



EFFECT OF OFF-FARM INCOME ACTIVITIES ON LIVELIHOOD OF SMALL-SCALE CROP FARMERS IN NIGER STATE, NIGERIA

¹Yahaya, J., ¹Yisa, E. S., ¹Baba, K. M. and ²Muhammed, Y*.

¹Department of Agricultural Economics and Farm Management,
Federal University of Technology (FUT), P. M. B. 65, Minna, Niger State.

²Department of Agricultural Extension and Rural Development,
Federal University of Technology (FUT), P. M. B. 65, Minna, Niger State.

***Corresponding Author: mohdyak@futminna.edu.ng
08036576697**

ABSTRACT

This study analysed the effect of off-farm income activities on livelihood of small-scale crop farmers in Niger State, Nigeria. The specific objectives were to describe the socio-economic characteristics of the small-scale crop farmers; examine their off-farm income activities, livelihood status and constraints mitigating small-scale farmers to diversify into off-farm activities in the study area. Multi-stage random sampling procedure was employed to select 241 small-scale crop farmers on which structured questionnaire was administered. Primary data collected were analysed with descriptive statistics such as frequency counts, percentages and mean and inferential statistics such as Tobit regression. Livelihood index was used to examine the livelihood status of the farmers. Findings from the study revealed that the mean age of the respondents was 49 years, mean household size was 7 people, mean farming experience was 12.5 years and mean farm size was 2.10 hectares. Meanwhile, 68.9% of the respondents were males, 83.4% were married and 61.0% had formal education with a mean of 9 years in formal schooling. The major off-farm income activities of the respondents examined were marketing (51.9%), petty trading (23.2%) and commission agents (18.7%) ranked 1st, 2nd and 3rd, respectively. Based on the livelihood index classification, majority (75.1%) of the respondents were found to have low livelihood status. Tobit regression result revealed that sex (1.76, $p < 0.1$), household size (2.97, $p < 0.01$), education (4.16, $p < 0.01$), experience (2.25, $p < 0.05$), farm size (2.03, $p < 0.05$), access to credit (2.16, $p < 0.05$), extension contact (2.24, $p < 0.05$), cooperative (3.84, $p < 0.01$) and off-farm income (10.40, $p < 0.01$) were statistically significant, thus had effect on livelihood status of the small-scale crop farmers. Major constraints identified to mitigate against diversification into off-farm income activities were inadequate capital ($\bar{X}=4.46$), climatic risk and uncertainties ($\bar{X}=3.97$) and poor marketing facilities ($\bar{X}=3.80$) ranked 1st, 2nd and 3rd, respectively among others. In conclusion, the small-scale farmers were in their most productive stage of life where they could engage in off-farm income activities which have significant effect on the livelihood status of the small-scale crop farmers in the study area. It was therefore recommended that credit facilities should be provided for small-scale farmer by financial institutions in order to increase their participation in off-farm income activities.



Keywords: Off-farm, income, livelihood status, small-scale, crop farmers

INTRODUCTION

Over the years, agrarian man has relied on off-farm income sources like hunting, trading, artisanal mining and other trades from time immemorial in order to survive severe droughts and even migration (Mtocha, 2015). Therefore, off-farm income activities are those extra-agricultural jobs which farmers engage in to complement and supplement their income. It is the extra income derived from other sources that are not farm-related. According to Loison (2015), off-farm income is that portion of household income which is obtained off the farm. It includes non-farm wages and salaries, trading and interest on farm income given out as loan, and share dividend earned by farm families.

In developing countries like Nigeria, off-farm income activities play a vital role in sustainable development and poverty reduction in rural areas (Shehu and Abubakar, 2015). It reduces the pressure of unemployment and the demand for land by the poor in rural areas; contributes to breaking down the vicious cycle of poverty among the rural populace and the income obtained from off-farm activities can significantly increase total household income and hence enhance the investment capacity in farm activities (Babatunde *et al.*, 2010). Therefore, off-farm income activities are often a source of savings, which plays an important role in food security and livelihood. The households that diversify their income by participating in off-farm income activities are more capable of overcoming negative shocks from poor harvest (Myyra *et al.*, 2011).

