

**EFFECTIVE AGRICULTURAL EXTENSION SERVICE: A STRATEGY FOR IMPROVING FOOD PRODUCTION IN NIGERIA**

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**Abstract**

*Despite the level of resources potentially available for the development of the agricultural sector in Nigeria, it has performed below global average over the past three decades. In reaction to this, several policies have also been employed by successful governments in an attempt to revamp the sector but the achievement of any of these policies has been minimal because of dwindling investments, low capital and political commitment. The objective of this study was therefore to examine the impact of agricultural extension services on food production in Nigeria. The study relied mainly on a randomized primary data from farmers in Oshin, Oke-Oyi in Ilorin East Local Government of Kwara State through a structured questionnaire. The data collected were analysed using the descriptive and inferential statistics (Multinomial Logit Model (MLM)). The results show that most of the farmers under the Oshin Irrigation scheme indicated that the scheme has greatly improved their farm outputs and reduced their cost of production. It has also promoted private farmers' partnership with the government agricultural extension service. This had made them have constant access to government extension services more than their non-member farmers. The study, therefore, recommended the shaping of a general policy package to induce the youth back to agriculture, an arrangement such as the one at Oshin irrigation scheme. Also, it was recommended that availability and accessibility of credit facilities to farmers should be enhanced so as to enable them acquire more modern farm implements and other inputs towards increased productivity.*

**Keywords:** *Extension Services, food crops, Multinomial Logit Model, Irrigation scheme, Oshin*

**Introduction**

The economic history of Nigeria cannot be written without recourse to the contribution of agriculture. It has been seen as a fundamental precondition for economic development (see for example, Eicher & Witt, 1964; Oluwasanmi, 1966; Jones & Wolf, 1969). This is because it has the potential to spring-board industrial development. The experience of some developed countries is a striking example of how agriculture can advance beyond its primary function of supplying food and fibre (Humbert, 2000). At the earliest stage (first decade of independence), Nigeria's economic planning and development was based on agriculture which made some to have referred to the Nigerian economy as an agricultural economy (Ogen 2003). Agriculture contributes immensely to the Nigerian economy in various ways namely, in the provision of food for the increasing population; supply of adequate raw materials (and labour input) to a growing industrial sector; a major source of employment; generation of foreign exchange earnings; and, provision of a market for the products of the industrial sector (Okunmadewa, 1997; World Bank, 1998; Winters, Janvry, Sadoulet & Stamoulis, 1998; FAO, 2006).

The discovery and exploration of oil and its boom has however led to the neglect of the agricultural sector. This was either as a result of individual and government's lackadaisical attitude, and improper policy environment at the expense of the expected increasing national wealth and food sustenance. Several policies have also been employed by successful governments in an attempt to revamp the sector. Despite these efforts, the achievement of any of these policies was minimal and productivity in the sector has remained low when compared with global average due to the inadequate public spending, many years of underinvestment, corruption and mismanagement which have made the sector retrogressive. Moreover from the mid 70s, Nigeria became a net importer of various agricultural products (Alkali, 2007). In addition, the private sector too tends to neglect the agricultural sector for lack of incentives, while credit and investment flow towards the energy, construction, and services sectors.

However, despite the slow growth of agriculture and food production in Nigeria, agriculture still remains the bedrock of the rural economy in Nigeria. It is having a strong hold on the national economy and offering considerable entrepreneurial opportunities to a large chunk of the population, mostly on a subsistent level (Central Bank of Nigeria, 2006). Increased agricultural productivity depends primarily upon the acceptance of cultural and technological changes at the rural farm level. Thus, for Nigeria agriculture to improve, farmers have no alternative but to learn and adopt recommended scientific farming techniques in place of their traditional practices. Nigeria cannot achieve increased agricultural productivity on rural farm level, except through the provision of basic agricultural education, particularly the non-formal or extension type that will help move millions of the farmers from traditional to progressive farming, thereby improving the overall quality of rural life (Anaeto, et al., 2012). There is no doubt that agricultural extension is crucial in improving the agricultural sector in many parts of the world for the benefit of small farmers, sustainability and income convergence over time (Umar & Mahmood, 2007). Effective extension service is an essential factor for improving the lot of rural farmers, particularly in the developing countries (Ani, 2007). Studies like Walker et al. (2004) among others assert that agricultural extension had a negative and statistically insignificant impact on individual and household income.

