

# COOPERATIVE CREDIT: EFFECT ON PRODUCTIVITY AND WELFARE OF RURAL FARMING HOUSEHOLDS IN YEWA NORTH LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

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## ABSTRACT

This study investigated the effect of cooperative credit on productivity and welfare of rural farming households in Yewa North Local Government Area of Ogun State. A total of 120 rural farming household heads were sampled through a multi-stage sampling procedure. Data were analysed using descriptive statistics, logit regression model, multiple regression model and household per capita consumption expenditure model. Majority (68.4%) of the farming household heads were below 50 years of age, 94.2% were male while only 48.3% had access to loan in the last planting season. The result from the logit regression model showed that sex, age, farm size and non-farm activities were statistically significant and determined households' participation in cooperative society. Expenses on planting material, quantity of fertilizer used and other agro-chemical had positive significant relationship with farm productivity. The result also showed that age of the farming households and its square, education, household size, access to cooperative credit and worth of income yielding asset owned by the households were significant determinants of farm productivity. It was also revealed that age, educational level and access to cooperative credit were the significant factors that explain the contributions of cooperative credit to household welfare. The study however concluded that cooperative credit only have positive effect on the productivity and welfare of rural farming households who are cooperators and accessed credit from cooperative society. Thus, education for cooperators and non-cooperators alike should be strengthened and adequate monetary contribution among cooperators is advised.

**Key words:** Cooperative Credit, Productivity, Welfare, Rural, Farming Households

## Introduction

Agriculture is the most crucial sector among other active sectors of the world because the main policies of output, growth, poverty alleviation, social justice and equity are best served in this sector. It is one of the major contributors to Nigeria Gross Domestic Product (GDP) and small-scale rural farming households play a dominant role in its contribution (Rahji and Fakayode, 2009), but their productivity and growth are hindered by limited access to credit facilities (Okwocha and Obinne, 2010). In developing countries such as Nigeria, Agriculture dominates the nation's economy. It has been established that about 70 percent of

Nigeria population is engaged in Agriculture (Obasi and Agu, 2000) while 90 percent of Nigeria total food production comes from small farms and 60 percent of the country population earn their living from these small farms (Oluwatayo *et al*, 2008). The recent importation of food items into the country to make up for the shortfalls in food supply is a dangerous indication of dwindling farm productivity and a warning sign that if the nation continues with business as usual, the prospect of food security will be bleak for millions of people (Nweze, 2003). Many authors have attributed the fall in agricultural production to inadequate infrastructure, under-mechanization and inadequate finance.

Inadequate finance has remained the most limiting problem of agricultural production (Izekor and Alufohai, 2010). This is because capital is the most important input in agricultural production and its availability has remained a major problem to small-scale farming households who account for the bulk of agricultural produce of the nation. In Nigeria, credit has long been identified as a major input in the development of the agricultural sector. Credit is considered the catalyst that activates other factors of production and make under used capacities functional for increased production (Ijere, 1998). Credit institutions can be categorized into three groups (Badal, 2010): Formal Financial Institutions: such as Commercial banks, Microfinance Banks, Development Financial Institutions (DFIs), and State Government-owned Credit Institutions; Semi-formal Financial Institutions: such as Non-governmental Organizations-Microfinance Institutions (NGOs-MFIs) and Cooperative Societies. Informal Financial Institutions: such as money lenders, rotating savings and credit associations (ROSCAS) and Self-Help Groups (SHGs).

Farm credit can be obtained from any of these sources. According to Bolarinwa and Fakoya (2011), the informal source of credit is more popular among small-scale farming households which may be due to the relative ease in obtaining credit devoid of administrative delay, non-existence of security or collateral, flexibility built into repayment which is against what is obtained in the formal sources. Nwagbo *et.al* (1999) observed that the institutional lending system has failed to meet the objective for which they were set up. According to these authors, only 15 percent of the trading bank credit to agriculture has been covered. The major short comings of their transactions, they observed, are due to the inaccessibility of these funds by rural farming households as a result of the bureaucratic procedures and high service cost, which are very difficult for the farming households to meet. Rural farming households in developing countries like Nigeria may remain trapped in poverty due to lack of finance needed to undertake profitable investments. Improved

access to credit could generate pro-poor economic growth if the credit constraints that poor rural farming households faced are relaxed (Colemana, 2002).

