

DETERMINANTS OF OFF-FARM INVESTMENTS AMONG FARM HOUSEHOLDS IN BENUE STATE, NIGERIA

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Abstract

Off-farm investments have become an important component of livelihood strategies among rural households in most developing countries; this study therefore analyzed the determinants that influence the direction of off-farm investments. Stratified and simple random sampling techniques were adopted in selecting 445 respondents for this study. Data collected were analyzed using descriptive statistics and Binary logistic regression model. The result revealed that 35.96% of respondents were aged between 35-49 years; 62.5% were male; 44.27% were married; 38.2% had household size between 6 - 9 people; 33.03% had no formal education; 40.9% had farm experience of ≥ 11 years; most (82.7%) had farm size between 1 - 5 hectares; 48.31% earned annual farm income of ₦300,000 - ₦599,000; 56.18% earned annual non-farm income of \leq ₦199,000 and 35.51% had annual farm output of ≤ 499 kilograms. Furthermore, the prevalent type of off-farm investments was agricultural wage employment on other people's farm (18.2%) and farmers invested in off-farm activities for various reasons. The estimate of coefficient of determination (R^2) was 0.714; indicative of the 71.4% variation in off-farm investment decisions. Policy formulation to improve access to off-farm investments, provide educational and vocational training, ensure sustainable off-farm investments and remunerative income are recommended.

Keywords: Determinants, farm capital, livelihood strategies, off-farm investments, socioeconomic factors

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 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 farm capital 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). Off-farm investments can be used as a risk management strategy. Thus, it is expedient to provide empirical analysis on off-farm investments. Furthermore, previous studies do not provide empirical evidence of the relationship between factors influencing investments in off-farm

activities in the study area, hence this study is being undertaken to bridge this research gap. It is against the backdrop of this knowledge gap that this study attempts to empirically analyze the typology, benefits and determinants of off-farm investments among rural farm households in Benue State, Nigeria, while the specific objectives of the study were to:

- I. describe the socioeconomic characteristics of the rural farm households;
- ii. ascertain the types of off-farm investments among the respondents;
- iii. identify the reasons for off-farm investments;
- iv. determine the factors influencing off-farm investments in the study area.

Based on specific objectives, the following hypothesis was tested;

H₀: Socioeconomic variables of the respondents do not significantly influence their off-farm investment decisions.

Methodology

Study area

This study was carried out in Benue State. The State is located in north-central region of Nigeria, approximately between latitudes 6½° and 8½° N and longitude 7½° and 10° 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. The State has a total land area of about 30,955 square kilometers and administratively it is divided into 23 Local Government Areas (LGA). Benue State has a population figure of 4,942,100 inhabitants (World-gazetteer, 2011), however, the current population density, if population growth would be same as in period 2006-2011 (=3.05/year), the estimated population in 2021 would be: 6,671,338. 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.

