



Revamping Challenges of Rural Dwellers in USAID Markets II Soybean Production Project in Benue State, Nigeria

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Abstract

This study evaluated USAID MARKETS II Soybean Production Project in Benue State, Nigeria. The study was carried out to investigate factors influencing farm yields among project participants and examine the relationship between adoption of new soybean production technologies and farmers' yields. A sample size of 150 soybean farmers was proportionally selected from a total population of 509 project participants. This represents 30% of the farmers, randomly drawn from each of the two soybean farmers' associations across the eight Local Government Areas (LGAs) designated for the study. Data were collected using semi-structured interview schedule while mean, multiple regression, and correlation analysis were used for data analysis. Results showed that farming experience, education level, extension contact, and quantity of fertilizer applied significantly influenced farmers' yields at 5% level. A positive weak relationship ($r = 0.091$, $p > 0.05$) was found between technology adoption and yield. The study recommended timely provision of quality farming infrastructure to project participants to enhance adoption of new soybean technologies and boost farm yields in order to enhance the wellbeing of the rural farmers.

Introduction

Agricultural development projects have been instrumental in Nigeria's efforts to promote rural development, reduce poverty, and enhance food security (Olagunju *et al.*, 2022). However, despite the numerous projects implemented over the years, many rural dwellers in Nigeria continue to face significant challenges, including limited access to agricultural inputs, inadequate infrastructure, and poor livelihood outcomes (Ogundari and Awotide, 2020). The agricultural sector in Nigeria is characterized by low productivity, limited technological adoption, and inadequate market access (Federal Ministry of Agriculture and Rural Development, 2016). In an effort to address these challenges, the USAID MARKETS II

(Maximising Agricultural Revenue and Key Enterprise in Targeted Sites) Soybean Production Project was implemented in Benue State, Nigeria, with the aim of improving the livelihoods of rural farmers (USAID, 2019). In an effort to address these challenges, the USAID MARKETS II Soybean Production Project was implemented in Benue State, Nigeria in 2012 (USAID, 2019).

It is a project designed to build on the successes of the previous private sector-led USAID-funded MARKETS by strengthening agricultural competitiveness and food security in Nigeria. The project was funded under the United States Government's (USG) Feed the Future (FtF) initiative. In the first year of its creation in April, 2012, MARKETS II's value chain efforts targeted only four commodities; white sorghum, rice, maize, and sesame in Kwara, Anambra, Ebonyi, Benue, Bauchi, Kano,

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Kaduna, Katsina, Jigawa, Kebbi, and Sokoto states (USAID MARKETS II 2015 Report)

MARKETS II in Benue State is packaged with modern soybean production technologies aimed at teaching the relevant agronomic practices and empowering Benue State farmers to boost production of soybean. According to USAID-Nigeria (2015), MARKETS II is a 5-year USAID funded project implemented by Chemonics International (a contracted company for carrying out the project) with the goal of increasing private-sector participation and investment, raising incomes, increasing employment, promoting food security and reducing poverty. The key objectives of the project were to help smallholder farmers access better farming inputs (such as improved seeds and optimal use of fertilizer), increase farm yields, access to finance, better water management, appropriate use technology, improve extension services, and nutritional uses of grown or purchased of basic foods (USAID, 2015) to enhance food security.

However, a preliminary survey by the researcher in the study area revealed that the project had been implemented several years now but the soybean farmers seem not to have bumper harvest (Iwuchukwu and Beeior, 2018). Hence the study sought to: investigate factors influencing yields of soybean farmers that participated in the project, examine correlation between adoption of USAID MARKETS II soybean production technologies and farm yields and collate suggested strategies for enhancing the success of the project.

Materials and Method

The study was conducted in Benue State, Nigeria. The target population comprised 509 registered MARKETS II soybean farmers across eight soybean-producing Local Government Areas (LGAs) who participated in the project. A multistage sampling procedure was employed, combining purposive and proportionate random sampling techniques. At the first stage, all eight LGAs involved in the project were selected. In the second stage, two soybean farmers' associations (SFAs) that participated in the project were randomly selected from each LGA, resulting in a total of 16 soybean farmers' associations. In the third stage, 30% of the members from each selected

association were randomly chosen using proportionate sampling, yielding a total of 150 respondents.

Primary data were collected through an interview schedule designed to address the specific objectives of the study

Analytical Techniques

To determine the factors influencing yield of the soybean farmers a multiple regression model was employed. The explicit form of the model is:

$$Y_c = b_0 + b_1X_1 + b_2X_2 + \dots + b_{11}X_{11} + e.$$

Where,

Y_c = Yield of soybean farmers in tones

X_1 = Farming experience of soybean farmers in years

X_2 = Age (years)

X_3 = Years of education (years)

X_4 = House hold number

X_5 = Amount of fertilizer used in kg.

