



## **SOCIOECONOMIC FACTORS INFLUENCING ADOPTION OF RECOMMENDED IRISH POTATO PRODUCTION TECHNOLOGIES AMONG WOMEN FARMERS IN PLATEAU STATE, NIGERIA**

**<sup>1</sup>Yakubu, K., <sup>2</sup>Danwanka, H. A., and <sup>2</sup>Abu, I. A.**

<sup>1</sup>Department of Agricultural Extension, College of Horticulture Dadin Kowa,  
Gombe State, Nigeria

<sup>2</sup>Department of Agricultural Economics, Abubakar Tafawa Balewa University,  
Bauchi, Nigeria

**Corresponding Author's Email:** kaunamshelia@gmail.com **Tel:** 07035952264

### **ABSTRACT**

The study examined the factors influencing adoption of Irish potato recommended production technologies among women farmers in Plateau State, Nigeria. A multi stage sampling technique was used in selecting 229 respondents from the study area. Data were collected using structured questionnaire and were analyzed using descriptive and inferential statistics. The result revealed that 32.8%, 31.9% and 23.1% of the respondents were within the ages of 28-37 years and 38-47 years and 18-27 years respectively. Almost half (48.9%) of the respondents had household size between 3-4 persons. Majority (53.3%) of the respondents had farm size of between 1-2 hectare and a reasonable proportion (36.2%) have less than 1 hectare. Most (75.5%) of the respondents were married. The result also shows that almost half (46.7%) of the respondents had attended secondary school. The result further shows that more than half (52.4%) of the respondents were members of cooperatives and a reasonable proportion (47.6%) of the respondents does not belong to any cooperative societies. Almost half (49.3%) and a reasonable proportion (33.6%) of the respondents were artisans and livestock producers as their secondary occupation. The result also indicated that 44.5% and 38% of the respondents had a farming experience of 7-13 years and 1-6 years. A reasonable proportion of 42.8% harvested more than 12 bags. Majority (73.4%) of the respondents had an annual income of ₦50,000-₦100,000. Majority (85.2%) of the respondents had access to extension, while 14.8% of the respondents had no access to extension. About 38.4% and 32.8% of the respondents received extension visits quarterly and annually respectively in the study area. The result of regression analysis revealed that yield, land ownership, extension visit and information sources were significant ( $P < 0.01$ ) in influencing the adoption of potato production technologies. The result further revealed that, age, farm size, farming experience and income were also significant ( $P < 0.05$ ) in influencing the adoption of recommended Irish potato technologies. However, Inadequate capital (67.3%), flood (65.1%), inadequate farmland (62.9%), and scarcity of improved planting materials (62.4%) were the major constraints affecting women's adoption of recommended technologies which were ranked 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> respectively. The study concluded that land ownership, yield, income, access to extension, frequency of extension visit, sources of information, age, farm size and farming experience were the factors that significantly influence the adoption of recommended Irish potato production practices. The study recommended that there is need for government and non-governmental organizations to make credit facilities available and accessible to farmers at single digit interest and also there is need for farmers to be trained on yield-raising technologies and other technologies that can positively contribute to high productivity among farmers.

**Keywords:** Adoption, Irish Potato, Production and Technologies



## **INTRODUCTION**

Agriculture plays a fundamental role in economic growth, enhancing food security, poverty reduction and rural development. It is the main source of income for about 2.5 billion people in the developing world (Wandji, *et al.*, 2021). Consequently, additional sustainable agricultural technologies such as improved agricultural technologies remain an important part of the efforts to boost food availability, crop production and improve soil quality in a bid to reduce food and nutrition insecurity which is currently threatening humans' right to food accessibility in developing countries (Sennuga and Fadiji, 2020). Irish potato (*Solanum tuberosum* L.) is the world's fourth largest food crop in terms of production after maize, rice and wheat (FAOSTAT, 2016). It is thus, the largest non-cereal food crop cultivated in the world. It was first cultivated in South America (Zhang *et al.*, 2016). Global output is estimated at 388 million metric tonnes and the yield per hectare stands at 20,110.8kg/ha (FAOSTAT, 2019). 25 million metric tonnes with yield per hectare of 13,215.4 kg/ha Irish potato production in Africa. Algeria is the leading producer of Irish potato in Africa with a production 4,606,400 metric tonnes, followed by Egypt (4,325,480 metric tonnes) and South Africa (2,450,540 metric tonnes). Over half of the global output is produced in developing countries, almost one-third of the output is harvested in China and India alone while China is the leading producer in the world with 99 million metric tonnes (FAOSTAT, 2019).

