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Analysis of Yam Production among Women in Wukari Local Government Area, Taraba State, Nigeria

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ABSTRACT

This study analyzed yam production among women in Wukari Local Government Area, Taraba State, Nigeria. It described the socioeconomic characteristics of women yam farmers, estimated the profitability of women yam farmers and determined factors affecting yam output. Data were collected using a well-structured questionnaire administered to 83 respondents selected for the study. The data were analyzed using descriptive statistics, budgetary techniques and multiple regression model. The major findings of the study revealed that 64% of the women yam farmers were married, 62.65% were within 41-50 years while the mean age was 41years. Majority (67.47%) had formal education while 56.63% had over 10 years farming experience. The budgetary analysis revealed a gross margin of ₦455, 028, net farm income of ₦431, 248 and benefit cost ratio was 1.68, implying that yam farming was profitable. Significant factors that affected yam output were; yam seeds, fertilizer, herbicides and labour. The study recommended the participation of more young females in the yam production enterprise and early purchase of yam seed especially during the harvest season when price will be relatively cheaper.

INTRODUCTION

Yam (*Dioscorea spp.)* is a staple food crop in West Africa providing food for a large percentage of the population. Nigeria is the largest producer of yam in the world contributing two-thirds of global yam production each year (Kleih *et al.*, 2019). Yam also ranked second to cassava in root and tuber crop production in Nigeria and it is grown in 27 of the 36 states of the country with the North central zone being the main producer (Olorunsanya, 2015). The common species of yams grown in the country are white yam (*Dioscorea rotundata)* and water yam (*Dioscorea alata*). Yams (*Dioscorea* species) are annual root tuber bearing plants with more than 600 species out of which six are socially and economically important in terms of food, cash and medicine (Nanbol & Namo, 2019). Some of the yam species are water yam (*Dioscoreaalata),* white yam (*Dioscorea rotundata*), yellow yam (*Dioscorea cayanensis)*, Chinese yam (*Dioscorea esculant*) and three-leaf yams (Okeke & Oluka 2019). They are grown in tropical regions and mostly produced in the savannah region of West Africa, where rainfalls are divided into wet and dry seasons (Schroth *et al*., 2016). This crop is also grown in Latin American and Caribbean countries like Colombia, Brazil, Haiti, Cuba and Jamaica (Siqueira *et al.*, 2023).

Yams are mostly marketed as fresh tubers and prepared for consumption. Transportation and marketing are carried out both by farmers and traders (Verter & Bečvářová, 2015). Yam consumption also cuts across all the states of the federation emphasizing the importance of the crop

in Nigerians' diet. (Ikeh *et al*., 2023). Schroth *et al*., (2016) reported that in year 2016, 46 percent of Nigerian households consume yams during post planting season and 53 percent during post-harvest season.

Yam can be eaten boiled, roasted, fried, pounded or made into pottage. There is also some religious, social and cultural importance attached to planting, harvesting and eating of yam in Nigeria (Obidiegwu & Akpabio, 2017). Although land planted to yam has been on the increase over the years in Taraba state, the yield per hectare is however, on the decline with increasing cost of production all adding up to reduce the net farm income of the resource poor farming population, thus accentuating their level of poverty (Akintunde *et al.,* 2022). The need to meet immediate financial obligations also make these farm population to dispose of their harvest when price is at the lowest thus losing out to middlemen who have the ability to store and sell when price is at the peak.

Nigeria has one of the lowest recorded female labour force participation rates well below that of their foreign counterparts (Ewuziem 2019). They have no or minimal part in decision making process regarding agricultural development, food security and food production. Gender inequality is therefore dominant in the agricultural sector and this constitutes a bottleneck to agricultural development. The gender disparities are the outcomes of specific socio-cultural factors that affect women position in the household and wider society and their ability and willingness to participate in agricultural productivity. Gender participation also affects yam production despite the widespread assumption; men make the key farm management decision but women play a dominant role in yam production. This was confirmed by the finding of the study financed by the United Nations Development Programme (UNDP), which revealed that women make up 60 – 80 % of agricultural labour force in Nigeria depending on the region and they produce two-thirds of food crop (Mabundza *et al.,* 2014). The involvement of males and females in yam production activities and in different parts of the yam value chain is shaped by socially defined norms of behaviour, social roles and responsibilities (Ewuziem, 2019). Women face more difficulties than men in gaining access to resources such as land, credit and improved inputs. Ufondu *et al.* (2021) reported that lack of title to land prevents women from exercising or improving their expertise in crop production particularly seed yam production; decision-making on seed yam production, processing, marketing, control of income. Many studies such as Obidiegwu and Akpabio, (2017), Olabode, (2022), Oduntan, (2019), Schroth *et.al.,* (2016) among others, have been carried out on the economic analysis of yam production in Wukari, but little have been conducted on the economic analysis of yam production among rural women in Wukari LGA. Hence, the study analyzed yam production among women in Wukari LGA. Specifically, this paper described the socioeconomic characteristics of respondents, estimated profitability and examined the relationship between input and output amongst women yam farmers in the study area.