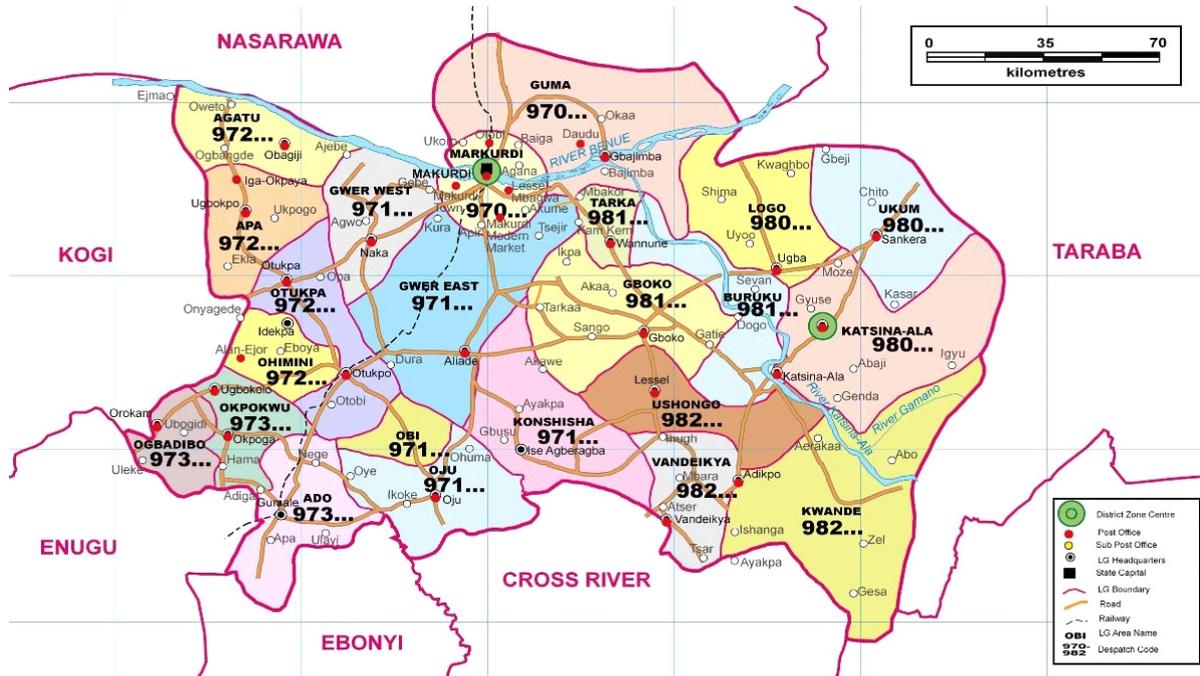


Figure 1: Map of Benue state showing the location of the study area

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

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 selection procedure

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
Total		22,307	445

Source: Benue State ADP, 2016

Method of data collection

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

Analytical techniques

Data for the study were analysed using both descriptive and inferential statistical tools. Descriptive statistics such as percentages and frequency distribution were used to analyse specific objectives i, ii and iii. Specific objective iv was analysed using Binary logistic regression model. The null hypothesis was tested using the results from the Binary logistic regression model.

Binary logistic regression

Binary Logistic regression model was used to determine the factors that influence the probability of off-farm investments among farm households and was explicitly specified in equation (1);

$$Z = \log [P/1-P] = \log Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_i \dots \dots (1)$$

Where:

Z = probability of farmers to invest off-farm

Invest off-farm = 1; Do not invest off-farm = 0

β = regression coefficient explaining changes caused in Z by changes in the independent variables

α = constant term

X_1 = Age (years)

X_2 = Marital status (0=single; 1= married; 2=widow; 3= divorced,)

X_3 = Farm size (hectares)

X_4 = Household size (population)

X_5 = Educational status (0=no formal; 1= primary; 2= secondary; 3= tertiary)

X_6 = Farm income (₦)

X_7 = Dependent household population (household population ≤ 18 years)

X_8 = Training in non-agricultural skillset (0=no; 1=yes)

X_9 = Access to credit (0= no; 1= yes)

e_i = Error term

Results and Discussion

Socioeconomic characteristics of the respondents

Table 2 revealed that (35.96%) of the respondents were within the age bracket of 35-49 years. This suggests that most of the respondents in the study area are within the economic active age bracket. Also, most (62.5%) of the respondents were male, suggesting male dominated farm households in the study area. This is probably because farm operations are so laborious such that the men cope better than their female counterpart and the fact that men have more access to farm assets and productive resources. Furthermore, most (44.27%) of the respondents were married. The high proportion of the respondents who are married is an indication that family labour would be available for farming operations among the respondents. It also suggests a high demand for food and additional income due to the population of household members.

