted that several farms in the United States of America could not boast of favorable leverage ratio without off-farm income. In developing countries like Nigeria where agriculture has been relegated and further worsened by flagrant diversion of agricultural intervention funds to unintended beneficiaries (Idachaba, 1993; Kung, 2002), off-farm activities deserves no less attention. Babatunde (2008) found that off-farm income supplemented and boosted farm and total households' incomes. The Agri-vision 2015 report concludes that the number of economically viable farm businesses is declining and that a large number of farm households are sustainable only because of the presence of off-farm income (National Bureau of Statistics, 2007). Compared to the agricultural sector, employment opportunities in the off-farm sector have been increasing rapidly (The Financial Express, 2012).

For a very long time, the perception of farm households in developing countries is that they rely almost exclusively on agriculture and undertake little or no activities off farm. This perception has led policy makers to concentrate on the farm sector at the expense of the off-farm sector. However, there has been increasing evidences showing that small-holder farm households in developing countries rarely rely on agriculture alone, but often maintain a portfolio of income activities in which off-farm activities are an important component (Barrett *et al.*, 2001). Haggblade *et al.* (2010) reported that off-farm income accounts for about 45% of the gross income of rural households in developing countries. The estimated global figure is approximately 65% (Davis *et al.*, 2007). The share of off-farm income is expected to increase substantially, especially in sub-saharan Africa where increasing population growth and limited agricultural resources are threatening the growth of the agricultural sector (Haggblade *et al.* 2007). Off-farm income is the portion of households' income which is obtained off the farm. Off-farm income doubles as risk minimization and household income stabilization strategies. Off-farm investment is generally disaggregated into three components namely: agricultural wage employment (AWE), involving labor supply to other farms; non-agricultural wage employment (NAWE), involving both formal and informal non-farm activities; and self-



employment (SE) such as business owners (Babatunde *et al.*, 2010). Ibekwe *et al.*, (2010) reported that farmers have resorted to these off-farm investments to boost savings investment. Eventually, off-farm investments are seen to divert critical resources away from the farm sector thereby leading to dual investment structures (De Jan Vry and sadoulet, 2001). While off-farm income may have the potential to assist in enhancing farm investments, it appears however that very little is known regarding the exact nature of the relationship between the off-farm investments and the broader process of agricultural development (Lanjouw, 2001). Mandal *et al.* 2002) reported that studies in Nigeria have hardly explored factors that influence the direction and nature of off-farm investments. Several studies have reported the inadequacy of farm income and high prevalence of poverty among rural farm households, culminating in their inability to invest and scale up their farm activities (Davis *et al.*, 2010; Kwom *et al.*, 2006). A vast literature provides mixed evidences of the role of off-farm investment on rural poverty reduction (Lanjouw 2007; Barrett *et al.*, 2001; Barrett *et al.*, 2005; Haggblade *et al.*, 2010). Current research in agriculture has beamed its search light on off-farm investment embarked upon by farmers as an alternative and sustainable source of savings. Off-farm investments can be used as a risk management strategy, the relationship of off-farm investments variability to agricultural output and income should be explicitly studied as this has implication for agricultural production and development. Thus, it is expedient to provide empirical analysis on off-farm investments. Furthermore, previous studies do not provide empirical evidence of the relationship between off-farm income, savings and expenditure of farm assets in the study area. It is against the backdrop of this knowledge gap that this study attempts to empirically analyze off-farm investments, savings accumulation and poverty status among farm households in the study area, while the specific objectives were to:

- i. identify off-farm investments among the respondents;
- ii. ascertain the levels of income shares from off-farm investments; and
- iii. determine the relationship between off-farm income, savings and expenditure of farm assets