Nigeria's production of 1,284,370 metric tonnes ranks seventh in Africa after Morocco (1,924,870 metric tonnes), Tanzania (1,749,201 metric tonnes) and Kenya, the fourth to sixth largest African producers (Amadi, *et al.*; 2021). More than 85% of the potato production in Nigeria is done by smallholder farmers who maintain small farms and carry out their operations manually with traditional farm tools, like hoes and machetes. The Nigerian economy is still predominantly agrarian and women are key players in the business of agriculture, especially within rural communities. Women contribute between 40% and 65% of all hours spent in agricultural production, processing and also undertake 60% to 90% of rural agricultural product marketing, thus constituting more than two-thirds of the workforce in Agriculture (FAO, 2017). The role of women in agricultural production in Nigeria can never be over emphasized. Various researches conducted on the contribution of women to agricultural development in the country. Women make essential contributions to the agricultural and rural economies in all developing countries. Their roles vary considerably between and within regions and are changing rapidly in many parts of the world, where economic and social forces are transforming the agricultural sector. Rural women often manage complex households and pursue multiple livelihood strategies (Jiriko, 2015). Potato is critical to food security and sustenance of livelihoods of subsistent farmers, especially in the highlands areas where its growth can be economically sustained (Amadi, *et al.*; 2021).

These farmers generally obtain very low crop yields because the local varieties used by farmers have low potential yield, most of the Irish potato is grown under rain-fed conditions and irrigation is used only in limited areas, little or no fertilizers are used and pest control is not adequate (Sennuga, *et al.*, 2020). Technology is one of the resources for agricultural production. Technology adoption refers to the acceptance of a group or an individual to use a new product or innovation. The process of adopting an idea or new innovation does not happen as a single unit act, but rather a mental process that consists of at least five stages namely; the awareness stage, the interest stage, the evaluation stage, trial stage and finally, the adoption stage (Rogers, 2003, Cheteni *et al.* 2014; Sennuga and Oyewole, 2020). Adoption of improved agricultural technologies has been associated with higher earnings and lower poverty, improved nutritional status, lower staple food prices, increased employment opportunities as well as earnings for landless laborers (Kasirye, 2010; Sennuga *et al.* 2020). Adoption of



improved technologies is believed to be a major factor in the success of the green revolution experienced by developed countries (Ravallion and Chen, 2004; Kasirye, 2010). Conversely, nonadopters can hardly maintain their marginal livelihood with socio-economic stagnation leading to deprivation (Jain *et al.*, 2009).

Several efforts have been devoted to the development and transfer of new technologies to improve Irish potato production in Nigeria; including Irish potato seed multiplication, training of farmers, Irish potato research, breeding and selection of new improved varieties (Zemba *et al.*, 2013). However, annual Irish potato production in Nigeria has not improved appreciably (Jwanya *et al.*, 2014; FAOSTAT, 2019).

There is a large and growing literature concerned with gender-based agricultural productivity issues and the economic activities of women. A great deal of substantive work has been done concerning, for example, the relative effects of increases in men's and women's incomes on the health, nutrition, and education of children Strauss, and Thomas, (1985); the access of women to credit markets Morris, and Meyer, (1983); the various roles played by women and men in a variety of farming systems Fabiyi, *et al.*, (2007); determinants of women participation in livestock production Girei *et al.*, (2016), Gwary, *et al.*, (2017); women in household decision-making Baba *et al.*, (2015). There is, however, it is unarguably that, there is paucity of information on the factors influencing adoption of recommended Irish potato production technologies among women in Plateau state because of the growing recognition of the contribution of women to agricultural production today.

### **Objectives of the study**

- i. Describe the socioeconomic characteristics of the respondents;
- ii. Determined the factors influencing adoption of Irish potato production technologies among women potato farmers; and
- iii. Describe constraint militating adoption of Irish potato production technologies

## **METHODOLOGY**

### **Study Area**

Plateau State is one of the thirty - six states that make up the Federal Republic of Nigeria, including the Federal Capital Territory, Abuja. The State is located in the north-central zone of Nigeria and lies between latitude 8°30' and 10°30'N, longitude 7°30' and 13°37'E. It has an estimated population of 3,178,712 (NPC 2006 Projection), 3.78 million people (NPC, 2013) and based on the annual population growth rate of 2.4%, the projected population of the State is about 4,717,300 million people in 2022. The State is bounded by Kaduna and Bauchi states to the north, Taraba on the east and Nasarawa to the south and west with a landmass covering 30,913 square kilometres, the state was created on 3rd February 1976, from Benue-Plateau, with its administrative headquarters in Jos. It is structured into 17 local government areas (LGAs).

