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Impact of the United States Agency for International Development Rice Project Phase 1 on Rice Farmers in Anambra and Ebonyi States, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors MCM and AEA designed the study and supervised the entire work. Author HUN carried out all field works, managed the literature searches and performed the statistical analysis. Author EMN edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

The study assessed the impact of United States Agency for International Development (USAID) rice project phase 1 on the socio-economic life of the rice farmers in Anambra and Ebonyi States of Nigeria. After more than five years of operation, the evaluation of the USAID project phase 1 in terms of its impact on rice production and socio-economic life of the rice farmers becomes pertinent. The population of the study included all rice farmers in Anambra and Ebonyi States that participated in the first phase of the project. Purposive and simple random sampling techniques were used to select a total of 80 project participant farmers (PPFs) which constituted the sample size for the

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study. Primary data were collected through validated structured interview schedule. T-test and Chi square were the analytical tools used at $P = .05$ significance level. The results of the study revealed that the project made significant impact on the socio-economic life of project farmers in the areas of hectarages of rice land cultivated (t= 8.33, $P \leq .05$), rice production output (t= 10.58, $P \leq .05$), annual farm income (t= 11.2, $P \leq .05$), knapsack sprayer (t= 8.32, $P \leq .05$), motorcycle (t= 12.90, $P \leq .05$) and mobile phones (t= 14.79, $P \leq .05$). Other areas of significant changes were access to agro-inputs ($\chi 2= 50.19$, $P \leq .05$), ease of marketing rice ($\chi 2= 40.14$, $P \leq .05$), knowledge of rice production and processing techniques ($\chi 2= 61.00$, $P \leq .05$), attitude toward rice production ($\chi 2= 23.00$, $P \leq .05$), aspiration to invest more money into rice production ($\chi 2= 12.60$, $P \leq .05$) and improved standard of living ($\chi 2= 51.00$, $P \leq .05$). Increase in access to credit by the farmers; and the need for state governments or USAID in partnership with relevant manufacturing companies to provide various farmers' groups with improved parboiling tanks and low capacity set of rice milling machines at subsidized rate were recommended.

Keywords: Impact evaluation; USAID rice project; Nigeria.

1. INTRODUCTION

Evaluation of impact is generally regarded as an essential part of the project cycle, and is already well known and widely used in many disciplines. Bottom line issues are generally return on investment for the provider of funds, accountability, and the need for the recipient to be able to justify the case for further funding [1]. Impact studies aim to measure not only the reactions of the beneficiaries and the outputs generated by them, but also the proportion of any perceptible change attributable to the project [2]. Owen [3] describes 'impact evaluation' as evaluation that leads to a decision about the worth of a programme and which often has a strong summative emphasis. This type of evaluation is generally carried out at the end of the programme, or when a programme is at a settled phase.

Rice (*Oryza sativa*) is the most important staple food for about half of the human race [4]. It has witnessed considerable growing demand as more consumers move away from local carbohydrates diets such as yam and garri to making rice the staple food. About 70% of Nigerians feed on rice, while about 30% feed from other cereal products. Nigeria is the largest rice producing country in West Africa, but is also the second largest importer of rice in the World. From publications made by the National Bureau of Statistics and Federal Ministry of Finance, of the total foreign debts and importation figures of rice amount to about one (1) Trillion of Naira as the end of 2012. Rice importation has the greatest figure of over 60% of total import figures [5]. Adesina [6] noted that the country, a major consumer and importer of rice in Africa, was spending over N1bn daily or N356bn annually on rice importation. According to him, Nigeria imports about 2.1 million metric tonnes of rice annually. In 2013, the country produced 1.1 million metric tonnes of rice [7].

The small number of hectares under cultivation is an indication that food sufficiency through rice production has not yet been realized as rice production is left in the hand of smallholders whose output is inadequate and paddy processing is substandard [8,9]. The domestic production is also constrained by low-input and crop management techniques by small scale rice farmers, as well as lack of water control techniques [10]. To meet this shortfall, government recognizes the potential of large-scale mechanized irrigated agriculture, using improved modern techniques, and wishes to promote further expansion of rice production by the private sector [11,12].

