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ADOPTION OF IMPROVED YAM PRODUCTION PRACTICES AMONGST FARMERS IN KWARA STATE, NIGERIA

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ABSTRACT

This study assessed the adoption of improved yam production practices (IYPPs) to sustain yam production amongst farmers in Kwara State, Nigeria. One hundred and fifty (150) yam farmers were randomly selected in Kaiama and Baruten local government areas. Primary data was collected with the use of structure questionnaire. Data collected was analysed with frequency count, percentages, mean score, and regression statistical tools. Findings reveal that 94.7% were aware of improved yam production practices. IYPPs adopted by farmers were agro-chemicals and fertilizer application (58.0%), minisett technology-improved yam seed variety (52.7%), and seed treatment-preservation/packaging techniques (23.3%). A t-test ($t = 9.434$; $p < 0.01$) indicated farm size after adoption was statistically greater than farm size before adoption. About 82.0% indicated that the reason for the adoption of the IYPPs was to sustainably increase yam production. The study concludes that yam farmers adopted some IYPPs to sustainably increase yam production.

Keywords: minisett technology, agro-chemicals, seed treatment, yam production, sustainability

INTRODUCTION

The Agricultural sector has always been an important component of Nigerian economy with over 70 percent of the population engage in agriculture and agricultural related activities (Pius, 2013). The sector is almost entirely dominated by small scale resource poor farmers living in rural areas, with farm holdings of 1- 2 hectares, which are usually scattered over a wide area. Root and tubers crops comprise crop covering several genera. They are staple food crops, being the source of daily carbohydrate intake for the large populace of the world.

Yam is a preferred food security crop in most parts of Kwara State and it is an important source of income to the people and a socio-cultural crop in Nigeria (Falola et al. 2017; Komolafe et al., 2022). Farmers production output has been linked to adoption of improved production technologies. However, low adoption of agricultural technologies disseminated by extension agents has been an impediment to the actualization of this goal (Tasie et al. 2021).

Kwara State government have recognized the importance of adoption of improved agricultural practices for the survival of the small scale farmers. This could be seen in the involvement of both State and Local governments in the formulation and implementation of agricultural development policies and programmes with extension components which resulted to increase in productivity and level of income of the farmers. The goal of adopting agricultural practices is to disseminate agricultural technologies for improving productivity, farmers' welfare and household nutritional status (Fabiyi, 2015).

In the light of the above, adoption has been recently defined as systems that facilitate the access of farmers, their organizations and other market actors to modern knowledge, information and technologies; facilitate their interaction with partners in research, education, agribusiness, and other relevant institutions; and assist them to develop their own technical, organizational and management skills and practices (Christoplos, 2010).

Objectives of the Study

i. identity the socio-economic characteristics of the respondents.
ii. identify the areas of adoption of improved yam production practices
iii. to identify the sources of information of the farmers.
iv. identify factors militating against the adoption of improved yam production practices in Kwara State.

Research hypothesis

H_0: There is no significant relationship between selected socio-economic characteristics of yam farmers and the areas of adoption of improved yam production practices.

METHODOLOGY

Study area

This study was conducted in Kwara State. Kwara State was created on 27 May 1967 and lies on the Coordinates of 8°30′N 5°00′E and has a population figure of 2,365,353 according to 2006 Population census. The State consists of sixteen Local Government Areas. They are: Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin East, Ilorin South, Ilorin West, Irepodun, Isin, Kaiama, Moro, Offa, Oke Ero, Oyun and Pategi. Kwara State is bounded in the north by Niger State, in the South by Oyo, Osun and Ekiti States, in the east by Kogi State and in the West by Benin Republic.

With a total land mass of 36,825 km^2 (14,218 sq mi), Kwara state has a tropical climate with its characteristic medium temperature all year round. The State enjoys two distinct seasons. These are rainy (April to October) and dry (November to March) seasons. Kwara State's climate supports the growing of the following crops; yam, cassava, oil palm, cashew, cocoa, vegetables, maize, rice etc Kwara State is divided into three senatorial districts namely Kwara Central, Kwara North and Kwara South. This study is limited to Kwara North which comprises of Kaiama, Patigi, Edu, Moro and Baruten Local Government Areas but with emphasis on Kaiama and Baruten Local Governments. The principal ethnic groups are Yoruba, Nupe, Fulani, Bokobaru and Baruba.