The state falls within the Northern Guinea Savanna zone, the climate is characterized by two distinct wet and dry seasons. The wet season starts in late April and ends in October, while the dry season starts in November and ends mid-April. The mean annual rainfall is about 1450mm, and relative humidity of 60%. The mean monthly maximum and minimum temperatures are 20°C and 15°C, respectively. (FAO, 2010).

Plateau State is primarily an agrarian community. The State has a land mass of 30,913 square km or 6,678,162 acres (National Bureau of Statistics, 2006). About two thirds of the land area is arable. The major food crops include Irish potatoes, sweet potatoes, chili pepper tomatoes and strawberry. Others include leafy vegetables, cereals, legumes and root and tuber crops and tree crops. Vegetables include carrots, lettuce, radish, cucumber, sweet pepper, hot



pepper, green beans, parsley and fruits include strawberries. However, cereal production on the Plateau represents about 34% of all agricultural produce; root and tubers production represents about 32 % while horticultural crops stand out at about 21%. The least is forest products which represent 13% (Employment-oriented Private Sector Development Programme, 2010).

### **Sampling technique and Sample Size**

A multi-stage sampling technique was used for this study in selecting the respondents. In the first stage two (2) Local Governments Areas, Bokkos and Jos south based on their potential for Irish potato production activities among the women farmers. Secondly, six villages were purposively selected, three from each LGA. From Bokkos, (Butara vet, Mai katako and Mbar) while the villages selected from Jos south are (Bisichi, Kuru and Giring) based on their intensity of Irish potato production. Finally, proportionately (25%) and random sampling technique was employed in selecting the respondents who are women engaged in Irish potato production.

*Table 1: Sampling Size Selection Plan*

<b>L.G.A</b>	<b>Villages Selected</b>	<b>Sampling frame</b>	<b>Sample size (25%)</b>
Bokkos	Butara vet	279	70
	Mai katako	151	38
	Mbar	117	29
<b>Sub-total</b>	<b>3</b>	<b>547</b>	<b>137</b>
Jos south	Bisichi	155	39
	Kuru	97	24
	Giring	117	29
<b>Sub-total</b>	<b>3</b>	<b>369</b>	<b>92</b>
<b>Total</b>	<b>6</b>	<b>916</b>	<b>229</b>

Source: Reconnaissance Survey (2022)

### **Method of Data Collection**

Data were collected through the use of pretested and validated questionnaire administered to women farmers selected from the study area by well-trained enumerators.

**The model is specified below:**

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_{13} X_{13} + e.$$

Where:

Y= dependent variable as defined above i.e. Adoption (1 if a farmer adopted any technology, 0 if other wise)

X<sub>1</sub> = Farmers' age (years)

X<sub>2</sub> = Marital status (single = 1, married = 0)

X<sub>3</sub> = Level of education (Number of years in formal schooling)

X<sub>4</sub> = Household size (number in household)

X<sub>5</sub> = Farm size (hectares)

X<sub>6</sub> = Farming experience (years in Irish potato production)

X<sub>7</sub> = Land ownership —

X<sub>8</sub> = Information source (number of sources used)

X<sub>9</sub> = Membership of association (years of membership of co-operative associations)

X<sub>10</sub> = Frequency of extension visit (number of visits)

X<sub>11</sub> = Annual income (Naira)

X<sub>12</sub> = Yield harvested (in bags)



$X_{13}$  = Major occupation  
 $X_{14}$  = Access to extension (Yes =1, No = 2)  
 $X_{14}$  = Sex (Male =1, Female = 2)  
 $b_1 - b_{13}$  = Regression coefficients  
 $a$  = constant  
 $e$  = error term