The United States Agency for International Development (USAID) rice project is one of the various efforts made to improve rice production in Nigeria. It is one of the current policy initiatives aims at prioritizing the rice sector and decreasing dependence from international imports, fostering production and supplying agricultural inputs. The USAID is the United States government agency primarily responsible for administering civilian foreign aid; and its intervention in food and agriculture production is known as Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites (MARKETS). The project was initiated in June 2005 and ended in December 2010. It operated in 24 states of Nigeria and the Federal Capital Territory (FCT). Initially, the project focused on the value chains for rice, dairy, aquaculture, sorghum, and cowpea. Over time, the support provided by MARKETS has grown to include assistance to the value chains associated with: fertilizer supply and technology

development; seed development; and additional crops including sesame and cassava. The rice project covered only four states for rice commodity value chain. These include Anambra, Benue, Ebonyi and Kwara. The MARKETS' core strategy to develop rice sub-sector is to encourage competitiveness along the value chain, by strengthening identified markets and encourage the use of commercially-led technologies. It had a mandate to work along the entire rice value chain in order to improve on-farm productivity and sales and income. It provided technical assistance, training, and access to production technology through small farmer/producer associations. The project identified and helped reduce constraints to producing and selling rice product [12]. After more than five years of operation, the assessment of the USAID MARKETS project phase 1 in terms of its impact on rice production and socio-economic life of the rice farmers become pertinent. To what extent has the project changed the socio-economic life of rice farmers?

The main objective of the study was to assess the impact of United States Agency for International Development (USAID) rice project phase 1 on the socio-economic life of the rice farmers in Anambra and Ebonyi States of Nigeria.

The specific objectives of the study were to assess the impact of the project on the following socio-economic life/variables of the project farmers:

1. rice farm size, yield, income and cost of rice production of the project participant farmers in Anambra and Ebonyi States;
2. farm equipment, transportation and information resources owned by the project participant farmers; and
3. project farmers' access to agro-input and credit, ease of marketing rice produce, knowledge, attitude, skill, aspiration, and standard of living.

1.1 Hypothesis

Ho: There is no significant difference between the socio-economic life (such as revenue/income from rice produced, cost of rice production, quantity of rice produced, rice farm land cultivated, access to agro inputs & credits, possession of farm & household materials, improved living standard, increase in knowledge, attitude, skill and aspiration (KASA) towards rice production and processing, etc) of the project farmers before and after the project.

2. METHODOLOGY

The study was carried out in Anambra and Ebonyi States of Nigeria. The two states participated in the first phase of USAID MARKETS project in the southeast zone. Anambra State of Nigeria is made up of 21 Local Government Areas (LGAs) and four Agricultural Zones (AZs) - Aguata, Anambra, Awka and Onitsha. It is located in the South-East region of Nigeria between longitude 6º 36'E and 7º 21'E and latitude 5º 38'N and 6º 47'N. Anambra State occupies an area of 4,416 sq. km and has a population of 4,177,828 out of which 2,117,984 are male and 2,059,844 female [13]. The climate is typically equatorial with two main seasons, the dry and the rainy seasons. The state experiences dry season from late October to early May and has at least six dry months in the year. Crops, livestock and fisheries are main stock in the farming system of the state. Off-farm activities like processing and marketing are also vital components. The State has a population of about 25,000 rice farmers and 33 public extension agents. The first phase of USAID-MARKETS project in the state covered 2 LGAs. Twenty-two rice farmer cooperatives with a total population of about 440 farmers were registered under the project [14].

Ebonyi State is made up of thirteen LGAs. It lies on latitudes 5º 40'N and 6º 45'N and longitudes 7º 30'E and 8º 46'E. It occupies an area of about 5,935 km^2, which is approximately 5.8 per cent of the total land area of Nigeria with a population of 2,173,501 people [3]. The State is semi-savannah with seasonal variations of hot, mild cold weather and mixed grid vegetation with all eastern prototypes including agrarian, forestry and swamp which are ideal for rice production. The climate is a tropical hot humid type characterized by high rainfall, high temperature and sunshine with two marked seasons: the rainy and dry. The major occupation of the State is farming with a population of 145,109 rice farmers and 202 public extension agents. The first phase of USAID-MARKETS project in the state covered 12 LGAs. Sixty-eight rice farmer cooperatives with a total population of about 1,360 farmers were registered under the project [15].