Data collection and Analysis

Primary data was collected with the use of structured questionnaire designed to address the objectives of the study. Two Local Government which constitutes forty percent (40%) of population in Kwara North was identified (Kaiama and Baruten) and One hundred and Fifty (150) questionnaire was dispersed into the two local government areas of which 75 questionnaire was administered in each local government area. Data collected was analysed using frequency, percentage, and regression statistical tools.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

According to data presented in Table 1, 96.0% were males while 4.0% of the respondents were female. This shows that yam farming in the study area is male dominated. This finding may be connected with the rigorous activities involved in practicing yam farming. This finding may be connected with earlier report by Natural Resources Institute (2012) that the male is the major actors involved in yam production activities in Kwara State. Regarding age group of the respondents, about halve of the respondents (50%) were aged between 41 – 50 years of age while appreciable percentage (36.0%) were still in their 30 –40years of age. This is to show that yam farmers in the study area were aging, needing more youths to venture into the business of yam farming to secure future food security in Kwara State. Study further showed that 50% of the respondents had no formal education while 32% had secondary education. This is slightly higher than 42.8% with no formal education in a study by Falola et al. (2017) who sampled yam farmers in Asa, Baruteen and Kaiama LGAs of Kwara State. The present level of education among yam farmers in Kwara State may negatively influence their willingness to improved practices for yam farming. Farming (81.3%) is the major occupation of the respondents. This implies that yam farmers in Kwara State will be more committed to yam farming since majority had no other means of livelihood. The marital status of the respondents surprisingly indicated that most (91.3%) of the rspondnts were married. Marriage in our society comes with responsibilities, meaning that yam farming will definitely be committed to yam farming to enable higher earning to cater for household responsibilities. This factor may also positively enhance yam farmers' willingness to adopt innovation aimed at improved yam production.

Results also show that 90.7% practices Islamic religion, 32.7% were Bokobaru by tribe while 40.7% were Batonu by tribe. About 39.3% had 21 – 30years of experiences in yam farming while 28.7% had 11 – 20 years of experience in yam farming activities. This shows that yam farmers in Kwara State had appreciable years of experience in yam farming activities, capable to help in deciding on adopting improved innovation on yam farming activities.

Table 1: Socio-economic Characteristics of Respondents

Variables	Frequency (n=150)	Percentages
Sex		
Male	144	96.0
Female	6	4.7
Age		
< 30	11	7.3
30 –40	54	36.0
41 – 50	75	50.0
51—60	7	4.7
61 above	3	2.0
Level of Education		
No formal education	75	50.0
Primary education	9	6.0
Secondary education	35	23.3
Tertiary education	20	20.0
Major Occupation		
Trading/Business	6	4.0
Artisan	2	1.3
Civil servant	15	10.0
Farming	122	81.3
Politics	4	2.7
Students	1	0.7
Marital Status		
Married	137	91.3
Single	9	6.0
Widowed	1	0.7
Divorced	3	2.0
Religion		
Christianity	14	9.3
Muslim	136	90.7
Tribe		
Yoruba	9	6.0
Hausa	7	4.7
Bokobaru	49	32.7
Batonu	61	40.7
Nupe	2	1.3
Others	22	14.7
Yam farming experience (years)		
1 – 10	18	12.0
11 – 20	43	28.7
21 – 30	59	39.3
31 – 40	23	15.3
Above 40	7	4.7

Source: Field Survey, 2022

Characteristics of yam farming enterprise and extension coverage

Results in Table 2 show that 68.7% cultivate yam for commercial purposes while 31.3% cultivate subsistence yam farming. This is an indication that yam farmers in Kwara State have taken yam farming as a profitable enterprise where they could earn income capable to sustain a livelihood. This understanding is expected to positively influence adoption of improved practices aimed at improving yam production and income. Most (69.3%) of the respondents indicated family members as their means of sources for capital for yam farming. Adoption of modern farming practices are always capital intensive (Agbarevo, 2013), unfortunately family members may not be able to provide enough/needed capital for commercial yam production. This call for special financial intervention for yam farming in Kwara state where they could source for reasonable amount of money to practice modern practices at commercial level. Majority (86.0%) of the respondents indicated manual production practices. This clearly indicated that the commercial production earlier claimed by the respondents were small farm size. The same is applicable to method of yam harvesting where majority (94.7%) indicated traditional method and manual for storage (92.0%). This finding agrees with Akangbe et al. (2013) report of traditional yam storage system been practice by farmers in Kwara State. Only few (14.0%) that practice mechanized farming are category of farmers who are in line with improved yam production practices.

