Analysis of USAID-Market II Intervention on Rice Farmers' Profitability in Niger State, Nigeria

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Abstract
The focus of this study was to analyze the USAID-MARKET II intervention on rice farmers' profitability in Niger state, Nigeria. The specific objectives were to; describe the socioeconomic characteristics of the farmers, determine and compare the costs and returns associated with rice production under the programme and identify constraints faced by small scale rice farmers participating in the programme. Multi-stage sampling technique was used to select respondents for the study. A total of 247 respondents made up of 130 participants and 117 non-participants were randomly selected from two participating Local Government Areas in Niger State. Data were collected with the aid of structured questionnaire. Analytical tools used were descriptive and Gross margin analysis. The result of the analysis shows that the average age for participant and non-participant farmers were 43 and 41 years respectively. The results also revealed that male (96.9%) were more involved in the programme. Majority of the participant and non-participant rice farmers were married . The average household sizes were 10 and 9 while the average years of experience were 12 and 14 years respectively. Average farm sizes among participant and non-participant farmers, were 4 and 2 hectares respectively. The gross margin were found to be ₦88,148.00/ha and ₦30,492.00/ha for both category of farmers while the average rate of return per naira invested were 1.15 and 0.58 for the rice farmers. The study recommends that rice farmers should be encouraged by extension agents to take advantage of intervention and actively participate in programmes that increase their productivity and income on sustainable basis.

Keywords: Rice farmers, USAID-MARKET, profitability, Nigeria

Introduction

Nigeria is one of the major rice producing and marketing countries where 90 percent of the rice produced comes from resource-poor and weakly organized smallholder farmers (Umar, 2015). These farmers apply a low-input strategy to agriculture and with minimum input requirements and low output, their livelihood have been constrained by a whole

lot of challenges: low productivity; paucity of opportunities for value addition; limited access to productive inputs; inadequate support services (extension and research); inadequate market and rural infrastructure; post-harvest losses and a problem of enabling environment (IFAD, 2012). The small number of hectares under cultivation is an indication that food sufficiency through rice production has not yet been realized as its production is left in the hands of farmers whose output is inadequate and paddy processing is substandard (Nwalieji *et al.,* 2016).

Agricultural Development strategies must identify the participation of smallholder farmers as a critical feature to attaining ultimate success (Okam *et al.,* 2016). In many developing countries, linkages between agribusiness firms and small scale farmers are keys to economic growth and poverty alleviation in the country (USAID, 2017). And USAID has a mandate to work along the entire rice value chain in order to improve on-farm productivity, sales and income of the Farmers (USAID, 2017).

There is a major problem of increase in demand for rice because of population growth. Farmers output falls below 60 percent irrespective of the government interventions and to enhance this, the means of production should be improved as well as other factors that support farmers output should be given adequate attention (Katrien and Miet, 2014). More than 90% of Nigeria's rice is produced by resourced-poor farmers, while the remaining 10% is produced by corporate/commercial farmers. (Abdulrahaman *et al.,* 2016). Even when this crop is produced, farmers face further challenges to get buyers for their produce, resulting in production surplus and subsequently wastage or sell at low price. This marketing problem has taken some farmers out of rice production business. In Nigeria, various development intervention programmes have been designed from numerous agricultural policies but many failed owing to political instability, corruption, poor management among others (Chinedum, 2013). One of such interventions programme was undertaken by USAID/MARKETS.

Others similar interventions on rice include; African Rice Initiative of 2002 and Presidential initiative on increased rice production of 2005. There has been demand by government, aid donors and the development community at large for evidence-based assessments of the impacts of these programmes claiming to improve farmers' income. Hence, the objectives of the Study, these includes: describe the socioeconomic characteristics of the respondents, determine

and compare the costs and returns associated with rice production under the programme and identify constraints faced by small scale rice farmers participating in the programme.

