Agricultural Extension Services And Poverty Reduction In Nigeria: A Case Of Farmers Cooperative Societies In Kano State Nigeria

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Abstract: This study examines the effect of agricultural extension services on poverty reduction among members of farmers' cooperative societies in Kano State Nigeria. A cross-sectional survey research design was adopted. Primary data collection method was used in which self-administered questionnaire were distributed to a total sample of 217 respondents selected from the target population of 498 members of farmers' multi-purpose cooperative societies. Pearson correlation and binary logistic regression model were used to determine the influence of agricultural extension services on poverty reduction among the respondents. The mean per capita expenditure was used as a dependent variable, while agricultural extension services as the independent variable.

The results showed that getting access to market, access to inputs, access to credits, assisting poor farmers to improve their farming productivity, demonstration of farming methods, and assisting poor farmers to generate more income accounted for 63.09% variation in agricultural extension services. Further analysis from correlation and logistic regression showed that there was negative significant relationship between agricultural extension services and poverty reduction among members of farmers' cooperative societies in this research. This means that as agricultural extension services increases the poverty level among members of farmers' cooperative societies falls or decreases. The study recommended that providing good access to market, access to inputs, access to credits, assisting poor farmers to improve their farming productivity, demonstration of different farming methods, and assisting poor farmers to generate more income should be adequately taken into consideration.

Keywords: Agricultural extension services, farmers' cooperative societies, poverty

I. INTRODUCTION

This study examines the effect of agricultural extension services on poverty reduction among members of farmers' cooperative societies in Kano State Nigeria. The agricultural extension services is one the objectives of Farmers Empowerment Programme (FEP) which was designed and implemented under National Poverty Eradication Programme (NAPEP) in 2007 with the sole purpose and mandate of fighting or alleviating poverty levels among members of farmers' cooperative societies in Kano State, Nigeria.

In spite of the above mandate, there are several concerns (complaints) about the persistent increase of poverty level among farmers in Kano State in particular and Nigeria in general (Garba, 2006; National Bureau of Statistics, NBS, 2010; Okpe and Abu, 2009; World Bank, 2015).

In 2004, the national statistics showed that 68.9 million (54.89%) people were affected by poverty in Nigeria, but this problem has continued to get degenerated as the number of people living in poverty increased from 112.47 million (69%) in 2010 to 119 million (70%) in 2015 (National Bureau of Statistics, NBS, 2004; 2010; 2012). While, in the geo-political

zones/regions National Bureau of Statistics (NBS, 2012), reported that the poverty level in Nigeria was lowest in the South-West geo-political zone (59.1%) and that the North-West geo-political zone had recorded the highest poverty rates in the country with 77.7% and 62% of the farmers are poor. Hence, Kano State was chosen for this research because it is the most populated state in the North-Western Nigeria and the poverty rate in the state is 72.3% which is greater than the national level of 70%.

Therefore in the light of the above situation, it was necessary to carry out this study in order to examine the effect of agricultural extension services on poverty reduction among members of farmers' cooperative societies in Kano State Nigeria.

II. LITERATURE REVIEW

Agriculture plays an important role in both poverty reduction and economic growth. Agriculture remains the main source of income for many people in the developing world (FAO, 2003). The impact of the agricultural sector is wide-ranging and extends to economic growth, food security, poverty reduction, livelihoods, rural development and the environment. Moreover, the poorest half of the population benefits significantly more from agricultural growth than growth in other sectors of the economy (UN, 2008; World Bank, 2007). Therefore, agricultural extension is one of the important factors that leads to the growth and development of agricultural sector which invariably leads to poverty reduction among many poor farmers in developing world where majority of people engaged in one form of agricultural activity or the other.

Mahaliyanaarachchi (2003) defined agricultural extension as an ongoing, non-formal educational process which occurs over a period of time and it leads to improve the living conditions of farmers and their family members by increasing the profitability of their farming activities. In this activity, to achieve above goals, it expects the improvement of the farmer's knowledge, skills and change of their attitudes in agricultural technology, farming activities and agricultural marketing. Agricultural extension and advisory services play an important role in agricultural development and can contribute to improving the welfare of farmers and other people living in rural areas. On the other hand, Anderson (2007) defined the terms agricultural extension and advisory services as the entire set of organisations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods.