On sources of information, Table 2 have shown that slightly above halve (54.0%) of the respondents gets information on yam farming practices from cooperative societies, 48.7% source for information from extension agents while 28.7% source for information from friends. This shows that cooperatives societies, extension agents and friends-fellow yam farmers were the main information flow channels for yam farming practices in Kwara State. This finding is in line with Komolafe and Adesiji (2018). Unfortunately, only 24.7% gets information on yam farming practices from extension agents. Extension agents still remain the liable means of sourcing for updated/improved practices on yam production because they disseminate information based on facts and tested from research institutes that develop the innovation. This situation must have been responsible for majority (72.7%) indicating they never receive information from extension, resulting to no extension agents' impact on yam production. However, majority (94.7%) of the respondents indicated they were aware of improved yam production practices.

Table 2: Characteristics of Yam farming among Respondents

Variables	Frequency	Percentages
Type of Yam farming system		
Commercial	103	68.7
Subsistence	47	31.3
Sources of capital for yam farming		
Friends	37	24.7
Family	104	69.3
Banks	7	4.7
Co-operatives	46	30.7
Others	3	2.0
Type of labour		
Manual	129	86.0
Mechanized	21	14.0
Sources of Information		
Extension workers	73	48.7
Friends	43	28.7
Coop Societies	81	54.0
Radio	31	20.7
Television	6	4.0
Method of harvesting		
Mechanical	8	5.3
Traditional	142	94.7
Method of Storage		
Manual	138	92.0
Chemical	12	8.0
Extension officers/agents visit		
Yes	37	24.7
No	113	75.3
Frequency of Extension agents visit		
Never	109	72.7
Weekly	15	10.0
Monthly	19	12.7
Quarterly	7	4.7
Impact of Extension agents visit		
Impactful	41	
Not impactful	109	72.7
Awareness of Yam improved practice		
Aware	142	94.7
Not aware	8	5.8

Source: Field Survey, 2022

Improved yam farming practice adopted

Results in Table 3 shows that majority of the respondents adopted the use of mulching-mechanization of tiling the soil (78.0%), and stalking-processing/handling techniques (72.0%). Adoption of stalking technology has been similarly reported by Apu et al. (2020) as one of the improved yam farming technology highly adopted by yam farmers in Ebonyi State.

Appreciable percentage further adopted the use of agro-chemicals and fertilizer application (58.0%), minisett technology-improved yam seed variety (52.7%), and seed treatment-preservation/packaging techniques (23.3%). This finding implies that mulching-mechanization of tiling the soil, stalking-processing/handling techniques and agro-chemicals and fertilizer application were the leading modern yam farming practices adopted by yam farmers in Kwara State. This agrees with report earlier that farmers-based seed production for themselves can function well (Almekinders et al., 2019).

The reason for low adoption of seed treatment may be due to its technicality which may require the guiding of extension experts to use, as few only few earlier indicated their contact with extension agents. On the years of adoption of improved yam production practices, majority (88.0%) of the respondents indicated 1 to 5years. This is an indication that the use of improved yam production is relatively new among yam farmers in Kwara State. This call for serious extension intervention in the dissemination improved yam practices in the study area.

This is expected as majority (82.0%) indicated that the reason for the adoption of the modern production practices was to increase yam production. This implication is that future extension program aimed at improving yam production practices that leverage on improved production to attitudinal change of the farmers will possibly record high success in the dissemination and adoption rate. Regarding the obstacle yam farmers faced in adopting the technologies, Table 3 reveals that 100% of the respondents agree that the practices consume time and cumbersome, and inadequate market for yam produce. This challenge may be attributed to the non-formal level of education and poor extension coverage/impact that should have provided market linkage as indicated by respondents in the study area. Furthermore, seed yam are too small (93.3%) and inadequate capital (23.3%) were also indicated among substantial number of the respondents. Studies have reported high cost of seed yams, high cost of labour, inadequate visit of extension agents, high cost of agrochemicals and high cost staking materials as major problems of yam production in Nigeria (Ismaila et al., 2010; Ezedinma, 2016; Komolafe, Adesiji & Adebayo, 2018).

