The Implications of Farm Production and Farmers' Characteristics on Poverty Reduction in Benue Division, Cameroon: A Multiple Correspondence Analysis Approach

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Research Article

Abstract

The main objective of this study was to determine the effect of farm production and Farmers' Characteristics on Poverty Reduction in the Benue division in the Northern region of Cameroon. Data were collected from 399 respondents using a self-administered questionnaire through a stratified sampling technique of 12 sub-divisions in the Benue division. We adopted a survey research design. To estimate our results, we used Multiple correspondent analysis (MCA) and the OLS technique. The results reveal that there is a positive relationship between farm production and poverty reduction in Benue state. An increase in farm production will lead to a 2.19% reduction in farmers' poverty in Benue and this result is significant at a 5% level of significance. Similarly, the farmer's characteristics reveal that gender, farmers' experience, and educational level also significantly affect poverty reduction. In this light, there is a need for the government to train and deploy more extension workers in the various sub-divisions and communities in Benue division, to increase farmers' access to these services. This can be done by imparting specific skills to produce dominant food crops and livestock in the Benue division through workshops and seminars.

Keywords: Poverty Reduction, Farm Production, Farmer's Characteristics, Multiple Correspondence Analysis (MCA).

1. Introduction

Farm production and Poverty reduction are the core objectives of governments, international development discourses, and policies. This is particularly evident in the extent to which governments are determined to improve farm production as a way of reducing poverty has gone to reduce it. First, the Green Revelation, a series of research and technology transfer projects supported by the Food and Agricultural Organization (FAO) of the United Nations and backed by the Ford and Rockefeller Foundation, increased agricultural production globally and decreased poverty in many countries in Asia and Latin America between the 1960s and 1990s. However, the same strategies were not as successful when applied to Sub-Saharan Africa, partly because of locally inappropriate seed varieties and a lack of institutional and human resources (Dawson et al., 2016).

Secondly, to further fight poverty, the Millennium Development Goal was launched in the year 2000 by leaders of 189 countries at the United Nations Summit in New York. This program had eight main goals with the first aimed at eradicating extreme poverty and hunger. The main target of this goal was to reduce

by half the proportion of people whose income is less than $1 a day, which the world met and achieved by more than half (see United Nations, 2016). For example, Development Initiatives (2019) report that between 1990 and 2015, world poverty reduced from 1.9 billion consisting of 36%, to 735 million people living in extreme poverty, about 10% of the world population (this reduction occurred most during the MDG era). According to Schoch and Lakner (2020), the global poverty estimate fell between 2015 and 2017 from 10.1 to 9.2%, less than half percent per year but Africa's slow progression in reducing extreme poverty is particularly striking when compared with East Asia and the Pacific trends where the poverty rate fell from 60% to 1% between 1990 and 2018 (especially during Sustainable Development Goals era). Multiple layers of analysis are necessary to understand the link between agricultural supply and government policy. Ideas of economic development, economic interests, directives and standards of international organizations and regimes (like the World Bank and the International Monetary Fund), regional environmental circumstances, and the legacies of national and sub-national institutions influence the government's approaches to agricultural production. All these elements must be taken into consideration in research on agricultural production, policy, and public health to put together this puzzle and develop a thorough understanding of how these factors intersect (Raphael et al., 2020).

Sarris, Andrew & Ben (2016) argue that agricultural and food policies—among which are those that help increase the incomes of the rural poor—have a crucial role in reducing rural as well as aggregate poverty in Africa, including Cameroon, given that the majority of the impoverished live in rural areas and work in agriculture. In a similar spirit, FAO (2021) indicates that to foster local community involvement in rural regions as well as commercial private sector operations, Africa would also need to enhance the legislative and regulatory framework for agriculture. To provide both major and minor players in the farming community a voice, governance will need to be enhanced. Considering this, the importance of government-initiated agricultural policies cannot be emphasized if citizens' full potential is to be realized, as this will undoubtedly contribute significantly to raising production and reducing poverty.