The population of the study included all rice farmers in both Anambra and Ebonyi States of Nigeria that participated in the first phase of USAID-MARKETS project. Two LGAs (Ikwo and

Izzi) out of the 12 participating LGAs in Ebonyi State were purposively selected based on their high rice production activities in the State, while the two participating LGAs (Anambra East and Ayamelum) in Anambra State were used. The list of registered co-operatives (prerequisite for benefiting from the project) for each LGA from the project's state head office, Awka (Anambra State) and Abakaliki (Ebonyi State) were collected. From the list, a total of 10 out of the 22 registered cooperatives in Anambra State and 10 out of the 68 registered cooperatives (especially from the two selected LGAs) in Ebonyi State were selected using simple random sampling techniques. Then 4 cooperative members or PPFs each from the 10 selected cooperatives from each state were selected by the use of simple random sampling technique. This gave a total of 40 PPFs selected from each state. In all the total of 80 PPFs in both states were involved in the study. Primary data were used to collect data for the study. The primary data were collected through validated interview schedule.

To assess the impact of the project on socio-economic life of the farmers, the project participants' model was used to compare farmers' wellbeing before and after the project life. To achieve this, the changes in PPFs' socio-economic life/variable were compared in two different periods; before 2005 and after 2010 (5 years before 2005 and 5 years after 2010) within Anambra and Ebonyi states. The socio-economic life/variable of the farmers that were measured included; total hectare of rice land cultivated (ha), total quantity of rice produced (kg), estimated annual income from rice (Naira), degree of accessibility to agro-input and credit, ease of marketing rice produce, rating of standard of living, KASA toward rice production in the area, types of farm and processing equipment/ machinery, transportation resources and communication resources owned. To measure KASA, Swanson and Rajalahti [16] noted that improvement in farmer knowledge and skills are difficult to measure directly but we have to start with some obvious output indicators and then move into direct changes in farmer behaviour that reflect the acquisition of new knowledge and skills. These include number of farmers who directly participated in specific extension activities or who joined and became active members of producer or farmer groups, etc. Based on this, to measure knowledge and skill, the respondents were asked to tick/indicate among 20 relevant knowledge and skill statements/questions that they are aware and participated/adopted, respectively. The statements included: selection of improved rice seed varieties, treatment of seed before sowing, zero tillage, herbicide application, etc. The total score was 20 and each item ticked carries one point. The respondents were categorized into 4 (four) groups based on their level of knowledge and skill, namely:

a) No knowledge/skill (for those respondents with 0 score)
b) Poor knowledge/skill (for those respondents with 1-7 score)
c) Fair knowledge/skill (for those respondents with 8-14 scores)
d) Adequate knowledge/skill (for those respondents with 15-20 scores)

To measure aspiration, the respondents were asked to indicate their aspiration to invest more money into rice production; and their responses were strong, low/weak and do not know. To measure standard of living the farmers were asked to rate their standard of living even comparing their living situation with others in community before and after participating in the project. Their responses were very high, high, moderate and low standard of living. To measure attitude, farmers were asked to rate their attitude towards rice production and processing in the area and their responses were either positive or negative attitude; and do not know.

Data were analyzed using t-test and chi-square. The t-test was used to compare the mean scores for the rice farmers before 2005 and after 2010 project intervention in respect to profitability of rice production, revenue, hectareage, quantity, etc. of rice produced. Chi-square was used to analyze data collected at ordinal scale to find out whether there is a significant change of the project farmers in respect to access to agro inputs and credit, increase in KASA towards rice production and processing, before and after the project.