## RESULTS AND DISCUSSION

### Socioeconomic Characteristics of the Respondents

#### Age, household and farm size of the respondents

The result from Table 2 reveal that 32.8%, 31.9% and 23.1% of the respondents were within the ages of 28-37 years and 38-47 years and 18-27 years respectively, only 12.3% of the respondents were above 48 years. This implies that most of the respondents were within their active ages of production which can affect their adoption of technologies as young farmers tends to embrace technologies than old farmers. Similar finding was reported by Kosshak *et al.* (2020) that more than half (56.7%) of the women Irish potato farmers in Jos south were within the age bracket of 20- 49 years. This implies that most are still within the active productive and reproductive age. They are well fitted to providing the labour needed for farm work. This result is in disagreement with the report of Adams, (2017) that most of the female farmers are within the ages of 20 – 50 years and this age bracket facilitates the labour supply in agricultural production. The result also revealed that almost half (48.9%) of the respondents had household size between 3-4 persons and reasonable proportion (27.9%) had between 1-2 persons. This implies that respondents had relatively number of dependents though it is an additional source of family labour in their Irish potato production. This is a positive contribution to providing family labour for farm functions.

The result further depicts more than half (53.3%) of the respondents have farm size between 1-2 hectare and 36.2%, 9.6%, and 0.9% of the respondents had less than 1 hectare, 3-4 hectares and above 5 hectares, respectively. This implies that majority of the respondents are relatively small scale farmers operating on an average farm size 2 hectares of land for cultivation in the study area.

**Table 2:** Distribution of the Respondents According to Age, Household and Farm size (n=229)

Variable	Frequency	Percentage
<b>Age (Years)</b>		
18-27	53	23.1
28-37	75	32.8
38-47	73	31.9
48 and above	28	12.3
<b>Household size (Number)</b>		
1-2	64	27.9
3-4	112	48.9
5-6	44	19.2
7 and above	9	3.9
<b>Farm size (Ha)</b>		
Less than 1	83	36.2
1-2	122	53.3
3-4	12	9.6
5 and above	2	0.9

Source: Field Survey (2023)





### Marital Status, Educational Level and Membership of Association Status

The result from Table 2 reveal that most (75.5%) of the respondents were married, while 20.5% and 3.9% of the respondents were single and widows, respectively in the study area. This implies that most of the respondents were married which indicates to some extents levels of dependency in the study area. This results agreed with Gwary, *et al*, Barau, and Oladeji, (2017) that most of the women irish potato farmer were married. Similar finding was found in Kosshak *et al.* (2020) that majority (65.0%) of irish potato farmers were married

The result also shows that less than half (46.7%) of the respondents had attended secondary school, while 15.7%, 13.5%, and 12.2% of the respondents had non-formal education, primary education and tertiary education, respectively. This implies that most of the respondents had one form of education or the other which is an important factor in adoption and practice of technologies in agriculture and irish potato production in particular especially among women in the study area. This could be due to the numerous educational institutions in the study area which puts them in vantage position to learn new aspects of agricultural production. The results agreed with the report of Kosshak *et al.*, (2020) that majority of farmers (39.3%) having secondary education in Jos south LGA. The result further shows that more than half (52.4%) of the respondents were members of cooperatives and a reasonable proportion (47.6%) of the respondents does not belong to any cooperative societies. This implies that respondents had certain commitment and membership of one association or the other which tends to increase their access to other factors of production and inputs in the study area.

**Table 3:** Distribution of the Respondents According to Marital Status, Educational Level and Membership of Association status (n=229)

Variables	Frequency	Percentage
<b>Marital Status</b>		
Single	47	20.5
Married	173	75.5
Widow	9	3.9
<b>Educational level</b>		
Primary education	31	13.5
Secondary education	107	46.7
Tertiary education	28	12.2
Non-formal education	36	15.7
No education	27	11.8
<b>Membership of association</b>		
Yes	120	52.4
No	109	47.6

Source: Field Survey (2023)

### Respondents' Secondary Occupation, Land Ownership and Adoption of Recommended Irish Potato Production Technologies

The result from Table 4 shows that almost half (49.3%) and a reasonable proportion (33.6%) of the respondents were artisans and livestock producers as their secondary occupation in the study area. This implies that most of the respondents had other sources of income apart from the Irish potato production in the study area. This may be as a result of low outputs (low yield) harvested by the respondents and could be attributed to the low level of adoption of improved technologies. The result from table 4 also reveals that majority (79.5%) of the



respondents own their land through rent. This implies that most of the respondents had their farm lands through rent. This disagreed with Ogunlela, and Mukhtar, (2019) that majority of the land on which the women farmers carry out their activities are borrowed (60.0%). This is could be due largely to the patriarchal nature of the study area where only males have right to land inheritance.