Without a doubt, the governments of developing countries, such as Cameroon, have made significant strides in the field of agriculture to increase productivity and lower poverty. For instance, Cameroon has implemented important agricultural policies in several areas, such as agricultural research and extension services (G-FRAS 2021, & Ngomi, Yang & Chen 2019), climate change (Manila, 2019), financial services (Business in Cameroon, 2021), and other services like farm-to-market road provision, marketing of agricultural output, and input provision (MARD, 2019, Amabo, 2019, and Cameroon report, 2020). These policies have been implemented by Cameroon through its agricultural institutions, such as the Ministry of Agriculture and Rural Development.

Besides, Amabo, (2019), observes that people in Cameroon who depend on agriculture for their living are typically much poorer than people who work in other sectors of the economy and that they represent a majority, of the total number of poor people in Cameroon. A case at hand is the   Northern region of Cameroon. Cameroon is in poverty with a major part of the population dependent on agriculture and pastoral activities (Tambi & Bime, 2019). Poverty rates are highest in the Northern rural areas, almost two-thirds of the population in the Northern regions lives below the poverty line, and chronic poverty is over 56 % (Nsah, 2024). According to Andzongo (2018), the region with most of the poor is far North (35.8%), North (20.1%), and Northwest (13.2%).   This makes us doubt the precise role of farm production and farmers' characteristics, which have long been recognized that they have an inseparable link to poverty reduction. Thus, the objective of this paper is to examine the implications of farm production and farmers' characteristics on poverty reduction in the Benue division.

2.   Literature Review
2.1. Conceptual Literature
Poverty has been defined in the literature in many ways using varying constructs such as "extreme poverty," "absolute poverty" and "relative poverty" by Yamamori. People in extreme poverty are those living below

the international poverty line (IPL) of $1.90 income daily (Yamamori, 2019). The view of poverty in absolute terms considers certain services to be basic to good living including; food, safe drinking water, sanitation facilities, health, shelter, education, and information, and deprivation from them results in impairment of a minimum standard of living and thereby poverty (Benevenuto & Caulfield, 2019). Poverty in relative terms considered the minimum standard of living which is considered to vary from society to society (Yamamori, 2019). Yamamori (2019) talked of Peter Townsend as a key proponent of the relative poverty concept who described the poor as people who are relatively deprived because they cannot obtain the conditions of life that allow them to play the roles and are therefore unable to fulfill membership of society.

Oyeranti and Olayiwola (2005) conceptually identified three dominant views that concern the meaning of poverty in literature, and an improvement in these components leads to poverty reduction. The first view sees poverty as a severe deprivation of some basic human needs at the individual or household level also known as material deprivation. The second view defines poverty as the failure to achieve basic capabilities such as being adequately nourished, living a healthy life, possession of skills to participate in economic and social life, permission to take part in community activities just to mention a few the third conceptualization of poverty is the subjective view of poverty which posits that, poverty has both physical and psychological dimensions meaning that Poor people themselves strongly emphasize violence and crime, discrimination, insecurity and political repression, biased or brutal policing, and victimization by rude, neglectful or corrupt public agencies. We adopted the second view for the meaning of poverty reduction in this paper, which emphasized that an improvement in basic capabilities such as being adequately nourished, living a healthy life, and possessing skills to participate in economic and social life can lead to poverty reduction.

Meanwhile, Boulding (1956) defines farm production as "a subsystem of the larger economic system, and its purpose is to transform inputs of land, labor, capital, and management into outputs of food and fiber. He said farm production is different from agricultural farm productivity, which is the measurement of the quantity of agricultural output produced for a given quantity of input or a set of inputs (Mozumdar, 2012). Agricultural farm productivity measures are broadly divided into partial and total measures. The most common partial productivity measures for the agriculture sector are crop yield and labor productivity which refer to the amount of output per unit of a particular input. Farm production determines whether there is an increase or decrease in the quantity of output of a particular product produced by a farmer in a given year or farm season.