In view of the foregoing, this study was designed to investigate the impact of agricultural extension services on agriculture production among food crop farmers in Oshin, Oke-Oyi in Ilorin East Local Government of Kwara State. The specific objectives are to describe the socio-economic characteristics of the respondents; examine the relevance of farming practices introduced by extension agents to farmers under the irrigation scheme compared to non-members; the impact of private farmers' participation in partnership with government agency; the major food crops grown by the farmers; and, the major constraints faced by the food crop farmers. The rest of this paper is divided into four parts; part II contains the conceptual framework and review of literature; part III contains the methodological issues; presentation and discussion of results is contained in part IV; while part V concluded and recommended.

## **Conceptual Framework and Review of Literature**

### **Concept and Nature of Agriculture Extension Services in Nigeria**

It is not very easy to define agricultural extension in a short concise, phrase or statement. However, different authorities and experts have defined extension in different forms and ways where they show that it involves improvement in the standard of living of the people (Anaeto, et al., 2012). Maunder (1978) defined agricultural extension as a service or a system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, and bettering their levels of living as well as uplifting the social and educational standards of rural life. It is also defined as a piece of advice and an assistance given to farmers and their families through educational procedures on new farming methods and techniques in order to improve their production and income, bettering their level and uplifting the education and social standard of the farmers (Alabi & Mafimisebi, 2004; Adejo, Okwu & Ibrahim, 2012).

Furthermore, some of the specialised public extension schemes implemented in Nigeria include: farm settlement scheme, National Accelerated Food Production Programme (NAFPP) (1972), Operation Feed the Nation (OFN) (1976), River Basin and Rural Development Authorities (1976), Green Revolution Programme (1980), and the World Bank-Funded Agricultural Development Project (ADP) (1974) (Bassey, 2012). In addition, the models of extension approaches currently used in Nigeria include some of the following: training and visit (T&V) extension; University operated extension; Ministry of agriculture operated extension; Commodity/Sectoral agency extension; Special programme for food security (SPFS); Sasakawa Global 2000 (SG 2000); and Community based agricultural and rural development approach (CBARDA). The farmers' field school, which is just introduced, is still under incubation; it is the participatory approach extension service (Hamisu et al., 2017).

### **Empirical Review of Literature**

Obviously, from the previous literature, evidence have shown that there are numerous studies on the agricultural extension services. One of such studies is that of Nwankwo (2010) who examined the impact of agricultural extension services on agricultural development among the rural farmers in Ibiaku, Ikono Local Government Area of Akwa Ibom State. The data were sourced from the primary data among one hundred farmers and was analysed using simple percentage. The results concluded that agricultural extension service has created a tremendous effect in changing or influencing the activities of rural farmers in Ibiaku community. The study thus recommended that there should be increase in the number of extension workers that visit the farmers and their efforts be intensified so that they will be able to reach all the farmers and address their problems.

Auta and Dafwang (2010) assessed the performance of the Agricultural Development Projects in Nigeria. The data was collected through PRA, questionnaire, interviews and focused group discussions with farmers. The ranking shows that 63.6% of the ADPs have weak or very weak funding status. Only 22.7% had good to excellent funding status. In most of the ADPs, the number of extension workers had been reduced drastically due to various

reasons. Notable among them is poor funding which has resulted in the reduction in extension activities. That in turn has pushed some staff to voluntarily leave the ADPs for greener pastures. Despite the funding problems, 89% of the states paid visits to farmers, 68% established SPATs while 54% established OFARs in 2008. The study recommended that the National Agricultural Extension and Rural Development Policy be put in place with the necessary structures and processes that would ensure sustainable agricultural development and improved livelihoods.

