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Adoption of Faro (39) Rice Project Technology by Farmers' in Agricultural Zone 1, Niger State

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ABSTRACT
The study examined the adoption of the Korean International Cooperation Agency (FARO 39) Rice Project Technology by farmers in Agricultural Zone 1 of Niger State, Nigeria. To achieve the study objectives, 206 farmers were randomly selected from two local government areas of Agricultural Zone 1 in the state. Validated interview schedule with reliability coefficient of 0.89 was used for gathering data which were analyzed using descriptive statistics and correlation analysis. The result indicated that the mean age of the farmers was 39 years. Findings also revealed that more than half (63%) of the farmers were aware of all recommended technologies while 40% of the farmers adopted 5 out of the 8 recommended technologies of the rice project. Challenges of adoption of these recommended technologies were technicalities of some of the components of the technology (47.60%) and untimely delivery of improved seed (36.10%). The result further showed that farmers' educational level (r=0.221), farm size (r=0.264) and extension contact (r=0.206) had significant relationship with the adoption of recommended technologies of the FARO 39 Rice Project. Thus, it was recommended that extension service providers should provide follow-up information to the farmers in order to educate and create awareness on the recommended technological practices. In addition, relevant stakeholders should make adequate and timely back-up inputs, such as improved seeds and chemical fertilizer available to the farmers.

Keywords: Adoption, Technologies, Farmers, Rice project, Extension services.

INTRODUCTION

Globally, agricultural production is central to the overall wellbeing of the populace because of its importance in the provision of foods, income for farmers, raw materials for industries, employment and foreign exchange for the nation. National Bureau of Statistics (2016) stated that agricultural production provides income for 2/3 of Nigerians who are low income earners and it is presently one of the world largest producers of food and raw materials for its major enterprise. Rice production in Nigeria is dominated by small scale farmers with individual holdings of 0.10 to 2.0 hectares (ha) on the average. Nigeria's annual demand for rice is estimated at 7.0 million tones (FAO 2016). While production level is 4.0 million tones resulting in 3.0 million tones deficit. Consequently the country resorted to rice importation to bridge the gap. According to Central Bank of Nigeria (CBN) report in 2015, rice import bill was US$468 million (₦ 151920 trillion the exchange rate of N340 and this almost doubled in 2016 as a result of increase in exchange rate (NCRI 2016). From the forgoing, it is obvious that a lot of the country's money is expended on rice importation.

In pursuit of its goal to make Nigeria self-sufficient in rice production in the shortest possible time, the government of Nigeria banned rice importation and (FARO 39) rice project technology was initiated in agricultural zone 1 Niger State to increase rice cultivation and paddy yield.

The main objective of this study is Adoption of Faro (39) Rice Project Technology by Farmers' in Agricultural Zone 1, Niger State, the specific objectives are to: describe socio-economic characteristics of the respondents;

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determine the awareness of FARO 39 rice project technology by the respondents; determine the level of adoption of Faro 39 rice project technology by the respondents; and identify the challenges for adoption of Faro 39 rice project technology by the respondents.

Study Hypothesis
There is no significant relationship between Socio-economic characteristics of the respondents and adoption of Faro 39 rice project technologies.

METHODOLOGY

The Study Area

The study was conducted in Niger State which is located within Guinea Savannah ecological zone of Nigeria. It covers a total land area of 74,224km2 thus accounting for about eight percent of Nigeria's land area. The State is located within latitude 10.2155ºN and longitude 5.3904ºE.With annual growth rate of 3.5%, the State has estimated population of 5,347.159 in 2016 (Niger State Geographical Information System, 2015). Eighty-five percent of the people are farmers. Annual rainfall ranges from 1,100mm in the northern part to 1,600mm in the southern part of the State. The mean average temperature is around 32ºc, some of the crops grown in Niger State include yam, cotton, maize, sorghum, millet, soya bean, cowpea, rice and groundnut. While some of the tree crops cultivated are mango, citrus, cashew, banana, pawpaw. Livestock reared include goat, sheep, cattle, chicken and donkey. The State has 25 Local Government Area (LGAs) with three Agricultural zones (Niger State Geographical Information System, 2015).

Sampling Technique and Data

Multistage sampling technique was used for the selection of respondents for the study. The first stage was purposive selection of agricultural zone 1 because of high participation of farmers in rice production in the zone. The second stage involved random selection of two Local Government from the zone. The third stage was random selection of four rice producing villages from each of the selected LGA. The fourth stage was sample random selection of 10% of farmers from the selected villages. Thus, a total of 206 respondents were selected for the study from the sampling frame of 2060 farmers obtained through village heads with assistance of village extension workers attached to the village sampled. Content validity of the interview was ensured through expert consultation and literature scan. The validated interview schedule which was subjected to Test-retest reliability test (r=0.89) was used for data collection in April, 2016.

