ANALYSIS OF RICE PRODUCTION TECHNOLOGIES' USAGE AMONG FARMERS IN KWARA STATE, NIGERIA.

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ABSTRACT:
This study assessed the rice production technology usage by farmers in Kwara State. A total of 210 rice farmers were selected for the study using multi-stage sampling procedure. Data were collected using structured interview schedule. Descriptive statistics and Pearson Product Moment correlation were used for data analysis. Results reveal that the average rice farm size was 3hectares and average rice farming experience was 22years. A considerable percentage had primary education (34.3%), earned annual income between 401,000-800,000naira and indicated extension visit was twice a year (36.2%). Majority (74.8%) have been introduced to farm technologies. The leading rice production technologies/practices used by farmers were the use of improved varieties (99.7%), optimum seed rate (98.6%), use of agro chemicals (97%), fertilizer application/inculcation (95.4%), proper spacing (94.8%), and timely planting (91.9%). Bird damage (mean=4.40), pest and diseases (mean=4.19) and poor government policy (mean=3.84) were the leading constraints to use of the improved practices. PPMC show that household size, farm size, farming experience and extension visit at p<0.05 were the factors that significantly influenced the use of rice production technologies/practices by rice farmers in the study area. It was recommended that government and concern extension organizations should ensure extension agents increase frequency of visit to rice farmers and ensure rice production technologies are made available and accessible to farmers.
Key words: rice farmers; technologies, constraints, usage.

INTRODUCTION
Rice has emerged as a major staple food crop in Nigeria, given its demand in all the six geopolitical zones, 36 States, all the Local Governments, and across all socio-demographic groups (Gyimah-Brempong, Johnson and Takeshima, 2016).In 2016, the quantity of local rice production in Nigeria was estimated at 4.8 million tonnes (Food and Agricultural Organization-FAO, 2016). This production is far below local demand of annual 10 percent increase for rice in Nigeria. In the similar vein Uduma, Samson and Mure (2016) noted that the inability of local supply to meet up with rice demand (consumption) has given rise to the high import of rice in Nigeria.In view of this, attempts have been madeby government and other stakeholders in developing appropriate technologies in rice production.However, generating agricultural technologies is meaningful only when they are accepted and used at the farm level (Onu, 2018; Adisa et al. 2019).

The slow development of Nigerian agriculture can be attributed to the inability of the Nigerian farmers to respond positively to new ideas or innovations (Umeh, Igwe and Anyim, 2018).Perhaps, the low productivity of rice farmers is occasioned by the use of low technologically empowered agricultural equipment which do not support large scale production.For instance, Fasoyiro and Yaiwo (2012) observed that in Nigeria, rice is mainly produced by small-scale farmers whose production are characterised by low output resulting from production inefficiency, aging farming population, low technological know-how, and so on.Adisa*et al.*(2019) stated that one of the benefits/achievement of the use of improved rice production technology practicesis increase output. Similarly, Mustapha *et al.*, (2012) noted that rice yield could increase due to farmers using improved rice varieties which have potentials to improve nutrition, boost food security, foster rural development and support sustainable land care. Therefore, farmers must acquire new skills, ideas, and use improved techniques in order to get profit from theirenterprises (Adisaet al. 2018).

It is based onthe insufficient quantityof rice to meet local needs, the awareness and availability of technologies in rice farming communities that this study seeks to investigate the extent of rice production technology usage in rice producing communities in Kwara state. The general objective of the study was to examine the use of rice production technologies practices in Kwara State. The specifically examined rice production characteristics, rice production used and constraints to use of rice production technologies.

METHODOLOGY
The study was carried out in Kwara State, Nigeria. Edu and patigi local government areas (LGAs) were the rice producing LGAs which accounted for over 90 percent in Kwara State (Ayanda et al. 2013). The LGAs have the largest Fadama lowlands in the state with River Niger as the primary source of water. Patigi town is along the banks of the Niger River. The main crop grown in both LGAs include rice and other crop namely millet, cassava, guinea corn and melon.
A three stage sampling technique was employed in the selection of respondents. Stage one involved the

purposive selection of two villages from three district in each Local Government due to their prominence in rice production. Stage twoinvolved the random selection of 35 rice farmers from each of villages selected to make a total sample size of 210 respondents.

The data for the study was from primary source. The primary data wasobtained with the aid of interview schedule. The instrument was validated through content validation and tested for reliability through test-retest method before being used for data collection.

Dependent variable which is improved production technologies used by rice farming was measured on a scale of Used (1), Notused (0).Constraints to the use of improved rice production technologieswas measured on the scale of 4-point likert; very severe (4), severe (3) less severe (2) and not severe (1).

Descriptive statistics involving the use of frequency counts, percentages, mean scores, and standard deviation wereused while Pearson Product Moment Correlation was used totest hypothesis.