Cooperative society plays an important role in development of the rural community and the community at large and it helps rural farming households to undertake new investment. It helps smooth consumption by providing working capital and reduces poverty in the process (Aleem, 1990). For many years, credit unions and financial cooperatives have provided affordable financial services to millions of people around the globe. They serve members of all income levels, ethnic backgrounds, political beliefs and religions, in even the most challenging environments. Whether rural or urban, located in communities struggling with political unrest or confronting economic depression, credit unions serve people otherwise excluded from the financial system by offering them access to high quality and affordable financial services (World Council of Credit Unions (WCCU), 2008). Credit unions help to overcome the financial market imperfections that perpetuate poverty by expanding and deepening access to financial services. Cooperative credits play a vital role in economic transformation and rural development. Agricultural or farm credit is a crucial input required by the rural farming households to establish and expand their farms with the aim of increasing agricultural production, enhancing food sufficiency, promoting household and national income, and augmenting the individual borrower's ability to repay borrowed fund. It enables the poor farming households to tap the financial resources and take advantage of the potentially profitable investment opportunities in their immediate environment (Zeller and Sharma, 1998).

Moreover, rural farming households rely on cooperative credit basically because of the long gestation period characterization of agricultural production. During this long period, cash income is required both for home consumption and farm maintenance. The farming households therefore needs credit during this gestation period to defray cash expenses. In addition, because of the risky

nature of the farm industry, marginal farming households are always reluctant to take risks of trying new farming techniques for the fear of failure. Transfer of income in form of credit could therefore encourage them to be less risk averse (Badal, 2010; Nwagbo *et al.*, 2010). Farming households are also said to be operating in the ocean of atomistic competition, in which case they produce similar products and no farmer by his production can affect the price offered for his product. In other words, he is a price taker. The implication of this is that, at harvest, especially if there is bumper harvest, there could be a glut in the product market in which case the price will be sharply reduced, hence the income. This is greatly amplified in Nigeria where storage facilities are not in full operation. Cooperative credit also plays a big role in the processing of agricultural products into a more stable and acceptance form. A farmer may be encouraged to process his products further to earn more income if he has other means of fulfilling necessary obligations through credit. Availability of credit helps commercial farmer to promote and sustain commercial activities especially transport services, industries and trade.

In spite of the importance of credit in agricultural production, its acquisition is fraught with a number of problems. The rural farming households are forced to source for capital from relations, money lenders, and contribution clubs. All of these are known to be ineffective in providing capital for substantial increase in agricultural production. Thus, the last hope for the small scale farming households then lies with the cooperative societies (Ijere, 1998). The cooperative society has been identified to be a better channel of credit delivery to farmer than NGO's in term of its ability to sustain the loan delivery function. Thus, there is need to increase the credit flow to agriculture in order to raise productive capacity of land and enhance the potential of water resources for agricultural production. Credit is generally seen as an important catalyst for agricultural production and productivity while increased productivity has direct link with income and welfare of people.

From the foregoing, it is important to examine the effect of cooperative credit on the productivity and welfare of rural farming households. Specifically, this study sought to describe the socio-economic characteristics of rural farming households in the study area, examine the factors that determine rural farmer's participation in cooperative society, examine the effect of cooperative credit on farm productivity and the contribution of cooperative credit to rural farming households' welfare.