3. RESULTS AND DISCUSSION

3.1 Impact of the USAID MARKET 1 Project on Farm Size Cultivated, Yield, Income and Cost of Rice Production

3.1.1 Total area of land cultivated (ha)

Table 1 shows the mean hectarage of rice land cultivated by the project farmers before and after commencement of the project. The mean hectarage of rice land cultivated by the PPFs

before commencement of the project in 2005 and end of the project in 2010 were 2.31 and 3.00 hectares, respectively. The findings show that there are increments in mean hectarage of rice land cultivated from 2005 to 2010, and the rice farmers in the study area are still smallholders. Entries in Table 1 also reveal t-test carried out, that there was significant difference (t= 8.33, *P*≤ .05) between the mean score of hectarage of rice land cultivated by PPFs before and after the project. This finding implies that there was significant increase or change in the mean hectarage of rice land cultivated by PPFs from 2005 to 2010. The increase in mean hectarage of rice land cultivated is attributable to the project intervention. It is concluded that the project had made an appreciable impact on hectarages of rice land cultivated by the PPFs. The finding is in line with that Ajayi and Nwalieji [17] which reported that project farmers were able to increase the hectarages of their fadama farmland, as a result of the direct influence of the project on them.

3.1.2 Total quantity of rice paddy produced (metric tonne)

Data in Table 1 reveal that the mean scores of the quantity of rice produced by the PPFs in 2005 and 2010 were 10.23tonnes per 2.31ha and 16.19tonnes/3.00ha, respectively. There was a significant difference (t=10.58, *P*≤ .05) between the mean score of the quantity of rice produced by PPFs before and after the project. The findings imply that there are increments in average quantity of rice produced by the farmers from 2005 to 2010 and the quantity of rice produced was encouraging. The increased quantity of rice produced by the PPFs could be as a result of increased number of hectares of land cultivated which was attributable to the project intervention. It is concluded that the project had made an appreciable impact directly on rice production output of the PPFs. USAID MARKETS [18] notes that farmers can earn from 10-25% more per tonne by adopting improved growing techniques. This is as a result of 'Building a Competitive Rice Industry' which can change yields to 4.5/5.0 tonnes per hectare. Nigeria MARKETS [19] in a similar findings observed that since 2006, MARKETS farmers increased yield from 1.5 metric tons per hectare to as high as 5 metric tonnes.

3.1.3 Annual income from rice (Naira)

Table 1 shows that the mean scores of the annual income from rice by the PPFs in 2005 and 2010 were ₦ 471,000 per10.23tonnes and ₦931,000/16.19tonnes, respectively. Also, Table 1 shows that there was significant difference (t= 11.21, *P* ≤ .05) in the mean scores of the estimated annual income from rice by PPF, before and after the commencement of the project. These findings imply that there were great and significant increases in revenue realized by the rice farmers between 2005 and 2010. It is concluded that the project made an appreciable impact on the estimated annual income of the rice farmers. Olatoye [20] noted that a farmer can harvest close to 3-5tonnes of rice in one hectare depending on the variety. A 25 kg of rice is about N3, 500. So about N350, 000 can be realized from 1hectare of land. Adeola, Adebayo and Oyelere [21] in similar findings note that results of t-tests showed significant differences in the yields of rice and income of the rice producers before and after the project.

3.1.4 Total cost of rice production (Naira)

Total cost of rice production includes average operating input and labour costs incurred by rice farmers per annum. Table 1 reveals that the mean scores of the total cost of rice production in 2005 and 2010 for the PPFs were ₦ 303,000 per 2.31ha and ₦ 573,000 per 3.00 ha, respectively. The results further reveal that there was significant difference (t=10.91, *P* ≤ .05) in the mean scores of the total cost of rice production for PPFs, before and after the project. These findings imply that there were great and significant increases or changes in the total cost of rice production of rice farmers between 2005 and 2010. This implies that the cost of production increases with time. The increase in cost of production of the farmers could be as result of increase in yield and hectare of land cultivated.

3.2 Impact on Farm Equipment, Transportation Resources and Information Resources owned by the Rice Farmers

3.2.1 Possession of farm equipments

Table 2 shows the mean number of farm equipments owned by rice farmers between 2005 and 2010. The farm equipments considered were tractor, knapsack sprayer, thresher and rice mill. There was no significant differences (t= 1.75, *P* > .05) between the mean number of tractor owned by the PPFs, before and after the commencement of the project. This implies that the PPFs had so little number of tractors that it

Table 1. Impact of USAID MARKET 1 project on farm size cultivated, yield, income and cost of rice production per annum