In Nigeria, small-scale crop farmers earn their livelihoods through diverse sources, dispelling the traditional perception among most urban settlers that their income comes from farming alone. According to Loison and Bignebat (2017), rural households especially in Sub-Saharan Africa diversify their farm activities and by extension virtually through working on other farms or engaging in natural resource related activities. The income diversification through off-farm activities comes by engaging in waged labour, self-employment or labour migration. Djurfeldt and Djurfeldt (2013) posited that rural households operate between on-farm and off-farm activities over time depending on the opportunities and circumstances on ground.

Off-farm economic activities may be a deliberate household strategy to secure survival, reduces risk, finance farm inputs and minimize income fluctuations (Reardon *et al.*, 2006). Thus, off-farm income diversification among small-scale crop farmers is fast becoming an important income and livelihood technique (World Bank, 2007). Empirical studies across Africa had shown that off-farm activities had positive impacts on household incomes, wealth, consumption and nutrition among rural farmers (Reardon *et al.*, 2006; Davis *et al.*, 2010). Therefore, off-farm income diversification activities are of interest to policy makers because of its potential to contribute to poverty reduction and economic growth for improved livelihood.

Despite the growing importance of off-farm activities, very little is known about the role it play on livelihood of rural households in developing countries like Nigeria and particularly, in the study area. There is also an erroneous impression that rural people are homogeneous in their activities implying that they hardly diversify into off-farm activities. This assumption has constituted a gap in knowledge that call for concerns from various researchers in agricultural



sector. Thus, there is need to analyze the effect of off-farm income activities on livelihood of small-scale farmers in Niger State, Nigeria. In view of the aforementioned, attempts were made to provide answers to the following research objectives which were to:

- i. describe socio-economic characteristics of the small-scale crop farmers;
- ii. examine off-farm income activities and livelihood status of the small-scale crop farmers;
- iii. analyze effect of off-farm income activities on livelihood status of small-scale crop farmers;
- iv. identify and describe constraints mitigating against off-farm income diversification in the study area.

METHODOLOGY

Study Area

The study was conducted in Niger State which is one of the six states in the North-Central Nigeria. It is located within latitudes $8^{\circ} 20'$ and $11^{\circ} 30'$ North and longitudes $8^{\circ} 20'$ and $8^{\circ} 30'$ East, and covers 76,363 square kilometers of land mass which makes it the largest Nigerian State by land mass. The State has a population of 3,950,249 (National Population Commission (NPC), 2006). However, using the population growth rate of 3.2%, the projected population of the State was 5,764,755 as the end of 2018. The landscape consists mostly of wooded savannas and includes the flood plains of the Kaduna River. Niger State like other States in Nigeria experience two main climatic conditions (dry and wet seasons); with annual rainfall varying from 1,100mm in the Northern part to 1,600mm in the Southern parts. The State has a maximum temperature of not more than 34°C which is recorded between March and June every year with some slight variations and the minimum is usually between December and January. The largest ethnic group in Niger State is the Nupes. Other major ethnic groups residing in the State include, the Gwari in the East, the Busa in the West, and Kambari, Hausa, Fulani, Kamuku, and Dakarki in the North (Niger State Agricultural Mechanization and Development Authority (NAMDA), 2018).

The fertile soil type and hydrology of the State permit the cultivation of variety of cash and food crops and still allows sufficient opportunities for grazing, fresh water fishing and forestry development. The State has a predominant farming population who mostly resides in the rural areas. Some of their dominant harvests include Cotton, Shea nuts, yams, and peanuts (groundnuts) which are for subsistence and commercial purposes (NAMDA, 2018). Pottery, brass work, glass manufactures, raffia articles, and locally dyed cloth are significant exports in the state. Marble is quarried at Kwakuti, near Minna, the state capital and Minna has a brick-making factory. Niger state is a home for major hydro-electric power dams. These are Shiroro, Jebba and Kainji Dams. These dams serve dual purposes - generating hydroelectric power and sustain irrigation projects.

