



GENDER ANALYSIS OF IRISH POTATO (*Solanum tuberosum* L.) PRODUCTION IN JOS-SOUTH LOCAL GOVERNMENT AREA OF PLATEAU STATE, NIGERIA



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Abstract: The study was on comparative analysis of male and female involvement in Irish Potato (*Solanum tuberosum* L.) production in Jos-South Local Government Area of Plateau State, Nigeria. The specific objectives of the study were to describe and compare the socio-economic characteristics of male and female Irish potato farmers; examine male and female farmers' access to productive resources and services; compare farming activities performed by male and female in Irish potato production; assess the level of production of male and female. Primary data were collected through the use of questionnaires administered to 160 respondents in four selected districts using randomization and proportionality factor. Both descriptive and inferential statistics were used to analyze the data. The mean age for male and female were 47 and 44 respectively. Majority of both male (77.10%) and female (77.8%) were married. Similarly, 52.80 and 56.70% of male and female attained primary education. The mean farming experience for male and female were 11 and 10 years respectively. Both had mean extension contact of 2 per annum. The result showed that male had access to productive resources than their female counterpart, similarly land preparation was mainly done by male (57.50%) while majority of the female (66.20%) were involved in selling. Also male level of production is higher than the female output. It was recommended that farmers should be facilitated to access inputs, and extension services.

Keywords: Gender, Irish potato, production, Jos-south

Introduction

Generally, in the Nigerian society, male and female have different responsibilities, needs, interests, opportunities and constraints in agricultural production (Food and Agriculture Organization-FAO, 2008). They have different levels of access to ownership and control of resources and benefits in households, which vary widely and are in many instances determined by culture, tradition and social status (Schneider and Gugerty, 2010). In addition, male and female have unequal decision-making abilities in resource management (Nwaru, 2003). Over the years, it is believed that some crops are designated as "women crop" for planting and processing. These include vegetables, groundnuts and cassava while yams and tree crops such as cocoa and palm produce are said to be men's crop (Quisimbing and Pandolfelli, 2009).

The roles of rural women have been clearly recognized as fundamental in the field of agriculture (FAO, 2003; FAO, 2005; Mukhtaret *et al.*, 2007; Jenelid, 2008; Yusuf *et al.*, 2009). They have been characterized as the people who produce 60-80% of basic foodstuffs (Prakash, 2003; Aderiti, 2005). The women are involved in the production of these crops because they are knowledgeable about sustainable agricultural system and also play a key role in preserving and exploiting biodiversity (Eghereuba, 2004). Nigeria is now diversifying its economic resource and efforts to revamp the agricultural sector once again in order to achieve sustainable economic development, which is part of government policies aimed at stimulating the production of Irish Potato products, which will be used for both local and export trade (Mutimba *et al.*, 2010). Potato is a major food crop, grown in more than 100 countries in the world. According to FAO (2008) Potato is consumed by more than one billion people in the world. It is a high-quality vegetable cum food crop used in preparing more than 100 types of recipes. The protein content of potato has a high biological value than cereals and considered to be better than milk. Hence, Potato is supplementing meat and milk products by lowering energy intake and also by reducing food cost. Mbwika (2001) reported that potato has now become a key food security crop with many comparative advantages over cereals, it has economic, medical and nutritional value in the sense that it contains higher crude protein than any other root and tuber crop and because of the low caloric and high vitamin C content it is an important nutritive food. Douches *et al.* (2009) and Ilevbajoje (2002) asserted that women are active

in the Irish Potato industry and are more predominant in the processing and marketing than men folk who dominate the production of Irish Potato roots. This is because women activities in root crops production was due to men's off farm employment or part-time work off farm, therefore women involved themselves in weeding, harvesting, transportation, storage, processing and marketing (Rahman *et al.*, 2004)