Variable	2005 mean	2010 mean	T-value
Area of land cultivated (ha)	2.31	3.00	8.334* (0.00)
Total quantity of rice produced (metric tonne)	10.23	16.19	10.576* (0.00)
Estimated annual income from rice (₦)	471000	931000	11.206* (0.00)
Total cost of rice production (Naira)	303000	573000	10.906* (0.00)

*Source: Field survey, 2013; Figure in parenthesis= P-value; *= significant, P ≤ .05*

Table 2. Impact of USAID MARKET 1 project on farm equipment, transportation resources and information resources owned or rented by the rice farmers

Variable	2005 mean	2010 mean	T-value
Farm equipment			
No. of tractor	0.01	0.05	1.75(0.08)
No. of knapsack sprayer	0.54	1.05	8.32 *(0.00)
No. of thresher	0.02	0.12	2.96* (0.00)
No. of rice mill	0.01	0.04	1.42 (0.16)
Transportation resources			
No. of bicycle	0.81	1.24	5.67*(0.00)
No. of motorcycle	0.38	1.10	12.9* (0.00)
No. of pick-up van	0.02	0.12	2.96* (0.00)
Information resources			
No. of radio	0.70	0.94	4.96*(0.00)
No. of TV	0.30	0.60	5.82*(0.00)
No. of mobile phone	0.04	0.90	14.8* (0.00)

*Figures in parenthesis= P-value; * = significant (P ≤ .05)*

could not make any difference when compared before and after; therefore the project had no impact on the rice farmers in terms of tractor possessions. Data in Table 2 also reveal that there was a significant difference (t= 8.32, $P \leq .05$) between the mean number of knapsack sprayers owned by the PPFs, before and after the commencement of the project. This implies that there is significant increase in possession of knapsack sprayers by the farmers. This could be as a result of the cost and importance of knapsack sprayers in the application of herbicide and insecticide. The project is therefore said to have positive impact on project farmers in terms of possession of more knapsack sprayers.

Table 2 also reveal that there was significant difference (t= 2.96, $P \leq .05$), between the mean number of thresher owned by the PPFs, before and after the commencement of the project. This implies that there is significant increase in possession of threshers by the PPFs which impact is attributable to the project's intervention. Data in Table 2 show that there was no significant difference (t= 1.42, $P > .05$) between the mean number of rice mill owned by the PPFs, before and after the commencement of the project. This implies that the PPFs had so little number of rice mill that it could not make any difference when compared before and after, and the project is said to have no impact on the rice farmers in terms of rice mill possessions.

3.2.2 Transportation resources

Data in Table 2 show the mean number of transportation resources owned by rice farmers between 2005 and 2010. The transportation resources under study included bicycle, motorcycle and pick-up van. There was significant difference (t= 5.67, $P \leq .05$) between the mean number of bicycle owned by the PPFs

before and after the commencement of the project. This implies that there is significant increase in possession of bicycle by the farmers. This could be as a result of the importance of bicycle as common means of transportation in the study area. However, the project is said to have an impact on the project farmers in terms of ownership of bicycle. Table 2 also reveals that there was significant differences (t=-12.90, $P \leq .05$) between the mean number of motorcycle owned by the PPFs, before and after the commencement of the project. This implies that there is significant increase in possession of motorcycle by the farmers. This could be as a result of the importance of motorcycle as more improved means of transportation in the study area. Therefore the project had positive impact on the project farmers in terms of possession of more motorcycles. Entries in Table 2 indicate that there was significant difference (t= 2.96, $P \leq .05$), between the mean number of pick-up vans owned by the PPFs before and after the commencement of the project. This implies that there was significant increase in possession of pick-up vans by the PPFs. the project therefore had positive impact on the PPFs in terms of possession of more pick-up vans.

3.2.3 Information resources owned or rented

Entries in Table 2 show the mean number of information resources owned by rice farmers between 2005 and 2010. The information resources considered were; radio, TV and mobile phone. There was significant difference (t=4.96, $P \leq .05$) between the mean number of radio owned by the PPFs before and after the commencement of the project. This implies that there is significant increase in possession of radio by the categories of farmers. The project had positive impact on the project farmers in terms of possession of more radios. Data in Table 2 reveal that there was significant difference (t= 5.82, $P \leq .05$) between the mean number of radio owned by the PPFs before and after the commencement of the project. This implies that there is significant increase in possession of TV by the farmers. The project is said to have positive impact on the project farmers in terms of possession of more TVs. Table 2 also shows there was significant difference (t= 14.79, $P \leq .05$) between the mean number of mobile phone owned by the PPFs before and after the commencement of the project. This implies that there is significant increase in possession of mobile phone by the farmers. The project had positive impact on the project farmers in terms of possession of more mobile phones.