Table 3: Yam improved practice adopted by Respondents

Yam improved practice adopted	Frequency	Percentage
Mulching (Mechanization of tiling the soil)	117	78.0
Minisett (Improved yam seed variety)	79	52.7
Agro-chemicals and Fertilizer application	87	58.0
Stalking (Processing/Handling techniques)	108	72.0
Seed Treatment (Preservation/Packaging techniques)	35	23.3
Spacing	0	0.0
Years of adoption of improved practice		
1 – 5	132	88.0
6 – 10	15	10
11 and above	3	2.0
Reasons for the adoption		
Change source of yam planting materials	48	32.0
Increase capital/income	71	47.3
Increase yam production	123	82.0
Challenges to adoption		
Seed yam are too small	140	93.3
Inadequate capital	35	23.3
Low income generation	0	
High cost of chemicals	18	12.0
Labour intensive	9	6.0
Low success rate	10	6.7
Consume time and cumbersome	150	100.0
Lack of land availability	36	24.0
Government policy	4	2.7
Inadequate market	150	100.0

Source: Field Survey, 2022

Effect of adoption of modern yam farming on farm size

Farm size of respondents before the adoption of modern yam production practices presented in Table 4 shows that majority (80.0%) cultivate between 1 to 5 hectares of land for yam production. After the adoption of modern yam production practices, only 58.7% cultivate between 1 to 5 hectares of land for yam production while appreciable percentage (18.7% and 12.7%) have increase farm size between 6 to 10 hectares and 11 to 15 hectares of land respectively. A t-test of difference ($t = 9.434$; $p < 0.01$) indicated that statistical difference farm size of respondents as farm size after adoption (mean=1.74) was greater than farm size before adoption (mean=1.25). The implication is that the adoptions of modern production practices have enhance the capacity of yam farmers to increase farm size, an effect that is expected to increase the income of yam farmers.

Table 4: Effect of adoption of improved yam farming on farm size

Farm size	**Before adoption**		**After adoption**	
	Frequency	Percentage	Frequency	Percentage
1-5	120	80.0	88	58.7
6 -10	22	14.7	28	18.7
11 – 15	8	5.3	19	12.7
16 – 20	0	0.0	15	10.0
Above 20	0	0.0	0	0.0
Mean	1.25		1.74	
Paired t-test of difference		t = 9.434; p = 0.000		

Source: Field Survey, 2022

Benefits of adoption of modern yam farming practices among respondents

According to Table 5, all (100.0) of the respondents indicated that they derive benefits from the use of modern yam production practices. About 80% of the respondents further agree that adoption of modern yam production practices increase access to food, and increase farm income. This finding have indicated that yam farmers in Kwara State understand the concept that use of modern farm production practices is essential and directed related to food security and improved livelihood. This finding is in line with (Mignouna et al., 2015), who earlier noted that involvement in yam production enterprises has greater potential to address food insecurity and poverty if measures are taken towards policy inclusion and intervention programmes to stimulate adoption of improved practices.

Table 5: Benefits of the adoption of Modern Yam Production Practices

Variables	Frequency	Percentage
Benefits from the use of improved yam practices		
Yes	150	100.0
No	0	0.0
Specific benefits		
Access to Food	120	80.0
Increase farm income	120	80.0
Increase yam production	19	12.7
Improve storage practices	8	5.3
Pest control practices	11	7.3

Problems encountered for sustainable use of improved yam production practices

According to Table 6, pest/disease attack (50.0%), high cost of hired labour (46.7%), decline in soil fertility (40.7%), effect of climate change (26.7%), and weed pressure (24%) were indicated as problems encountered in the use of modern yam farming practices among appreciable number of respondents. This finding affirms a report by Busari (2013) that the effect of climate on tuber farming is significant for cassava and yam yield in Kwara State.