## Methodology

### The Study Area

The study was carried out in Yewa North Local Government Area (LGA) of Ogun State, Nigeria. The headquarters of the LGA is in Ayetoro. Yewa North LGA has large expanse of land measuring 2043.60 ha (YNLG, 2005). It is bounded in the West by the Republic of Benin, in the South by Yewa South LGA, in the North by Oyo State and in the East by Abeokuta North and Ewekoro LGAs. The headquarters, Ayetoro, is located on latitude 7° 15' N and longitude 3° 3' E in the deciduous derived savannah zone of Ogun State (YNLG, 2005). Other important settlements in the local government include Joga-Orile, Saala-Orile, Owode-Ketu, Igbogila, Igan-Okoto and Imasayi. The inhabitants are mainly Yoruba speaking people comprising the Yewas and Ketus. Farming is the main occupation of the people. Majority of the people of these areas traditionally owns land for farming. They are also in possession of income yielding assets including houses, crops, animals, farm equipment, etc. Among the major crops grown are yam, tomato, beans, pepper, maize, vegetables, cassava, potatoes, plantain and oranges. One peculiar feature of most farming households in the study area is their level of enlightenment and exposure to cooperative activities. This was necessitated by the fact that the College of Agricultural Sciences of the Olabisi Onabanjo University, Ogun State, Nigeria had been domiciled in Ayetoro, the headquarters of the Yewa North LGA. As part of

its community development functions, the College had over the years promoted cooperative activities in the area because it houses a programme called Cooperative and Business Management.

**Sampling Techniques**

Yewa North Local Government Area was purposively selected for the study due to the prevalence of farming households that belong to cooperative societies in the area. Multistage sampling technique was used to select the study sample. In the first stage, four (4) wards were randomly selected from the eleven wards that make up the LGA. The wards include: Ayetoro North, Ayetoro South, Iboro and Imasayi. In the second stage, three (3) farming communities were purposively selected from each of the wards selected in stage one to give twelve (12) farming communities. The farming communities were selected because of their dominant involvement/role in cooperative societies and farming. In the third stage, ten (10) farming household heads were randomly selected from each farming community to give a total of 120 respondents. The data were collected using structured questionnaire on the target group. The data collected covers socio-economic characteristics, cooperative activities, farm inputs and output, consumption and income.

**Methods of Data Analysis**

**Socio-economic Characteristics of the Farming households**

Descriptive statistics including charts, frequency and percentages was employed to summarize the socio-economic characteristics of the farming households and identified the different types of cooperative societies/unions in the study area.

**Determinants of Participation in Cooperative Societies**

The logit regression model was used to examine the factors that determine rural farming households' participation in cooperative society. The logit model is a binary choice model assuming the value of 1 and 0 if farming households participate in cooperative societies or not, respectively. Following Bierens (2008), the model was specified as follows:

$$\Pr[Y_j = 1|X_j] = \frac{1}{1 + \exp(-\alpha_0 - \beta_0 X_j)} \quad (1)$$

$$\Pr[Y_j = 0|X_j] = 1 - \Pr[Y_j = 1|X_j] = \frac{\exp(-\alpha_0 - \beta_0 X_j)}{1 + \exp(-\alpha_0 - \beta_0 X_j)} \quad (2)$$

Where the X<sub>j</sub>'s are the explanatory variables and α<sub>0</sub> and β<sub>0</sub> are unknown parameters to be estimated. This model is called a Logit model, because

$$\Pr[Y_j = 1|X_j] = F(\alpha_0 + \beta_0 X_j) \quad (3)$$

Where:

$$F(x) = \frac{1}{1 + \exp(-x)} \quad (4)$$

is the distribution function of the logistic (Logit) distribution.

- Y = 1 if rural household heads participate in cooperative society
- Y = 0 if otherwise
- X<sub>1</sub> = Gender of household heads (Male = 1, Female = 0)
- X<sub>2</sub> = Age of household heads (Years)
- X<sub>3</sub> = Education level of household heads (Years)
- X<sub>4</sub> = Farming experience of the household heads (Years)
- X<sub>5</sub> = Farm size (hectare)
- X<sub>6</sub> = Household size (number)
- X<sub>7</sub> = Marital status (Married = 1, Otherwise = 0)
- X<sub>8</sub> = Availability of non-farm activities (Yes = 1, otherwise = 0)
- X<sub>9</sub> = Farm Income (Naira)
- U = error term

**Effect of Cooperative Credit on Farm Productivity**

This section explores the issue of total factor productivity of crop and aggregate agricultural production of rural farming households. Total factor productivity (TFP) refers to that part of total production that is not accounted for by the normal basic primary production factors, such as labour and capital. To analyze farm production we fit a standard Cobb-Douglas production

function, using instrumental variables for the endogenously determined variables. We introduce a variety of potential productivity determining variables in the right hand side in order to explore the determinants of TFP. Our estimations use the following general form following Sarris, *et. al* (2006).