Table 2 also revealed that (38.2%) of the respondents had a household size of between 6 - 9 people, suggesting that the respondents have a relatively large number of household members and adequate labour supply required for off-farm and farm activities. In addition, it was

revealed that most (33.03%) of the respondents had no formal education. However, 24.04% had primary education, 23.37% had secondary education while 19.55 had tertiary education, suggesting that most of the respondents were literate, this factor will increase their capacity to acquire skillsets required for engaging in off-farm and farm activities. Table 2 also revealed that most (40.9%) of the respondents has been farming for 11 years or more. This implies that most of the respondents have adequate farming experience required to carry out their various farm operations. Table 2 also revealed that most (82.7%) of the respondents had farm size of between 1 - 5 hectares, suggesting that most of the respondents were small scale farmers who readily engage in off-farm work to supplement their subsistent farm incomes.

The intensity of participation in off-farm activities is positively correlated with farm size, suggesting that an increase in farm size may result to increased output levels and subsequently increased remunerative farm income, consequently a fraction of this additional income may be re-invested into off-farm activities (Rahman *et al.* 2010). Table 2 also revealed that (48.31%) of the respondents earned annual farm income of between ₦300,000 - ₦599,000, suggesting that most of the respondents earned moderate farm income from their enterprises, however this is still inadequate to cater for all expenditures on farm assets and household consumption expenses, hence this will also increase their likelihood to engage in off-farm work that will supplement their household incomes. Table 2 also revealed that most (56.18%) of the respondents had annual non-farm income of ≤₦199,000, suggesting that most of the respondents earned additional income from their off-farm activities to supplement their farm income. Table 2 also revealed that most (35.51%) of the respondents had annual farm output of ≤499 kilograms, implying that most of the respondents obtained low output from their farm enterprise. This may be attributable to their subsistent level of production and inadequate capital required to scale up their farm enterprise hence the need to engage in off-farm work to mitigate the effects of declining farm income.

Table 2: Distribution of the respondents based on their socioeconomic characteristics

Variables	Frequency	Percentage
Age		
20 – 34	150	33.70
35 – 49	160	35.96
= 50	135	30.34
Total	445	100
Sex		
Male	243	54.61
Female	202	45.39
Total	445	100
Marital status		
Single	72	16.18
Married	197	44.27
Widowed	100	22.47
Divorced	76	17.08
Total	445	100
Household size		
1-5	159	35.73
6-10	170	38.20
= 10	116	26.07
Total	445	100
Education		
Non-formal education	147	33.03
Primary	107	24.04
Secondary	104	23.37
Tertiary	87	19.55
Total	445	100
Farming experience		
1- 5	108	24.27
6 -10	155	34.83
=11	182	40.90
Total	445	100
Farm size		
1-5	368	82.70
6-9	65	14.61
= 10	12	2.70
Total	445	100
Annual farm income		
= 299,000	150	33.71
300,000 - 599,000	215	48.31
=600,000	80	17.98
Total	445	100
Annual non-farm income		
= 199,000	250	56.18
200,000 - 499,000	113	25.39
=500,000	82	18.43
Total	445	100
Annual output		
= 490	158	35.51
500 – 999	139	31.24
=1000	148	33.26
Total	445	100

Source: Field Survey, 2016.

Types of off-farm investments among the respondents

The types of off-farm investments among the respondents were presented in Table 3. 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. Similarly, Rahman *et al.* (2010) also reported the predominance of off-farm employment in the agricultural sector.

Table 3: Distribution of respondents based on the types of off-farm investments

Variables	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
Total	445	100

Source: Field Survey, 2016.

Reasons for off-farm investments among the respondents

The reasons for off-farm investments among the respondents are presented in Table 4. The result revealed that farmers invested in off-farm activities for various reasons. The most significant factors include; low or declining farm income (84.27%), burden of maintaining large family (79.55%), availability of off-farm work opportunity (76.85%), income diversification (75.51%), assists households in overcoming cash constraints when making farm investments (74.83%), desire to insure against agricultural production and market risk (73.48%) and when farming becomes less profitable and more risky as a result of

population growth and crop market failures (71.46%). The implication of the foregoing finding is that a considerable proportion of off-farm work undertaken by the farm households in the study area was mainly due to declining farm income. This finding is in consonance with Rahman *et al.* (2010) who also reported that low income from agriculture is the major reason for participating in off-farm activities.