Akpomedaye (2010) reviewed the strategies of agricultural extension to boost food production in Nigeria. The study asserted that agricultural extensions have contributed positively towards the welfare of rural farmers such as increase in food productivity, help farmers to adopt new technology and innovations systems, help to raise farmers' income and improve farmers' literacy. The study further identified poor communication skill, late adopters and never adopters, transportation problem and lack of finance as the major challenges militating against the delivery of agricultural extension service. The study recommended that farmers should be provided with adequate education to equip them properly on the use of farm equipment. Also, extension agents should be trained and be funded, so that farmers' problems can easily be executed in order to boost food production

Anaeto et al. (2012) assessed the role of extension officers and extension services in the development of agriculture in Nigeria. The study dwelt on the basic concepts underlying the scope and meaning of agricultural extension, role of extension service and extension officers. The study concluded that: no nation can achieve real growth in the agricultural sector without effective extension service; the total eradication of agricultural development problems can be achieved through extension service approach if the role of extension is properly conceived and effectively administered.

Ayanwuyi, Adeola and Oyetoro (2013) examined the relevance of agricultural extension services on crop production in Irepodun Local Government Area of Kwara State, Nigeria. The study made use of primary data from 112 farmers' sampled for the study. Descriptive statistics and the t-test were used to analyse the data collected. The study revealed that almost all the respondents were visited by village extension agents. Respondents also emphasised the relevance of agricultural practices introduced by extension agents. The findings however showed that there was no significant difference in land use before and after extension services, but there was a significant different in crops yield. The study concluded that there is the need for motivation of extension agent through adequate provision of field operation facilities in order to encourage their commitment and dedication to duty.

Oluwususi and Akanni (2014) investigated the effectiveness of extension services among food crop farmers in Ekiti State, Nigeria. A multistage sampling technique was used to select 145 respondents in the study area and the data collected were subjected to descriptive and inferential statistics. The findings revealed that there was a significant relationship between age, sex, level of education, farming experience, farmer's attitude toward extension services, extension services received, and the effectiveness of extension services. The study concluded that training and increased incentives for extension agents as well as proper monitoring and

evaluation of extension budgets are pertinent to improving extension service delivery to farmers.

Ijogu (2016) assessed farmers' preference for agricultural extension systems in Nigeria. The data for the study were obtained from primary source and descriptive statistics was used to analyse the data. The findings of the study show that majority of the farmers were males and easily accessed agricultural extension services and as well as have high preference for private extension system as is more relevant in addressing their problems. The study further concluded that gradual steps should be adopted in changing to private agricultural extension system and outsourcing of extension is required.

Hamisu et al. (2017) reviewed the status of agricultural extension service in Nigeria. The study identified improvement in agricultural production, environmental degradation, biotechnology, HIV/AIDs, reduction in government support for public research and extension, entrance of private service providers, increasing private sector involvement and development of information and communication technology in extension service as the major challenges facing agricultural extension service in Nigeria. It however concluded that there was need to legislate agricultural extension policy so that it will be well organized, financially stable for effectiveness and sustained impact.

Finally, Inegbedion (2018) examined financing agriculture in Nigeria through agricultural extension services of ADPs. It ascertained the extent to which agricultural extension services of the ADPs have impacted the financing of agriculture in six communities in three selected local government areas in Edo South senatorial district, Nigeria using a sample of 120 respondents. Stratified random sampling was used to select the respondents. The research data were analysed by descriptive and inferential statistics of the t-test and multiple regression techniques. The research findings showed that the extension services of ADP have impacted significantly on crop and farm development in the selected communities but not on employment creation and the development of infrastructural facilities. The study also revealed that there was significant difference between the implementation of the projects in the selected communities, as revealed by the post-hoc test. It concluded that there was the need for a complete redesigning of the project and proper monitoring of its implementation to ensure that it achieves its stated goals.

