Kasu Journal of Economics and Development Studies (KASUJEDS)
Vol 12, Issue 1, No 1, June 2025. ISSN: 2805-3303 (print)

DETERMINANTS OF THE FACTORS INFLUENCING HOUSEHOLDS' LIVELIHOOD CHOICES IN POST–INSURGENCY: CASE STUDY OF MUBI NORTH, ADAMAWA STATE

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ABSTRACT

Insurgency brutally affects socioeconomic activities, means of sustenance, and productivity. This study identifies the factors that influence households' livelihood choices in post-insurgency in Mubi North, Adamawa State. A stratified random sampling was employed, and 335 structured questionnaires were administered to sample households. Three livelihood categories, such as farming only, non-farming only, and both farming and non-farming, were used in this study, and multinomial logistic regression was employed in identifying factors that influence the livelihood choices of the households. The result reveals that 54% of the respondents adopted non-farming activities as their source of livelihood, 26% derive their livelihood from both farming and non-farming activities, while 20% generate their means of sustenance from farming activities only. Socioeconomic characteristics of the respondents, such as sex, age, marital status, level of education, access to credit, farm size, household size, season, availability of natural resources, and institutional policies, were the major determinants of livelihood choices. However, only four of the socioeconomic characteristics, viz-a-viz level of education, sex, farm size, and institutional policies, significantly influenced the livelihood choices of the respondents in the study area. As the adoption of farming livelihood category was low, this study recommends that local, state government, and other development partners provide adequate farming implements to enhance food security in the study area.

Keywords: Livelihood, Livelihood Choices & Insurgency

JEL Codes: D74, and Q01

1. Introduction

Ever since, livelihood forms the bedrock of human survival, development, and dignity. Globally, access to secure and productive livelihoods is a central pillar of economic growth, social inclusion, and poverty reduction. The concept of livelihood extends beyond income but includes the capabilities, assets, and activities required for a means of living (Chambers & Conway, 1992). According to the United Nations Development Programme (UNDP), enabling sustainable livelihoods is fundamental to achieving multiple Sustainable Development Goals (SDGs), especially in developing countries where large portions of the population depend on agriculture, the informal sector, and self-employment (UNDP, 2017). Livelihood diversification and resilience are recognized as key to reducing vulnerability, enhancing productivity, and ensuring inclusive participation in economies affected by shocks, such as climate change, conflict, and pandemics (Ellis, 2000; Food and Agriculture Organisation [FAO], 2020).

In many low and middle-income countries, particularly across Sub-Saharan Africa, livelihoods are the primary means through which individuals engage in various economic activities. The Nigerian economy is characterized by high reliance on the informal sector, such as agriculture, trade, and artisanal work, which employs over 80% of the labour force and forms the backbone of household income generation (National Bureau of Statistics [NBS], 2020). Despite Nigeria's oil wealth, high unemployment (33%) and underemployment (22.8%) have contributed to widespread poverty and economic vulnerability in the country (World Bank, 2022). Consequently, many households depend on fragile subsistence livelihoods, particularly in rural and northern regions. This fragile reality is further compounded in areas afflicted by armed conflict, particularly in northeastern Nigeria, which has suffered over a decade of insurgency by Boko Haram terrorist groups. The insurgency has resulted in the deaths of over 35,000 people and displaced more than 2.5 million, significantly disrupting agricultural production, market systems, and basic service delivery (United Nations Office for the Coordination of Humanitarian Affairs [UNOCHA], 2022). BBC (2014) reported that in late 2014, Mubi North and South, among other local governments in Adamawa state, had experienced the brunt of the Boko Haram attacks, where the insurgents captured those places, until the Nigerian Army fully recovered them in March 2015. Therefore, farming

communities were forced off their lands, supply chains have collapsed, and critical infrastructures were destroyed or inaccessible due to insecurity (FAO, 2021). These undoubtedly led to a rise in food insecurity, economic dependence, and social dislocation.