### 1.1 Research Hypothesis

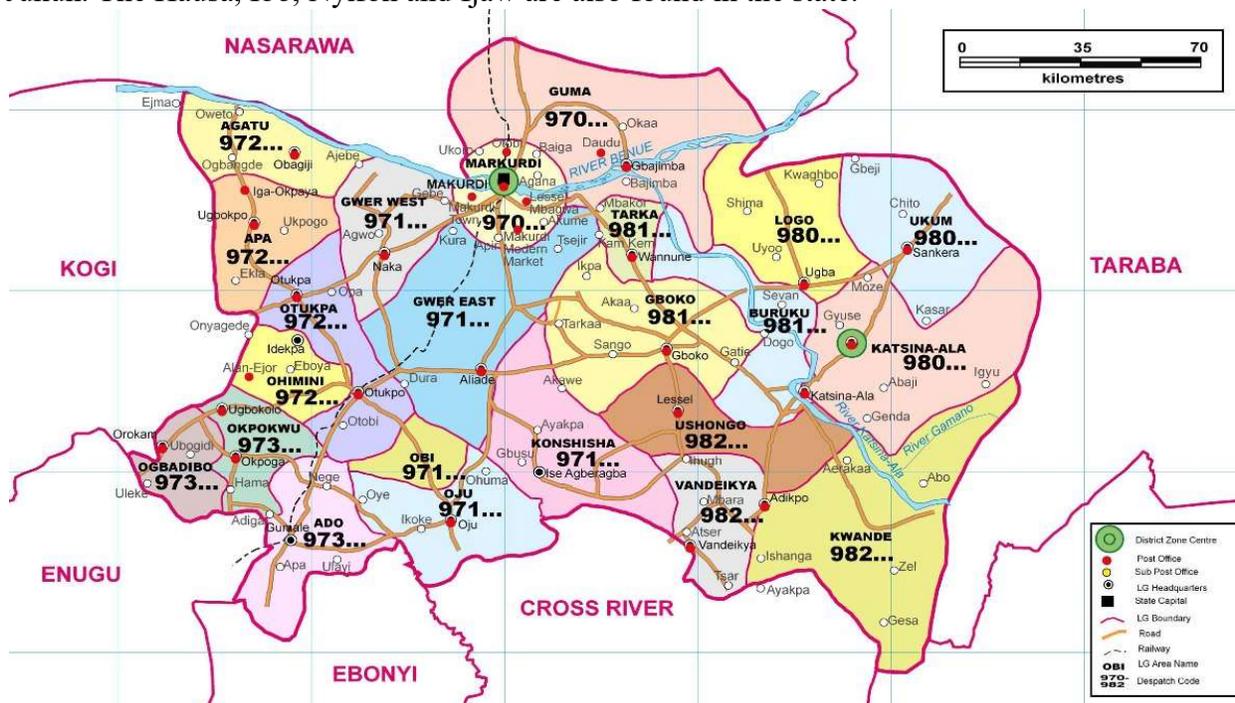
H<sub>0</sub>: There is no significant relationship between off-farm income, savings and expenditure of farm assets.

## 2.0 Methodology

### 2.1 Study Area

This study was carried out in Benue State. The State is located in north-central region of Nigeria, approximately between latitudes  $6\frac{1}{2}^{\circ}$  and  $8\frac{1}{2}^{\circ}$  N and longitude  $7\frac{1}{2}^{\circ}$  and  $10^{\circ}$  E. The State is also bordered on the North by 280 km River Benue, and is traversed by 202 km of River Katsina-Ala in the inland areas. Benue State has a tropical climate, which manifests two distinct seasons. The rainy season is from April to October while the dry season is from November to March. Annual average rainfall varies from 1750 mm in the Southern part of the State to 1250 mm in the North. In the mountain region of Kashimbia area average rainfall rises up to 400 mm. Temperatures in mid-April can be very hot and can be as high  $32^{\circ}$  C -  $38^{\circ}$  C with intense humidity. The State stretches across the transition belt between the forest and savanna vegetation's. Much of the area consists of undulating hills or grassy open space on the North and derived Savanna in the South. The State has a total land area of about 30,955 square kilometers and administratively it is divided into 23 Local Government Areas. Benue State has an estimated population figure of 4,219,244 inhabitants (National Bureau of