3.3 Impact on Project Farmers' Access to Agro-Input and Credit, Ease of Marketing Rice Produce, KASA and Standard of Living

3.3.1 Access to agro-input such as fertilizer, herbicide, insecticide and improved Seeds

Table 3 shows that there was significant change ($\chi 2$= 50.19, $P \leq .05$) in the proportion of PPFs, that had access to agro-inputs such as fertilizer, herbicide, insecticide and improved seeds, before and after the commencement of the project. This implies that there is significant change in access to agro-inputs from no access to full access by the farmers as a result of the project presence. This is in line with Manyong, et al. [22] which noted that access to inputs is facilitated by the sustained activities of the Agricultural Development Programmes by providing adequate information on the market situation for the different inputs. Through this, the ultimate users of the different inputs at both the downstream and upstream segments of the agricultural sector are sensitized and enlightened.

3.3.2 Access to credit

Data in Table 3 reveal that there was no significant change ($\chi 2$= 6.00, $P > .05$) in the proportion of PPFs that had access to credit, before and after the commencement of the project. This implies that there is no significant increase in access to credit by the farmers. Degree of accessibility to credit implies farmers' ability to acquire or access loan facility or other credit facilities from the agency. Here, USAID did not provide loan facility direct to farmers but linked the service providers such as banks. In conclusion, the project had no impact on the project farmers in terms of access to credit. However, access to credit is seen as a great enabler for primary producers' especially small-scale farmers in enhancing adoption of technologies and better production methods to improve output on farms. Credit is important in reducing poverty and increasing farm output and livelihoods of small-holder farmers. Emongór et al. [23] noted that various banks and micro financing institutions were available in the rice growing regions and provided credit to rice growers but survey results showed that the uptake of credit was low among the rice

producers. The reasons cited according to them for non-use of credit were: 26% of the respondents were not aware of the existence of the loan facilities and 10% said they were afraid of loan.

3.3.3 Ease of marketing rice produce

Entries in Table 3 indicate that there was significant change ($\chi 2= 40.14$, $P \leq .05$) in the proportion of PPFs before and after the commencement of the project. This implies that there is significant changes in ease of marketing rice produce by the PPFs. the project is said to have positive impact on the PPFs in terms of ease of marketing rice produce. Ease of marketing rice produce is the ability of the farmers to sell their produce with ease and at a will without much hassles and difficulties. Here buyers who are readily available and willing to buy farmers' produce at affordable price are being linked by the project.

3.3.4Knowledge of improved rice production and processing techniques

Table 3 reveals that there was significant change ($\chi 2= 61.00$, $P \leq .05$) between the knowledge of improved rice production & processing techniques by the PPFs before and after the commencement of the project. This implies that there is significant change in the knowledge of improved rice production and processing techniques by the PPFs (from poor to adequate knowledge). However, the project had positive impact on the PPFs in terms of knowledge of improved rice production and processing techniques. The finding is in line with Ajayi and Nwalieji [17] which noted that a significant difference existed between the fadama production knowledge by the project farmers before and after project intervention due to the existence of the project.

3.3.5 Attitude towards rice production and processing in the area

Entries in Table 3 show that there was significant change ($\chi 2= 23.00$, $P \leq .05$) in the proportion of PPFs in their attitude towards rice production and processing in the area, before and after the commencement of the project. This implies that there is significant change in attitude of the farmers towards rice production and processing. So, the project had impact on the project farmers in terms of their attitude towards rice production and processing.

3.3.6 Standard of living

Data in Table 3 reveal that there was significant change ($\chi 2= 51.00$, $P \leq .05$) in the proportion of the PPFs in the standard of living, before and after the commencement of the project, before and after the commencement of the project. This implies that there is significant change in the standard of living of the PPFs (from low to high). It is therefore concluded that the project had positive impact on improved standard of living of the PPFs. The finding is in line with that Ajayi and Nwalieji [17] which reported that the PFs had a positive change in the perception of their standard of living after becoming project farmers. Also, Alabi, Ogbonna, Lawal and Awoyinka [24] note that fadama II project greatly enhanced the income of the beneficiaries, thereby raising their standard of living, had expansion in their business and increased their productivity.