The government's constraint to provide timely and comprehensive livelihood interventions has prolonged the vulnerability of affected households. Various humanitarian and development agencies have implemented recovery and rehabilitation programs in the areas affected by Boko Haram insurgency, which include food distribution, shelter, vocational training, cash grants, and other reintegration support. However, the uptake and success of these initiatives have been uneven. Mustapha et al. (2018) observe that livelihood recovery is not merely a function of aid but depends on a complex interplay of socio-economic characteristics, institutional access, and environmental factors. Consequently, it is based on the above background that this examines the determinants of livelihood choices in post-insurgency in Mubi North local government of Adamawa State, to provide a deeper understanding of the factors influencing households' livelihood choices for effective and sustainable livelihood programs for the conflict-affected populations.

2. Literature Review

This section of the paper contains the conceptual review, where key concepts in this study were defined, also relevant empirical and theoretical literature were reviewed.

2.1 Conceptual Review

2.1.1 Livelihood

Ellis (2000) opined that the concept of livelihood aims to bring together important factors that affect the strength or weakness of individual or household survival strategies. These factors majorly comprise assets owned by people; activities that they engage in to generate them adequate living standard and to satisfy some of their goals, reducing risks, as well as factors that facilitate or restrain different individuals from having access to assets and activities. Moreover, a livelihood encompasses assets of natural, human, physical, social, and financial assets, the choices individuals

make regarding their activities, and their ability to participate in them governed by both the rules set by institutions within society (Allison & Ellis, 2001).

2.1.2 Livelihood Choices

Alinovi et al. (2010) defined livelihood choices as the combination of activities that people choose to undertake to achieve their livelihood goals. In other words, livelihood choices are various income sources that an individual or a household chooses to maintain their means of sustenance. The livelihood choice, which means different adoptions of occupation or industry that residents depend on for subsistence, often includes engaging in different activities to obtain livelihood means (Krantz, 2001). Livelihood choices have been classified into four categories: only farm, farm and non-farm, only non-farm, and non-labour (Alemu, 2012).

2.1.3 Boko Haram Insurgency

According to BBC News (2016), the Boko Haram insurgency started in July 2009 when the terrorist group Boko Haram began an armed rebellion against Nigeria's government. Moreover, after spree years of attacks by Boko Haram insurgents, the insurgents became intensely aggressive and began to seize many local governments in north-eastern Nigeria. For over five years, with sustained uprising and violence predominantly in north-eastern Nigeria, large insurgent activities by Boko Haram, characterized by terrorism, assassinations, massacres, kidnapping, enslavement, and other barbaric crimes against humanity, took place between 2009 and 2014.

2.2 Theoretical Reviews

2.2.1 Sustainable Livelihood Approach

This study adapted the sustainable livelihood framework developed by the British Department for International Development (DFID). Carney, (1998) asserted that the fundamental feature of the sustainable framework is an analysis of five different types of assets possessed by individuals to build their livelihoods and these consist of natural, social, human, physical and financial capital. Also, the framework has multidimensional aspects which includes livelihood asset, livelihood

strategy, livelihood outcome, institutional involvement and vulnerability context. The approach is an analytical framework designed for better understanding of institutional interventions by both government or non-governmental agencies in response to vulnerability caused by shocks seasonality, violent conflict, natural and non-natural disasters, and the available livelihood which could be used to improve the victims' livelihood in order to achieve livelihood outcomes of improved well-being, food security and increased income in areas affected by shocks, disasters and violent conflicts (Farrington et al., 1999).

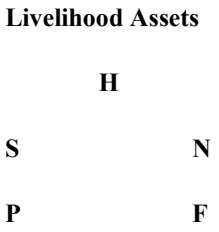


Figure 1: Sustainable Livelihood Framework
Source: Adapted from DFID (2001) and Carney et.al. (1998)
Note: H = Human capital, N = Natural capital, S = Social capital, F = Financial capital and P = Physical capital

2.3 Empirical Review

The aftermath of insurgencies often leaves communities grappling with socio-economic challenges that profoundly influence household livelihood decisions necessitating households to adapt to new economic realities. Several studies show that factors such as access to resources, socio-demographic attributes, and policy interventions play a significant role in shaping livelihood choices. Diversification also plays a key strategy for mitigating risks and ensuring resilience in post-insurgency environments. Many households engage in multiple income-generating activities, such as micro-enterprises and casual labour, to spread risk and sustain livelihoods (Mustapha et al., 2018). According to Gabriel, (2023) socio-demographic attributes such as household size, education level, and gender composition significantly influence livelihood strategies, where larger

households often diversify their income sources to manage economic instability in post-conflict areas like Borno state. Also, the level of education within households determines the likelihood of transitioning to non-agricultural livelihoods, particularly in urbanized settings where formal employment opportunities may be more accessible. On the other hand, access to resources such as land, credit, and infrastructure further determines livelihood choices in post-insurgency. This is because returnees in the Kondunga Local Government area faced limited access to arable land, compelling them to adopt non-farming livelihoods such as trading or casual labour (Gabriel, 2023).