Statistics, 2007). The state is made up of 413,159 farm families (National Bureau of Statistics, 2007). These farm families are mainly rural. Benue State has an abundance of agricultural resources. About 80% of the State population is estimated to be directly involved in semi-subsistence agriculture. It is also a major producer of food and cash crops. For example cereal crops like rice, sorghum, maize and millet are produced in abundance. Roots and tubers produced include yams, cassava, cocoyam and sweet potato. Oil seed crops include pigeon pea, soybeans and groundnuts, while tree crops include citrus, mango, oil palm, guava, cashew and banana. Farming is the major occupation of Benue State indigenes, which determines to a large extent the settlement pattern. For instance the Tiv live in dispersed settlements as homesteads, and are very much dependent on readily available farm lands. The Idoma on the other hand live in clustered communities typically surrounded by farm land. The Etulo and Jukuns are predominantly fishermen. The Hausas and Ibos are mainly traders, residing in villages, towns and cities. The Hausa in addition to trading are dry season farmers. In fact, they constitute the migrant farmers currently undertaking dry season farming through tube-wells and direct surface pumping in the State. Civil servants, craftsmen, traditional medicine practitioners and herbalists also exist in Benue state. The Tiv are the predominant tribe. Other major ethnic groups indigenous to the state are: Idoma, Igede, Etulo, Abakwa and Jukun. The Hausa, Ibo, Nyifon and Ijaw are also found in the state.



**Figure 1:** Map of Benue State Showing the Location of the Study Area

**Source:** Adapted from Ministry of Land and Survey, Makurdi (2015).

## 2.2 Population and Sampling Procedure

The population for the study is made up of farm households in Benue State. In this study, stratified and simple random sampling technique was used for sample selection. Benue State is divided into three (3) agricultural zones viz: North-East, North-West and Southern zone. North-East zone and North-West are made up of seven local government areas each while Southern zone is made up of nine local government areas. Using a constant sampling proportion of 0.45, three Local Government Areas were randomly selected from North-East

(Zone A) and North-West (Zone B) while four Local Government Areas were randomly selected from Southern Zone (Zone C). Using the list of estimated population of farm households in each of the selected Local Government Areas, households were randomly selected using 0.02 sampling proportion. Based on the foregoing, 445 farm households were randomly selected for the study. Table 1 presents the sample size selection procedure.

**Table 1: Sample Size**

Zone	LGA	Sampling Frame	Sample size
A	Vandeikya	1279	25
	Kwande	915	18
	Ukum	869	17
B	Gboko	2990	60
	Gwer West	1005	20
	Buruku	3423	68
C	Otukpo	3595	72
	Okpokwu	5179	104
	Apa	980	20
	Ogbadibo	2072	41
<b>Total</b>		22,307	445

**Source:** Benue State ADP, 2015.

### 2.3 Method of Data Collection

Data for this study were collected mainly from primary sources. The primary data were obtained through the use of structured questionnaires, which were administered to the 445 farm households that were selected for the study in Benue State.

### 2.4 Analytical Techniques

Data for the study were analyzed using both descriptive statistics (frequency distribution and percentages) and multivariate correlation techniques. The null hypothesis was tested using the results from the multivariate correlation analysis.

#### 2.4.1 Model Specification

##### *Multivariate Correlation Analysis*

The correlation analysis was used to analyze the multivariate relationship between off-farm income (x), savings (y) and expenditure on farm assets (z), where multiple correlation coefficients (R, r) is defined in equation (1) as:

$$R_{z, xy} = \sqrt{r_{xz}^2 + r_{yz}^2 - 2r_{xz} \cdot r_{yz} \cdot r_{xy} / (1 - r_{xy}^2)} \dots \dots \dots (1)$$

$R_{z, xy}$  = multiple correlation coefficient between dependent and independent factors;