X_6 = Use of improved varieties of Soybean (1= improved, and 0 otherwise)

X_7 = Amount of agrochemicals used (Herbicides and insecticides in litres)

X_8 = Farm size (hectares) committed to soybeans production.

X_9 = Monthly household income of farmers from farming in (Naira)

X_{10} = Number of extension contact

X_{11} = access to credit (1= credit access, and 0 otherwise)

b_0 = intercept, b_1 - b_{11} = Coefficient of variables used in the regression and e = error term.

while correlation analysis between adoption of USAID MARKETS II soybean production technologies and soybean yield was used to establish the relationship between the two variables.

Strategies for enhancing the success of the project were obtained by asking farmers to suggest them out of their various experiences acquired from participating in the soybean production project, while regression, correlation analysis and standard deviation were respectively used for data analysis.

Results and Discussions

Factors influencing yield of farmers participating in USAID MARKETS II project

Table 1 shows the result of a multiple regression analysis on factors influencing yield of soybean

farmers participating in USAID MARKETS II project. The result shows that the R^2 was 0.36 and the adjusted R^2 had a value of 0.31. This implies that the independent variables were able to explain the dependent variables by about 31% which implies that 31% of the variation observed were attributed to the combined influence of all the independent variables included in the model. The result of the multiple regression analysis in table 1 also reveals that out of eleven variables regressed, five variables significantly influenced soybean yield. They are farming experience, farm size, number of years spent in acquiring formal education, quantity of fertilizer applied and number of extension contact.

Details of the analysis in Table 1 shows that farming experience had a significant ($t = 2.162$; $p = 0.32$) positive influence on the yield of soybean farmers. This implies that with increased farming experience, farmers are generally better able to assess the relevance of new technologies considering their long years of farming and adopt them in their farms to enhance farm yield. This result however, contradict Mustapha *et al.* (2012), Atagher and Okorji (2014) and Oyewole and Ojeleye, (2015) who reported a negative significant relationship between farming experience and farm yield. They argued that a farmer who gained more farming experience also grows old in strength and ability to make vibrant farming decision diminishes unlike young farmers who are agile and can think better and faster. They added that older farmers become more risk averse to new technology and this adversely affect their farm yield.

Number of years spent in acquiring formal education significant ($t=1.99$; $p= 0.04$) positive influence on the yield of soybean farmers implies that increase in years of acquiring formal education will tend to increase yield of soybean farmers. This is because formal education provides them with the ability to read and write, handle and interpret messages relating to their farm operations in the instruction manuals on input and machinery uses. Thus, enables them to appreciate and adopt an innovation to enhance crop yield. This result is in conformity with Okoli, et al. (2015) and Atagher and Okorji (2014) who stated that education increases farmers' productivity. Adesoji and Adebayo (2008) observed that the more educated a farmer is, the more the chances that the farmer will

adopt innovations than the uneducated ones. In the same vain, Mignouna *et al.* (2011) and Lavison (2013) reported that education level of a farmer increases his ability to obtain, process and use information relevant to adoption of a new technology. The implied policy is to step up efforts towards farmer's education which will invariably increase productivity/yield.

Entries in Table1 reveal that number of bags of fertilizer applied had a significant ($t=3.136$; $p=0.002$) positive influence on the yield of soybean farmers. This implies that a unit increase in fertilizer application will result to a consequent increase in farm yield. In order to have a good crop yield and maintain the soil fertility under intensive, and rotational cropping, it is important to apply proper fertilizer rates for soybean as recommended by the project. Fertilizer usage enhances development and yield of soybean if quality ones are made available to the farmers in time. However, due to scarcity and high cost of the commodity many farmers are discouraged from applying it in their farms in fear that they may operate at loss. Umaru (2015) observed that in situations where the price of fertilizer is high, a unit increase in fertilizer application will result to decrease in farmer's income.

The results in Table 1 reveal that soybean farm size had a significant ($t= -2.931$; $p=0.004$) negative influence on soybean yield. This inverse relationship suggests that, an increase in farm size of soybean farmers participating in the project will result to decrease in farmer's yield. It also submits that though output may be increasing with increase in farm size but yield will be decreasing indicating a negative trend. The result implies that there is inefficiency in resource use by project participants which results to low productivity as farm increases. The implied policy is that more technical training should be offered to project farmers in addition to provision of all the necessary farming inceptives to enhance productivity. This study agreed with Abu (2012) and Agada (2015), who reported a negative relationship between soybean farm sizes and farmers yields in the study area.

However, Parvan (2011) observed that farm size does not always have the same effect on adoption and yield; rather the effects of farm size vary depending on the type of technology being introduced, the institutional setting of the local community, market

failure and quality of land used by the farmer among other factors.