**Table 4:** Distribution of the Respondents According to Secondary Occupation and Land ownership (n=229)

Variables	Frequency	Percentage
<b>Other occupation</b>		
Crop farming	18	7.9
Livestock	77	33.6
Civil servant	14	6.1
Artisan	113	49.3
Trading	7	3.1
<b>Land acquisition</b>		
Inheritance	11	4.8
Bought	24	10.5
Communal	1	0.4
Rent	182	79.5
Leased	5	2.2
Government	6	2.6

Source: Field Survey, (2023)

### **Farming Experience, Yield and Annual Income of the Respondents**

The result from Table 5 indicated that 44.5% and 38% of the respondents had a farming experience of 7-13 years and 1-6 years. The many years of farming experience among respondents could have a positive impact on the production techniques of these farmers Muntaka, (2012). The result also shows the yield of irish potato harvested by the respondents in Table 5. According to the findings, a reasonable proportion of (42.8% and 29.3%) of the respondents harvested more than 12 bags. This finding implies that respondents' needs for technologies and innovations to increase their yield as much more yield can be obtained with the aid of technologies in the study area.

The result further indicated that majority (73.4%) of the respondents had an annual income of ₦50,000-₦100,000. This implies that most of the respondents had a relatively high level of income in the study area.



*Table 5: Distribution of Respondents According to Farming experience, Yield and Annual income (n=229)*

Variables	Frequency	Percentage
<b>Farming experience (years)</b>		
1-6	87	38.0
7-13	102	44.5
14-20	28	12.2
21-27	8	3.5
28 and Above	4	1.7
<b>Yield in bags</b>		
1-2	4	1.7
3-5	4	1.7
6-8	67	29.3
9-11	56	24.5
12 and Above	98	42.8
<b>Annual income in naira</b>		
50,000-100,000	168	73.4
101,000-150,000	24	10.5
151,000-200,000	16	7.0
201,000-250,000	12	5.2
251,000 and above	9	3.9

Source: Field survey (2023)

### **Factors Influencing Adoption of Recommended Irish Potato Production Technologies**

The factors influencing adoption of recommended Irish potato production practices are presented in Table 6. The adjusted  $R^2$  value was found to be 0.548, implying that the independent variables explained 54.8% of the variations in the dependent variable. The result revealed that out of the fifteen variables included in the regression model land ownership, yield, income, access to extension, frequency of extension visit, sources of information, age, farm size and farming experience were the factors that significantly influence the adoption of recommended Irish potato production practices. The fitness of the model was further confirmed by the overall significance of the model was depicted by the F-statistics which was significant at 1% level of significance. The significance of F-ratio shows that the regression result was statistically reliable.

The coefficient for age was found to be positive and statistically significant ( $P \leq 0.05$ ) at 5% level of probability. This implies that the older farmers adopt less of the recommended Irish potato production practices. Conversely, the younger farmers adopt new innovations more than the older farmers probably because they are more adventurous than their older counterparts. The coefficient of farm size was found to be positive and statistically significant ( $P \leq 0.05$ ). This means that as the farm size increases, adoption of recommended Irish potato production practices also increases. Farm size has bearing on the capacity of farmers to adopt improved technologies and new farm practices. Farmers with large farm size can afford to devote part of their farms for soybean production without significantly affecting the total land left for the production of the staple food crops compared to small land holders. Land size is also one of the indicators of the level of economic resources available to farmers (Ajibefun, 2016).

The coefficient of farming experience was also found to be positive and statistically significant ( $P \leq 0.05$ ). This means that the more their farming experience, the higher the probability of adopting of the recommended Irish potato production practices. Farming





experience is an important determinant of the respondent's level of farm income. Farming involve a lot of risks and uncertainties, therefore to be competent enough to handle all the vagaries of agriculture farmers must have stayed in farming business for quite some time This is in line with the report of Ayinde *et al.* (2010) that farming experience and farm size have significant and positive influence on adoption.

The Table also reveal that land ownership status, yield and frequency of extension contact were significant ( $P \leq 0.001$ ). On the other hand, annual income was negatively significant at 5% probability level which implies that one-unit increase in income will result to one-unit decrease in adoption of recommended irish potato practices. However, sex, marital status, household size, educational level, membership of association and occupation were not significant and had no influence on respondents' adoption of recommended irish potato production practices in the study area.