However, flowing from the reviewed literature above, some of the studies only focused on the reviewed of the agriculture extension in Nigeria, and almost all the studies that were empirical mainly employed the descriptive analysis in their research work, except Inegbedion (2018) that used multiple linear regression as against this current research which focused on the development of agriculture production (food crops) among the private farmers in Oshin irrigation scheme in partnership with the Lower Niger River Basin Authority. In addition to the attempt to fill the gap, the methodology aspect needs to be beefed up by employing inferential statistics (Multinomial Logistic Regression) on the impact of agricultural extension services on agriculture productivity in Nigeria.

**Methodology****Area of Study**

This study was conducted at Oshin, Oke-Oyi in Ilorin East Local Government of Kwara State, Nigeria. The scheme was under the Lower Niger River Basin Authority. It was initiated in 1994 at Oke-Oyi in Ilorin East Local Government of Kwara State for the Water User Farmers. The State is characterized by alternating dry and wet seasons. The rainy season extends from April to early October while the dry season extends from November to March. The major crops grown include maize, rice, fruits, vegetables, cassava, maize and cowpea. This study area was chosen in order to achieve the objective of this study since majority of the farmers in this area specialized in the production of food crops.

**Types and Sources of Data**

In pursuing this research, the study was based on a cross-sectional farm data which were mainly primary sourced. The primary data were collected through the use of structured questionnaire to solicit response from the member of farmers' household under the Oshin Irrigation Scheme and their non-members. Information were collected on farm household characteristics, input and output variables, income, extension services, source(s) of credit, perception on partnership with the agency, problems faced by the farmers and how these can be solved. A simple random sample was chosen. The study sample involves the random selection of two hundred (200) farmers' household, that is one hundred farmers from each group. The study sample comprised only a one-stage sampling procedure involving the random selection of one hundred farmers from the sampling frame of farmers under the Oshin irrigation scheme and the remaining hundred from non-members.

**Method of Data Analysis**

This study employed both descriptive and inferential statistic. The descriptive analysis was employed to describe the socio-economic characteristics of the respondents while the inferential method was used in estimating the contribution of extension services toward agriculture production in Nigeria, the model employed is Multinomial logit model. Multinomial Logit (MNL) model was used due to the qualitative nature of the data required for this study and the categorical division of regressand to three groups. MNLR compares multiple groups through a combination of binary logistic regressions. Thus, the regressand in the MNLR was divided into three categorical groups which are: less than 50bags of output as category 1; 50-100bags as category 2; and' more than 100bags as the third category. There are three equations, one for each of the groups defined by the regressand. The three equations can be used to compute the probability that a subject is a member of each of the three groups. A case was predicted to belong to the group associated with the highest probability.

**The Model of the Study**

The model for this study was Multinomial logit and it was based on the assumptions that: (i) the nature of the land is the same for all the farmers; (ii) the producers have an identical production function; (iii) the production inputs and socioeconomic characteristics of the farmers are included in the specification of the multinomial logit model; (iv) there is equal

accessibility of farmers to the irrigation system for members. We, therefore, postulated the relationship between extension services and agriculture production as:

$$Q_i = f_i(E_i, C_i, L_i, F_i, P_i, ES_i, CR_i, EX_i) + \varepsilon_i \dots \dots \dots (1)$$

$$\text{Let } H_i = f_i(E_i, C_i, L_i, F_i, P_i, ES_i, CR_i, EX_i) \dots \dots \dots (2)$$