Sampling Procedures and Sample Size

Multi-stage random sampling procedure was used to select the respondents for the study. The first stage was random selection of one Local Government Area (LGA) from each of the agricultural zones (Lapai LGA from zone I out of 8 LGAs, Bosso LGA from zone II out of 9 LGAs and Wushishi LGA from zone III out of 8 LGAs). In the second stage, three villages were randomly selected from each of the LGA selected to give a total of nine villages. The third stage involved proportionate sampling of the small-scale crop farmers using Yamane's formula from each of the selected village's based on the sample frame obtained from Niger State Agricultural Mechanization and Development Authority (NAMDA) to get a total of 241



small-scale crop farmers that were used as respondents for the study. Primary data was collected with the aid of structured questionnaire complimented with an interview schedule. The data collected were subjected to descriptive statistics (frequency count, percentages and mean) and inferential statistics (Tobit regression) as well as Livelihood Index. Attitudinal measuring scale such as 5-point Likert rating scale was used to measure the severity of the constraints.

Model Specification

Livelihood index model

Livelihood indicators among the respondents as used in this study include household assets, livestock assets and production assets.

- i. Household assets: This include ownership of land properties, furniture, houses, cars, bicycle, motorcycle, radio and television among others measured as dummy variable (i.e 1 if owned, 0 if otherwise).
- ii. Livestock assets: This include ownership of cow, sheep, goat, dogs, chicken, horses and donkeys among others measured as dummy variable (i.e 1 if owned, 0 if otherwise).
- iii. Production assets: This include ownership hoes, cutlasses, machet, plough, ridger, water pump, ox-cart, milling and grinding machines among others measured as dummy variable (i.e 1 if owned, 0 if otherwise).

Livelihood status of the respondents was measured using livelihood index as used by Olughu (2019). The index is expressed as in equation (1);

$$LI = \frac{\text{Number of off-farm livelihood indicators owned by the respondents}}{\text{Total number of off-farm livelihood indicators}} \quad (1)$$

Where;

LI = Livelihood Index

Meanwhile, the LI was categorized further by the researcher as follows:

- ≤ 0.26 = low livelihood status
- 0.26 – 0.50 = moderate livelihood status
- 0.51 – 0.75 = high livelihood status
- ≥ 0.75 = very high livelihood status

Tobit regression model

Tobit Regression model was used to determine factors influencing livelihood status of the small-scale crop farmers in the study area which is the objective (v). The Tobit model as proposed by Greene (2003) and adopted by Isaac (2009) could be explicitly expressed as in equation (2):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{11} X_{11} + U \quad (2)$$

Where;

Y = Livelihood status of the small-scale crop farmers measured using LI

X₁ = Age of farmers (years).

X₂ = Sex (1 if male, 0 if otherwise)

X₃ = Education (years)



- X_4 = Household size (number)
 X_5 = Farm size (ha)
 X_6 = Years of farming (years)
 X_7 = Market accessibility (distance in kilometres)
 X_8 = Credit received (naira)
 X_9 = Membership in farmer's organization (number)
 X_{10} = Off-farm income (Naira)
 X_{11} = Distance to farm (km)
 U = Error term
 β_0 = Constant term
 β_1 – β_{11} = Regression coefficient