$$\ln Q = \alpha + \sum \beta_i \log X_i + \sum \Theta_j Z_j + \mu \quad (5)$$

Where Q is a measure of the value of production of the farm per total value of farm inputs,  $X_i$ s are set of factors of production such as land, labour and inputs,  $\beta_i$ s are the estimated coefficients of each factor (the elasticities, if the log specification is chosen),  $Z_j$ s are vector of TFP determinants such as household characteristics including cooperative credit access,  $\Theta_j$ s are coefficients of  $Z_j$  and  $\mu$  is an error term.

- Q = Gross value of total farm output per total value of farm inputs (Naira)  
 $X_1$  = Farm size cultivated for arable crops (hectare)  
 $X_2$  = Total amount of labour used in the last production season (Manday)  
 $X_3$  = Total of all variable capital/expenses on planting materials (Naira)  
 $X_4$  = Total quantity of fertilizer used (kg)  
 $X_5$  = Total quantity of other agro-chemical used (liter)  
 $X_6$  = Total quantity of fixed inputs depreciation (Naira)  
 $\beta_i$  = Estimated co-efficient of each factor (elasticity)  
 $Z_1$  = Age of the household heads (years)  
 $Z_2$  = Squared age of household heads (years)  
 $Z_3$  = Gender of the household heads, (1 = male; 0 = female)  
 $Z_4$  = Educational level of the household heads (years)  
 $Z_5$  = Household size  
 $Z_6$  = Income from farming (Naira)  
 $Z_7$  = Amount of credit accessed from cooperative society during the last production season (Naira)

$Z_8$  = Worth of income yielding assets owned by the farming households (Naira)

$Z_9$  = Total farm owned (hectare)

### Contribution of Cooperative Credit to Rural Farming households' Welfare

The contribution of cooperative credit to farming households' welfare was analyzed using household per capital consumption expenditure model. Household welfare is defined here as a household's command over market and non-market goods and services at the household level (Ravallion 1996). Welfare was proxy by income, consumption (amount spent on non-food items) and food consumption in the empirical analysis below. The income and consumption outcomes at the household level implicitly contain the effects of nutrition, health, education, asset endowments, climatic and market risks as well as institutional arrangements (Bruck, 2004).

The model is implicitly specified as:

$$C = X_i \beta_i + e_i \quad (6)$$

Where:

- C = Monthly consumption expenditure of the households (Naira)  
 $X_i$  = Set of exogenous determinants that include:  
 $X_1$  = Age of the farming household heads (years)  
 $X_2$  = Square age of the farming household heads  
 $X_3$  = Gender of the farming household heads (1 = male; 0 = female)  
 $X_4$  = Education level of the farming household heads (year)  
 $X_5$  = Household size (Number of persons)  
 $X_6$  = Dependency ratio (number of working household members/ total household size)  
 $X_7$  = Access to cooperative credit in last production season (Yes = 1; 0 = others)  
 $X_8$  = Farm income (Naira)  
 $X_9$  = Worth of income yielding assets owned by the farm (Naira)  
 $X_{10}$  = Total farm owned (hectares)  
 $\beta_i$  = Parameters to be estimated  
 $e_i$  = Stochastic residual term

**Table1: Socioeconomic Characteristics of the Rural Farming Household Heads**

Variables	Frequency	Percentage
<b>Age</b>		
< 30	1	0.8
30 – 40	41	34.2
41-50	41	34.2
51-60	23	19.2
> 60	14	11.6
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Gender</b>		
Male	113	94.2
Female	7	5.8
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Marital Status</b>		
Single	6	5.0
Married	113	94.2
Divorce	1	0.8
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Household Size</b>		
< 5	11	9.2
6-10	51	42.5
> 10	58	48.3
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Education Level</b>		
Pry	41	34.2
Sec.	31	25.8
Tertiary	12	10.0

Source: field survey, 2012

**Table2: Socio-economic Characteristics of the Farming Household Heads and Prominent Cooperative Society/Union in the Study Area**