3.3.7Skill in improved rice production practices

It is evident from Table 3 that there was significant change ($\chi 2= 52.00$, $P \leq .05$) in the proportion of the PPFs that had skill in improved rice production practices, before and after the commencement of the project. This implies that there is significant changes in the proportion of the PPFs that had skill in improved rice production practices (from poor in 2005 to adequate in 2010). This could be attributed to their participation in the project, hence the project is said to have positive impact on the acquisition of skill in rice production practices by the PPFs.

3.3.8 Aspiration to invest more money into rice production

Data in Table 3 reveal that there was significant change ($\chi 2= 12.60$, $P \leq .05$) in the proportion of PPFs that had aspiration to invest more money into rice production in the area, before and after the commencement of the project. This implies that there is significant change in the proportion of the farmers from low aspiration in 2005 to strong aspiration to invest more money into rice production in 2010. The project however made an impact on the project farmers in terms of raising their aspiration to invest more money into rice production. The finding is in line with observation made by Onimaes [25] that rice can be grown conveniently in Nigeria because the climate is good and the potential in investment cannot be overestimated. This is why both indigenous and foreign investors are seriously going into it.

Table 3. Change in rice farmers' access to agro-input and credit, ease of marketing rice produce, KASA and standard of living

Variable	2005 (%)	2010 (%)	χ2 -value
Access to agro-input such as fertilizer, herbicide, insecticide and improved seeds			
No access	48.8	7.5	
Little access	43.8	57.5	50.19*
Full access	7.5	35.0	(0.00)
Access to credit			
No access	65.0	61.2	
Little access	26.2	25.0	6.00
Full access	8.8	13.8	(0.11)
Ease of marketing rice produce			
Not easy	57.5	16.2	
Easy	30.0	56.2	40.14*
Very easy	12.5	27.5	(0.00)
Knowledge of improved rice production & processing techniques			
Poor knowledge	50.0	10.0	
Fair knowledge	41.2	38.8	61.00*
Adequate knowledge	8.8	51.2	(0.00)
Attitude towards rice production and processing in the area			
Do not know	20.0	12.5	
Negative	30.0	12.5	23.00*
Positive	50.0	75.0	(0.00)
Standard of living			
Do not know	11.2	5.0	
Very low	10.0	7.5	
Low	28.8	2.5	51.00*
Moderate	27.5	30.0	(0.00)
High	13.8	37.5	
Very high	8.8	17.5	
Skill in rice production practices based on no. of modern rice production practices adopted			
Poor skill	43.8	10.0	
Fair skill	42.5	37.5	52.00*
Adequate skill	13.8	52.5	(0.00)
Aspiration to invest more money into rice production			
Do not know	12.5	10.0	
Low/weak	25.0	10.0	12.60*
Strong	62.5	80.0	(0.01)

*Figures in parenthesis= P-value; P ≤ .05= significant = **

4. CONCLUSION

The project made significant impact on the socio-economic life of project farmers in the areas of: hectarages of rice land cultivated, rice production output, annual income, number of knapsack sprayer, thresher, bicycle, motorcycle, radio and mobile phone. Other areas of significant changes included; access to agro-inputs, ease of marketing rice, knowledge of rice production and processing techniques, rating attitude towards rice production and processing, improved standard of living, acquisition of skill in rice production practices and raising aspiration to invest more money into rice production.

The following recommendations are made:

1. There should be Increase in access to credit (from no or little or poor access to full access) by the farmers; and need for government or USAID MARKETS in partnership with relevant manufacturing companies to provide various farmers'

groups with improved parboiling tanks and low capacity set of rice milling machines at subsidized rate.

2. There should be timely (before the farming season kicks off) and adequate supply of agro-input such as fertilizers, herbicides, etc. at about 20-50% subsidized rate by the service providers. This would discourage farmers from relying on high cost of privately sold agro-input such as fertilizers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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