2.2. Empirical Literature

Bekun and Akadiri (2019), empirically investigate the dynamic linkage between agricultural farm production, agricultural value-added, and poverty reduction for a panel of nine countries in Southern Africa using a second-generation panel approach for the period 1990 to 2015 and the empirical results show that agricultural development enhances far production but not a sufficient policy to combat poverty as it is only viable in the short run.

Ogundipe, et al. (2016) examined the impacts of agricultural productivity on downscaling poverty in Africa by employing the System-GMM method and dynamic panel data technique, and empirical findings indicated that agricultural value added per worker contributed substantially to lessening Africa's poverty through an increase in farm production. Development schemes aimed at boosting agricultural productivity and comprising credit-accessibility strategies were suggested such that rural farmers would have a higher asset base for massive commercial production. In the same vein, Oluwatoyin et al. (2019) examined the feasibility of a poverty reduction program through a well-coordinated social protection policy on agriculture as a way of increasing farm production. They concluded that if these policies significantly increase farm production of rural farmers, it will lead to a reduction in poverty. Meanwhile, Sarris et al. (2016) find that

agricultural arm production directly affects household consumption and poverty reduction. Their finding was consistent with Christiaensen et al. (2006) Whose findings support the overall premise that enhancing agricultural productivity is the critical entry point in designing effective poverty reduction strategies.

For farmers' characteristics and poverty reduction, Khan et al., (2015) on the Determinants of rural household poverty: the role of household socioeconomic empowerment, using primary information gathered through a rural home survey, this study looked at the determinants influencing rural household poverty in the Pakistani district of Bahawalpur. 600 homes from the district of Bahawalpur were chosen through a multistage random selection procedure for data collection. Principal component analysis is used to create the socioeconomic empowerment index, which is then used as a stand-in for the household's socioeconomic empowerment. Only rural households with 4 to 5 hectares were included in the study to regulate land ownership. The findings demonstrated that several factors have a significant impact on rural household poverty reduction, including socioeconomic empowerment, and other farmers' characteristics such as experience of the household in agriculture, female to male, age, educational level, household size, and household size. He recommended that, for the elimination of poverty in rural areas, it is also necessary to pay attention to the demographic variables.

Similarly, for the age of farmers and other socioeconomic characteristics of farmers, Umeh, & Nwadike, (2019)., on the impact of socioeconomic factors on small-scale farmers in Nigeria's Benue State's Apa Local Government Area was determined. A multi-stage sampling process was employed to choose the respondents (120), and a structured questionnaire was used to collect the necessary data. To examine the data, descriptive and inferential statistics were used. Most of the respondents (70.9%) were men between the ages of 41 and 50 who had been involved in farming for more than 20 years. Approximately 45% of them have households with six to ten members, which suggests big family sizes. About 48.70% of them had only completed elementary school, and 65.80 had one to five dependents. Most respondents (62.20%) were impoverished, and a sizable portion (44.50%) did not have any revenue from outside their farms. Age (0.336) and farm size (0.415), according to the results of the logistic regression analysis, significantly and favorably influence respondents' poverty status. Additionally, important factors included formal education years (-2.138) and farming experience (-0.349). Most farmers (62.20%) subsist on less than USD 1 a day. They concluded that if opportunities for human capital development and training are made available, they will not only help people acquire more human capital but also generate more money, which will help fight poverty.

3. Methodology
3.1 Description of Study Area
With a population density of 37 people per km2, the North Region occupies 66,090 km2 in the northern portion of the Republic of Cameroon. The region is bounded to the north by the Far North, to the south by the Adamawa Region, to the west by Nigeria, to the east by Chad, and to the southeast by the Central African Republic. The third-largest port on the Benue River, Garoua serves as the political and industrial hub of the North Region. 2,442,578 people live in the region (City population, 2020). It is made up of four divisions of which Benue division is the biggest, and the other includes; Garoua 1, Garoua 2, and Garoua 3, (UCCC, 2014).