Variables	Frequency	Percentage
<b>Farm Size</b>		
Large scale	8	6.7
Small Scale	36	30.0
Middle Size	51	42.5
Family Size	25	20.8
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Farming Experience</b>		
< 10	12	10.0
11-20	50	41.7
20-30	44	36.7
> 30	14	11.7
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Farm Labour</b>		
Self labour	11	9.2
Family labour	28	23.3
Hired labour	79	65.8
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Cooperative member status</b>		
Yes	98	81.7
No	22	18.3
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Cooperative Society Attended by Respondent</b>		
Irewunmi	32	26.7
Ibukunoluwa	23	19.2
Ifeoluwa	15	12.5
Ogo- Oluwa	28	23.3
Temidire	22	18.3
<b>Total</b>	<b>120</b>	<b>100</b>
<b>Benefit of Cooperative to Respondents</b>		
Access to loan	58	48.3
Access to Welfare Packages	21	17.5
No Access	41	34.2
<b>Total</b>	<b>120</b>	<b>100</b>

Source: field survey, 2012

**Table 3: Logit Regression Model Result**

Variables	Co-efficient	Standard Error	T- Value
Constant	-0.5391	0.1311	-0.41
X <sub>1</sub> : Sex	0.1062***	0.0146	7.28
X <sub>2</sub> Age	0.1296*	0.0677	1.92
X <sub>3</sub> : Education	-0.0914***	0.0188	-4.85
X <sub>4</sub> : Farming Experience	-0.0001	0.0001	-0.74
X <sub>5</sub> : Farm Size	0.1044*	0.1044	-1.90
X <sub>6</sub> : Household Size	0.0001	0.0001	1.06
X <sub>7</sub> : Marital Status	0.0001	0.0001	0.44
X <sub>8</sub> : Non-farm activities	0.1291*	0.6919	1.87
Chi-square	17.34***		
Log-likelihood Function	45.24		

**Source: field Survey 2012**

\*\*\*Significant at 1%, \*\*Significant at 5%, \*Significant at 10%

**Table 4: Multiple Regression Result**

Variables	Coefficient	Standard Error	T- value
(Constant)	-11.6800	0.4910	-23.80
X <sub>1</sub> : Farm size	-0.0450	0.0720	-1.35
X <sub>2</sub> : Farm labour	-0.0890**	0.0690	-2.15
X <sub>3</sub> : expenses on planting materials	0.2170***	0.0620	4.15
X <sub>4</sub> : fertilizer used	0.0350*	0.0210	1.87
X <sub>5</sub> : chemical used	0.8330***	0.0560	16.70
X <sub>6</sub> : fixed inputs depreciation	-0.1440	0.0600	-2.94
Z <sub>1</sub> : Age of Farming households	0.1190*	0.0020	1.77
Z <sub>2</sub> : Squared Age of Farming households	-0.0530***	0.0001	-2.65
Z <sub>3</sub> : Gender of Farming households	-0.0590	0.0001	-0.62
Z <sub>4</sub> : Education Level of Farming households	0.0610***	0.0020	2.79
Z <sub>5</sub> : Household Size	-0.1960*	0.0580	-1.96
Z <sub>6</sub> : Farm Income from Farming	-0.0030	0.2230	-0.03
Z <sub>7</sub> : Cooperative credit access.	0.3000***	0.0040	3.07
Z <sub>8</sub> : Worth of Income yielding assets	0.0030**	0.0001	2.03
Z <sub>9</sub> : Total Farm Owned	0.0830	0.0001	0.83
R <sup>2</sup>	0.92		
Adjusted R <sup>2</sup>	0.90		
F- value	142.91***		