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Some of the socio-economic characteristics of the respondents analyzed were age, sex, marital status, household size, educational status, farming experience and farm size. As revealed in Table 1, most (66.0%) of the respondents were within the age group of 26 – 45 years with mean age of 38 years. This implies that the respondents were in their active and productive age where they could diversify into off-farm income generating activities to improve their livelihood. This finding is in agreement with that of Odoh and Nwibo (2017) who reported that the majority of household in South-Eastern Nigeria that diversified into off-farm income are younger and active in their respective occupations. Most (68.9%) of the respondents were males, while 31.1% were females. This implies that male are the dominant gender in off-farm activities in the study area. This could be due to the fact that they are major decision makers regarding off-farm income generating activities. This agrees with the findings of Okere and Shittu (2012) who revealed that the males dominated the work force in Nigeria's agricultural communities. More so, majority (83.4%) of the respondents were married implying a sign of responsibility. Marriage demands high responsibilities on the family thereby forcing household head to diversify into off-farm income generation for improved livelihood. This finding agrees with Adeoye *et al.* (2019) who reported that majority of rural households in Nigeria are married as a form responsibility.

Majority (80.9%) of the respondents had household size of less than 11 people with a mean household size of 7 people implying a relatively large household size which is very important in agricultural production. This result agrees with the findings of Okere and Shittu (2012) who posited that larger households are likely to diversify into off-farm income activities than smaller households. In terms of educational status; Table 4.1 revealed that 61.0% of the respondents acquired formal education with a mean of 9 years of formal schooling, while 39.0% had non-formal education. This implies that most of the respondents in the study area acquired formal education which could influence their decision to utilize different off-farm income generation activities to improve their livelihood. This agrees with Etuk *et al.* (2018) who reported that level of education influences the kind of opportunities available for improve livelihood status, food security and poverty alleviation. More than half (54.8%) of the respondents had farming experience between 6 – 20 years with a mean of 12.5 years of farming experience. This implies that the small-scale crop farmers in the study area are relatively experienced and exposed to various forms of off-farm activities that could enhance income and livelihood. This finding is in consonance with that of Babatunde and Qaim (2009)

who reported that highly experience farmers diversified into non-farm income activities in Nigeria. Also More than half (66.4%) of the respondents had farm size between 1.1 – 4.0 hectares with a mean of 2.1 hectares. This implies that the respondents are actually producing crops on a small-scale. This finding agrees with that of Adeoye *et al.* (2019) who reported that larger proportion of households in Nigeria operate on small scale.

Table 1: Distribution of respondents according to socioeconomic characteristics (n=241)

Variables	Frequency	Percentage	Mean
Age			
< 26	30	12.4	37.6
26 – 35	88	36.5	
36 – 45	71	29.5	
46 – 55	38	15.8	
> 55	14	5.8	
Sex			
Male	166	68.9	
Female	75	31.1	
Marital status			
Married	201	83.4	
Single	25	10.4	
Widowed	11	4.6	
Divorced	4	1.7	
Household size			
< 6	98	40.7	7.0
6 – 10	97	40.2	
11 – 15	32	13.3	
> 15	14	5.8	
Educational status			
Adult	27	11.2	8.9
Primary	53	22.0	
Secondary	59	24.5	
Tertiary	35	14.5	
None	67	27.8	
Farming experience			
< 6	56	23.2	12.5
6 – 10	50	20.7	
11 – 15	40	16.6	
16 – 20	42	17.4	
> 20	53	22.0	
Farm size			
< 1.1	66	27.4	2.1
1.1 - 2.0	72	29.9	
2.1 - 3.0	65	27.0	
3.1 - 4.0	23	9.5	
> 4.0	15	6.2	

Source: Field Survey, 2021

Off-farm income activities of the respondents

Table 2 showed the distribution of respondents based on their off-farm income activities in the study area. The result revealed that marketing (51.9%) ranked 1st among the off-farm

activities engaged by respondents, implying that the respondents engaged in marketing as a mean of livelihood. Petty trading (23.2%) ranked 2nd which could be due to the fact that trading is the most common business among households in the rural area. Commission agent (18.7%), civil servant (18.3%) and tailoring (14.9%) ranked 3rd, 4th and 5th, respectively. This implies that most of the small-scale crop farmers engaged in various off-farm activities to help support farm income in taking care of household expenditure. This finding agrees with Batool *et al.* (2017) who reported that most farm families diversify their income sources mainly into off-farm and self-employment such as engaging in agricultural wage-labour, small manufacturing factories, construction and transportation as a means of shielding themselves from risk and uncertainties of agricultural production.