Table 4: Distribution of respondents based on their reasons for off-farm investments

Variables	*Frequency	*Percentage
Assists households in overcoming cash constraints when making farm investments	333	74.83
Income diversification	336	75.51
Declining farm income	375	84.27
Burden of maintaining large family	354	79.55
Desire to insure against agricultural production and market risk	327	73.48
When farming becomes less profitable and more risky as a result of population growth and crop market failures	318	71.46
When returns to off-farm employments are higher or less risky than in agriculture	309	69.44
Availability of off-farm work opportunity	342	76.85

Source: Field Survey, 2016; *Multiple responses

Factors influencing off-farm investments among the respondents

The result of the binary logistic regression in Table 5 revealed that at 5% level of significance, the hypothesis that the specified explanatory variables in the model have no significant influence on off-farm investments is rejected. There was a significant change in -2 log-likelihood (85.369), suggesting that there was a significant cause-effect relationship between off-farm investments and the specified explanatory variables in the model. The estimate of Cox & Snell R square (coefficient of determination) (R^2) is 0.714. This indicates that 71.4%

variation in off-farm investment decisions was accounted for by variations in the specified explanatory variables in the regression model, suggesting that the model has explanatory power on the changes in off-farm investment decisions. The Nagelkerke R square (adjusted R^2) also supported the claim with a value of 0.783 or 78.3%, implying that the specified explanatory variables are significant determinants of the outcome of the dependent (off-farm investment decisions) variable at 78% level of confidence.

The result of the determinants of off-farm investments among the respondents is presented in Table 5. The result in Table 5 revealed that the coefficient of age (-0.743) was negative but statistically significant at 5% ($p < 0.05$) probability level, implying that the likelihood of off-farm investments among the respondents decreases with increase in age. This suggests that older farmers are more likely to receive lower incomes and opportunities for off-farm work. This may be attributable to the fact that the mental and physical energy required for increased productivity decline with age. Older farmers are less likely to engage in off-farm work, which may reflect differences in attitudes regarding to work that correlates with age. This finding is in consonance with previous studies (Mishra and Goodwin, 1998; Mandal *et al.* 2002; Shi *et al.* 2004).

The result in Table 5 also revealed that the coefficient of farm size (-0.637) was negative but statistically significant at 5% ($p < 0.05$) probability level, implying that the probability of off-farm investments decreases with increase in farm size. Increase in farm size and the attendant increase in farm activities will definitely reduce off-farm activities. This is in agreement with Ibekwe *et al.*, (2010) who also reported that farm size was negatively correlated with off-farm investment. Rahman *et al.* (2010) also reported that the rural household farming model provides an income source. The higher the farm income the lower the need for off-farm income to satisfy the budget constraints. Also, different farming systems influence the decisions to work off the farm. The reason for such specifications is that farming systems that are labour intensive will be less likely to have operators involved in off-farm employment. Furthermore, the profitability of farming systems also assumes an important role in the decision to participate in the off-farm labour market. The result in Table 5 further revealed that the coefficient of household size (0.561) was positive and statistically significant at 5% ($p < 0.05$) probability level. The household size of the respondents has significantly affects off-farm participation decisions. Also, the household size comprised a significant population of

dependent household members, with increased consumption demand and expenditures and hence an increased need to engage in off-farm activities that generate additional income to supplement budgetary constraints. This is in agreement with Woldehanna *et al.* (2000) who reported that households with a larger population have a relatively higher marginal utility of income and need to participate in off-farm work.