In a study by Anadozie (2021), it was found that the adoption of technology, particularly mobile phones, has emerged as a critical enabler of livelihood recovery in the aftermath of insurgency, as mobile phones facilitate access to market information, improve financial transactions, and enhance communication for agricultural households in northeast Nigeria. Another study conducted by Ali and Ali (2024) examines the socio-economic aftermath of the Boko Haram insurgency on the livelihoods of internally displaced persons (IDPs) in North East Nigeria. The study utilized a descriptive survey design, with a sample of 386 IDPs across Borno, Adamawa, and Yobe states using simple random techniques. Data were analyzed using descriptive statistics, t-tests, and ANOVA to assess the impact of post-insurgency activities. Findings reveal that agriculture and livestock farming were identified as the most favorable income-generating activities, while access to training was limited. Also, significant gender and age differences were observed in the perception of livelihood impact.

Jahknwa et al. (2024) conducted a quasi-experimental study to assess the impact of humanitarian assistance on post-conflict livelihood recovery in Adamawa State, using households as the respondents. The study compared beneficiaries of humanitarian interventions with non-beneficiaries using Propensity Score Matching (PSM) and regression analysis. Findings show a positive influence of targeted interventions, particularly in improving access to livelihood resources, significantly improving recovery outcomes in conflict-affected areas, enhancing resilience, and facilitating smoother economic reintegration for affected households.

3. Methodology

This section presents various methods used in the study and it comprises the study area, population of the study, and sources of data, sample size and sampling techniques, methods of data collection, and methods for data analysis.

3.1 Study Area

The scope of this study will cover households in the Mubi North local government area of Adamawa state. According to the Adamawa State Ministry of Land and Survey ([ASMLS], 1999), Mubi North is located at latitude 10º16'N and longitude 13º16'E. The LGA was created in 1991 when Taraba State was created out of Gongola State. It borders with Hong local government to the west, Baza–Michika LGA to the North, and the Republic of Cameroon to the east. There are many ethnic groups, but the Fali, Fulani, and Gude are the major ethnic groups.

3.2 Population of the Study

The population of this study comprises the number of households in Mubi North Local Government has a total population of ten thousand four hundred and seventy-eight (10,478), with two thousand and seventy-four (2,074) total numbers of households from eleven wards, namely Bahuli, Betso, Digil, Kolere, Lokuwa, Mayo Bani, Mijilu, Muchala, Sabon Layi, Vimtim, and Yelwa. Bahuli ward has ninety (90) households, Betso ward has one hundred and three (103) households, Digil has sixty-five (65) households, Kolere has three hundred and sixty-eight (368) households, Lokuwa has three hundred and one (301) households, Mayo Bani has ninety-seven (97) households, Mijilu has seventy-nine (79) households, Muchala has eighty-nine (89) households, Sabon Layin has two hundred and ninety-seven (297), Vimtim has one hundred and sixty-six (166) and Yelwa ward has four hundred and nineteen (419) households (IOM, 2021).

3.3 Sources of Data

For this study, data were collected from both secondary and primary sources. Secondary data were sourced from the Organization for Migration (IOM), while primary data were collected directly from the sampled households in the study area.

3.4 Sample Size and Sampling Techniques

Based on the total population of this study, the sample size was obtained using Taro Yamane's formula (1967), and the sample size was 335, as it was computed under this section. Multi-stage and stratified random sampling technique was used as a tool for selecting the sample households, whereby each member of the population (total number of households) was randomly selected, that is, each household had an equal chance of being selected after the entire population was stratified into wards. Our choice for the stratified random sampling technique over simple random, systematic, and cluster sampling methods is to avoid sample bias and have more diverse data for the entire population. In addition, proportionate sampling techniques were used to determine the number of samples to be drawn from each ward.