However, it has been argued that in the Agricultural sector, extension services approaches and methods play a vital role in sharing knowledge, technologies, agricultural information and also linking the farmer to other actors in the economy. The extension services approaches and methods are, therefore, one of the critical change agencies required for transformation of subsistence farming to modern and commercial agriculture. This is critically important in promoting household food security, wealth creation and poverty reduction (Ministry of Agriculture-Kenya, 2007).

Agricultural extension services are now a major activity and basic element in programmes and projects formulated to bring about agricultural development and improvement in the quality of lives of the poor farmers (NDPC, 2011). Today extension should look into increasing the productivity of the farming business as a whole. It includes both direct farming activities and off farm or farming related activities. Agricultural extension should assist, guide and direct farmers to identify both farming and non-farming activities which can increase their net income as well as reduce their poverty level.

Through provision of extension services, the field extension staffs are mandated to transfer proven and accepted farming practices to farmers in a participatory manner and to assist them to secure micro-loans to help them get started on their own farms or expand them. The field extension staffs are also expected to teach rural farmers post-harvest processing and storage of the foodstuffs. They also provide credit and market-access assistance to the farmers to secure capital for their activities and to sell their surplus crops to generate income for their families (MoFA, 2007).

Scholars such as Dercon, Gilligan, Hoddinott and Wolddhanna (2008); Egziabher, Mathijs, Deckers, Gebrehiwot, Bauer and Maertens (2013); Falsafi, Jangchi and Parsmehr (2014); Hasan, Imai, and Sato (2013); and Nigussie, Adisu, Desalegn and Gebreegziabher (2016) were interested in studying the roles of agricultural extension services and poverty reduction. Dercon, et al. (2008) studied the impact of agricultural extension and roads on poverty and consumption growth in fifteen Ethiopian villages, using longitudinal household data from Ethiopia Rural Household Survey (ERHS) 1994-2004 consisting of 1,477 households. Adopting regression model, they related extension services that were livestock, family size and cultivable land to the consumption and poverty. They found that public investment that led to improvement in roads quality and increased access to agricultural extension services led to faster consumption growth and lower rates of poverty among poor farming households.

Egziabher, et al. (2013) analysed the impact of the Integrated Household Extension Programme (IHEP) in Tigray region in northern Ethiopia, using cross-sectional survey data form 743 farm households of which 363 received extension services and 371 did not receive the service. Adopting propensity score matching and regression model, they related participation in extension service programme which were household characteristics (i.e. age, education, sex, family size and adult labour force in the household), farm characteristics (i.e. land size, livestock, and oxen), social capital (i.e. membership of iddir organisation), and distance to market to the welfare or poverty reduction. They established that the programme had contributed significantly to rising income, investment as well as welfare which led to the poverty reduction among poor farm households.

Falsafi, et al. (2014) evaluated the viewpoint of the villagers about the role of extension programmes in agricultural development and poverty reduction through provision of low-interest credit, using self-administered questionnaire in which the data were collected from 144 respondents in Ab-shirin region of Kashan City in Iran. Adopting descriptive and correlation analysis, they found that

there was a significant relationship between impacts of extension programmes, the proper use of the funds provided by the government and poverty reduction among poor farm households.

Hasan, et al. (2013) examined whether participation in different agricultural extension programmes had any effect on household crop productivity, poverty or vulnerability in Uganda, drawing upon Uganda National Panel Survey in 2009-2010. Using probit model where the dependent variable poverty was determined by mean per capita expenditure (MPCE) of the household and the independent variables were participation in extension service programmes provided by National Agricultural Advisory Services (NAADS), NGO, Cooperatives, large farmers, input supplier and other types of extension service providers. They found that participation in extension service programmes played a significant role in reducing poverty level and vulnerability among poor household farmers.