Linearizing equation (1) & (2)

$$Q_i = \beta_i H_i + \varepsilon_i \dots \dots \dots (3)$$

Transform equation (3) to multinomial logit

$$\Pr(Q_i/H_i) = \frac{\exp(\beta_i H_i)}{\sum_{k=0} \exp(\beta_k H_k)}$$

Where  $Q_i$  = Farmers’ output,  $H_i$  = represent all the regressors,  $E_i$  = Number of labour employed annually,  $C_i$  = Source of capital employed,  $L_i$  = Size of farmland,  $F_i$  = Quantity of fertilizer applied,  $P_i$  = Private farmers’ participation in collaboration with government agencies,  $ES_i$  = Farmers’ access to government extension services,  $CR_i$  = Farmers’ access to credit facilities,  $EX_i$  = Farmers’ experience in farming,  $\beta_i$  = Coefficient values indicating the effect of various  $H_i$ ’s on individual agricultural output,  $\varepsilon_i$  = Error Term,  $i = 1, 2, 3$ . The a-priori expectation was that all the regressors were expected to be positively related with the agricultural output. The model above was determined using a combination of criteria such as coefficient of determination ( $R^2$ ), the level of significance of the overall relationship between a regressor and the regressand (Likelihood Ratio Tests), the level of significance of the overall relationship among the regressors and groups defined by the regressand (Chi-Square ( $\chi^2$ )), the level of significance of whether or not the regressor is statistically significant in differentiating between the two groups in each of the embedded binary logistic comparisons (wald test or t-statistics) and the correct sign of the co-efficient relative to a-priori expectations.

**Results and Discussion**

**Descriptive Analysis**

**Table 2: Comparing socioeconomics characteristics of Members and Non Members Respondents**

Label	Value	Member	Non Member
		Percentage (%)	Percentage (%)
Gender	Male	99	97
	Female	1	3
Age	<20yrs	8	0
	20-45yrs	32	6
	46-60yrs	46	42
	>60yrs	14	52
Marital Status	Single	8	0
	Married	87	95
	Divorced	5	3
	Widow	0	2
Education Level	No Formal Education	36	74
	Primary	42	24
	Secondary	22	2
	Tertiary	0	0
Household Size	<5	4	2
	5-10	47	35
	>10	49	63
Monthly Household Income	<18,000	8	39
	18,000-40,000	31	36
	40,001-60,000	43	23
	>60,000	18	2
Yrs of Experience in Farming	<5yrs	6	3
	5-10yrs	42	12
	>10yrs	52	85
Size of Farmland	<3	18	56
	3-6	65	34
	>6	17	10
Quantity of Fertilizer Used	<300kg	7	48
	300-600kg	27	44
	601-900kg	48	6
	>900kg	18	2
Labour Employed	<10	6	31
	10-20	21	56
	21-30	54	8
	>30	19	5



Output Produced	<50 Bags	3	30
	50-100 Bags	6	22
	>100 Bags	91	48
Access to Extension service	Very Often	70	0
	Often	30	0
	Not Often	0	100

Source: Field Survey, 2018.

A comparison between members of the scheme and the non-members to measure the degree of success of access to extension services showed that forty-six percent (46%) of the respondents among the members were youth with  $\leq 45$  years, while only six percent (6%) among non-members were youth. Although majority of the respondents in the two groups were elderly people, but there were more elderly people among the non-members than the members. These revealed a ninety four percent (94%) for non-members and 54% for members. This indicates that there was probability that these youths among the members would be able to work at large scale production levels than the elderly respondents. Moreover, the fact that there were more youth respondents among members than non-members could imply that farming under the Oshin scheme is more viable. A programme like Oshin irrigation scheme will encourage more youth to participate in farming in Nigeria. Seventy four percent (74%) of the respondents among non members have no formal education while twenty six-percent (26%) have either primary or secondary education. Sixty-four percent (64%) of the respondents among members have either primary or secondary education while thirty six-percent (36%) have no formal education. This result indicates that the farmers under the Oshin Irrigation scheme were more likely to adopt new system compared to the non-members because of their level of education which was likely to facilitate their understanding and use of improved crop production practices.