Computation of sample size from the population of this study using Yamane's (1967) formula:

$n = N/1+N(e)^2$

Where:

n = sample size
N = finite Population
1= unity or constant
e = level of significance (5%)

$n = 2074/1 + 2074(0.05)^2$
$n = 2074/1+ 2074(0.0025)$
$n =2074/1+5.19$
$n = 2074/6.19$
$n = 335$

To obtain the proportionate sample of each ward/stratum, the formula below was employed:

$$n_i = \frac{N_i}{N} \, x \, n$$

Where:

n_i = sample size of ith ward.
N = Total population of all wards.
N_i= Population of the ith ward.
n = sample size.

Table 3.1: Sampling Frame

Ward	Bahuli	Betso	Digil	Kolere	Lokuwa	Mayo Bani	Mijilu	Muchala	Sabon Layi	Vimtim	Yelwa	**Total**
Pop.	90	103	65	368	301	97	79	89	297	166	419	**2,074**
Sample	15	17	10	59	49	16	12	14	48	27	68	**335**

Source: Authors' computation, 2023

3.5 Methods for Data Collection and Analysis

A well-designed questionnaire with a different number of questions was formed in line with the research's questions which helped to achieve the study's goals. Primary data were collected from the household heads through filling out the online questionnaire KoboCollect. The objective of identifying the determinants of households' livelihood choices was achieved using the Multinomial logistic regression model.

3.6 Model Specification

3.6.1 Multinomial Logistic Model

To find out what factors influenced the households' choices of livelihood in the research area, a Multinomial Logistic Model (MNL) was utilised. When the endogenous variable is nominal and categorical, with more than two categories, multinomial logistic regression models are usually used. According to Greene (2003), the model for choosing a livelihood creates a relationship between the probability of choosing a specific choice and a group of explanatory variables called Xi. It is noteworthy that these explanatory factors hold for every option made for every observation. The model is thus specified as:

$$\Pr(Yi = j) = \frac{exp^{(Xi\beta j)}}{\sum_{j=0}^{j} exp^{(Xi\beta j)}} = j = 0, \ldots 2 \quad - \quad - \quad - \quad - \quad (3.1)$$

Where:

βj= vector of parameters of each independent variable, X_i

$(Y_i = j)$ = Endogenous variable that is, jth chosen strategy choices

X_i= independent variables

$i = ith$ independent variable

For this study, the strategy choices or response probabilities will be three, based on the perceived number of possible income sources that the respondents might have:

Y_i = The three possible unordered numbers of income sources adopted by the respondents:

Y_0 = Two selected livelihood choices (both farming and non-farming);

Y_1 = One adopted livelihood choice (only farming [crop production and rearing of animals]);

Y_2 = One adopted livelihood choice (non-farming)

Equation one (1) will thus be standardized below to remove indeterminacy in the model by given that $\beta_0 = 0$ and the likelihoods can be estimated as:

$$Prob\left(Y_i = \frac{j}{xi}\right) = \frac{e^{\beta jXi}}{1+\sum_{k=1}^{j} e^{\beta kXi}}, j = 0, 1 \ldots j, \beta_0 = 0 \quad - \quad - \quad (3.2)$$

The estimate of equation (2) will yield J log-odds ratios as specified below:

$$In\left(\frac{pij}{pik}\right) = xi\,(\beta_0 - \beta_k) = x_i\beta_j, if\ k = 0 \quad - \quad - \quad - \quad (3.3)$$

Thus, the endogenous variable is the log of one alternative relative to the base alternative.

The explanatory variables are the socioeconomic traits of the household heads, such as age (in years), gender, marital status, size of the household, level of education, location in a town or village, size of the farm, and total monthly income, among others.

4. Results and Discussions

In this section, estimated results and their discussions are presented. The first part presents descriptive statistics of the socioeconomic characteristics of the households, the second and third parts reveal the cross-tabulation outcome and the result of Multinomial logistic regression model.

4.1 Socioeconomic Characteristics of the Households

Table 4.1below shows the socioeconomic characteristics of the households in the study area.