Table 2: Distribution of respondent based on off-farm income activities (n=241)

Variables	Frequency	Percentage	Rank
Marketing	125	51.9	1 st
Petty trading	56	23.2	2 nd
Tailoring	36	14.9	5 th
Plumbing	2	0.8	17 th
Motorcycle riding	30	12.4	6 th
Car driving	5	2.1	14 th
Carpentry	23	9.5	8 th
Civil servant	44	18.3	4 th
Bricklaying	13	5.4	11 th
Weaving	17	7.1	9 th
Knitting	27	11.2	7 th
Sales of herbs	7	2.9	10 th
Commission agent	45	18.7	3 rd
Mechanic/electrician	6	2.5	12 th
Repairs	5	2.1	14 th
Black smiting	4	1.7	16 th
Handcraft	6	2.5	12 th

Source: Field Survey, 2021

Livelihood status of the respondents

As revealed in Table 3, majority (75.1%) of the respondents had low livelihood status, while 20.3% had moderate livelihood status and only few (4.6%) had high livelihood status. This implies that the small-scale crop farmers had low livelihood status which could influences off-farm income activities in the study area. This finding contradicts that of Ifeanyi-obi and Mathews-Njoku (2014) who reported that majorities of farmers in South East of Nigeria had high livelihood, Afeez *et al.* (2016) reported that most of the rural women farmers in Oyo State, Nigeria, had moderate livelihood.

Table 3: Distribution of the respondents based on their livelihood status (n=241)

Livelihood status	Frequency	Percentages
Very High	0	0.0
High	11	4.6
Moderate	49	20.3
Low	181	75.1
Total	241	100.0

Mean Livelihood Index	0.2014
Minimum Livelihood Index	0.0588
Maximum Livelihood Index	0.5294

Source: Field Survey, 2021

Effect of off-farm income activities on the livelihood of respondents

Table 4 showed the Tobit regression estimates on the effect of off-farm income activities on the livelihood of small-scale farmers in the study area. The result indicated that the z-value of age (-1.85, $p < 0.1$) was negatively significant implying that as the small-scale farmers advances in age, their interest to join many enterprises for better livelihood reduces. This could be attributed to the fact that the mental and physical energy required for engaging in off-farm income activities for improved livelihood status declines with age. This finding agrees with that of Odoh and Nwido (2017) who reported that age increase affect livelihood status of farmers in South Eastern States of Nigeria.

The z-value of sex (1.76, $p < 0.1$) was positively significant indicating that men are likely to engage more in off-farm activities to better their livelihood than women. The z-value of household size (2.97, $p < 0.01$) was positively significant implying that increase in household members stimulate engagement in off-farm activities in order to cater for the needs of the households. The z-value of education (4.16, $p < 0.01$) was positively significant signifying that an increase in literacy level among small-scale farmers will enhance their involvement in off-farm activities for improved livelihood. This is consonant with Shehu and Abubakar (2015) who reported that educated and younger ones were more likely to diversify into off-farm economic activities.

The z-value of farming experience (2.25, $p < 0.05$) was positively significant implying that many years of experience in farming could lead to improve livelihood status. This finding is in agreement with that of Babatunde and Martin (2019) who reported that many years in non-farm activities eventually translate to improve livelihood among respondents in their study area. The z-value of farm size (2.03, $p < 0.05$) was positively significant signifying that access to more farmland enhances increased output and improve livelihood. This agrees with Aniedu (2016) who established that an increase in farm size led to an increase in crop output in Abia State, Nigeria.