The importance of the assessment of male and female participation in Irish Potato production is very important because what is considered a normal activity or socially acceptable economic activity for different sexes varies from place to place and from culture to culture (Giovarelli, 2006). Olowoye (2005) observed that out of the 95 percent of the small-scale farmers in Nigeria who actually feed the nation, 65 percent of them are female. However, according to Akor (2006) 92 percent of the northern rural women gave farming as their primary and secondary occupation. The changing male and female roles and responsibilities in agriculture in Nigeria are traceable to the discovery of crude oil (FAO, 2008). The number of female involved in Irish Potato production has increased over the years as Irish Potato production provides increased employment opportunities for female. Plateau State is noted for Irish potato production and processing which involve land preparation, planting and harvesting and several processes of farm and domestic task as packing, peeling, washing, and bagging, respectively (Verma *et al.*, 2001).

Purpose of the study

Male and Female involvement and differences in Irish potato production have not been studied in depth for the purpose of channeling development incentives, particularly support in terms of finances, access to land, technologies and agricultural extension packages in the study area. Agricultural production incentives appear to be distributed to the male at the expense of the female farmers (World Bank, 2010). In spite of the overwhelming evidence of female's roles and involvement in Irish potato production; it is most unfortunate that change agents or extension workers seem to side line female. In some situations, where male and female are on the fields, the land is considered 'his' not 'hers' (Olowoye, 2005). Lijongwa (2003) stated that female farmers had fewer opportunities than men by having less contact with extension officers who are mostly men and whose services are geared towards male farmers. Therefore, continual changes in men and women

responsibilities in farming activities; calls for an urgent and in depth study to fill the existing knowledge gap.

The specific objectives of the study were to:

- i) describe and compare the socio-economic characteristics of male and female Irish potato farmers in the study area;
- ii) examine male and female farmers' access to productive resources and services;
- iii) compare the farming activities perform by male and female in Irish potato production in the study area;
- iv) assess the level of production by male and female Irish potato farmers in the study area;

Materials and Methods

The study was conducted in Jos-South Local Government area which is one of the seventeen Local Government Areas of Plateau State, Nigeria. It is located on latitude 08° 44' and longitude 09° 44' North (National Bureau of Statistic-NBS, 2011). It is made up of four districts; namely, Du, Gyel, Kuru and Vwang. The Local Government have its Headquarters in Bukuru. It's bounded by Barkin-Ladi Local Government Area to the South, Riyon Local Government Area to the South-West, Jos-East Local Government Area to the East and Bassa Local Government Area to the West. The Local Government has a projected population of 356,400 people as at 2010, with a land mass of 1,037 km² (NBS, 2011). Their major occupation is farming (i.e. crop and animal production) and it forms the bedrock of their livelihood.

Sources and types of data

Primary data used for this study were collected from the male and female Irish potato farmers of the study area. The primary data collected comprised of demographic information, access to productive resources and services, farming activities and production.

Sampling technique and sample size

The four districts in Jos South Local Government Area, namely Du, Gyel, Kuru and Vwang were considered for the study. List of registered farmers was obtained from Department of Agriculture at the Local Government level which served as the sampling frame. Thereafter a random sampling technique was adopted to select 160 Irish Potato farmers in proportion to their number and gender in each district (Table 1). It was determined using proportionate factor as adopted by Adebayo and Olayemi (2005).

The Formula is stated as: $s = \frac{e}{p} X \frac{q}{1} \dots \dots, 1, \dots \dots 3.1$

Where: S = Total number of respondents sampled; e = Population of farmers per district; P = Total population of farmers in the study area; Q = Total number of questionnaires that was administered

Table 1: Sampling of respondents

Wards	No. of	No. of	Sampled Male	Sampled Female
	Male Farmers	Female Farmers		
Du	178	223	18	22
Gyel	185	247	18	25
Kuru	169	218	17	22
Vwang	173	209	17	21
Total	705	897	70	90

Source: Field survey 2016

Method of data analysis

Descriptive statistics was used to analyze the data. The descriptive statistics involved the use of frequencies, percentages, mean and ranking method, it was used to achieve objectives i, ii and iii. Likert scale was used to achieve objective vi. T-test was used to compare male and female Irish potato farmers in the study area.