RESULTS AND DISCUSSION

Table 1: Socioeconomic characteristics of rice farmers

Socioeconomic characteristics	Mean (±SD)	Frequency	Percentage
Age (years)	40.2±1.10		
Household size (persons)	5.95±2.53		
Rice farm size (Ha)	2.87±1.50		
Farming experience (years)	22.30±11.35		
Educational attainment	Non formal	65	30.9
	Primary	72	34.3
	Secondary	50	23.8
	Tertiary	23	11.0
Average annual incomefrom rice production (Naira)	200,000-400,000	77	36.7
	401,000-800,000	93	44.3
	>800,0000	40	19.0

Table 1 shows the socio-economic characteristics of the farmers. The average age of rice farmers was 40 years. This implies that the rice farmers were in still energetic and in their productive age. Similar age of rice farmers was found by Mustapha*et al.* (2012) carried out in Borno State, Matami*et al.* (2011) in Kwara state and Osanyinlusi*et al.* (2016) in Ekiti State.

The average number of people in their household was approximately 6 persons. The year of rice farming experience was 22 years. This implies that rice production has been in existence for a longer period and the farmers cultivate rice majorly in both areas. The average rice farm size of farmers was 2.8

hectares. This implies that most of the respondents are small scale farmers. These findings also conform to Matanmi*et al.* (2011) in which majority of the respondents in that study had 1-2 hectares of rice farms. With respect to their educational status, most of the rice farmers had no formal education (30.9%) and primary education (34.3%). A handful number of farmers (44.3%) indicated their average annual income from rice production ranging from 401,000-800,000naira. This shows that there is relatively high level of income generated yearly among rice farmers in the study area and this can positively affect the adoption of capital intensive farm technologies (Adejo et al. 2016).

Table 2: Rice production characteristics of farmers

Production characteristic		Yes (%)
Varieties	FARO 44	64.8
	FARO 52	35.2
Crop spacing	25x25cm	22.4
	30x25cm	29.1
	30x30cm	30.0
	Broadcasting	18.6
Method of manure/fertilizer application	Broadcasting	62.9
	Ploughing with soil	3.4
	Side placement	33.8
Sources of inputs	Agro-input dealers	27.6
	Fellow farmers	32.4
	Open market	22.9
	MANR/ADP	17.2

Farming system	Sole cropping	91.0
	Mixed cropping	9.1
Method of preparing farmland	Slash, gather & burn	62.2
	Slash & allow to rot	37.9
Technology introduction	Yes	74.8
Technology used	Machine	46.2
	Simple tools	24.8
	Both	29.0
Extension visit	Once a year	23.8
	Twice a year	36.2
	Quarterly	27.6
	Never	11.4

Table 2 shows the varieties of rice cultivated by farmers and production characteristics. FARO 44 (64.8%) was majorly cultivated among the respondents in the study area. According to Longtau, 2003, fifty-one rice varieties released for farmers in Nigeria, the National Cereals Research Institute (NCRI) in collaboration with National Seed Service (NSS) identified varieties preferred by farmers in Nigeria and this has shown that FARO 44 was highly adopted by most farmers in Nigeria compared to other varieties.

The spacing method of crop spacing commonly adopted by the respondents in the study area varies and they are 30x30cm with 30% respondent and 30x25cm with 29.1% respondent. Method of manure/fertilizer application used by majority (62.9%) of the respondents was broadcasting. Mustapha et al. (2012) also confirmed that majority of rice farmers adopted the broadcasting method of planting rice. Results also show that fellow rice farmers (32.4%) and agro-input dealers (27.6%) were the leading sources of rice farming inputs by farmers in the study area. Farming system was majorly sole cropping among 91% respondents and method of preparing farmland used mostly by 62.2% of the respondents in Slash, gather and bum.

The table also shows that majority were introduced to technology usage. Similar finding was presented by Mustapha et al. (2012) that majority of farmers were aware of rice production technologies.

The commonly used technologies for rice production were machine (46.2%) and simple tools (24.8%). A considerable percentage 36.2% of the respondents received extension visit twice a year while about 11.4% never receive extension visit. This study suggests that agricultural extension agents are not actively disseminating rice production services to farmers in the study area. This factor may lower farmers' contribution towards rice self-sufficiency in Nigeria (Umeh, Igwe and Anyim, 2018).