Sorghum, millet, and maize are the three main staple foods grown in Benue and are consumed by most of the region's ethnic groups. While rice is widely consumed in the city of Garoua, cassava is mostly grown on the Adamawa plateau. Because it grows well in the North River Valley and is overseen by SODECOTTON, cotton is the main cash crop. Most of the territory is settled, with an average of 12 to 25 people per km2 (Amabo, 2019).
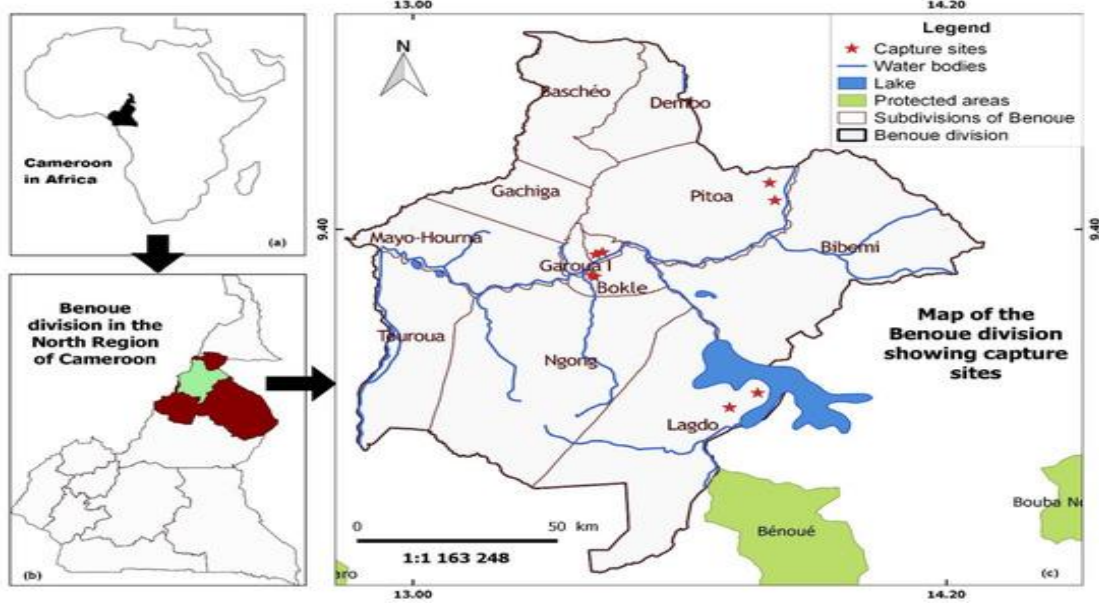
Fig.1: Map of Benue Division
Source: Melton & Baumann, (2010)

3.2 Data Collection

This study focuses on farmers in the North Region of Cameroon. However, given that the researcher is constrained concerning finance and time, coupled with the fact that the area is large, the target population was farmers living in the Benue division. Stratified sampling was used as the sampling technique for this study. Farmers in the Benue Division, North Region were divided into subdivisions, and questionnaires were distributed equally among the farmers in the subdivisions within the sample frame. The Slovin (1961) technique is used to calculate the sample size in the following way:

$n = N/1 + Ne^2$

where n= sample size N = sample population

e= standard error is 5%

The population of Benue division=1,247,369 inhabitants (2020 estimates)

Percentage of farmers =70%

Sample population =70% *1,247,369 = 873,158

$n = 873,158.3/1 + 873,158. (0.05)^2 = 400$ respondents

Hence, the sample size from the Slovin technique is 400 respondents. A total of 400 questionnaires would be self-administered to those within the sample population as follows:

Table 1: Sample Size by Subdivisions in Benue

Subdivision	Sample	Subdivision	Sample	Total
Garoua 1	35	Dembo	33	
Garoua 2	35	Gashiga	33	
Garoua 3	33	Barndake	33	
Bibemi	33	Basheo	33	
Pitoa	33	Ngong	33	
Lagdo	33	Touroua	33	400

Our instrument of choice for collecting data was a self-administered questionnaire. For the most part, the questionnaire used a five-point Likert scale, with strongly agree to strongly disagree as the possibilities. Questions about farmers' characteristics made up the first part of the questionnaire, questions on farm

production made up the second part, and questions on poverty reduction made up the last part of the questionnaire.