Results and Discussion

Demographic characteristics of the respondents

The demographic characteristics of the respondents are presented in Table 2. The variables considered were age, marital status, household, education and farming experience. The result revealed that majority (52.9%) of the male respondents were between 41-60 years of age, 35.7% were between 20-40 years and 11.5% were between the ages of 61-80. On the other hand, the age distribution of the female respondents is also presented in Table 1. The result revealed that majority (46.70%) of the female respondents were between 20 and 40 years, 43.30% were between 41-60 years and 10% were between the ages of 61-80. On the marital status of the respondents it shows that majority of the male respondents were married (77.1%) while 22.9% were single. Similarly, the distribution of the female respondents based on marital status as indicated that majority of them were married (77.80%) while 22.20% were single. The result on household size revealed that majority of the male respondents (55.80%) had between 6-10 persons in their household. The male farmers that had household size of between 1-5 and 11-15 constituted 37.10% and 7.10%, respectively. The result for female farmers revealed that majority of them (53.40%) had between 6-10 persons in their households. The female farmers that had household size of 1-5 and 11-15 constituted 42.20 and 4.40%, respectively. Distribution of male farmers based on educational level revealed that majority (52.80%) of the respondents had attained primary education, while 21.40 and 25.70% attended secondary and tertiary education. Similarly, distribution of female farmers based on educational level revealed that majority (56.70%) of the female respondents had attained primary education, while 34.40 and 8.90% attended secondary and tertiary education, respectively. The distribution of the male respondents based on farming experience revealed that 20% of the male respondents had between 1 to 5 years of farming experience, 34.50% had 6 to 10 years of farming experience, 34.30% had 11 to 15 years of farming experience and 11.40% had above 15 years of farming experience. On the other hand, the result of female farmers' experience showed that 25.6% of the female respondents had between 1 to 5 years of farming experience, 35.50% of them had between 6 to 10 years of farming experience, 28.40% had between 11 to 15 years of farming experience and 10% of the female respondents had above 15 years of farming experience.

Table 2: Socio-economic characteristics of the respondent

Characteristics	Male freq.	%	Female frequency	%
Age				
21-40	25	35.7	42	46.7
41-60	37	52.9	39	43.3
>60	8	11.5	9	10.0
Marital status				
Single	16	22.2	20	22.2
Married	54	77.1	70	77.8
Household size				
1-5	26	37.1	38	42
6-10	39	55.8	48	53.4
11-15	9	7.1	4	4.4
Education				
Primary	37	52.8	51	56.7
Secondary	15	21.4	31	34.4
Tertiary	18	25.7	8	8.9
Farming experience				
1-5	14	20	23	25.6
6-10	24	34.3	32	35.5
11-15	24	34.3	26	28.4
>16	8	11.4	9	10.0

Source: Field survey, 2016

Male and female access to productive resources

Male and female access to farm size (ha)

The distribution of the respondents according to farm size showed that 71.40% of the male respondents had farm size of between 0.5-2 hectares, while 18.60% had farm size of between 2.1-3.5 hectares and 5.70% had farm size of between 3.6-5 hectares and 4.3% had access to 5 hectares and above (Table 3). The result for female access to farm land revealed that 63.30% of the female in the study area had access to 0.5-2 hectares of farm land. Also, 20% of the female respondents had access to farm land of 2.1-3.5 and 8.90% of the female respondents had access to farm land of 3.6-5 hectares. 8.9% of the female respondents had access to farm land of 5 hectares and above (Table 3).