$z$  = dependent variable  $z$ ;

$x$  = independent variable  $x$ ;

$y$  = independent variable  $y$ ;

$r^2$  = coefficient of determination;

$r_{xz}^2$  = coefficient of determination between  $x$  and  $z$ ;

$r_{yz}^2$  = coefficient of determination between  $y$  and  $z$ ;

$r_{xy}^2$  = coefficient of determination between  $x$  and  $y$ ;

$r_{xz}$  = correlation coefficient between  $x$  and  $z$ ;

$r_{yz}$  = correlation coefficient between  $y$  and  $z$ ; and

$r_{xy}$  = correlation coefficient between  $x$  and  $y$ .

Also, the strength of relationships based on the correlation coefficient ( $r$ ) is expressed as follows;

- i.  $\geq \pm 0.7$  (strong linear relationship);
- ii.  $\pm 0.4-0.69$  (moderate linear relationship); and
- iii.  $\geq \pm 0.39$  (weak linear relationship).

### 3.0 Results and Discussion

#### 3.1 Types of Off-farm Investments among the Respondents

**Table 2: Distribution of Respondents based on the Types of Off-farm Investments**

Factors	Frequency	Percentage
Agricultural wage employment on other people's farm	81	18.20
Non-agricultural wage employment	76	17.08
Self-employment in commerce	70	15.73
Self-employment in mining	40	8.99
Self-employment in manufacturing	30	6.74
Self-employment in constructions	35	7.87
Self-employment in transport	55	12.36
Self-employment in services sectors	58	13.03
<b>Total</b>	<b>445</b>	<b>100</b>

**Source:** Field Survey, 2016.

The types of off-farm investments among the respondents were presented in Table 2. The result revealed that farmers engaged in various types of off-farm investments. However, the most prevalent was agricultural wage employment on other people's farm (18.2%). Others include non-agricultural wage employment (17.08%), self-employment in commerce (15.73%), self-employment in services sectors (13.03%) and self-employment in transport services (12.36%). The implication of the foregoing finding is that a considerable proportion of off-farm work undertaken by the farm households in the study area is in the agricultural sector. This finding agrees with Rahman (2010); Ellis and Freeman (2004) also reported the predominance of off-farm employment in the agricultural sector.

### 3.2 Off-Farm Activities and Their Income Share Contribution

**Table 3: Distribution of Average Income shares from the Investments in Off-Farm Activity**

Off-Farm Activity	Income share (₦)	Percentage (%)
Agricultural wage employment on other people's farm	997,500	25.7
Non-agricultural wage employment	752,800	19.4
Self-employment in commerce	650,200	16.7
Self-employment in mining	238,000	6.1
Self-employment in manufacturing	105,000	2.7
Self-employment in constructions	141,900	3.7
Self-employment in transport	416,700	10.7
Self-employment in services sectors	585,400	15
<b>Total</b>	<b>3,887,500</b>	<b>100</b>

**Source:** Field Survey, 2016.

Table 3 revealed the average income share of each off-farm activity among the households in the study area. The off-farm activities which the farmers engaged in to diversify their income include; agricultural wage employment on other people's farm, non-agricultural wage employment, self-employment in commerce, self-employment in services sectors, self-employment in transport services, self-employment in mining, self-employment in construction and self-employment in manufacturing; were found to be the alternative sources of income in the study area. The largest income share contribution of off-farm activity in the study area was agricultural wage employment on other people's farm (25.7%), attributable to the prevalence of farming activities in the area hence demand for hired labour will be high. This was followed by non-agricultural wage employment (19.4%); attributable to the prevalence of diversified economic potentials in the area, self-employment in commerce (16.7%); attributable to access and market proximity, self-employment in services sectors (15%); attributable to demand for varied levels of household services, self-employment in transport (10.7%); attributable to high traffic with regards to the movement of people and goods, self-employment in mining (6.1%); attributable to the presence of sparse mineral deposits in the study area, self-employment in constructions (3.7); attributable to the presence of project sites within the area and self-employment in manufacturing (2.7%); attributable to the presence of industrial sites within the study area. The foregoing finding validates the finding of Rahman (2010) who reported that over 50% of the farmers surveyed considered that off-farm income was useful, important or essential to their farm enterprise. This confirms findings in other studies on diversification in Africa (Barrett *et al.*, 2001; Losch *et al.* 2011; Idowu *et al.* 2011).