The result in Table 5 further revealed that the coefficient of educational status (0.437) was positive and statistically significant at 5% ($p < 0.05$) probability level. The probability of off-farm investments increases relative to the educational status of the respondents. Farm households with more literate population tend to engage in more off-farm investments. Education and training produce a labour force that is mobilized, more skilled, prone to risk taking and adaptable to the needs of a changing economy. Hence an educated population may tend to be reluctant to work in the farm sector or on a part time basis, as they have alternative economic prospects and potentials. This finding is in agreement with previous studies (Ibekwe *et al.*, 2010; Eboh and Ocheoha, 2002; Parasada, 2002). The result in Table 5 further revealed that the coefficient of farm income (-0.653) was negative but statistically significant at 5% ($p < 0.05$) probability level. Farm income is significant and negatively correlated to off-farm investments. This is because the higher the annual farm income, the lower the need to participate in off-farm activities. Also, this result corroborates with the expectation that poor income from the farm activities can lead to low savings and consequently investment, hence this will decrease the likelihood for off-farm investments (Ibekwe *et al.*, 2010). The result in Table 5 further revealed that the coefficient of dependent population (0.675) was positive and statistically significant at 5% ($p < 0.05$) probability level. Dependency ratio has a significant and positive influence on off-farm investments. Households that comprise a significant number of dependents tend to have higher pressure for obtaining additional income to meet their consumption needs. This result validates the findings of previous studies (Mishra and Goodwin, 1998). The result in Table 5 also revealed that the coefficient of non-agricultural skillset (0.574) is positive and statistically significant at 5% ($p < 0.05$) probability level. The probability of off-farm investments increases with increase in training on non-agricultural skillsets, suggesting that skill acquisition facilitates engagement in off-farm activities. This agrees with Ellis and Freeman (2004) who also reported that training in non-agricultural skillset was a critical factor in increasing the ability of farmers to engage in off-farm activities. The result in Table 5 also revealed that the coefficient of access to credit (0.635) is positive and

statistically significant at 5% ($p < 0.05$) probability level. The probability of off-farm investments increases with improved access to credit, suggesting that improved credit access provides respondents with capital required for farm and off-farm investments as well as critical domestic expenditures. This result corroborates with Babatunde *et al.* (2010) who also reported similar determinants of off-farm income among farm households.

Table 5: Determinants of off-farm investments

Variables	B	S.E.	Wald	Exp. (B)
Age	-0.743	0.237	-3.214*	0.713
Marital status	0.718	0.335	1.435 ^{n.s}	0.739
Farm size	-0.637	0.387	2.463*	0.654
Household size	0.561	0.259	2.426*	0.646
Educational status	0.437	0.253	2.627*	0.557
Farm income	-0.653	0.284	-2.429*	0.541
Dependent population	0.675	0.271	2.314*	0.738
Non-agricultural skillset	0.574	0.257	2.233*	0.753
Access to credit	0.635	0.228	2.785*	0.615
Constant	4.541	2.153	2.109	0.359
-2 Log likelihood				85.369*
Cox & Snell R square				0.714
Nagelkerke R square				0.783

Source: Field Survey, 2016; *Wald statistic is significant at 5% level; *Change in -2 Log likelihood is significant at 5% level.

Conclusion and Recommendations

The result of the study revealed that the socioeconomic variables of the respondents influenced their off-farm investment decisions. Agricultural wage employment on other people's farm was the most prevalent type of off-farm investment among the respondents. In addition low or declining farm income was the most significant reason for investing off-farm. Furthermore, the result of the study revealed that the likelihood of off-farm investments among the respondents was significantly influenced by age, farm size, household size, educational status, farm income, dependency ratio, training in non-agricultural skillset and access to credit. The outcome of this study would be of immense benefit to farmers on appropriate patterns and the determinants 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 farm capital and household income. Based on the findings of this study, the following recommendations are made:

- (i) Policy modifications to improve factors that influence investments in non-farm assets.
- (ii) Policy modifications to enhance income diversification strategies among rural farmers. This will help to provide additional income that can support agricultural sustainability.
- (iii) Formulating policies that will improve availability and access to off-farm investments among rural farm households.
- (iv) Increasing farmers access to training in non-agricultural skillsets that will improve their capacity to invest in off-farm activities.
- (v) Policies should be formulated to provide farmers with vocational and educational training to improve their literacy levels and hence acquire better capacity to invest in off-farm activities.

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