Variable	Frequency	Percentages (%)	Cumulative Frequency(%)
Age (in years)			
Below 25	58	18	18
25 – 30	72	21	39
31 – 35	144	43	57
Above 35	61	18	100
Gender			
Male	221	66	66
Female	114	34	100
Marital Status			
Married	218	65	65
Single	99	30	95
Widow	9	3	98
Divorcee	8	2	100
Educational Qualification			
Tertiary	119	36	36

Secondary	118	35	71
Arabic/Qur'anic	49	14	85
Primary	33	10	95
No formal education	16	5	100
Livelihood Activities			
Non-farming only	181	54	54
Farming and non-farming	86	26	80
Farming only	68	20	100

Table 4.1: Socioeconomic Characteristics of Household Heads in the Study Area

Source: Authors' Computation from Survey Data, 2023

Table 4.1 shows that the majority (43%) of the household heads were between 30 to 35 years of age while 18% were below 25 years. This implies that the majority of the respondents are young and they are in their productive age, and they can engage in livelihood activities that provide the most necessities to maintain a healthy life. However, the gender distribution of the respondents shows that 66% were male, while 34% of the respondents were female. It is observed that female-headed households are more vulnerable than male-headed households as they were harder hit by the insecurity, and thus, they spend more of their income on food than male-headed households. On the other hand, the marital status of the respondents shows that 65% are married and 30% are single. Contrarily, the result showed that 36% of the household heads had tertiary education, 35% had secondary education, 14% had primary education, 5% had Arabic/Qur'anic education, while 4% had informal education, respectively. It is generally believed that the educational level of the household plays an important role in determining food security and/or the chance of being poor or not. Conversely, majority of the household heads 54% engaged in non-farming livelihood activities and these include; trading/business, tailoring, carpentering, civil service, service rendering etc. 26% of the head of the household worked both on and off the farm, while 20% of the respondents engaged in only farming activities and these include; crop production and rearing of animals.

4.2 Factors that Influence Households' Livelihood Choices

4.2.1 Cross-Tabulation Result

To ascertain the determinants of livelihood choices (only farming, only non-farming and both farming and non-farming) in the study area, socioeconomic characteristics (sex, age, marital status, household size etc.,) of the households were cross-tabulated with livelihood choices and hypotheses were tested to understand the relationship the demographic features of the households and their livelihood choices.

Table 4.2: Cross-Tabulation Result

Source: Authors' Computation from Survey Data, 2023
Noted: *, and ** above denotes significance levels less than 1%, and 5% respectively for Chi-square and Likelihood Ratio

Variables	Livelihood Choices	Variables Counts						Hypothesis Test
		Pri.	**Sec.**	**Ter.**	**Quran**	**Infor.**	**Total**	
Education	Farming	8	22	26	3	9	68(20.3%)	Chi-square=28.359a*
	Non-farm	17	70	70	36	5	181(54.0%)	
	Both farm/Non	8	26	40	10	2	86(25.7%)	Likelihood Ratio=26.951*
Total		**33(10%)**	**118(35%)**	**136(35%)**	**49(15%)**	**16(5%)**	**335(100%)**	
		<25	**25-30**	**31-35**	**>36**		**Total**	Chi-square=21.292a*
Age	Farming	15	21	8	24		68(20.3%)	
	Non-farm	32	38	43	68		181(54.0%)	
	Both	11	13	10	52		86(25.7%)	Likelihood Ratio=20.859*
Total		**58 (17%)**	**72(22%)**	**61(18%)**	**144(43%)**		**335(100%)**	
		Married	**Single**	**Divorce.**	**Widow**		**Total**	
Marital Status	Farming	43	22	2	1		68(20.3%)	Chi-square=13.832a**
	Non-farm	107	61	5	8		181(54.0%)	
	Both farm/Non	68	16	1	0		86(25.7%)	Likelihood Ratio=16.283*
Total		**218(65%)**	**99(30%)**	**8(2.3%)**	**9(2.7%)**		**335(100%)**	
		Male		**Female**			**Total**	
Sex	Farming	50		18			68	Chi-square=13.030a*
	Non-farm	104		77			181	
	Both farm/Non	67		19			86	Likelihood Ratio=13.322*
Total		**221(66%)**		**114(34%)**			**335(100%)**	
		No		**Yes**				
Inst. Pol.	Farming	55		13			68	Chi-square=7.435a**
	Non-farm	168		13			181	
	Both farm/Non	76		10			86	Likelihood Ratio=6.891**
Total		**299(89%)**		**36(11%)**			**335(100%)**	
		No		**Yes**			**Total**	
Living in Town/Vil.	Farming	13		55			68	Chi-square=1.898a
	Non-farm	38		143			181	
	Both farm/Non	12		74			86	Likelihood Ratio=1.984
Total		**63(19%)**		**272(81%)**			**335(100%)**	
		No		**Yes**			**Total**	
Credit Access	Farming	64		4			68	Chi-square=7.15a**
	Non-farm	156		25			181	
	Both farm/Non	68		18			86	Likelihood Ratio=7.664**
Total		**288(86%)**		**47(14%)**			**335(100%)**	