Nigussie, et al. (2016) examined the impact of agricultural extension system or service on small-scale irrigation on total income, and the probability of being poor or not at household level. In order words, the study compared households with and without access to extension systems in which the study was carried out on 900 extension users' households and 875 non-extension users totaling of 1775 households in Afar, Oromia and Somali regional states of Ethiopia. Using probit model where the dependent variable poverty level was binary (1 if household was poor when its annual income was in the lower quartile, and 0 if household was classified as non-poor) and determined by independent variable such as education, household characteristics, asset holdings, and access to services. They found that education, extension service access, total land holding all had a significant level of increment in income, while with marginal analysis factors like household leaders' age, access to credit and dependency ratios were negatively related with total income. They also established that in general, the average annual income of extension users with application of small scale irrigation households was significantly greater than non-extension users. This shows that extension users in small-scale irrigation significantly promote total income of a household and the poverty incidence in non-extension user households is by far greater than user households.

III. RESEARCH METHODOLOGY

This study adopted a cross-sectional research design because necessary information about the role of agricultural extension services on poverty reduction among different members of farmers' multi-purpose cooperative societies was gathered through the use of self-administered questionnaire and interview at a go. This choice of the research design is supported by the statement of Sekaran (2003) that when a researcher is faced with a situation where he/she will gather data just once from a cross-section of different respondents for the purpose of answering research questions the appropriate research design for him/her is cross-sectional research design. On the other hand, Amin (2005) contended that a cross-sectional survey is the most commonly used research method

in social science research. The cross-sectional research design required one to use a number of data collection methods and collect information from a cross-section of respondents (Sekaran, 2003). This study also employed a mixed methodology approach which involves using quantitative and qualitative approach.

STUDY POPULATION

The target population of this study consists of 498 members of 18 different farmers' multi-purpose cooperative societies. Sampling strategies used in this study was random sampling technique and specifically stratified random sampling technique was chosen because the cooperative societies were heterogeneous in their productive activities (Amin, 2005; Bogere and Gesa, 2015; Kothari and Garg, 2014; and Odiya, 2009).

SAMPLE SIZE DETERMINATION

217 sample size was selected from the target population of 498 using Krecie and Morgan (1967)'s formula as can be seen below;

$$s = \frac{x^2\,Np\,(1-p)}{d^2\,(N-1)+ x^2\,p(1-p)}$$
$$= \frac{3.841 \times 498 \times 0.50(1-0.50)}{(0.05)^2(498-1) + 3.841 \times 0.50(1-0.50)}$$
$$= 217$$

SAMPLE SIZE DISTRIBUTION

For proper distribution of these 217 sample size the proportional stratified random sampling technique was used under which the sizes of the samples from the different strata were kept proportional to the sizes of the strata (Kothari and Garg, 2014). This can be shown in table 1 below;

S/N	Stratified Cooperative Societies	Population	Sample Size
1	Crop Production Cooperative Societies	106	46
2	Agro-processing Cooperative Societies	173	75
3	Livestock Production Cooperative Societies	219	96
	TOTAL	498	217

Source: Researcher's calculation from NAPEP, 2007
Table 1: Allocation of 217 Sample Size to Three Different Strata

Table 1 shows how 217 sample sizes were distributed using proportional stratified random sampling formula to three different strata of farmers' multi-purpose cooperative societies.

DATA COLLECTION METHOD

This study used primary data collection method which involved survey/questionnaire and personal interview. The data collection instruments used in this study were questionnaire and interview guide.

VALIDITY OF THE RESEARCH INSTRUMENTS

It is observed that validity of the research instrument is concerned with the idea that research design fully addressed the research objectives. The validity of a research instrument is the degree to which the instrument actually measures or collects data on what it is really intended to measure (Kakinda-Mbaga, 1990). In this current study, the validity of the research instrument was established through a validity test using face validity, content validity and construct validity.

FACE VALIDITY

This is where the supervisors were provided with the draft of the research instrument (questionnaire) to check for its validity. Face validity is important because it provides an Idea about the validity of the instruments used (questionnaire). Therefore, the supervisors were provided with the draft of the questionnaire for their inputs. Hence their inputs were used to improve the instrument.