**Table 6: Regression Result of Factors Influencing Adoption of Recommended Irish Potato Production Technologies**

<b>Variables</b>	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>	<b>T</b>	<b>Sig.</b>
(Constant)	1.739	0.379		4.584	0.000
Land ownership	-0.100	0.028	-0.223	-3.569	0.000***
Yield harvested (in bags)	0.066	0.012	0.330	5.423	0.000***
Annual income (Naira)	-0.065	0.032	-0.145	-2.034	0.043**
Access to extension	0.050	0.020	0.164	2.448	0.015**
Frequency of extension visit	-0.059	0.022	-0.169	-2.646	0.009***
Sources of information	-0.049	0.012	-0.258	-3.937	0.000***
Age	0.006	0.003	0.178	2.294	0.023**
Sex	-0.085	0.072	-0.075	-1.168	0.244
Marital status	0.007	0.061	0.009	0.119	0.905
Household size	0.016	0.014	0.092	1.172	0.243
Educational level	-0.023	0.024	-0.058	-0.930	0.354
Farm size	0.086	0.034	0.174	2.556	0.011**
Farming experience	0.016	0.006	0.170	2.545	0.012**
Membership of association	0.074	0.059	0.076	1.254	0.211
Major occupation	-0.004	0.032	-0.010	-0.139	0.890
R square	0.236				
Adjusted R square	0.548				
Standard error	0.42211				

Source: Field Survey (2023) \*\*\* and \*\*= Significant at 1% and 5%

### **Constraints Faced by Women Farmers in Adoption of Recommended Irish Potato Production Technologies**

The result from Table 7 reveal the various constraints faced by the women irish potato farmers in adoption of recommended technologies in the study area. the result indicated that, inadequate capital (67.3%), flood (65.1%), inadequate farmland (62.9%), and scarcity of improved planting materials (62.4%) were the major constraints affecting women's adoption of recommended technologies which were ranked 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> respectively. This agreed with the report of Kosshak *et al.*, (2020), that the major constraints to women farmers in irish potato farming were land tenure system which accounts and is the most limiting factor to



adoption of improved agricultural practices. The result also revealed that poor pricing (50.8%) of agricultural produce and access to extension services (45.0%) were another constraint reveal by the respondents. Other constraints include high cost of farm inputs (38.3%), poor transportation network (36.7%) and access to credit and late delivery of farm inputs (35.0%), respectively. Respondents that were constrained by poor communication network, pest and diseases, poor market prices and inadequate storage facilities constituting 59.8%, 58.2%, 43.2% and 39.3% of the respondents respectively. This result was similar to the finding of Tafida and Sa'adu (2019) in a research conducted on Factors Influencing Irish Potato Output among Male and Female Farmers in Jos-South Local Government Area of Plateau State, Nigeria that, access to land, availability of extension agents, problem of pest, disease were the major constraints to irish potato production. Inadequate processing facilities (41.0%), high cost of farm inputs (34.9%) and government policies (29.3%) were also affecting the respondents' adoption of the irish potato production technologies in the study area.

*Table 6: Distribution Respondents According to Constraints to Adoption of Recommended Irish Potato Production Technologies*

Variables	Frequency	Percentage*	Rank
Inadequate capital	154	67.3	1 <sup>st</sup>
Flood	149	65.1	2 <sup>nd</sup>
Inadequate of farm lands	144	62.9	3 <sup>rd</sup>
Scarcity of improved varieties	144	62.4	4 <sup>th</sup>
Poor communication network	137	59.8	5 <sup>th</sup>
Pest and diseases	115	58.2	6 <sup>th</sup>
Inadequate extension service	114	49.8	8 <sup>th</sup>
Poor road networks	113	49.3	9 <sup>th</sup>
Poor market price	99	43.2	10 <sup>th</sup>
Inadequate storage facilities	90	39.3	11 <sup>th</sup>
Inadequate processing facilities	94	41.0	12 <sup>th</sup>
High cost of farm inputs	80	34.9	13 <sup>th</sup>
Government policies	67	29.3	14 <sup>th</sup>

Source: Field Survey (2023) \* = Multiple responses recorded

## CONCLUSION AND RECOMMENDATION

The study concluded that land ownership, yield, income, access to extension, frequency of extension visit, sources of information, age, farm size and farming experience were the factors that significantly influence the adoption of recommended Irish potato production practices. However, farmers were constrained by inadequate capital, flood, inadequate farmlands and scarcity of improved varieties.