3.3. Model Specification and Estimation Technique
3.3.1. Cobb-Douglas Production Function
The econometric model adopted for this study applied the framework proposed by Tung and Rasmussen, (2005). Thus, in determining the effect of farm production and farmers' characteristics on poverty reduction in the Benue division, we make use of a Cobb Douglas production function as presented in the model below:

$PovRi = \sigma + \beta iX i, + \varepsilon$ ……………………………………………………………(1)

The *PovRi* is poverty reduction, σ is the constant term, and X_i is the exogenous variable affecting poverty reduction. These exogenous or independent variables include; Farm production farmers' characteristics (Experience, Nature of farming, Marital status, gender of farmer, educational level of farmers and age of farmers), the equation can be transformed to a functional form expressed as:

$PovRi = f(X1, X2, X3, X4, X5, X6 ,..., X n)$……………………………………….(2)

Where: *PovRi* is farmers poverty reduction, X_1 = farm production, X_2 = Age of farmer, X_3 is Experience, X_4 = marital status X_5 = educational level is household income, X_6 = Nature of farming, $X n$ is other factors influencing poverty reduction (improvement in income level, improvement, in the level of education, improvement in the living standard, and improvement in health status) and $f()$ is a production function. However, poverty reduction includes several related variables as it is a multidimensional concept, which can be used to create an index of poverty reduction. These variables include improvement in the level of income of farmers as a result of the effect of the implementation of government agricultural policies, improvement in farmer's level of education as a result of an increase in farm production, and improvement in the health status of farmers. To measure poverty reduction, these different variables had to be aggregated into one measurement unit/index using multiple correspondent analysis (MCA).

Above all, the reason for choosing Cobb Douglas production function is that it is linear in its logarithmic form, and therefore easy to estimate by using the ordinary least squares estimation technique (OLS). At the same time, this function type has been widely used for production function analysis by many authors (Seyoum et al., 1998). The function has the following form;

$PovRi = \alpha Xi^{\beta} \exp(e_i)$……………………………………………………………..(3)

$\ln PovRi = \delta + \ln(a) + \beta*1 \ln X 1i + \beta 2 \ln X 2i + ... + \beta n \ln X n + ei$ ……………………(4)

The parameters $\beta*1, \beta 2, \beta 3 ,..., \beta n$ will be estimated using Ordinary Least Squares analysis (OLS). All estimations will be performed using the procedure 'reg' in STATA 14.0. The estimated parameters are shown in chapter four of the result section. The parameters $\beta_1, \beta_2, \beta_3, \ldots ..., \beta n$ are the parameter estimates of the poverty reduction function in the Benue division.

3.3.2. Poverty Reduction Index and Computation of Synthetic Variable using MCA
Multiple Correspondence Analysis (MCA) was used to create this index. According to Epo and Baye (2011), the discipline of multidimensional poverty analysis has popularized the use of Multiple Correspondence Analysis (MCA) techniques. In contemporary research, MCA is employed in the analysis of multidimensional well-being. In theory, MCA is obtained by choosing the synthetic variable and each of its several modalities, then doing the usual correspondence analysis on an indicator matrix. In this case, the composite index for farmer poverty reduction (PovR) was created using the Multiple Correspondence Analysis method. Notably, the modalities employed in this case to create the synthetic variable adhere to the basic specifications given in Asselin and Tuan (2005). According to the literature, the modalities or indicators employed have an ordinal ordering that is compatible with their contributions in the first factorial axis (Asselin & Tuan, 2005). Concerning our synthetic variable—the decrease in poverty among farmers, we selected four indicators, or variables, each with five modalities, and arranged them in ascending ordinal order. The variables selected for our poverty reduction indicator are as follows:

Table 2: Variables for the construction of poverty reduction index

Variables	Modalities
Improve level of income	1)Strongly agreed, 2) Agreed, 3) Neutral, 4) Disagreed, 5) Strongly disagreed
Improved level of education	1)Strongly agreed, 2) Agreed, 3) Neutral, 4) Disagreed, 5) Strongly disagreed
Improve the standard of living	1)Strongly agreed, 2) Agreed, 3) Neutral, 4) Disagreed, 5) Strongly disagreed
Improve health status	1)Strongly agreed, 2) Agreed, 3) Neutral, 4) Disagreed, 5) Strongly disagreed

4. Results

4.1. Synopsis of Poverty Reduction Indicators

Table 3: Synopsis of Poverty Indicators using Multiple Correspondence Analysis (MCA)

Categories	Overall			Dimension_1			Dimension_2		
	mass	Quality	%inert	coord	sqcorr	contrib	coord	sqcorr	contrib
PovR1(improved income level)									
Agreed	0.079	0.560	0.029	0.293	0.124	0.007	0.964	0.436	0.073
Neutral	0.107	0.284	0.027	0.345	0.255	0.013	0.205	0.029	0.004
Disagreed	0.058	0.714	0.047	-0.212	0.030	0.003	-1.782	0.684	0.185
Strongly Disagreed	0.006	0.818	0.236	-7.573	0.814	0.359	0.949	0.004	0.006
PovR2(Improved Standard of living)									
Strongly Agreed	0.001	0.409	0.007	-0.536	0.013	0.000	-5.186	0.396	0.017
Agreed	0.030	0.602	0.051	0.263	0.022	0.002	-2.380	0.580	0.170
Neutral	0.077	0.256	0.028	0.351	0.182	0.009	0.392	0.074	0.012
Disagreed	0.132	0.191	0.022	0.169	0.090	0.004	0.314	0.100	0.013
Strongly Disagreed	0.011	0.870	0.187	-5.342	0.869	0.304	0.315	0.001	0.001
PovR3(Improved Educational Level)									
Agreed	0.013	0.574	0.047	0.136	0.003	0.000	-3.521	0.571	0.155
Neutral	0.050	0.209	0.024	0.213	0.051	0.002	-0.659	0.158	0.022
Disagreed	0.180	0.587	0.016	-0.050	0.015	0.000	0.539	0.572	0.052
Strongly Disagreed	0.007	0.290	0.038	-0.496	0.024	0.002	-2.923	0.267	0.059
PovR4(Improved Health)									
Strongly Agreed	0.001	0.146	0.006	0.710	0.059	0.001	1.522	0.087	0.003
Agreed	0.068	0.152	0.015	0.230	0.130	0.004	-0.167	0.022	0.002
Neutral	0.128	0.708	0.026	0.331	0.296	0.014	0.688	0.413	0.061
Disagreed	0.045	0.882	0.034	-0.305	0.066	0.004	-1.881	0.816	0.160
Strongly Disagreed	0.008	0.915	0.160	-6.014	0.910	0.272	0.784	0.005	0.005
Num. Obs	399								
Total inertia	0.2327								
Num. of axes	2								

From our observation, we realize that all the variables contributed to the first dimension, with improvement in income contributing 7.9% to the total inertia, improved standard of living contributing 3.1% (adding up the percentage contribution of strongly agreed and agreed), to the first dimension, improvement of educational level contributed 1.8%, while improvement in health status 6.9% contributed to the first dimension. Our results revealed that most of the indicators have significantly contributed to the total inertia. This may be because poverty reduction is a domain whereby no single factor plays a major role in determining its outcome, it's a combination of indicators that help to reduce the poverty of farmers and

permit them to further increase their agricultural productivity. The second dimension contributes lower than the first dimension to the overall total inertia.