Materials and methods

Study area

This study was conducted in Niger State, in the North Central Zone of Nigeria, of latitudes 8^0 to 11^0 30^1 North and Longitude 03^0 to 7^0 40^1 East. It occupies a land area of approximately 76, 469.903 square kilometers or about 10% of Nigeria's land mass. The State has an estimated population of 3,950249 persons. The estimated projected population of the state at 3% growth rate per annum in 2014 was 4,898,309 persons. The State has a tropical climate marked by dry and wet seasons. The rainy season commences in April and ends in October. The dry season begins from November and ends in March. It has a mean annual rainfall of 1000mm and mean temperature of 33.5^0C. Niger State is characterized by Guinea Savanna vegetation with trees like shea-butter and locust bean and also endowed with fertile agricultural land and has the capacity to produce most Nigerian staple food crops including rice, maize, sorghum, soybean, groundnut, yam, pepper, tomatoes as well as livestock such as goat, poultry, cattle and sheep). The State is popular for its farming activities and brass work, particularly in Bida. It is also known for pottery, weaving and several cottage industries which can be found throughout the State. There are 3 prominent ethnic groups, Nupe, Gbagi (Gwari) and Hausa. Other ethnic groups include, Kamberi, Kamuku, Gade, Pangu and Ingwai.

A multi-stage sampling technique was used to select respondents for the study, a purposive selection of two Local Government Areas namely Katcha and Lapai based on predominance of rice production in the study area. Finally, a proportionate random sampling was employed to select a sample size of (247) for both participant and non-participant rice farmers. Primary data were collected using structured questionnaire. Data were analyzed using descriptive statistics and Gross margin analysis to achieve the objectives of this study.

The formula for gross margin is stated as follows.

$$GM = TR - TVC$$

Where,

GM = Gross margin (₦): is the difference between Gross Income and Total variable cost. TR= Total revenue (₦): is the sum total of all output realized multiplied by their unit price $\sum Q_i.P_i$,

TVC= Total variable cost (₦): is the sum total of all inputs use in production multiplied by their unit price $\sum P_i.X_i$

Results and discussion

Socioeconomic characteristics of small-scale rice farmers in Niger State.

The socio-economic variables included for the analysis are;

- *Quantitative variables***:** age (years), household size (numbers), farming experience in rice cultivation (years), farm size (hectares)
- *Qualitative variables:* marital status, educational status, membership of farmers association among others.

Distribution of participant and non-participant rice farmers based on age, household size, experience, extension visit and farm size.

The result in Table 1, indicated that average age of farmers was 43 years with over 81% within the range of 30-60 years. This implies that most of the farmers were in their productive age and therefore can participate actively in various agricultural production activities. This finding is consistent with that of Opoku, (2012), who reported that most active farmers' age groups that engage in production activities was within 30-60 years which implies that rice production and participation in farming arrangement holds prospect in the area. Average household sizes as shown in Table 1, were 10 persons per household for participant and 9 persons per household for non-participant farmers. This large household size depicts common characteristics of rural households particularly in Northern States of Nigeria where polygamy is mostly practiced and family labour is also utilized for farming activities. It is expected that farmers with larger family are more likely to join the USAID/MARKETS II schemes because of the labour-intensive nature of the commodity selected, family size is expected to have a positive influence on participation. From the result in Table 1, Average extension contact was three times for participant and most a time once for non-participant farmers.

This indicates that farmers that participated in the programme receive more visits than those that do not participate which could be attributed to their participation in the programme. Extension visits enhance flow of information from an extension agent to the farmers. According to Obwona (2000), extension service is very essential to the improvement of farm productivity and efficiency among the farmers**.** Average farming experience from the result in table 1, for both categories of farmers was 10 years. The long number of years of experience shows that farmers will be able to make sound

decisions as regards resources allocation and management of their farms. This is in line with the finding of Opoku, (2012), who revealed that the length of a farmer's experience can either generate or erode confidence of rice farmers. The maximum farm size in Table 1 was 4 hectares with a minimum of 0.5 hectares and average of 2.5 and 2.1 hectares for both groups of farmers. The implication of this finding is that the respondents are predominantly small-scale farmers. Small farm size is an impediment to agricultural mechanization because using farm machineries like tractors for farm operation will be underutilized and excessively expensive (Opoku, 2012).

Distribution of farmers based on Gender, Marital status, Education and Cooperative societies

The result in Table 2, revealed that majority of farmers were married while very few were single which implies that there will be available labour supply and is dependent on the age structure of the households. This finding is in agreement with Adepoju, (2012), who found that marriage has been traditionally considered as an important step to self-actualization in the study area. Literacy among the participant farmers is relatively higher and this is in line with Amaza *et al*. (2009), who observed that education has a positive and significant impact on farmer's efficiency and productivity. The result in table 2, shows that farmers that participated in the USAID intervention programme were members of cooperative society while very few of the non-participant farmers were members of cooperatives. Ekong (2003) observed that membership of cooperative societies confer advantages of accessibility to micro-credit, input subsidy as well as outlets of output of members and information among members.