The table 4.2 result above reveals the cross-tabulation for various livelihood choices with some of the socioeconomic characteristics where null hypothesis of no significant difference in the choices made by the household was tested. In addition, different factors influence the households' choices

thus the null hypothesis were either accepted or rejected base on the values of chi-square and likelihood ratio at various levels of significant.

Table 4.3: The Multinomial Logistic Model Result

Variables	Farming only			Non-farming only		
	Coef.	P-Value	Exp(B)	Coef.	P-Value	Exp(B)
INTERCEPT	-3.093	.260		12.872	.999	
EDULEV	1.152	.043**	3.163	.572	1.000	1.772
AGE	-.646	.147	.524	-2.086	.999	.124
MARSTAT	.112	.887	1.118	1.139	1.000	3.125
SEX	.995	.055***	7.350	1.866	.999	6.465
INSTPOL	-.065	.969	.937	6.628	.000*	756.172
TOW/VIL	-2.800	.037**	.061	-.474	1.000	.623
CREDACC	-.498	.766	.608	1.515	1.000	4.550
HHSIZE	-.134	.200	.874	.018	1.000	1.018
FARMSIZE	.012	.026**	1.024	-.006	.982	.994

Source: Authors' Computation from Survey Data, 2023

Chi-square = 628 (0.0000*), Log likelihood = 43 (0.0000*), Pseudo R-square = 0.85 to 0.98.

Note: The reference category is ***Both farming and non-farming***, and *,**,*** above denote significance levels less than 1%, 5% and 10% respectively.

4.2.2.1 Educational Level

The EDULEV variable represents the educational level of the respondents and reveals the relationship between educational levels and the outcome categories. The EDULEV in cross-tabs 4.2 variable suggests that having higher (tertiary) educational levels is associated with a greater chance of being in the farming only category. The coefficient of EDULEV is significantly positive at p<5% (0.043). As the number of respondents with higher education levels increases, it will increase the likelihood of choosing only farming rather than the reference category of both farming and non-farming by 3.2%. On the other hand, based on Table 4.2, households with secondary educational levels have a greater chance of choosing only non-farming activities. The coefficient of the educational level variable that shows the relationship between educational level and non-farming livelihood activities compared to the reference category was positive but statistically insignificant. This implies that, as the number of respondents with a secondary educational level increase, it will increase the chance of choosing only non-farming rather than both farming and non-farming by 1.8%.

4.2.2.2 Age

The age bracket variable shows that the relationship between the likelihood of choosing only farming, as compared to the reference category of both farming and non-farming activities, is negative and statistically insignificant. Table 4.2 cross-tabs for the age bracket variable suggest that being older (above 36 years) have a higher likelihood of engaging in only farming activities. The coefficient of the age variable is negative and statistically insignificant, this means that as the number of 36 years and above age brackets increase, the likelihood of choosing only farming rather than the reference category (both farming and non-farming) will decrease by 0.5%. On the other hand, the coefficient of the age variable that shows the relationship between age and non-farming livelihood activities as compared to reference category (both farming and non-farming) is negatively insignificant, meaning that, as the number of older respondents with above 36 years increase, it will decrease the chance of choosing only non-farming rather than both farming and non-farming by 0.1%.