Considering the monthly income of the non-member respondents, the result shows that seventy-five percent (75%) earn monthly income of less than or equal to ₦40,000 while twenty five-percent (25%) earn monthly income of more than ₦40,000. Comparing this with the farmers under the scheme, sixty-one percent (61%) of the members earn monthly income of more than ₦40,000 while thirty-nine percent (39%) earn monthly income of less than or equal to ₦40,000. This implies that farmers' receipt under the scheme was reasonably fair compared to their non-member respondents. The result obtained for the annual output of the respondents also indicates that ninety-one percent (91%) of the member respondents produced more than 100bags annually while nine percent (9%) produced less than or equal to 100bags. However for non-member, fifty-two percent (52%) produced less than or equal to 100bags while forty-eight percent (48%) produced more than 100bags annually. This implies that the member respondents produced output more than the non-member. The reason behind this was that farmers under the Irrigation scheme does farm throughout the year (rainy and dry seasons) while the non-member only practice farming mostly in the rainy season.

Finally, the table shows the respondents' access to extension service. Sixty-eight percent (68%) of the respondents among members very often have access to extension service, while thirty-two percent (32%) often have access to extension service. All the respondents among

non-members do not often have access to extension service. This result indicates that, being a farmer under the scheme gives them more opportunity to have access to extension service than their non member counterparts.

**Presentation of Regression Results**

**Table 3: Multinomial Logit Estimates of PPP and Agricultural Sector in Oshin**

Variable	Less than 50 Bags		50-100 Bags	
	Co-efficient	p-value	Co-efficient	p-value
Intercept	24.91 (35.59)*	0.00	4.40(0.00)	0.99
E <sub>i</sub>	0.10(0.10)	0.75	0.72(2.31) **	0.13
C <sub>i</sub>	-20.30(0.00)	.	-22.68(0.00)	0.99
L <sub>i</sub>	-3.24 (8.77)*	0.00	-4.56(11.31)*	0.00
F <sub>i</sub>	1.51(6.60)*	0.01	4.78(20.56)*	0.00
P <sub>i</sub>	4.02(10.51)*	0.00	6.41(20.55)*	0.00
ES <sub>i</sub>	-3.89(18.84)*	0.00	-3.19(10.34)*	0.00
CR <sub>i</sub>	1.58(2.28)**	0.13	4.68(16.03)*	0.00
EX <sub>i</sub>	-2.57 (9.71)*	0.00	-2.51(7.30)*	0.01

The reference category is: More than 100bags.  
R<sup>2</sup>- Nagelkerke: 0.79  
Chi-Square: 206.58  
P-Value: 0.00  
Figures in the bracket are Wald-test

- \* Significant at 1% level
- \*\* Significant at 15% level

**Interpretation of the Results**

The results from table 2 above show that years of experience did not have the expected sign with the values -2.57 and -2.51 but has a significant effect on the level of output with p-value of 0.00 and 0.01. This shows that it is significant in distinguishing between the three categorical groups of the regressand. The negative sign implies that as the farmers continue to spend more years in farming (in terms of experience), the output of the farmers would be reducing. This may be as a result of their inability to cope with the new system due to old age. The significance of the variable may be connected to the fact that years of experience in farming affect the managerial skills being acquired over time and better assessment of the importance and complexities of good farming decision making. Also, the result indicates that there was a negative sign between the output and farmland size with the values -3.24 and -4.56, but also has a significant effect on the level of output with p-value of 0.00 and 0.00. This shows that the size of the farmland was significant in distinguishing between the three categorical groups of the regressand. This may be attributed to the effective use of land rather than size of the farmland. Both quantity of the fertilizer applied and labour employed have the expected signs (1.51, 4.78 and 0.10, 0.72, respectively) with quantity of fertilizer having significant effects on the level of output with the p-value 0.01 and 0.00, while the labour employed does not have significant effects on the level of output with p-value of 0.75 and

0.13. The positive sign implies that as the farmers applied more quantity of fertilizer correctly and employed more labour, their output would increase. In the same vein, the quantity of fertilizer applied was significant in distinguishing between the three categorical groups of the regressand while the labour employed was not significant.