Cost and Returns of Small Scale Rice Farmers

The result in Table 3 revealed that rice seed used by the non-participant farmers in the study area were mainly unimproved seeds taken from the last harvest. The quantity used was 86kg with an average market price of ₦200 per kg constitutes 33% of the total cost of production as oppose to the participant farmers that were provided with high quality seed (136kg) at average market price of ₦250 per kg, the cost of seed constitute 44.24% of the total cost of production. The quantity of fertilizer used was 24.16kg/ha with an average market price of ₦160per kg, the cost constitutes 19% of the total cost of production for non-participant farmers and 97.50kg/ha at the same market price which also constituted 20.3% of the total cost for the participant farmers.

Labour costs consist, cost of land preparation, planting, fertilizer application, weeding,

replanting and harvesting. The labour was computed on the basis of opportunity cost in man-days. The wage rate varied according to farm operation performed. An average wage rate of ₦600 per man-day was used, giving the average labour cost per hectare to be ₦13,272 and ₦8,742 for participant and non-participant farmers respectively and constitute17.26% and 16.8% of the total variable cost for the group of rice farmers. The results revealed that participant farmers incurred an average cost of ₦76852.00 per hectare; and within the same period they had an average estimated returns of ₦165000.00 per hectare while the Non-participant farmers incurred average cost of 52158.00 and had a returns of 75300.00 This implies that the participant farmers made a profit of ₦88,148.00 while the non-participant farmers made a profit of ₦30,492.00, the average rate of returns on investment (return per naira invested) were 1.15 and 0.58 for the participant rice farmer and their non-participant counterpart. This indicated that for every ₦1 invested in rice production in the study area, a profit of ₦1.15 was made for the participant farmers while the non-participant farmers made 0.58 kobo for every ₦1 invested. Thus, it could be concluded that rice production though on a small scale, was financially viable and profitable in the study area. This finding is similar to that of Okam *et, al* (2015) finding, in their study "Profitability analysis of Male and Female Rice Farmers in Ebonyi State, Nigeria" who observed that rice production is profitable with an average rate of return per naira invested was 1.18 for rice farmers implying that for every one naira invested in rice production, a profit of N1.18 was made.

Constraints faced by rice farmers

The constraint faced by USAID/MARKET II participant farmers in the study area were ranked according to their magnitude as presented in Table 4. High cost of inputs ranked first with 61.5% as indicated by the respondent. They asserted that the input is not available at the right time, and government subsidy is being diverted to unintended beneficiaries. According to the respondents, inputs like fertilizer, agrochemical and seeds were made available when farmers are far into the production period, sometimes at the middle of the rainy season. This finding is in line with Ekong (2003), who opined that most farmers have little or no access to inputs like, improved seed, fertilizer and continues to recycle seeds that have become exhausted after generations of cultivation.

About 45.4% of the respondents indicated inadequate capital to finance agricultural activities is their problems and this ranked

second. This affect rice production in the study area as the new method introduced by USAID/MARKETS II is labour intensive, demanding more cash to pay for labour and buy inputs. The farmers complained that even when they desire to allocate more land to rice production, they are cash trapped, because their meager savings from off farm activities cannot meet their needs during the farming season.

Other constraints as indicated by the respondents takes 21% which include high cost of transportation, Pest and diseases and high cost of labour during the peak of the land clearing, ridging and weeding. These constraint as claimed, lead to labour shortage especially at the peak of farming activities. However it was observed that the non-participant farmers are faced with inadequate access to inputs, access to market and other logistic problem.

Conclusion

The study shows clearly that all the EOs have worked for a longtime in GRP, attained tertiary education and have many farmers assigned to each of them. The EOs play key roles in assisting farmers on credit management, such role as group formation, record keeping, loan application, reminds farmers to repay and save, and helps in conflict resolution.. The EOs faced challenges of high illiteracy by the farmers, frequent meeting with the farmers and attitude of farmers in seeing loan as a grant.

Recommendations

Rice production was a profitable enterprise in the study area as participant farmers recorded significant profit through the intervention, it is therefore recommended that:

- Intervening agencies on agriculture should ensure that strong institutional linkages and facilitation are created among farmers, input suppliers, credit institutions and market for effective service delivery.
- Rice farmers in the study area should be encouraged to take advantage of such intervention programmes to increase their productivity through better access to inputs and linkages to markets which would increase their income for better improvement in their living standard.