4.2.2.3 Marital Status

The MARSTAT represents the marital status of the respondents, which shows the relationship between marital status and the outcome categories. Table 4.2 cross-tabs suggest that being married is associated with a higher likelihood of being in the Farming only category. The coefficient of MARSTAT is positive but insignificant; this means that, as the number of married respondents increases, the chance of choosing only farming rather than the reference category will increase by 1.1%. Also, the variable of marital status that shows the relationship between marital status and non-farming livelihood activities compared to the reference category is positive but statistically insignificant. This implies that, as the number of married respondents increases, it will increase the chance of choosing only non-farming rather than the reference category by 3.1%.

4.2.2.4 Sex

The sex variable, which indicates the likelihood of choosing only farming compared to the reference category of both farming and non-farming livelihood activities, is positive and

statistically significant at p<10% (0.055). Table 4.2 cross-tabs for the gender variable suggest that being female is associated with a higher likelihood of engaging in farming activities. As the number of female respondents increases, the chance of choosing only farming activities rather than both farming and non-farming activities will increase by 7.6%. Again, the parameter of the sex variable that shows the probability of selecting only non-farming livelihood activities as compared to the reference variable of both farming and non-farming is also positive but statistically insignificant. This implies that as the number of female respondents increases, the likelihood of choosing only non-farming activities rather than both farming and non-farming activities will increase by 6.5%.

4.2.2.5 Institutional Policies

The INSTPOL variable represents the governmental/institutional policy, which shows the relationship between the policies of institutions and the outcome categories. The cross-tabs result in table 4.2 reveal that majority of the respondents stated that govt./institutional policy does not influence their livelihood choices, however the hypothesis test for association between govt./institutional policy and livelihood choices have significant relationship with Chi-square = 7.435^{a} and p=0.024, which means the null hypothesis of no significant differences between livelihood choices of the respondents and government/institutional policies was rejected. The coefficient of INSTPOL in Table 4.3 is a negative parameter and statistically insignificant, which suggests that changes in govt./institutional policy will decrease the odds of selecting only farming activities rather than both farming and non-farming activities by 0.06%. On the other hand, the variable of the institutional policies, which shows the relationship between policies of institutions and non-farming livelihood category as compared to both farming and non-farming categories, is positive and statistically significant at p<1% (0.000). This implies that changes in institutional policies (government and non-governmental) will increase the chance of choosing only non-farming rather than both farming and non-farming by 756.2%.

4.2.2.6 Living in Town/Village

TOW/VIL variable represents the relationship between respondents who live in a town or village and the outcome categories (livelihood choices). The crosstabs result in table 4.5.11 reveal that majority of the respondents stated that living in town or village influence their livelihood choices, however, the hypothesis test for association between living in town or village and livelihood choices have insignificant relationship with Chi-square = of 1.898^{a} p-value not significant, meaning that the null hypothesis of no significant differences between livelihood choices of the respondents who live in town or village was therefore, not rejected. The coefficient of the TOW/VIL in Table 4.3 is negative, but statistically significant at $p<5\%$ (0.037). This implies that as the number of respondents who live in a town or village increases, the likelihood of choosing only farming rather than both farming and non-farming will decrease by 2.3 %. Also, the variable of TOW/VIL, which shows the relationship between those who live in town or village and non-farming livelihood activities as compared to both farming and non-farming, is negatively insignificant. This means that, as the number of respondents who live in a town or village increases, it will decrease the chance of choosing only non-farming rather than both farming and non-farming by 2.0%.

4.2.2.7 Access to Credit

The CREDACC variable represents access to credit, and this expresses the relationship between access to credit and the outcome categories. The crosstabs result in table 4.2 reveal that most of the respondents stated that cooperative membership does not influence their livelihood choices, however the hypothesis test for association between cooperative membership and livelihood choices have significant relationship with Chi-square = of 7.15^{a} with p-value less than 10% significant level, means the null hypothesis of no significant differences between livelihood choices of the respondents and access to credit was therefore, rejected. The coefficient of CREDACC in Table 4.3 is negatively insignificant. This suggests that an increase in credit access for the respondents will decrease the odds of selecting only farming activities rather than both farming and non-farming activities by 0.6%. On the other hand, the variable of credit access, which

shows the relationship between households' access to credit and non-farming livelihood category as compared to both farming and non-farming categories, is positive but statistically insignificant. This implies that an increase in credit access for the respondents will increase the chance of choosing only non-farming rather than both farming and non-farming by 4.6%.