CONTENT VALIDITY

To ascertain the content validity, content validity index (CVI) was computed from the responses of 10 specialists or experts in the field of study in which they assessed the questionnaire items' suitability and relevance vis-à-vis to the objectives of the study. Therefore, these assessors or experts were asked to rate the validity of all the items on the questionnaire using the scale of: not relevant (NR) = 1; somewhat relevant (SR) = 2; quite relevant (QR) = 3; relevant (R) = 4; and very relevant (VR) = 5. The relevant and very relevant were summed up and divided by the sum of all items as can be seen using content validity index formula and the result was shown below;

$$CVI = \frac{Number\ of\ questions\ ticked\ relevant\ (R\ \&\ VR)}{Total\ number\ of\ questions}$$

= 0.9357

Therefore, comparing this result with the conventional research wisdom which requires that a credible research instrument should have validity score from 0.7 and above shows that the questionnaire items and the whole questionnaire is credible and valid for use in this research (Amin, 2005; Sekaran, 2003; Sullivan, 2001).

CONSTRUCT VALIDITY

The questionnaire was subjected to the factor analysis (Exploratory Factor Analysis, EFA) to determine its validity using construct validity (convergent) test. The convergent validity test was shown in table 2

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.761
Bartlett's Test of Sphericity	Approx. Chi-Square	832.843
	Df	15
	Sig.	.000

Source: primary data (2016)

Table 2: Convergent Validity Results of Agricultural Extension Services

The table 2 shows Exploratory Factor Analysis (EFA) results of the study variable (agricultural extension services). The KMO value (0.761) shows that the variable was acceptable as it had a value greater than 0.5, the Bartlett's test of sphericity Sig. value was 0.000. The rule of thumb states that KMO should be greater or equal to 0.5 to show sample adequacy, while Bartlett's test of sphericity Sig. value should be less than 0.05 (Field, 2009). Based on this assumption it implies that the study sample was adequate enough to continue with factor analysis.

RELIABILITY OF THE RESEARCH INSTRUMENTS

The importance of research reliability calls for concern to ensure that the data collection instrument should be able to yield the same results when repeated tests are conducted on the same respondents under the same conditions (Koul, 2004). Therefore, the data obtained from the pilot study were subjected to reliability test through the use of the Cronbach's (1964) alpha (α) test so as to ascertain the internal consistency of the study variables or questionnaire items. Therefore, reliability tests using Cronbach alpha are shown on the table 3:

Cronbach Alpha	Number of items
0.860	14

Sources: Field Research, 2016

Table 3: Reliability Tests Results

The reliability test of the questionnaire items from the table 3 using Cronbach alpha test shows that agricultural extension services scored 0.860; Classification on quality of Cronbach's Alpha value by George and Mallery (2003), state that value of 0.9 to 1 is excellent, between 0.8 and 0.899 is good, 0.7 to 0.799 is acceptable, 0.6 to 0.699 is questionable and 0.5 to 0.599 is poor, and below 0.5 as unacceptable. The result obtained from this analysis as depicted from table 3 shows that Cronbach's Alpha value was high, indicating a high reliability of the research instrument. Therefore, this implies that the questionnaire items and the whole questionnaire are reliable, credible and consistent for use in this research (Amin, 2005; Sekaran, 2003; Sullivan, 2001).

IV. FINDINGS PRESENTATION, INTERPRETATION AND DISCUSSION

In this section of the paper, findings, interpretation and discussion were all handled at the same time. First the descriptive statistics and factor structure (component metrics) of agricultural extension services were presented and thereafter the correlation and regression of the study objective was presented.

DESCRIPTIVE STATISTICS OF AGRICULTURAL EXTENSION SERVICES

Descriptive statistics describing the characteristics of the study variables and the relationship that exists between agricultural extension services and poverty reduction were presented below.