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Table 1. Distribution of participant and non-participant rice farmers based on age, household size, experience, extension visit and farm size.

Variable	Participant (n=130)		Non-participant (n=117)		Participant farmers				Non-participant farmers			
	Freq.	%	Freq.	%	Min	Max	Mean	SE	Min	Max	Mean	SE
Age (years)												
20-29	25	19.3	8	6.8	**24**	**69**	**43**	**1.2**	**20**	**65**	**44**	**1.0**
30-39	21	16.2	29	24.8								
40-49	40	30.8	34	29.1								
50-59	22	16.9	30	25.6								
60-69	22	16.9	16	13.7								
Total	130	100	117	100								
Household size (No)												
1-5	37	28.5	29	24.8	**2.0**	**20**	**10.0**	**0.7**	**1.0**	**20**	**9.0**	**0.8**
6-10	35	26.9	43	36.8								
11-15	24	18.5	15	12.8								
16-20	17	13.1	13	10.0								
Total	130	100	117	100								
Farming experience (Yrs)												
1-10	88	67.7	54	46.2	**5.0**	**50**	**10**	**1.0**	**4.0**	**40**	**10**	**1.0**
11-20	30	23.1	47	40.2								
21-30	4	3.1	12	10.3								
31-40	6	4.6	4	3.4								
41-50	2	1.5	-	-								
Total	130	100	117	100								
Extension visit (No)												
0-3	65	50	90	78								
4-6	65	50	27	22								
Total	130	100	117	100	**2**	**5**	**3**	**0.07**	**0**	**2**	**1**	**0.1**
Farm size (Ha)												
<1	2	1.5	5	4.3								
1.0-1.9	65	50.0	39	33.1	**0**	**4.0**	**2.5**	**0.07**	**1**	**4.5**	**2.1**	**0.1**
2.0-2.9	40	30.8	28	23.9	**.**							
3.0-3.9	21	16.2	37	31.6	**5**							
4.0-4.9	2	1.5	8	6.8								
Total	130	100	117	100								

Source: Field Survey 2016. n = 247

Table 2. Distribution of farmers based on gender, marital status, education and cooperative societies

Socio-economic	Participant-farmers (n=130)		Nonparticipant-farmers (n=117)	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Marital status				
Single	4	3.10	9	7.69
Married	126	96.90	108	92.31
Total	130	100	117	100
Education				
Primary education	29	22.3	33	28.2
Secondary education	25	19.2	16	13.7
Tertiary education	18	13.9	0	0.0
Quranic	58	44.6	68	57.1
Total	130	100	117	100
Membership of cooperatives				
Accessed	130	100	16	13.68
No accessed	0	0	101	86.32
Total	130	100	117	100

Source: Field survey, 2016 n = 247

Table 3. Costs and returns per hectare of rice production for participant and Non-participant farmers under the project

Variable	Participant farmers		Non-participant farmers	
	Value/ha (₦)	**% Contribution**	**Value/ha (₦)**	**% Contribution**
Variable Cost(₦)				
Material inputs				
Seed(Kg)	34000.00	44.2	17200.00	33
Fertilizer(Kg)	15600.00	20.3	9870.00	19
Agrochemical(L)	1846.00	3.8	906.50	1.7
Labour (Land preparation planting, weeding, spraying, etc)(Mandays)	13272.00	17.3	8742.00	16.8
Transportation cost	11004.00	14.3	15440.00	29.6
Total Variable Cost(₦)	76852.00		52158.00	
Total Revenue(₦)	165000.00	100	75300.00	100
Net Income(₦)	88148.00		30492.00	
Return per Naira Invested	1.15		0.58	

Source: Field Survey, 2016

Table 4. Constraints faced by the Rice Farmers

Participant farmers	**Frequency**	**Percentage (%)**	**Ranking**
Constraints			
High cost of Inputs	80	61.5	1st
Inadequate capital	59	45.4	2nd
High cost of labour	34	26.2	3rd
Others(Pest and diseases)	28	21.5	4th
Non-participant farmers			
Access to inputs	62	40.1	1st
Access to markets	46	33.4	2nd
Others	31	25.2	3rd

** Multiple responses were allowed