Results from Table 1 show that the number of extension contact had significant ($t=2.522$; $p=0.013$) positive influence on soybean yield. This result implies that as extension agents' contacts with farmers increase the higher the soybean yield. This necessitate the need to recruit more extension agents that will educate farmers on the new technologies and the need to adopt them which will lead to more soybean yield. In corroboration to the findings, Oyewole and Ojeleye (2015) stated that higher extension contacts would increase adoption of improved farm production technologies and farm yield. Umaru (2015) reported that with increase in number of extension contacts offered to the famers, farmers yield are likely to incre-

ase due to increased adoption of new farming technologies.

Table 2 shows the result of a simple correlation analysis conducted in order to determine the nature of the relationship that exist between adoption of USAID MARKET II soybean production technologies and soybean farmers yield indicates that there is a positive weak relationship ($r = 0.091$; $P>0.05$) between adoption and yield of the project participants. The coefficient of correlation (r) is far less than one which suggests that there is a weak relationship between the variables correlated. This relationship infers that adopting more of the new technology may not boost farmers yield but may rather result to a moderate increase in yield of the farmers due to certain factors that are negatively influencing adoption of new technologies.

Table 1: Factors influencing yield of farmers participating in USAID MARKETS II project

Variables	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	T
(Constant)	0.233	0.141		1.646
Years of experience in the production of soybean	0.007	0.003	0.189	2.162*
Age	-0.003	0.003	-0.110	-1.168
Number of years Spent in Education.	0.009	0.004	0.164	1.986*
House hold Size	0.000	0.006	-0.002	-.023
Number of bags of fertilizer applied	0.044	0.014	0.288	3.136*
Use of improve variety	0.260	0.093	0.215	2.802
Litres of chemicals applied	0.008	0.006	0.157	1.402
Farm size for soybean production	-0.098	0.033	-0.284	-2.931*
Estimated monthly income	9.501E-7	0.000	0.120	1.659
Number of extension contact	0.101	0.040	0.185	2.522*
Access to credit	-0.049	0.040	-0.092	-1.246

Table 2: Correlation between adoption of USAID MARKETS II soybean production technologies and farm yield

Variables		Adoption score for each soybean farmer	Yield of soybean in tones
Adoption score for each soybean farmer	Pearson Correlation	1	0.091*
	Sig. (2-tailed)		0.266
	N	150	150
Yield of soybean in tones	Pearson Correlation	0.091*	1
	Sig. (2-tailed)	0.266	
	N	150	150

Coefficient of correlation (r) was tested at 5% level of probability.

This finding contradicts the view of Obasoro, *et al.* (2015) who reported a positive significant relationship between adoption and soybean yield in Benue State. They also identified household size, farm experience, cooperative membership, education and access to credit as five variables significantly explained the effect of adoption on yield. Umaru (2015) also stated that soybean production practices have significant effects on farmers yield in Taraba State. According to him an increase in adoption of soybean production practices will increase the yield of soybean reasonably. Other adoption studies that show significant relationship between yield and the new technology are Cornejo and Wechsler (2012) which reported a positive and significant relationship between corn yield and adoption of new technologies in US. Kudi *et al.* (2011) recounted that yield significantly influenced farmers' decision to adopt improved maize varieties in Kwara State

Suggested strategies to ensure success of USAID MARKETS II soybean production project

Table 3 indicates that the majority (74.7%) of the respondents suggested timely supply of inputs as strategy to ensure success of USAID MARKETS II soybean production project. Other strategies included: provision of soft loans to farmers participating in the project (48.7%), adequate monitoring and evaluation of the project (48.7%), providing lasting solution to herdsmen attacks on farmers (36.7%), activities of middle men should be removed in the marketing channel of soybean (24.7%), involvement of project participants in all the stages of the project (16.7%), reduction of cost USAID MARKETS II technologies (15.3%) and removal of bureaucracy in accessing help from USAID (10.7%).

Timely provision of quality critical farm inputs like fertilizers, and agrochemicals to farmers through their cooperatives will not only motivate the farmers to adopt the new production technologies but will also solve the difficulties they often encounter in distinguishing quality farm inputs from fake ones which are all available in the open markets. This opinion corroborates Abu (2012), Agada (2015) and Mustapha *et al.* (2012) who recommended that production inputs such as fertilizer and herbicide

should be provided through institutional sources at the required time and quantity and at affordable price to the soybean farmers.