The z-value of access to credit (2.16, $p < 0.05$) was positively significant implying access to credit from either formal or informal institutions is expected to better small-scale crop farmers' livelihood status. This finding is in agreement with that of Ayoade *et al.* (2012) who reported that access to credit improved the livelihood status of cassava farmers in Oyo State, Nigeria. The z-value of extension contact (2.24, $p < 0.05$) was positively significant implying that more extension contact could enhance farmers' livelihood. This is because extension is always associated dissemination improved knowledge, skills and innovation that is expected to facilitate off-farm income diversification for improved livelihood. This finding concurs with that of Chekene (2015) also maintained that access to extension by the farmers exposed them to new technologies.

More so, the z-value of cooperative (3.84, $p < 0.01$) was positively significant implying that membership of cooperative and association could enhance small-scale farmers'

livelihood. This finding agrees with that of Adeoye *et al.* (2019) who reported that membership of cooperative increases rural household diversification in Nigeria. The z-value of off-farm income (10.40, $p < 0.01$) was positively significant signifying that increase participation in off-farm income generating activities will increase the livelihood status of the small-scale farmers. This finding tends to conform with the a priori expectation that farm households who engaged in off-farm income activities will have a better livelihood status than those who did not. Thus, engagement in off-farm income activities had significant effect on livelihood status of small-scale farmers in the study area. This finding is in agreement with that of Odoh and Nwibo (2017) who reported that high income base tends to improve the livelihood status of rural households in Nigeria.

Table 4: Regression estimates on effect of off-farm income activities on livelihood status

Variables	Coefficient	Z-value
Age	-0.0022298	-1.85*
Sex	0.0256825	1.76*
Household size	0.0103716	2.97**
Education	0.0035909	4.16***
Experience	0.0036185	2.25**
Farm size	0.0150177	2.03**
Access to inputs	-0.0164611	-0.49
Access to credit	0.0262668	2.16**
Extension	0.0133492	2.24**
Cooperative	0.0056434	3.84***
Off-farm income	5.25e-07	10.40***
Constant	0.2637916	6.34***
Sigma	0.0859	20.45***
Chi-squared	151.98***	
Pseudo R2	0.7034	
Log likelihood	201.9364	

Source: Field Survey, 2021

***implies significant at $p < 0.01$, **implies significant at $p < 0.05$, *implies significant at $p < 0.1$

Constraints mitigating against off-farm income activities by the respondents

Table 5 revealed that inadequate capital ($\bar{X} = 4.46$) rank 1st among the severe constraint militating against the small-scale crop farmers to diversify into off-farm income activities. This was followed by climatic and risk uncertainty ($\bar{X} = 3.39$) ranked 2nd, poor marketing facilities in rural areas ($\bar{X} = 3.80$) ranked 3rd and poor infrastructure ($\bar{X} = 3.76$) ranked 4th. This finding agrees with that of Khatun and Roy (2012) who reported that lack of capital, poor marketing and lack of infrastructure were the major problem to off-farm activities in Nigeria. Similar studies by Ewebiyi and Meliudu (2013) have identified lack of infrastructural facilities inadequate livelihood asset and poor transportation system as the constraints to livelihood diversification.

However, unavailability of government support projects ($\bar{X} = 3.70$), poor access to credit ($\bar{X} = 3.67$) and lack of appropriate technology ($\bar{X} = 3.63$) ranked 5th, 6th and 7th, respectively among the severe constraints. This finding corroborates Iyanda *et al.* (2014) who reported that lack of credit negatively affects diversifying into off-farm income activities in Yewa North of Ogun State. Other results showed that small market size in the rural area ($\bar{X} = 3.50$),

inadequate capacity building and training ($\bar{X} = 3.31$) poor exposure to various opportunities ($\bar{X} = 3.31$), lack of entrepreneurship skills ($\bar{X} = 3.29$) ranked 8th, 9th and 11th respectively.