**Source: field Survey 2012**

\*\*\*Significant at 1%, \*\*Significant at 5%, \*Significant at 10%



**Table 5: Contribution of Cooperative Credit to Farming households' Welfare**

Variables	Co-efficient	Standard Error	T-value
Constant	2698.4000***	1010.6500	2.67
X <sub>1</sub> : Age of the Farmer	0.2130**	36.1730	2.22
X <sub>2</sub> : Square age of the farmer	-0.0470	6.4530	-0.49
X <sub>3</sub> : Gender of the farmer	0.0160	0.0330	0.17
X <sub>4</sub> : Education Level of the farmer	0.0250***	41.9770	3.24
X <sub>5</sub> : Household Size	0.0670	997.2990	0.66
X <sub>6</sub> : Dependency ratio	0.1210	1640.1720	1.20
X <sub>7</sub> : Access to cooperative credit	0.0470**	3821.1020	2.43
X <sub>8</sub> : Farm Income	-0.0080	63.4420	-0.09
X <sub>9</sub> : Worth of income yielding assets owned	0.0350	3.8620	0.35
X <sub>10</sub> : Total farm owned	0.0540	0.0070	0.54
R <sup>2</sup>	0.62		
Adjusted R <sup>2</sup>	0.60		
F – value	2.79**		

Source: filed Survey 2012

\*\*\*Significant at 1%, \*\*Significant at 5%, \*Significant at 10%

## Result and Discussions

### Socio-economic Characteristics of the Respondents

The distributions of the socio-economic characteristics of rural farming household heads are presented in Tables 1 and 2. The results reveal that (68.4%) of the farming households were between 30 and 50 years of age. This implies that majority of the respondents fall within the economic active age group. Majority (94.2%) of the farming household heads were male indicating that farming activities in the study area were dominated by male-headed households. Frequency of the marital status showed that 94.2% of the respondents were married. This implies that farming households in the study area shoulder a lot of family responsibilities and this could also contribute to the availability of family labour. The study also revealed that 9.2% of the sampled respondents had less than 5 people in the household, 42.5 had between 6 and 10 people as their household size while 48.3 had more than 10 people as their household size. This large household size may boost the availability of family labour in the study area. Household heads that had no formal education accounted for 30%

of the respondents. The remaining 70% had formal education ranging from primary to tertiary education. This implies that the respondents are considerably educated.

A larger proportion (53.3%) of the respondents acquired land through inheritance, 15.8 and 29.2 through rent and lease respectively while 1.7% of the respondents acquired land through purchase. Furthermore, (42.5%) of the respondents cultivated a medium scale farm size, 20.8% cultivated a family size (subsistence) farming while, only 6.7% cultivated a large scale farm size. The relatively small farm size could be due to the farming households' inability to access large expanse of land for farming purpose in the study area. The result further shows that 78.4% of the sampled respondents had farming experience between 11 and 30 years. This implies that the respondents are very knowledgeable in their farming activities. Distribution of the respondents by cooperative activities revealed that 81.7% of the total respondents were cooperators and there were 5 prominent cooperative societies in the study area. About 48.3% of the cooperators had access to loan, 17.5% had access to only welfare packages such

as seeds and farm implements while 34.2% claimed they are yet to benefit from the cooperative society/union due to short duration spent with the society. This shows that not all the cooperators have access to loan facilities in the past one year.

#### **Determinants of Rural Farming households' Participation in Cooperative Society**

The logit regression model result on determinants of rural farming household heads' participation in cooperative society is presented in Table 3. The result showed that the co-efficient of sex, age, farm size and non-farm activities were positive and statistically significant, thus determined household heads' participation in cooperative society. Gender was significant at  $p < 0.01$ . This implies that the male-headed household heads participated more in cooperative society than their female-headed counterparts. The reason for this is attributed to the fact that farming activities in the study area were dominated by male-headed households. Age was also significant ( $p < 0.10$ ) implying that the likelihood of participation in cooperative society increases as the household heads grow older. The coefficients of farm size and non-farm activities were also significant ( $p < 0.10$ ) in determining the farming households' participation in cooperative society. This implies that the likelihood of household heads' participation in cooperative society increases with increase in farm size and non-farm activities. Education of the farming household heads measured by years of schooling negatively and significantly ( $p < 0.01$ ) influenced the farming households' participation in cooperative society meaning that the likelihood of participation in cooperative society decreases as the farming household heads increase in educational levels. This may be due to the fact that highly educated farming household heads are not resident in rural areas, thus more involved in non-farm activities in the city/town.