Table 4: Summary of descriptive statistics for all Variables in the Model

Variable	Obs	Mean	Std. Dev.	Min	Max
PovR (Index)	399	.9237445	.1398597	0	1
Farm Production	399	1.421053	.3818017	1	2
GEN	399	1.626566	.4843231	1	2
Age	399	39.96992	9.217587	19	64
Experience	399	12.54887	5.722388	1	35
Marital Status	399	1.884712	.8062207	1	4
EDU	399	1.596491	.6762948	1	3
Nature of Farming	399	1.699248	.7122577	1	3

Source: Field Survey, (2024)

Table 4 shows the summary of descriptive statistics of all the variables used in estimating the model of our third objective on the effect of farm production and farmers' characteristics on poverty reduction in Benue. From the table, the poverty reduction indexes the minimum and maximum values are 0 and 1 respectively, this is because the values of the index of poverty reduction were normalized into 0 and 1 after carrying out the MCA. This was to avoid negative values that could affect the overall results and make the result inefficient. The table shows that the average age of farmers in Benue is about 40 years, with the youngest farmer with an age of 19 years and the oldest with an of 64 years.

Table 5: Estimated Regression Results

PovR (log index)	Coef.	Std. Err.	t	P>t
FarmPrd	.0219**	.0097691	2.25	0.025
GEN				
Male	0.053**	.021902	2.43	0.016
Age (in years)	-0.044	.0012701	-0.35	0.724
Experience (in years)	0.027**	.020436	1.85	0.039
Marital Status				
Married	0.031	.0235896	1.32	0.189
Divorced	-0.019	.0335809	-0.58	0.559
Widow(er)	0.027	.0352713	0.77	0.443
EDU				
Secondary/High School	-0.033**	.0168758	-1.97	0.049
Tertiary	-0.052	.0255842	-0.20	0.838
NFARMING				
Crop Production	0.091	.0226063	0.41	0.685
Livestock	0.011	.0228749	0.51	0.608
_cons	-0.130**	.0552612	-2.36	0.019
Num. Observation	399			
F(11, 390)	20.20			
P>F	0.00145			
R-Square	0.675			
Adj. R-Square	0.598			

Source: Field Survey, (2024)

It, therefore means that most of the farmers in the Benue division are above 40 years old. This is a common phenomenon in developing countries especially in a rural area, where farming is mostly in the hands of elderly people, since the youths see farming as a dirty job. Also, the average experience of a farmer in Benue is at least 13 years, with the least experienced farming having 1 year of experience while the most experienced farmers have 35 years of experience in farming. This reveals that most of those involved in farming have experience above 12 years, hence the farmers are highly experienced in farming. Furthermore, most of the variables are categorical such as gender with two outcomes (male and female, marital) status with four categories (single, married, divorced, and widow(er)), educational level (EDU) with three

categories (primary, secondary/high school and tertiary) and nature of farming (farm production, livestock and other).

Table 5 shows the estimated regression results of our third objective using the ordinary least square estimation technique. The results reveal that there is a positive relationship between farm production and poverty reduction in Benue state. Specifically, an increase in farm production will lead to a 2.19% reduction in the poverty of farmers in Benue and this result is significant at a 5% level of significance. An increase in farm production can reduce food insecurity and hence a reduction in poverty of farmers. Similarly, from the farmer characteristics, being a male farmer has a positive effect on poverty reduction as compared to being a female farmer. Specifically, being a male farmer reduces poverty by 5.3% as compared to their female counterpart. Thus, female farmers are 5.3% poorer than their male counterparts and this result is significant at a 5% level of significance. This may be explained by the reason that most women do not have access to enough farmland and finance and also, most male farmers have other sources of income, which help to increase their welfare and reduce poverty. Hence, the rate of poverty reduction among male farmers is 5.3% higher than that of female farmers in Benue. Another farmer characteristic with a significant value is the experience of farmers, from the result, there is a positive relationship between farmer experience and poverty reduction in the Benue division. An increase in farmer experience by 1 year tends to increase the rate of poverty reduction of the farmer by 2.7%. And the coefficient is significant at a 5% level of significance.