Table 3: Distribution of respondents by farm size access

Access to Land(Ha)	Male Frequency	%	Female Frequency	%
0.5-2	50	71.4	67	63.3
2.1-3.5	13	18.6	19	20.0
3.6-5	4	5.7	7	8.9
>5	3	4.3	7	8.9
Total	70	100	90	100
	Mean= 2.3ha		Mean = 2.5 ha	

Source: Field Survey, 2016

Table 4: Distribution of respondents by extension contact

No. of Contacts	Male Frequency	%	Female Frequency	%
1	15	21.4	20	22.2
2	42	60.0	51	56.7
3	10	14.3	18	20.0
4	2	2.9	0	0
5	1	1.4	0	0
6	0	0	1.1	1.1
Total	70	100	90	100
	Mean = 2		Mean = 2	

Source: Field survey, 2016

Male and female contact with extension agents

The distribution of respondents by extension contacts showed that 60% had 2 extension contacts, 21.40% of them had 1 contact, 14.3% had 3 contacts, 2.9% had 2 contacts and 1.4% had 5 contacts with extension agents during the year under review (Table 4). On the other hand, the result for female farmers equally revealed that 22.20% of the female potato farmers in the study area had 1 extension contact within the year under review, while 56.70% had 2 contacts, 20% had 3 contacts and 1.10% had 6 contacts during the year under review (Table 4). For both male and female, the majority had 2 contacts, though with varying degrees in favour of male farmers.

Farming activities perform by male and female respondents

The farming activities performed by male and female respondents showed that 32.5% of the female respondents were involved in land preparation while 57.50% of their male counterparts were involved in the land preparation (Table 5). It implies that male potato farmers performed more tasks that female in terms of land preparation in the study area. In soil tilling, it showed that 29.40% of the female farmers participated while 70.60% of male engaged in tillage. It also implies that there was more number of male in land tillage than the female farmers. However, in ridging there were more number of female to male where 70.60% of the female respondents involved in ridging while 29.40% of their male counterparts were involved. Also in weeding 75% of the female performed the operation while only 25% of male potato famers participated in the operation. In planting

70.60% was carried out by female farmers in the study area and only 19.40% of the male potato famers participated in planting operations.

Table 5: Farming activities perform by both male and female

Gender	Land Preparation	
	Frequency	Percentage
Female	52	32.50
Male	108	57.50
Total	160	100.00
Tilling		
Female	47	29.40
Male	113	70.60
Total	160	100.00
Ridging		
Female	113	70.60
Male	47	29.40
Total	160	100.00
Weeding		
Female	120	75.00
Male	40	25.00
Total	160	100.00
Planting		
Female	113	70.60
Male	47	19.40
Total	160	100.00
Fertilizer app		
Female	52	32.50
Male	108	67.50
Total	160	100.00
Harvesting		
Female	115	71.90
Male	45	28.10
Total	160	100.00
Processing		
Female	121	75.60
Male	39	24.40
Total	160	100.00
Transportation		
Female	57	25.60
Male	103	64.40
Total	160	100.00
Storage		
Female	112	70.00
Male	48	30.00
Total	160	100.00
Packing		
Children	58	36.20
Female	69	43.10
Male	33	20.60
Total	160	100.00
Peeling		
Children	8	5.00
Female	109	68.10
Male	43	20.60
Total	160	100.00
Female	45	28.10
Male	115	71.80
Total	160	100.00
Selling		
Female	106	66.20
Male	52	33.80
Total	160	100.00

Source: Field survey, 2016

In fertilizer application 32.50% of the female respondents participated while 67.50% male participated in fertilizer application. Majority (71.90%) of the female potato farmers performed the harvesting in the study area where only 28.10% of males involved in harvesting. Also in processing, majority (75.60%) of the female farmers performed this task with only 24.40% of the male involved in the operation. In transportation, the male farmers dominated the activity with 64.40%, while only 25.60% women were involved. 70% of the female performed the storage operations while only 30% of male performed the task. Also in packing, children were also involved in the activity where 36.20% of them were involved. Female constituted 43.10% and male took 20.60% of packing activities. The peeling activity is mostly done by female where 68.10% of the female respondents performed the activities with 20.6 and 5% children and male involvement respectively (Table 5). The final operation which is selling was also carried out by female with 66.20% participation, while only 33.4% of male participated.