Data were collected on socio-economic characteristics, adoption of Faro 39 rice project technology and challenges of adoption. Socio-economic characteristics such as age and educational level were measured in years. While farm size and extension contacts were measured in hectares and number respectively, level of awareness was determine by the total number of technologies the respondents were aware of the technologies. Adoption was measured by number of technologies adopted by the respondents. Challenges were ascertained by asking the respondents to indicate constraints faced in the adoption of Faro 39 rice production technology.

Analytical Techniques

Descriptive statistics such as frequency, percentages, count and mean were used to achieve objective i, ii, iii and iv while study hypothesis was tested using correlation analysis. The explicit form of the model is specified below:

$$r_{xy} = \frac{n\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[n(\Sigma X^2) - (\Sigma X)^2][n(\Sigma Y^2) - (\Sigma Y)^2]}}$$

Where:

r = correlation coefficient
Y = Adoption FARO 39
X = independent variables
N = total number of observations
∑ = summation

RESULT AND DISCUSSION

Socioeconomic characteristics of respondents

Result in Table 1 indicated that the mean age of the respondents was 39 years. The finding suggest that the respondents were young, active and likely to be more productive, if given adequate farming resources, which could be instrumental to adoption of rice project technology, because of the innovativeness of this age category toward technology adoption. This agreed with the findings of Haruna and Oyebisi (2016) who reported that age bracket of 30-40 years is an indicator of good supply of agile work force in technology adoption. Therefore, capacity building or training of these youth on Faro 39 rice project technology and its application can be useful for economy development and poverty reduction.

The findings in Table 1 also showed that 58.7% of the respondents attended primary school and this constituted the largest number of educational qualification attained in the study area. The implication of this is that education provides a platform for farmers and adoption of available innovations and easy access to information. Hussain (2015) observed that education has been identified as a catalyst in agricultural production and other productive activities. The study is also in line with finding of Olujimi and Adekule (2015) who reported that people with high education level are likely to analyze and interpret information than those who have less education. The more educated a farmer is, the more receptive he is to changes and has the ability to adopt improved agricultural practices.

Farm size is an important fixed input resource factor in agricultural production. This is because it determines to a large extent the level of agricultural production (i.e. small or large scale production). As indicated in Table ,1 majority (68.49%) of the respondents had 1.1-2.0 hectares implying that majority of the farmers in the area were into small scale farming which may in turn limit investment in technology adoption and output level. Furthermore, Table 1 indicated that 73.8% of the respondents received extension contacts twice throughout the cropping season, while 21.8% respondents received extension contacts thrice and 2.9% respondents received extension contact from extension agent four times respectively, During the cropping season in the area going by Training and Visit (T&V) extension system which recommended fortnightly visits to farmers monthly, the respondents in the area were grossly underserved with extension services which should be driving force for technology adoption by farmers.

Table 1: Socio-economic characteristics of respondents

Socio-economic characteristics	**Frequency**	**Percentage**	**Mean**
Age (Years)			
20-30	14	6.8	39
31-40	150	72.8	
41-50	25	12.1	
51-60	5	2.4	
61-70	8	3.9	
71-80	4	1.9	
Total	206	100	
Educational level			
No formal education	4	1.9	
Primary education	33	16.0	
Secondary education	11	5.3	
Tertiary education	26	12.6	
Adult education	11	5.3	
PSLC	121	58.7	
Total	206	100	
Farm size (ha)			
≤ 1.0	20	9.7	
1.1-2.0	141	68.4	
2.1-3.0	31	15.0	
3.1-4.0	14	6.8	
Total	206	100	
Extension Contacts			
Once	3	1.5	
Twice	152	73.8	5
Thrice	45	21.8	
Four times	6	2.9	
Total			

Source: Field Survey, 2016

Level of awareness of Faro 39 Rice project technology

Finding in Table 2 revealed that 8% of the farmers were aware of 3 and below of the technologies, 18% were aware of 4 to 6 of the technologies, 74% were aware of 7 to 8 of the Faro 39 rice project technologies. The creation of awareness on Faro 39 rice project technology was effected mainly through the Village Extension Agents (VEAs) efforts using demonstration plots and Small Plot Adopted Techniques (SPATs).

The findings on awareness agreed with the report of Isaac and Shehu (2015) who affirmed that the primary function of awareness stage is to initiate the sequence of four stages that lead to eventual adoption or research of an innovation.