Hence, more experienced farmers have a high level of poverty reduction as compared to less experienced farmers. Experience is often the best teacher, most farmers who have been farming for a long, develop skills that help them to increase their productivity more than less experienced farmers, this is often referred to as learning by doing. Furthermore, another farmer characteristic with a significant value is the level of education (secondary/high school). The results reveal that there is a negative relationship between educational level and poverty reduction in Benue. From the results, farmers with a secondary/high school level of education instead experience a fall in their rate of poverty reduction by 2.7% and it is significant at a 5% level of significance as compared to those with primary education. This therefore implies that farmers with higher levels of education are poorer than farmers with a low level of education in Benue division. In most rural communities, farmers with a lower level of education are more committed than farmers with a higher level of education in their farm work. This is because those with a higher education are distracted by searching for better opportunities instead of focusing on their farms. Above all, the value of the constant term is also significant with an expected value of -0.130, meaning that in the absence of all the variables in the model, the expected rate of poverty reduction among farmers in Benue division is 0.130 and the coefficient is significant at 5% level of significant.

In addition, other variables are insignificant with positive and negative effects on poverty reduction. From the result, the age of farmers hurts the rate of poverty reduction, meaning that older farmers are poorer than younger farmers in Benue. Also, marital status has an insignificant effect on the rate of poverty reduction. From the result, married farmers have a 3.1% reduction rate in poverty as compared to their single counterparts. Meaning that married farmers are better than single farmers in terms of poverty reduction. Meanwhile, divorced farmers hurt poverty reduction compared to their single counterparts by 1.9%. Hence, single farmers are better off compared to farmers who are divorced in terms of poverty reduction. In the same vein, being a widow or widower has a positive effect on poverty reduction concerning their single counterpart at a rate of 2.7%. Thus, widows (er) are better off than single farmers in terms of poverty reduction. Similarly, another insignificant variable is the nature of farming or the type of farming activity carried out by the farmer. The results show that farmers who are involved in crop production have a positive relationship with poverty reduction compared to farmers involved in other activities at a rate of 1.9% while

farmers who are involved in livestock production have a 1.1% reduction rate in poverty compared to those involved in other activities.

More to that, the Fisher test (F test), which captures the joint effect of the variables is 20.20 with a significant probability value, meaning that the variables are jointly significant. Thus, the model is globally significant and consistent. The coefficient of determination (Adjusted R-square) captures the explanatory or the fitness of the model. The value shows that about 59.8% variation in the dependent variable (Poverty reduction) is a result of the joint effect of the independent variables in the model.

5. Conclusion

Farm production revealed a strong positive effect on poverty reduction, meaning that an increase in farm production goes a long way to increase the reduction in poverty in the Benue division. Hence, the government can fight poverty and the problem of food insecurity in the Benue division through the implementation of government agricultural policies that positively impact farm production and yield. More so, our findings show that the reduction in poverty in Benue is also affected by farmers' characteristics such as age, gender, experience, marital status, educational level, and nature of farming carried out by the farmer. The significant factors were gender, education, and experience; thus, these demographic characteristics have a significant effect on poverty reduction in the Benue division.

Our findings revealed that some characteristics of farmers have a significant effect on poverty reduction such as gender, experience of farmers, and educational level of farmers. From these findings, being a male increases the chance of reducing poverty as compared to their female counterpart, Therefore, we recommend that the government should pay more attention to empowering the male gender in their various agricultural activities to drastically reduce poverty in the Benue division. Also, the findings revealed that more educated farmers have less impact on poverty reduction than less educated farmers. Thus, the government should focus on building and encouraging less educated farmers who are more involved in agriculture than the more educated ones. This will open more chances and skills to the less educated farmers and because of their high commitment to farming and agriculture in general, this will increase farm production and reduce poverty among farmers in the Benue division.

6. Direction for Future Studies

Given that this study focuses on examining only how farm production and farmers' characteristics affect poverty reduction in Benue division, it will be interesting if research is carried out on how government agricultural policies affect farm production and poverty reduction in Benue. Also, it will be more useful if similar research is carried out in other parts of Cameroon.

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