### 3.3 Nexus between Off-Farm Income, Savings and Expenditure on Farm Assets

**Table 4: Correlation Coefficient Matrix of multivariate factors**

Factors	Expenditure	Off-farm income	Savings
<b>Expenditure</b>	1.00		
<b>Off-farm income</b>	0.69**	1.00	
<b>Savings</b>	0.73**	0.71**	1.00



**Source:** Field Survey, 2016; \*\*Correlation coefficient ( $r$ ) is significant at 1% level (2-tailed). The result of the correlation analysis in Table 4 revealed that at 1% level of significance, the null hypothesis that there is no significant relationship between off-farm income, savings and expenditure of farm assets is rejected. This suggests that there is a significant linear relationship between these multivariate factors in the study area. The estimated correlation coefficient between  $x$  and  $z$  ( $r_{xz}$ ) was 0.69; which suggests a strong positive linear relationship between the factors. This implies that as off-farm income increases the purchasing power capacity of the farmers improves resulting to additional expenditure on farm assets. This is attributable to the fact that off-farm income increases the capital available for investment in farm assets. The estimated correlation coefficient between  $y$  and  $z$  ( $r_{yz}$ ) was 0.73; this suggests a strong positive linear relationship between the factors. This implies that as savings increases more capital is accumulated by the farmers for the purchase of requisite production inputs. The estimated coefficient of determination between  $y$  and  $z$  ( $r_{xy}$ ) was 0.71, which suggests a linear relationship between the factors exists. This suggests that as off-farm income of the respondents improves the likelihood of savings increases. The implication of this finding is that off-farm income is likely to increase the viability of existing farms and communities, and hence improve the sustainability of agriculture. For these farmers, part of the off-farm income was used to support their farm enterprise, either for debt servicing, working capital and expenses and enterprise development; or for other household expenses. Where the farmer engages in off-farm work, and the income derived is expended on the farm, it is likely that the expenditure will be devoted (at least in part) to resources that substitute for the farmer's labour. Thus, off-farm income increases the availability of capital for farm investments. This result corroborates with the findings of Ahituv and Kimhi (2002); Yasin et al., 2003 who also examined the role of off-farm investments and farm capital accumulation.

#### **4.0 Conclusion and Recommendations**

The implication of this finding is that off-farm income is likely to increase the viability of existing farms and communities, and hence improve the sustainability of agriculture. The result of the study revealed that agricultural wage employment on other people's farm was the most prevalent type of off-farm investment among the respondents. In the study revealed the respective income share contribution of off-farm investments in the study area. Furthermore, the study revealed that there is a strong and positive relationship between off-farm income, savings and expenditure on farm assets. This implies that linear relationship between the multivariate factors exists. The outcome of this study would be of immense benefit to farmers on appropriate patterns of off-farm investment decisions that maximizes income. It will be useful to policy makers, stakeholders, government and other researchers. It will facilitate policy formulation that supports and boosts off-farm investments among farmers as alternative sources of savings and household income. Based on the findings of this study, the following recommendations are made for policy actions:

- (i) Formulating policies that will improve availability and access to off-farm investments.
- (ii) Policy modifications to enhance income diversification strategies among rural farmers. This will help to provide additional income that can support agricultural sustainability.
- (i) Formulating policies that will improve and financial inclusion (credit and savings) among rural farm households. This will help to mitigate household budget constraints.
- (iv) Increasing farmers access to training in non-agricultural skillsets that will improve their capacity to invest in off-farm activities.



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