Table 3: Distribution of rice production technologies used by rice farmers

Rice production technologies	Yes (Percentage*)
Use of improved varieties	99.7
Use of agrochemicals	97.0
Zero tillage	80.0
Fertilizer application/inculcation	95.7
Proper spacing	94.8
Improved nursery	35.6
Use of modern milling system	41.9
Timely planting	91.9
Line planting	64.3
Urea deep placement	36.2
Planting depth	74.3
Optimum seed rate	98.6
Improved processing	50.5
Drain field prior to harvesting	52.9

Source: Field survey, 2017*Multiple responses

The result on the table 3 shows that rice production technologies used by majority of the rice farmers in the studywere theuse of improved varieties (99.7%), optimum seed rate (98.6%), use of agro chemicals (97%), fertilizer application/inculcation (95.4%),proper spacing (94.8%),and timely planting (91.9%). Other technologies/practices commonly used among rice farmers werezero tillage, planting depth andline planting.

Table 4: Constraints to use of rice production technologies

Constraints	Mean (±SD)	Rating
Land tenure problem	1.60±0.74	16th
Pests & diseases infestation on rice	4.19±1.07	2nd
Insufficient labour supply	2.30±0.72	14th
Insufficient capital	2.60±0.57	10th
Poor transportation system	2.73±0.89	8th
Inadequate access to extension services	2.35±0.79	12th
Poor governmental policy	3.84±0.81	3rd
Farm too far from home	2.88±0.69	7th
Inadequate farm implements	2.92±0.72	6th
Limited access to farm inputs	2.20±0.73	15th
Poor access to agricultural information	2.66±0.86	9th
Drought factors such as rain fall, temperature and solar radiation	3.44±0.75	4th
Inadequacy of modern storage and processing facilities	3.32±0.91	5th
Lack of technical know-how	2.58±0.96	11th
Low soil fertility	2.31±0.86	13th
Bird damage	4.40±0.74	1st

Source: Field survey, 2017

As showed in Table 5, the leading constraints indicated by farmers inhibiting rice production in the study area were bird damage (mean=4.40), pest and diseases (mean=4.19) and poor government policy (mean=3.84). This finding confirms the study of Ismaila*et al.* (2010), who earlier found pest/diseases and unfavourable government policies as constraints to rice production in Nigeria.

Table 5: Correlation between socioeconomic characteristics and rice production technologies used by the respondents

Variables	r –value	p –value	Decision
Age	-0.312**	0.000	Significant
Education	-0.023	0.742	Not significant
Household size	0.296**	0.000	Significant
Farm size	0.387**	0.000	Significant
Farming experience	0.315**	0.000	Significant
Extension contact	0.155*	0.025	Significant

**correlation is significant at 0.01 level
*correlation is significant at 0.05 level
Source: Field survey, 2017

Based on the result of Pearson Moment Correlation analysis presented in Table 5, age (r = -0.312, p=0.000)was negatively significant to the rice production technologies used by the respondents. This implies decrease in age (younger farmers), the more usage of rice production technologies and usage faster than the older farmers.

Household size (r = 0.296, p = 0.000) shows a positively significant with the rice production technologies used by the respondents. This implies that the larger the household size, the higher their access to rice production technologies available for use. In order words, the large household size will contribute greatly to rice production. As they will have more people for labour and hence the more they are, the less work they had to do.

Farm size (r = 0.387, p = 0.000) shows a positive significant relationship with the rice production technologies used by the respondent. The implication is that farmers which a larger farm size, will have a higher chance of using the technologies available as they will be able to produce rice in a large quantity. This suggests that the bigger a rice farm, the higher the productivity. This supports the study done by

Kagbu, Omokore and Akpoko (2016) that found farm size as the only socio-economic factor which significantly influenced adoption of recommended rice production practices by women rice farmers in Nigeria.

Farming experience (r = 0.315, p = 0.000) shows a positive significant relationship with rice production technologies used by the respondents. This implies that the more the experience of farmers on rice production, the more knowledge they have on rice production and the use of technologies available for production. This could also lead to an increase in rice production in the study area.

Extension contact (r = 0.155, p = 0.025) shows a positive significant relationship with the rice production technology used by the respondents. The implication is that, rice farmers will experience an increase in rice production and have more knowledge on the use of the technologies available when they have more contact with the extension agents.

CONCLUSION AND RECOMMENDATIONS
It was therefore concluded that the production technology such as of improved varieties, use of agro chemicals, Zero tillage, Fertilizer application/inculcation, proper spacing, timely planting, planting depth, and optimum seed rate and line planting were used by the farmers in the study area, information on rice production were obtained from the extension agents, neighbors/friend, cooperative meeting and the constraints limiting rice production were bird damage, poor government policy, drought factors, inadequacy of modern storage and processing facilities.

Based on the findings, the following recommendations was suggested:

• Rice farmers should form cooperative and make loans easily accessible to members in the group.

• Government should make agricultural credit more accessible to rice farmers.

• Management of extension organizations should direct more extension officers for rice farming services so as to enable the rice farmers have access them.

• Access to agro-allied chemicals for eradication of pest and diseases

• Government should make provision and accessible modern techniques for large production and ease fatigue.

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