Another major bottlenecks to the adoption of USAID MARKETS II soybean production technologies is poor access to institutional credit. Lack of access to credit and low patronage from farmers on accessing bank loans may be caused by high bank interest rate and lack of collateral facility by the farmers. Therefore, government should gear efforts towards establishing more rural microfinance banks or expand the existing agricultural banks to rural areas where loans can be given to farmers through their cooperatives. This will eliminate the challenge of collateral requirement for loans by the farmers since members of cooperatives will guarantee each other and access loans. Mustapha (2012), stressed that unless credit facilities are provided to small scale farmers, otherwise majority of them are seriously handicapped in adopting new and profitable farm technologies. Likewise, Umaru (2015) reported that amount of credit received by farmers positively and significantly influenced the adoption of recommended soil management practices in Kaduna State,

In addition, irregularities like embezzlement of funds and other corrupt practices would not have existed in the project if there was proper monitoring of all the stakeholders. Adequate monitoring will not only make the extension agents, project participants and other stakeholders to be more diligent and committed to their duties but will also help to ensure that each stage of the project is executed according to the initial plan and specifications thereby reducing sharp practices in the system for overall success of the project. Unfortunately, many Nigerian agricultural programmes have received little or no attention in this respect and this has led to failure of project and programmes in the country.

Furthermore, many farmers lament that many of them recorded low yield as a result of the attacks by cattle owners. Many people have been killed and others displaced abandoning their farms as feeds for cattle. Some project participants do not go to their farms in fear of unforeseen eventualities. Nigerian government should therefore arise to its basic responsibility and

Table 3: Suggested strategies to enhance the success of USAID MARKETS II soybean production project

Strategies	Frequency(n=150)	Percentage
Timely supply of farm inputs at affordable rates to project participants	112	74.7
Provision of soft loans to farmers participating in the project	73	48.7
Adequate monitoring and evaluation of the project	73	48.7
Providing lasting solution to herdsmen attacks on farmers in Benue State.	55	36.7
Activities of middle men should be removed in the marketing channel of soybean	37	24.7
Involvement of project participants in all the stages of the project	25	16.7
The cost of USAID MARKETS II technologies should be reduced	23	15.3
Bureaucracy involved in accessing help from USAID should be removed	16	10.7

provide the masses especially farmers with needed security to carry out their livelihood activities peacefully. This will enable participants of the project to work assiduously for the success of the project, similarly, Dimelu *et al.* (2016) suggested that institutionalized policy reforms targeting common structural issues like social, politics, religion, environment and inequality/marginalization should be enacted and promoted by the government to solve the problem.

The project participants also suggested that activities of middle men should be removed in the marketing channel of soybean in Benue State because they hinder the buyers from contacting farmers directly. For instance, HuleNig LTD supposed to buy soybean directly from project participants at agreed price to eliminate the activities of middle men however, due to inadequate monitoring, and lack of adequate information by the farmers, middlemen continue to take advantage of the farmers by buying their soybeans to sell for more profit to HuleNig LTD. Adequate monitoring and evaluation of the project by USAID MARKETS II officials will solve this problem.

It is also worthy to note that if farmers are carried along in all the stages of the project they consider the project as their own and give their full support towards its success. Involvement also enable the farmers to contribute towards the success of the project and also make their challenges and needs known to project management. Failure to involve project beneficiaries in developmental stages of the project will make the project to fail. Daneji (2011) affirmed that the non-

participation of relevant stakeholders during planning and implementation of agricultural programme has led to failure of many intervention programmes in Nigeria.

The soybean farmers also suggested that reduction of cost of USAID MARKETS II technologies will make the project more beneficial to the participants. This can be achieved by linking project participants with inputs dealers to purchase farm inputs timely and at affordable rate as initially intended by the project to improve adoption of the new technologies.

Lastly, project participants suggested that their request for assistance from government usually take long time before they are considered as a result of unnecessary bureaucracy. Removing bureaucracy will enhance adoption and success of the project. This can be achieved by improving the level of interaction between and among the various stakeholders of the project in order to close the wide gap that exist between them. Proper monitoring of the project to ensure timely implementation will also help to reduce bureaucracy.

Conclusion

This study unearthed the pivotal factors influencing soybean yields among farmers participating in the USAID MARKETS II project in Benue State. Our research revealed that years of farming experience, education level, extension contacts, and the quantity and quality of fertilizers used by farmers were the key drivers of farmer yields. Notably, we discovered a weak positive correlation between the adoption of USAID MARKETS II soybean production technologies and farmer yields, highlighting the need for targeted interventions.

To significantly boost soybean yields and empower farmers in Benue State, it is essential for the State Government and USAID MARKETS II to ensure the timely provision of affordable, high-quality fertilizers and agro-inputs by linking farmers with reputable dealers through their cooperatives, thereby reducing procurement costs and guaranteeing input quality. Additionally, increasing farmers' access to extension agents especially through training programmes focused on recommended soybean production technologies will enhance their efficiency and encourage the adoption of best practices. Furthermore, providing soft loans through farmer cooperatives, with support from both State and Federal Governments in collaboration with USAID MARKETS II, will enable farmers to afford critical inputs and operations. Collectively, these strategies will unlock the full potential of soybean farming, increase productivity, and advance food security in the region

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