	Mean	Std. Deviation	Analysis N
The extension agents have demonstrated the methods of farming to us	3.2488	1.40386	213
Extension services i have received assist me in getting access credits	3.3803	1.38761	213
Extension services i have received assist me in getting access to market	3.3192	1.38095	213
Extension services i have received assist me in getting access to input	3.3146	1.38374	213
Extension services i have received assist me in improving my farming productivity	3.3239	1.39515	213
Extension services i have received assist me in generating more income	3.1127	1.47510	213

Source: primary data (2016)

Table 4: Descriptive Statistics of Agricultural Extension Services

Table 4 shows that the extension agents had moderately (mean = 3.2488) demonstrated farming methods to the members of Farmers' cooperative societies in this study. This implies that members of Farmers' Cooperative Societies in this study agreed that they had moderately been taught various methods of farming by the agents of Farmers' Empowerment Programme. The Table 4 further depicts that members of Farmers' Cooperative Societies in this study agreed that the extension services they received had moderately (mean = 3.3803) assisted them in getting access to credits. The implication of this is that as members of Farmers' Cooperative Societies get more access to credit their productivities would improve which helps them acquire more income and hence, their poverty level reduced.

Additionally table 4 reveals that members of Farmers' cooperative societies in this study agreed that the extension services they received had on average (mean = 3.3192) assisted them in getting access to market. This means that Farmers' Cooperative Societies members agreed that they were taught different methods or techniques of getting access to more and different markets that they can sell more of their produce which would help them get more income and hence, their poverty status reduced.

However, table 4 shows that members of Farmers' Cooperative Societies in this study agreed that the extension services they received had moderately (mean = 3.3146) assisted them in getting access to input. This implies the members of Farmers' Cooperative Societies were taught on average about different methods of accessing more inputs by extension services agents.

Table 4 also illustrates that members of Farmers' Cooperative Societies in this study agreed that the extension services they received had on average (mean = 3.3239) assisted them in improving their farming productivity. Finally the table 4 indicates that members of Farmers' Cooperative Societies in this study agreed that the extension services they

received had moderately (mean = 3.1127) assisted them in generating more income and hence, their standard of living improved.

COMPONENT MATRIX AND VARIANCE EXPLAINED OF AGRICULTURAL EXTENSION SERVICES

An analysis of component matrix and variance explained were carried out in order to determine what constitute the items of agricultural extension services. Therefore, the data was factor analysed using the principal component method with varimax rotation to determine whether the items created to measure the variable were representative of the variable. According to Steven (2009), a factor loading level of 0.5 is regarded as significant and also according to the Keiser criterion items with Eigen values larger than one should be selected (Field, 2009).The results are depicted in table 5:

	Component (Extension Services)
Extension services i have received assist me in getting access to market	.869
Extension services i have received assist me in getting access to input	.840
Extension services i have received assist me in getting access credits	.840
Extension services i have received assist me in improving my farming productivity	.789
The extension agents have demonstrated the methods of farming to us	.713
Extension services i have received assist me in generating more income	.698
Eigenvalues	**3.785**
% of Variance	**63.088**
Cumulative %	**63.088**

Extraction Method: Principal Component Analysis; a. 1 components extracted,

Source: primary data (2016)

Table 5: Component Matrix and Variance Explained of Agricultural Extension Services

The results of table 5 shows that getting access to market, access to inputs, access to credits, assisting poor farmers in improving farming productivity, demonstration of farming methods, and assisting poor farmers in generating more income accounted for 63.09% variation in agricultural extension services. Furthermore, the results indicates that all the items have Eigen values of greater than one, implying that they should be accepted. The results also reveal that all the items were significant as they all had a factor loading values of more than 0.5 ranging; 0.869, 0.840, 0.840, 0.789, 0.713, and 0.698. This signified that the validity was by convergent.

RELATIONSHIP BETWEEN AGRICULTURAL EXTENSION SERVICES AND POVERTY REDUCTION

In this section, analysis of relationships between agricultural extension services and poverty reduction was undertaken in order to establish how extension services affect poverty level among the respondents. Pearson correlation was

first executed to determine their relationship and thereafter the binary logistic regression was also performed to find out by what percentage the agricultural extension services have contributed to the alleviation of poverty level among members of farmers cooperative societies in this research. This was intended to provide support or otherwise of the null hypothesis which states that "agricultural extension services have not significant relationship to poverty level among members of farmers' multi-purpose cooperative societies in Kano State, Nigeria".