The study recommended that;

- There is a need for Government to increase farmers' capital and credit facilities and make these services accessible at subsidized rate;
- There is the need for farmers to be trained on yield-raising technologies and other technologies that can positively contribute to high productivity among farmers; and
- It is imperative for policy makers to ensure that a wider spectrum of farmers are able to have access to credit in order to improve their adoption level of agricultural technology. In addition, developers of new agricultural technology should try to understand the farmers need as well as their ability to adopt technology in order to develop technology that will suit them.



## REFERENCES

- Abubakar, S. A., Bello, A., Manga, B. M., Ali, M. B., Muazu, A. and Magaji, D. (2020). Level of Participation of Women in Cowpea Production in Wammako Local Government Area of Sokoto State, Nigeria. *Annals of Urology & Nephrology* **1**(5): 1-7.
- Adams, O. K. (2017). Nigeria women in agriculture: Challenges and way forward, *IOSR Journal of Humanities and Social Science*, **22**(1): 102-106.
- Agwu, A. E., Ekwueme, J. N. and Anyanwu, A.C. (2008). Adoption of Improved Agricultural Technologies Disseminated via Radio Farmer Programme by Farmers in Enugu State, Nigeria. *African Journal of Biotechnology*. **9**: 1277-1286.
- Ajani, E. N. and Agwu, A.E. (2012). Information Communication Technology Needs of Small-Scale Farmers in Anambra State, Nigeria, *Journal of Agricultural and Food Information*, **13**(2): 144-156.
- Amadi, C. O., Ghislain, M., Khaya, S. S., Dabels, V., Nnadi, N. E. and Amadi, G. (2021). Prospects of mitigating late blight disease of potato in Nigeria through deployment of Triple R (3R) stacked gene transgenic varieties. *Nigerian Agricultural Journal*, **52**(2): 108-114.
- Ayinde, O. E, Adewumi M. O, Olatunji GB, and Babalola O A. (2010). Determinants of Adoption of Downy Mildew Resistant Maize by Small-Scale Farmers in Kwara State, Nigeria. *Global Journal of Science Frontier Research*, **10**: 23 – 31.
- Baba, I. B., Zain, R. M. D. Idris, H. U. and Sanni, A. N. (2015). The Role of Women in Household Decision-Making and their contribution to Agriculture and Rural Development in Nigeria. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)* **20**(5): 30-39.
- Cheteni P, Mushunje A, Taruvinga A. (2014). Barriers and incentives to potential adoption of biofuels crops by smallholder farmers in the Eastern Cape Province, South Africa. Munich Personal RePEc Archive (MPRA) Paper No. 59029.
- FAO. (2012). State of Food and Agriculture. Rome: FAO.
- FAOSTAT (2015). Food and Agricultural Organization of the United Nations. FAO Statistical Database 2015. Retrieved 04/012/2021 from World Wide Web <http://www.potatopro.com/world/potato-statistics>
- FAOSTAT (2016). Food and Agricultural Organization of the United Nations. FAO Statistical Database 2015. Retrieved 04/012/2021 from World Wide Web <http://faostat3.fao.org/download/FB/CC/E>
- FAOSTAT (2019). Crop statistics for Potatoes. Food and Agricultural Organization of the United Nations. Retrieved on 04/012/2021 from <http://www.fao.org/faostat/en/#data/QC>.
- FAOSTAT (2019). Food and Agricultural Organization of the United Nations. FAO Statistical Database. Retrieval date 04/012/2021, from World Wide Web <http://www.potatopro.com/world/potato-statistics> <http://www.fao.org/faostat/en/data>
- Girei, A. A., and Onuk, E. G. (2016). Determinants of women participation in livestock production in Mangu local government area of Plateau State, Nigeria. *Series Management, Economic Engineering in Agriculture and Rural Development* **16**(3):135-138
- Gwary, M. M., Nuhu, H. S., Burabe, B. I. and Toro, N. A. Analysis of Determining Factors to Women's Participation in Poultry Production in Toro Local Government Area of Bauchi State, Nigeria. *Global Advanced Research Journal of Agricultural Science* **4**(8): 479-484.