4.2.2.8 Household Size

The HHSIZE variable represents a household's size, which shows the relationship between household size and the outcome categories. The coefficient of HHSIZE in Table 4.3 is insignificant and negative. This suggests that an increase in household size will decrease the odds of selecting only farming activities rather than both farming and non-farming activities by 0.87%. On the other hand, the variable of the households' size, which reveals the relationship between household size and non-farming livelihood category compared to the reference category (both farming and non-farming), is positive but statistically insignificant. This means that, increase in the number of household sizes will increase the chance of choosing only non-farming rather than both farming and non-farming by 1.0%.

4.2.2.9 Farm Size

The FARMSIZE variable shows the relationship between farm size and the outcome categories. This suggests that household heads with larger farm sizes are associated with a higher likelihood of being in the farming-only category. The coefficient of the FARMSIZE in Table 4.3 is positive and statistically significant at $p<5\%$ (0.026). This means that as the number of households with larger farm sizes increases, it will increase the likelihood of choosing only farming activities rather than farming and non-farming by 12% more. On the other hand, the variable of the FARMSIZE, which shows the relationship between households with larger farm sizes and non-farming livelihood activities in relation to both farming and non-farming, is insignificant and negative statistically. This indicates that a unit increase in the number of respondents with larger farm sizes it will decrease the chance of choosing only non-farming rather than the reference category (both farming and non-farming) by 1.0%.

4.3 Discussion of Results

More than half of the respondents obtained their income from non-farming activities, according to our initial findings, whereas the rest of the respondents derive their livelihood from either only farming or both farming and non-farming activities. Also, it was found that, sex of the respondents, educational level, institutional policies, living in town or village, and farm size significantly influenced households' livelihood choices. This finding of the majority of the respondents deriving their means of sustenance from only non-farming activities is contrary to the results of Abiodun *et al.* (2019), who in their study found that the majority of their respondents chose only farming as their livelihood strategy. Also, based on our findings that sex and institutional policies were two of the factors that significantly influence livelihood choices in the research area, this does not corroborate with the findings of Shambel & Rajan (2017) and Abiodun *et al.* (2019). However, our findings of educational levels and farm size as two of the significant factors that influence the choices of livelihood outcomes in our study conform to the findings of Abiodun *et al.* (2019), where educational level and farm size were significant factors that determine choices of livelihood in their study.

Based on the three livelihood choices defined in this study, it was found that more than half (54%) of the respondents adopted non-farming activities as their source of livelihood, 26% derive theirs from both farming and non-farming activities, while 20% generate their means of sustenance from only farming activities. In addition, socioeconomic characteristics of the respondents, such as sex, age, marital status, level of education, living in town/village, access to credit, farm size, household size, season, and institutional policies, were the major determinants of livelihood choices of the respondents. Also, this study found that only four of the independent variables, viz-a-viz level of education, sex, farm size, and institutional policies, significantly influenced the livelihood choices of the respondents in the research area.

5. Conclusion and Recommendations

5.1 Conclusion

This study examined the determinants of the factors influencing households' livelihood choices in post–insurgency: case study of Mubi north, Adamawa state. The study employed field survey where structured questionnaires were administered to sample households. Three livelihood categories, such as farming only, non-farming only, and both farming and non-farming, were used in this study, and multinomial logistic regression was employed in identifying factors that influence the livelihood choices of the households. It was found and concluded that major determinants of households' livelihood choices in the study area in the aftermath of insurgency were the socioeconomic characteristics of the respondents, including sex, educational level, age, marital status, household size, living in town or village, farm size, access to credit, and institutional policies. However, only four of the socioeconomic characteristics, viz-a-viz educational level, sex, farm size, and institutional policies, significantly influenced the livelihood choices of the respondents in the study area.

5.2 Recommendation

Based on the three livelihood categories used in this study, adoption of farming was low as this could be attributed to the fact that high cost of farm inputs or tools, therefore, there is a need for local and state government as well as non-governmental agencies to provide more farming implements and adequate farmland arrangements at affordable rates to stimulate farming which in turn will enhance food security in the study area.

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