As it was clearly indicated, the hypothesis was first tested using bivariate correlation which yielded the results that proved the existence of negative significant relationship between agricultural extension services and poverty reduction among members of farmers' cooperative societies in the study [$r(213) = -0.487$, $p<0.01$]. It is easy to understand that agricultural extension services are factors that influence poverty reduction among members of farmers' cooperative societies in this study. The relationship being negative implies that the more agricultural extension services are provided, the more poverty is likely to be reduced or alleviated among members of farmers' cooperative societies in Kano State, Nigeria.

Furthermore, to get the more details or general picture on the overall influence of agricultural extension services on poverty reduction among members of farmers' cooperative societies in this research the binary logistic regression was performed.

| | | B | S.E. | Wald | Df | Sig. | Exp(B) | 95.0% C.I. for EXP(B) | |
								Lower	Upper
Step 1[a]	Extension Services	-.510	.190	7.216	1	.000	.601	.414	.871
	Constant	2.396	.647	13.730	1	.000	10.976		
	a. Variable(s) entered on step 1: Extension Services								

Source: primary data (2016)

Table 6: Logistic Regression Results for Agricultural Extension Services and Poverty

The results of logistic regression result on table 6 further reveals that agricultural extension services was negatively statistically significant (beta = -0.510, p < 0.01) in reducing poverty level among members of farmers' cooperative societies in this research. The results also showed that increasing agricultural extension services by 1 unit, the probability or likelihood of members of farmers' cooperative societies falling into poverty or being affected by poverty decreased by 0.510. The results further shows that increasing agricultural extension services by 1 unit the odd ratio or probability of the poverty levels among members of farmers' cooperative societies will reduce by 0.601time.

It is therefore, clearly depicted that based on these findings the null hypothesis (H^1_O) which states that; "agricultural extension services have not significant relationship to poverty level among members of farmers' multi-purpose cooperative societies in Kano State, Nigeria" was rejected and the alternate hypothesis (H^2_O) which states that; "agricultural extension services have significant relationship to poverty level among members of farmers' multi-purpose cooperative societies in Kano State, Nigeria" was accepted.

The finding of this study is in agreement with Dercon, Gilligan, Hoddinott and Wolddhanna, 2008; Egziabher, Mathijs, Deckers, Gebrehiwot, Bauer and Maertens, 2013;

Falsafi, Jangchi and Parsmehr, 2014; Hasan, Imai, and Sato, 2013; and Nigussie, Adisu, Desalegn and Gebreegziabher, 2016. Dercon, et al (2008) evidenced that public investment that led to increase access to agricultural extension services promoted faster consumption growth and lower rates of poverty among poor farming households. They also established that there was significant relation between extension service visit and poverty reduction among the farming households. Egziabher, et al (2013) established that extension service programme had contributed significantly to rising income, investment as well as welfare which led to the poverty reduction among poor farm households. Falsafi, et al. (2014) found that there was a significant relationship between impacts of extension programmes, the proper use of the funds provided by the government and poverty reduction among poor farm households. Hasan, et al. (2013) established that participation in extension service programmes played a significant role in reducing poverty level and vulnerability among poor household farmers.

V. CONCLUSION

This study aimed at examining the affect of agricultural extension services on poverty level among members of farmers' multi-purpose cooperative societies in Kano State, Nigeria. The study found that majority of the members of farmers' cooperative societies agreed that the extension service agents had demonstrated methods of farming to them; extension service agents also had assisted them in getting access to credits, market, inputs which led to increase of their productivities and income. Further analysis from correlation and logistic regression showed that there was negative significant relationship between agricultural extension services and poverty reduction among members of farmers' cooperative societies in this research. This means that as agricultural extension services increases the poverty level among members of farmers' cooperative societies falls or decreases.

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