Table 5: Respondents’ constraints mitigating against off-farm activities (n=241)

Variables	Sum	Mean	Rank	Remark
Inadequate capital	1075	4.46	1 st	Severe
Climatic risk and uncertainty	957	3.97	2 nd	Severe
Poor marketing facilities in the rural areas	916	3.80	3 rd	Severe
Poor infrastructure	906	3.76	4 th	Severe
Unavailability of government support project	892	3.70	5 th	Severe
Poor credit to access	884	3.67	6 th	Severe
Lack of appropriate technology	876	3.63	7 th	Severe
Small market size in the rural area	844	3.50	8 th	Severe
Inadequate capacity building and training	798	3.31	9 th	Severe
Poor exposure to various opportunities	798	3.31	9 th	Severe
Lack of entrepreneurial skills	793	3.29	11 th	Severe
Inadequate time to pursue diversification strategies	703	2.92	12 th	Not Severe
Problem of illiteracy	692	2.87	13 th	Not Severe

Source: Field Survey, 2021

CONCLUSION AND RECOMMENDATIONS

Based on the empirical evidence from the findings of this study, it could be concluded that majority of the respondents were in their active and most productive age, married and relatively experienced in farming activities. The small-scale farmers engaged majorly in marketing, petty trading and commission agents as off-farm income activities for improved livelihoods. Most of the respondents were found to have low livelihood status in the study area, thus off-farm income activities had significant positive effect on livelihood status of the small-scale crop farmers. However, inadequate capital, climatic risk and uncertainties, and poor marketing facilities were the major constraints mitigating against off-farm income activities in the study area. It was therefore recommended that credit facilities should be provided for small-scale farmer by financial institutions in order to increase their participation in off-farm income activities. Also, Government and Non-Government Organizations should help to provide rural infrastructure such as good road, ultra-modern market and storage facilities for small-scale farmers particularly in the study area.

REFERENCES

- Adeoye, I. D., Seini, W., Sarpong, D. B. and Amegash, D. (2019). Off-farm income diversification among rural farm households in Nigeria, *Agricultura Tropica Et Subtropica*, 5 (4), 149–156.
- Aniedu, O. C. (2016). Socio-economic factors influencing adoption of improved Yam production technologies in Abia state, Nigeria. *Advances in Applied Science Research*, 27 (4), 66 – 70.
- Ayoade, A. R. and Akintonde, J. O. (2012). Constraints to adoption of agricultural innovations among women farmers in Isokan Local Government Area, Osun State. *International Journal of Humanities and Social Science*, 2 (8), 57 – 61.