Access to credit has the expected sign (1.58 and 4.77) and significant effect on the level of output with the p-value of 0.13 and 0.00. The positive sign implies that the more farmers have access to credit facilities, the more their output would increase. It is also significant in differentiating between the three categorical groups of the regressand. The result further indicates that access to extension services did not have the expected sign (-3.89 and -3.19) but it was statistically significant in differentiating between the three groups of the regressand with the p-value of 0.00 and 0.00. In addition, not only was source of capital employed not having expected sign but was also insignificant. This implies that source of the capital employed was not significant in differentiating among the three categorical groups of the regressand. Finally, the private farmers' partnership with the government agricultural extension agencies displayed the expected sign (4.02 and 6.41) and has significant effect on the level of output of the farmers with the p-value of 0.00 and 0.00. The positive sign indicates that partnership between the private farmers and government agencies would improve farmers' output like that of the farmers under the Oshin Irrigation Scheme. As well, the partnership was statistically significant in differentiating between the three categorical groups of the regressand.

The Nagelkerke  $R^2$  measures the strength of the relationship between the regressand and regressors. The value of  $R^2 = 0.797$  or 79.7% tells us that there was a good positive relationship between the regressors and regressand. It shows that output could be explained by the regressors. The Chi-Square test ( $\chi^2$ ) measures the overall relationship among the regressors and groups defined by the regressand. The significance test for the final model chi-square determines the presence of a relationship between the regressand and the combination of the regressors. In this study, the model chi-square was (206.577) with a probability of 0.000 which was less than the alpha level of 0.05. The combination of the existence of a relationship between our regressand and regressors were established.

The likelihood ratio test was also conducted to see the overall relationship between a regressor and the regressand revealed that years of experience, farmland size, quantity of fertilizer, source of capital, access to credit facilities, access to extension services and the private farmers' partnership with the government agricultural agencies were positively related with the farmers' output and were statistically significant at 1% level of significant except labour employed which was statistically insignificant ( $0.259 > 0.05$ ) but was positively related with the level of farmers' output. This implies that a unit increase in any of these variables will improve the farmers' output.

### **Summary, Conclusion and Recommendations**

This study concludes that a well-coordinated arrangement between public and private sectors will contribute immensely to agricultural development in Nigeria. The result has also shown that the private farmers' partnership with the government agricultural extension

agency initiative contributed to the improvement of farmers' output under the Oshin Irrigation scheme than their non-members. Most of the farmers under the scheme indicated that the scheme has greatly improved their farm outputs, reduced their cost of production and they have constant access to government extension services more than their non member farmers. This implies that the farmers under the scheme were more productive than the non members because access to government extension services afford them the opportunity to learn improved technologies and availability and accessibility of credit to acquire needed inputs and services. This has also improved the income of members than their other counterparts. Given that with higher level of education there were more youth among the member respondents than their non-members made them more appreciative of the need for public-private partnering in the provision of irrigation services and other farm inputs.

Despite the enormous benefit of the scheme, problems such as inadequate effort of the government to create enabling environment in order to encourage private investors to invest in agricultural sector in Nigeria, inadequate funding by the government which is further compounded by the neglect of agricultural sector, lack of access to credit facilities by the farmers from financial institutions due to high interest rate and policy inconsistency, inadequate farm equipment, among others are some of the problems that can hinder the success of improving agricultural sector in Nigeria via private farmers' partnership with the government agricultural extension agencies.

In the light of these observations, the study therefore recommended that general policy package to induce the youth back to agriculture should be implemented. Similarly, a private farmers' partnership with the government agricultural extension agencies arrangement such as the one at Oshin irrigation scheme should be enhanced because it is youth friendly as it makes agriculture more profitable and attractive, and less laborious. Furthermore, there must be adequate support/cooperation and contribution from the other tiers of governments. In addition, affordable credit facilities should be made available to farmers through various financial organisations so as to enable them acquire more modern farm implements and other inputs which could lead to increased productivity.

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