Level of production between male and female farmers Respondents' production output

Data on level of production by male and female farmers revealed that 24.30% produced 10-50 bags/season and 61.40% produced 51-100 bags while 10.0 and 4.30% produced between 101-150 bags and above 150 bags in a season, respectively (Table 6). On the other hand, the female result revealed that 25.60% of them produced 10-50 bags within a season, 56.60% produced 51-100 bags and 11.10% produced 101-150 bags while 6.70% of the female potato farmers produced above 150 bags. From the two results, it is clear that majority of them produced between 51-100 bags. However, for output between 105 and 150 and above the female farmers dominated.

Table 6: Distribution of respondents by level of production

Output (Bags)	Male Frequency	%	Female Frequency	%
10-50	17	24.3	23	25.6
51-100	43	61.4	51	56.6
101-150	7	10.0	10	11.1
>150	3	4.3	6	6.7
Total	70	100	90	100

Source: Field Survey, 2016

Comparison of annual income

Income distribution of respondents is presented on Table 7. The result showed that 15.70% had an annual income of between 1-500,000 and 57.70% had an annual income of 501,000-1,000,000. Also 14.20% had an annual income of between 1,000,001-1,500,000 and 12.90% had an annual income of 1,500,000 and above. On the other hand, the result for the female farmers revealed that 21.10% had an annual income of 1-500,000 and 42.20% had 501,000-1,000,000 while 20% had an annual income of 1,000,001-1,500,000. The findings further revealed that 15.60% of the female potato farmers had an annual income of 1,500,000 and above. From the aforementioned result, it became clear that for both male and female farmers, majority had an annual income of between 501,000-1,000,000. In this category, there were more men than female, however in the category of >1,500,000 there were more female than male.

Table 7: Distribution of respondents by income

Amount	Male Frequency	%	Female Frequency	%
1-500,000	11	15.7	19	21.1
501,000-1,000,000	40	57.2	38	42.2
1,000,001-1,500,000	10	14.2	18	20.0
>1,500,000	9	12.9	15	15.6
Total	70	100	90	100
	Mean=		Mean	

Source: Field Survey, 2016

Table 8: T-test result of hypothesis

Gender	Mean	Std deviation	Std error	Mean difference	Df	T. Value	Decision
Male	71.14	41.55	4.96	6.21	1	0.77	Accept
Female	77.36	50.53	6.04				H ₀

Test of hypothesis

T-statistics was used to test the hypothesis that there is no significant difference in the output of male and female potato farmers in the study area.

The result of t-test (Table 8) revealed a t-value of 0.770 showing that there was no significant difference in production between male and female Irish potato farmers in the study area. Production was used as a proxy for access to resources, e.g. land, inputs, extension contacts, fertilizer etc., which are considered as necessary ingredients in determining the level of production. However, that does not negate the fact that differences in term of access to productive resources, involvement in farming activities and production exist. But the t-test is showing that, the cumulative difference which reflects in their output was not significant. Therefore, the null hypothesis was accepted that there was no significant difference between the male and female farmers output in the study area.

Conclusion

Based on the findings the following conclusions were made; that both male and female were engaged in potato farming and participated actively in most production activities, with some differences exist in terms access to productive resources, production activities, marketing etc. However, statistically there was no significant difference between the male and female's output, which was used to reflect the cumulative differences in their involvement in all farming activities and access to productive resources between male and female farmers in the study area.

Recommendations

In line with findings of the study, the following recommendations were made:

- i. Government should increase the number of extension agents and provide them with necessary facilities for effective discharge of their responsibilities, and should not be gender biased as both male and female are actively engaged in potato farming.
- ii. Women's ability to provide food can be enhanced by improving their access to productive resources (mostly ownership of land), credit, technology and information in the area, to that effect, the land tenure system should as well consider women, as they are actively involved in potato farming.
- iii. Government/Non-governmental organizations and Groups should embark on an intensive literacy campaign in order to educate the Irish potato farmers, aiming at widening male and female access to information and thereby access to technologies that would enhance their productivity

Conflict of Interest

Authors declare that there is no conflict of interest reported on this work.

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