- Babatunde, R. O., Olorunsanya, E. O. and Adejola, A. D. (2010). Assessment of rural household poverty: Evidence from South-Western Nigeria. *American-Eurasian Journal of Agriculture and Environmental Science*, 3 (6), 900 – 905.
- Babatunde, R. O. and Qaim, M. (2009). Patterns of diversification in rural Nigeria: Determinants and impacts. *Quarterly Journal of International Agriculture*, 48, 305 – 320
- Batool, S., Babar, A., Nasir, F. and Iqbal, Z. S. (2017). Income Diversification of Rural Households in Pakistan. *International Journal of Economic and Management Science*, 6 (6), 466 – 471.
- Chekene, M. B. (2015). Factors affecting the adoption of improved rice varieties in Borno State, Nigeria. *Journal of Agricultural Extension*, 19 (2), 21-33.
- Davis, B., Winters, P. and Carletto, G. (2010). A cross-country comparison of rural income generating activities. *Journal of World Development*, 38 (1), 48 – 63.
- Djurfeldt, A. and Djurfeldt, G. (2013). Structural Transformation and African Smallholders: Drivers of Mobility within and between the Farm and Non-farm Sectors for Eight Countries. *Oxford Development Studies*, 41 (3), 281 – 306.
- Etuk, E. A., Udoe, P.O. and Okon, I. I. (2018). Determinants of livelihood diversification among Farm Households in Akamkpa Local Government Area, Cross River State, Nigeria, *Agrosearch*, 18 (2), 101 – 112.
- Ewebiyi, I. O. and Meliudu, N. T. (2013). Constraints to livelihood diversification among rural households in South Western Nigeria. *Journal of Agricultural Extension*, 9 (1), 13 – 22.
- Greene, W. (2003). *Econometric Analysis*. New Jersey: Prentice Hall.
- Ifeanyi-obi, C. C. and Mathews-Njoku, E. C. (2014). Socio-economic factors affecting choice of livelihood activities among rural dwellers in Southeast Nigeria, *Journal of agriculture and veterinary science*, 1, 52 – 56.
- Iyanda, J. O., Afolami, C. A., Obayelu, A. E. & Ladebo, O. J. (2014). Social Capital and Access to Credit among Cassava Farming Households in Ogun State, Nigeria. *Journal of Agriculture and Environmental Sciences*, 3 (2), 175 – 196.
- Khatun, D. and Roy, B. C. (2012). Rural livelihood diversification in West Bengal: Determinants and constraints. *Agricultural Economics Research Review*, 25 (1), 115 – 124.
- Loison, S. A. (2015). Rural Livelihood Diversification in Sub-Saharan Africa: A Literature Review. *The Journal of Development Studies*, 51 (9), 1125 – 1138.
- Loison, S. A. and Bignebat, C. (2017). Patterns and Determinants of Household Income Diversification in Rural Senegal and Kenya. *Journal of Poverty Alleviation and International Development*, 93 – 126.
- Mtocha, I. M. (2015). Non-farm Income: The Struggles of the Rural Poor in Malawi. Unpublished Master Thesis submitted to the Department of Agrarian Food and Environmental Studies, University of Hague, Netherlands, pp 1 – 61.
- Myyra, S., Pietola, K. and Jauhiainen, L. (2011). Systemic yield risk and special index correlations: Relevant market area for index-based contracts. *Food Economics*, 8 (2), 114 – 125.
- National Population Commission (NPC) (2006). The Population Census Report. Lagos State, Federal Republic of Nigeria.



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- Niger State Agricultural Mechanization and Development Authority (NAMDA) (2018). National Farmers Data Base, Niger State, Nigeria.
- Okere, C. P. and Shittu, A. M. (2012). Patterns and Determinants of Livelihood Diversification among Farm Households in Odeda Local Government Area, Ogun State, Nigeria. Paper Presented at the Nigerian Association of Agricultural Economist Conference held at Obafemi Awolowo University, Ile-Ife from 13th – 16th September, 2012. Theme: Agriculture in National Transformation Agenda: The Policy Mix
- Odoh, N. E. and Nwibo, S. U (2017). Socio-Economic Determinants of Rural Non-Farm Households Income Diversification in Southeast Nigeria, *International Research Journal of Finance and Economics*, 1 (164), 1 – 13.
- Olughu, K. C. (2019). The Effect of Anchor Borrowers Programme on the Livelihood of Smallholder Rice Farmers in Kaduna State, Nigeria. An MTECH Thesis submitted to the Department of Agricultural Extension and Rural Development, Federal University of Technology, Minna, Niger State.
- Reardon, T. & Vosti, S. A. (2006). Links between rural poverty and environment in developing countries: Asset categories and investment poverty. *World Development*, 23 (9), 1495 – 1506.
- Shehu, A. and Abubakar, N. (2015). Determinants of participation of farm households in non-farm enterprise activities in rural Nigeria. *International Journal of Economics, Commerce and Management*, 3 (6), 57 – 71.
- World Bank (2007). World Development Report. Agriculture for Development United States of America, *Monthly Report*, 2, 7 – 9.