Table 6: Problems encountered by the use of improved yam practices

Challenges	Frequency	Percentage
Inadequate extension services	50	33.3
Pest/disease attack	75	50.0
High cost of hired labour	70	46.7
High cost of seedlings	22	14.7
Unavailability of modern seedlings	51	34.0
Effect of climate change	40	26.7
Decline in soil fertility	61	40.7
Lack of staking materials	11	7.3
Use of traditional technology	27	18.0
Weed pressure	36	24.0
Labour cost of land (heap) preparation	7	4.7
Barn making	4	2.7

Test of hypothesis

H_0: There is no significant relationship between selected socio-economic characteristics of yam farmers and the areas of adoption of improved yam production practices.

Based on results presented in Table 7, it was shown that the socio-economic characteristics of yam farmers significantly influenced the areas of modern yam farming practices adopted by the farmers in Kwara State ($R^2 = 0.185$ $F = 4.540$, $p < 0.01$). On the aggregate, the socio-economic characteristics of yam farmers predicted 18.5% the areas of modern yam farming practices they adopted. Specifically, it was found that two practices including the years of age ($\beta = 0.612$, $p < 0.01$), and tribe ($\beta = -.265$, $p < 0.05$) had significant influence on the areas of modern yam farming practices they adopted. This finding agrees with report by Apu et al. (2020) who earlier found that age of farmers was an important and significant variable influencing sustainable adoption of improved yam farming practices in Nigeria.

Results further showed that years of age showed negative relationship to areas of modern yam farming practices they adopted Thus, the increase in 1 unit years of age predicted the likelihood for lesser areas of modern yam farming practices to be adopted to -0.612 units. This implies that the younger farmers may adopt the modern yam farming practices faster than the older farmers.

Table 7: Results of multiple regression showing the socio-economic characteristics determining areas of modern yam farming practices adopted

Modern yam farming practices adopted	B	Std. Error	t-stat	p-value
Sex	-.165	.557	-.296	0.768
Age	.612**	.180	3.394	0.001
Education status	.128	.073	1.758	0.081
Main occupation	-.091	.189	-.482	0.630
Religion	1.553	.849	1.829	0.069
Tribe	-.265*	.117	-2.269	0.025
Years of experience	-.005	.145	-.037	0.970
(Constant)	-.773	2.044	-.378	0.706

R-square=0.183

Conclusion and recommendations

Based on the findings of this study, it can be inferred that yam farmers in Kwara State are aware of improved yam farming practices. The leading practices adopted to increase production were mulching-mechanization of tiling the soil, stalking-processing/handling techniques and agro-chemicals and fertilizer application. Adoptions of improved production practices have significantly enhance the capacity of yam farmers to increase farm size, an effect that has increase food security and income of the farmers. Pest/disease attack, high cost of hired labour, decline in soil fertility, effect of climate change, and weed pressure were the leading problems encountered by farmers in the use of modern yam farming practices. Yam farmers have suggested improved extension services to educate on modern yam practice, use of agrochemicals, and access to machinery for mechanized farming as ways to improve the adoption of modern yam farming practices in Kwara State.

Based on these findings, the following recommendations can be made:

1. Family member is the main source of capital for yam farmers. Family members may not be able to provide enough/needed capital for commercial yam production because modern practices are always capital intensive. This call for special financial intervention for yam farming in Kwara state where they could source for reasonable amount of money to practice improved practices at commercial level.

2. Cooperative societies are the main source of capital information for yam farmers in Kwara State respectively and the farmers are grossly not covered by extension agents. This study suggests that extension organizations (public and private) in Kwara State should intensify effort in reaching out to yam farmers in the dissemination of modern yam farming practices. This is the leading suggestions and pressing need of the yam farmers.

3. On the issue of problems of the farmers such pest/disease attack, effect of climate change, and weed pressure. This study recommends that farmers should adopt Climate Smart Agricultural Practices.

4. Years of age was found to be negative influence on the adoption of modern yam farming practices. This study therefore recommends that future extension program aimed at empowering yam farmers on modern farming practices should include younger farmers more in order to record higher success for acceptance and adoption.

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