- Gwary, M. M., Nuhu, H. S., Burabe, B. I. and Toro, N. A. Analysis of Determining Factors to Women's Participation in Poultry Production in Toro Local Government Area of Bauchi State, Nigeria. *Global Advanced Research Journal of Agricultural Science* **4**(8): 479-484.
- Idowu, O. S. (2017). The relationship of socio-economic status (SES) of the farmers to the knowledge of adoption and communication behaviours and other characteristics of maize farmers in Oyi LGA of Kwara State, Nigeria. Unpublished B.Sc Project submitted to the Department of Agricultural Extension Services, University of Ibadan.
- Jain R, Arora A, Raju S. (2009). A Novel Adoption Index of Selected Agricultural Technologies: Linkages with Infrastructure and Productivity: *Agricultural Economics Research Review*, **22**: 109-120.
- Jiriko, R. K. (2015). Socio-Economic Factors Affecting the Performance of Women in Food Production. *Global Journal of Agricultural Research*, **3**(2): 37-45.
- Jwanya, B. A., Dawang, N. C., Zarmai, D. C., and Mashat, I. M. (2014). Economic analysis of irrigated Irish Potato production in Plateau State, Nigeria. *Developing Country Studies*, **4**(12): 80-86.
- Kabungo CVD: 2008. Evaluation of Irish Potato production and marketing performance: A case study of Mbeya Rural District, Mbeya Region, Tanzania. Msc. Dissertation, Sokoine University of Agriculture, Morogoro, Tanzania. 89pp.
- Morris, G. and Meyer, R. (1993). Women and financial services in developing countries: A review of the literature. Department of Economics, Pennsylvania State, University, University Park, Pa., U.S.A. Mimeo.
- Muhammad, A., Gindi, A.A., Gona, A. and Kaka, Y. (2016). Partial Economic Analysis of Irish Potato Production under Kebbi State Agroecological Conditions. *International Journal of Life Sciences Scientific Research*, **2**(2): 183-190.
- Muntaka, J. M. (2012). Factors influencing women participation in women-in-agriculture (WIA) programme of kaduna state agricultural Development project. Unpublished thesis submitted to the school of postgraduate studies, Ahmadu Bello University, Zaria. 85pp
- Ogunlela, Y. I. and Mukhtar, A. A. (2009). Gender Issues in Agriculture and Rural Development in Nigeria: The Role of Women. *Humanity & Social Sciences Journal* **4**(1): 19-30
- Rogers, E. M. (2003). Diffusion of innovations. Free Press. *New York*, 551.
- Sennuga, S. O., Baines, R. N., Conway, J. S. and Angba C. W., (2020). Awareness and Adoption of Improved Agricultural Technologies among Smallholder Farmers in relation to the Adopted Villages programme: The Case Study of Northern Nigeria, *International Journal of Biology, Agriculture and Healthcare*, **10**(6): 34-49.
- Sennuga S. O. and Fadiji T. O. (2020): Effectiveness of Traditional Extension Models among rural dwellers in Sub-Saharan African Communities, *International Journal of Advanced Research*, **8**(4): 401-415.
- Sennuga S. O., and Oyewole S. O., (2020): Exploring the Effectiveness of Agricultural Technologies Training among Smallholder Farmers in Sub-Saharan African Communities. *European Journal of Training and Development Studies*, **7**(4): 1-15.
- Tafida A. A. and Sa'adu M. (2019) Factors Influencing Irish Potato (*solanum tuberosum* L.) Output among Male and Female Farmers in Jos–South Local Government Area of Plateau State, Nigeria *for trends in science & technology journal*, **4**(2): 572 – 576



- Wandji, D. N., Pouomogne, V., Binam, J. N. and Nouaga, R. Y. (2012). Farmer's Perception and Adoption of New Aquaculture Technologies in the Western Highlands of Cameroon. *Tropicultural* **3**(3): 180-184.
- World Bank (2018). Option and Investment Priorities in Irrigation development. Nigeria Sector Review 2016.
- Zemba, B. A. A., Wuyep, S. Z., Adebayo, A. A., and Jahknwa, C. J. (2013). Growth and yield response of Irish potato (*Solanum tuberosum*) to the climate in Jos-South, Plateau State, Nigeria. *Global Journal of Human Social Science Geography, Geo-sciences, Environmental Disaster Management*, **13**(5): 13-18.
- Zhang, L., Su, W., Eriksson, T. & Liu, C. (2016). How Off-farm Employment Affects Technical Efficiency of China's Farms: The Case of Jiangsu. *China & World Economy*, **24**(3): 37-51.