#### **Effect of Cooperative Credit on Farm Productivity**

The result of the multiple regression on the effect of cooperative credit on farm productivity is presented in Table 4. The F-value of 142.91 is significant at ( $P < 0.01$ ) indicating that the model has a good fit in modeling factors that influence

farm productivity among the rural farming households. The  $R^2$  value of 0.915 indicates that about 91% variations in farming households' productivity were explained by the cooperative related factors. The result of the Cobb-Douglas production function reveals that the coefficients of expenses on planting material, quantity of fertilizer used and quantity of chemical used had positive significant relationship with farm productivity. This supported the claim of Sarris, *et. al* (2006) who noted that judicious use of farm inputs has positive impact on farm productivity. This implies that access to cooperative credit has positive effect on farm productivity. Also the co-efficient of labour is statistically significant but negative. This implies that a continuous investment in labour (hired) could reduce the households' productivity.

The results further showed the significant instrumental variables as they affect farm productivity. The result showed that age of the household heads and its square, education, household size, as well as worth of income yielding asset owned by the households were significant determinants of farm productivity. Age of household heads and its square are both significant with a positive and negative signs respectively as expected. This indicates that farm productivity increases ( $p < 0.10$ ) with increase in age of the household heads in early years, but declines ( $p < 0.01$ ) as the household heads become aged. A unit increase in the age of the household heads will increase share of farm productivity by 0.119 units in early years and decrease it by 0.53 units as the household heads become aged. Education of the household heads measured by years of schooling positively and significantly ( $p < 0.01$ ) influenced the household heads' farm productivity which implies that the higher the level of formal education acquired by the farming households, the more their farm productivity. Household size had positive and significant ( $p < 0.10$ ) effect on farm productivity. This implies that farming households with larger family size tend to depend more on household members as a means of increasing their farm productivity. Also worth of income yielding asset owned by the farming households had positive and significant relationship with farm productivity. This implies that a unit increase in worth of income yielding asset owned by the

farming households will increase farm productivity by 0.003 units. Above all, access to cooperative credit had significant ( $P < 0.01$ ) positive effect on farm productivity. Thus household heads with access to cooperative loan are more productive than those without cooperative loan.

#### Contribution of Cooperative Credit to Household Welfare

The result of the ordinary least square on the effect of contribution of cooperative credit to rural household welfare is presented in Table 5. The F-value of 2.79 is significant at 5% implying the model is of good fit. Also, the  $R^2$  indicates that about 62% of the variations in household per capital consumption expenditure were jointly explained by the set of explanatory variables. The result (Table 5) showed that age of the household heads, educational level and access to cooperative credit in the last production season were the significant factors that determined the contribution of cooperative credit to household welfare. The coefficient of age, education, and access to cooperative credit had positive significant relationship with the household welfare. An increase in the age of the household heads ( $p < 0.05$ ), education ( $p < 0.01$ ) and access to cooperative credit ( $p < 0.05$ ) will have corresponding increase in the contribution of cooperative credit to household welfare. This implies that as the household heads grow older, they tend to participate in cooperative societies, and access to cooperative loan was found to increase productivity, thus resulting in more positive effect on households' welfare. This supports the claim by Bruck (2004) who reported that cooperative credit has positive effect on household welfare.

#### Conclusion and Recommendations

The findings revealed that majority of the sampled household heads are male-headed and relatively educated. The result from the logit regression model showed that sex, age, farm size and non-farm activities were significant determinants of household heads' participation in cooperative society. Expenses on planting material, quantity of fertilizer used and quantity of chemical used had positive significant relationship with farm productivity. It was further

revealed that age of the farming household heads and its square, education, household size, access to cooperative credit as well as worth of income yielding asset owned by the households were significant determinants of farm productivity. Also, age of the farming household heads, educational level and access to cooperative credit were the significant factors that determine the contributions of cooperative credit to households' welfare. The study concluded that cooperative credit has positive effect on the productivity and welfare of rural farming household heads who are cooperators and have access to credit from cooperative society. The study therefore recommended that the rural farming household heads in the study area should be adequately educated on the benefits of belonging to a cooperative society. Lastly, Farming household heads should be encouraged to invest cooperative loan on farming to enhance their welfare.

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