Table 2: level of awareness of Faro 39 project technology by farmers

Number of technologies aware of	Percentage
1	0.0
2	2.2
3	6.4
4	3.3
5	5.2
6	10.0
7	11.4
8	62.2

Source: Field Survey, 2016

The result in Table 3 indicated that all the respondents (100%) were aware of improved seed, plant spacing/density and fertilizer application. Similarly, 81.0%, 51.0%, 48.0% and 32.0% of the respondents were aware of Mechanized land preparation, Soil and water management, Seed dressing/plant protection and Row planting technologies, respectively.

Table 3: Distribution of respondents according to their awareness of recommended Faro 39 rice project technology.

Recommended practices	Percentage of farmers awareness
Improved seed	100.0
Plant spacing/density	100.0
Fertilizer application	100.0
Mechanized land preparation	81.0
Herbicide application	00.0
Soil and water management	51.0
Seed dressing/plant protection	48.0
Row planting	32.0

Source: Field Survey, 2016

Level of adoption of Faro 39 rice project technology

Result in Table 4 revealed that 40% of the farmers adopted 5 out of 8 recommended technologies while 94% of the farmers adopted 8 of the recommended practices. On the whole, 40% of the respondents were considered as high adopter of this recommended practices having adopted 5 out of 8 recommended practices. This finding was in line with (Isaac and Shehu, 2015) who revealed that any farmer who fully adopted 5 out of 8 agricultural technologies are considered as high adopters. This finding shows greater level of acceptance for this improved recommendation practices in the study area which may not be unconnected with various emphasis on agriculture by the present administration as a means of enhancing agricultural production and revitalized the Nigerian economy.

Table 4: level of adoption of Faro 39 rice project recommended practices

Number of technologies	Percentage adoption of farmer
Herbicide application	40.3
Soil and water management	76.1
Seed dressing/plant protection	90.6
Row planting	94.2

Source: Field Survey, 2016.

Challenges of adoption of Faro 39 rice project technology

From Table 5; some aspects of technicalities for adoption of Faro 39 rice project as indicated by 47.60% of the respondents ranged from planting, seed dressing/plant protection and appropriate planting time. Similarly, 36.10% of the respondents complained of problem of lateness in the delivery of improved seed by the seed suppliers. Furthermore, 21.80%, 10.20% and 7.32% of the respondents in the study area were faced with mechanized land preparation, high cost of chemical weed control and adequate chemical fertilizers respectively. From this finding,

it can be understood that the respondents had both technical and institutional challenges in the adoption of Faro 39 rice project recommended practices.

Table 5: challenges of Faro 39 rice project adoption technologies

Challenges	Frequency	Percentage*
Technicalities of some aspect of recommendation practices	96	47.60
Untimely delivery of improved seeds	74	36.10
Lack of mechanized land preparation	42	21.80
High cost of chemical weed control	21	10.20
Inadequate chemical fertilizer	19	7.32

Source: Field Survey, 2016.

- Multiple responses.

Relationship between socio-economics characteristics and adoption of Technologies

The result in Table 6 showed that at 5% level of significance, educational level (0.221) farm size (0.264) and extension contact (0.206) had significant positive relationship with adoption of Faro 39 rice project recommended technologies. Increase in educational level would improve farmers' capacities to bear the risk associated with adoption of Faro 39 rice project recommended technologies. Similarly, increase in extension contacts would influence adoption positively. Those result are in line with findings of Hussein (2015) who stressed that educational status and farm size influence adoption of improved practice by farmers in Kwara State.

Table 6: Relationship between socio-economic characteristics and adoption of Faro 39 rice project recommended technologies

Socio-economic characteristics	Correlation coefficient	Remarks
Age	3.240	NS
Educational level	0.221	S
Farm size	0.264	S
Extension contact	0.206	S

Source: Computed from Field Survey Data, 2016.
NS= not significant; S= significant

CONCLUSION

From the findings of the study, it was concluded that the mean age of the respondents was 39 years. More than half (63%) of the farmers are aware of all the 8 recommended technologies by Faro 39 rice project while 40% of the farmers adopted 5 out of the 8 recommended practices. Challenges to the adoption of recommended practices by Faro 39 rice project were technicalities of some of the components of the technology and untimely delivery of improved seed. Educational level, farm size and extension contacts had significant relationship with the adoption of recommended technologies by respondents in the study are.

RECOMMENDATIONS

Based on the findings of this study, it is recommended that extension agents should provide backup information to the farmers to educate them more on the components of these recommended technologies such as planting depth, spacing and appropriate planting time. Furthermore, improved seed and fertilizer should be made available to farmers adequately and timely by relevant agencies. Also agricultural extension workers should intensify education and awareness campaign on the recommended technologies by Faro 39 rice project all over the State to encourage adoption and improve rice production.

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