METHODOLOGY

This study was carried out in Wukari Local Government Area (LGA) located along Jalingo-Kasina-Ala road. Wukari town is the capital of Wukari LGA of Taraba State, Nigeria. Wukari is located in the guinea savannah of the middle belt region of Nigeria. Geographically, it is located between latitude 7.5°N and 9.5°N of the Equator and longitude 10°E and 12°E of Greenwich Meridian. It is bounded in the North by Ibi and Gassol LGA in the north east; in the south by Kastina-Ala (Benue State) and Takum LGA, in the east by Donga LGA and in the west by Nasarawa (Nasarawa State).

The area has good climatic conditions and rich agricultural soil (Zekariya, 2007). The study area has a land mass of about 4,308km2 with a population of 241,546 (National Population Commission, 2006). The dry and rainy season common to tropical regions are the dominant climatic features. The rainy season starts in April and ends in October, while the dry season begins in November and ends in March. The dry season reaches its peak in January and February when the dusty north east trade winds blow across the study area. The Local Government is situated on a rich agricultural

land, suitable for the cultivation of the following crops; yam, rice, sorghum, maize, fruit trees, beni-seed and vegetables. The people living in Wukari local government area are engaged in agricultural production activities (www.kwararafauniversity.edu.ng), with different cultural tribes among which the Wapan, Wanu, Ekpan, Ichen, Kuteb, Hausa, Chamba, Tiv and Fulani among many others.

Multi-stage sampling procedure was used for the selection of the study area and respondents for the study. In the first stage, five wards were purposively selected because of the relevance of yam production in the area, they are; Avyi Ward, Chunku Ward, Hospital Ward, Puje Ward, And Rafin Kada Ward. In the second stage two villages were purposively selected from each of the ward five wards earlier selected to make it 10. The communities were Prison Service, GSS Wukari, Kumutu, Tsinipanbae, Fire Service, General Hospital Quarters, Central Primary School area, Mechanic Village, Rafin Kada Motor Park and Kafin Ada area. In the last stage, 8 women yam farmers were selected randomly from nine villages each and 11 from General hospital quarter communities to make it 83 respondents. Data for this study work were obtained mainly from primary source using questionnaires that were randomly administered to sampled women yam farmers in Wukari LGA.

Descriptive statistics such as simple percentages, frequency and mean were used to identify the women yam farmers' socioeconomic characteristics. In estimating respondents' profitability, gross margin technique was adopted. Inferential statistics (regression model) was adopted to analyze input-output relationship amongst women yam farmers in the study area.

Model Specification

Regression Model on Physical Quantity of Input

The regression model is expressed as follows:

$Y = b_0 + b_iX_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \mu i$ ..... (1)

Where

Y = Output (kg)

X_1 = yam seeds (Number)

X_2 = Fertilizer (kg)

X_3 = Chemicals (Litre)

X_4 = Stake (Number)

X_5 = Labour (Manday)

X_6 = Farm size (Hectare)

μi = error terms

Budgetary Technique Model

This was used to estimate the cost and returns of Women yam farmers in the study area.

GM=TR–TVC ……. (2)

NFI=TR-TC…… …… (3)

TC=TVC + TFC ……... (4)

Where:

GM=Gross margin
TR=Total Revenue
TVC=Total Variable cost
TFC=Total Fixed Cost
NFI=Net Farm Income
TC=Total Cost

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics of Women Yam Farmers in Wukari

On table 1, the distribution of respondents according to their marital status shows that most (63.86%) of the women farmers were married, while 20.48% were widowed and 15.66% were single. This shows that majority of the respondents were households heads together with their husbands, bearing family responsibilities and as such they will be immensely dedicated to yam cultivation. This findings agrees with Musa *et al*., (2020) and Zaknayiba and Tanko (2013) whose both findings revealed that most yam farmers in Zing LGA of Taraba State and Karu LGA of Nassarawa state were married. The age distribution of the women farmers shows that most (62.65%) women farmers are those within the age bracket of 40 and above. This clearly depicts that in Wukari LGA, young female do not actively participate in yam cultivation as compared with their male counterpart. This was shown in Hassan *et al*., (2024) whose report showed that young male with mean age of 31.51 years were actively involved in yam cultivation in Wukari LGA. The mean of the age of the respondents is 40.61 which signifies that farming group in the study area are aging needing more youths to venture into the business of yam farming to ensure food security in Wukari LGA. This findings agrees with Olatinwo *et al*., (2022). Regarding household size, most (79.52%) of the respondents had household size of 1-10 persons and a mean of 8 persons. This could mean that most of the respondents have large family size which is an important index in any rural development intervention. The result of this findings agrees with Ebewore *et al*., (2013) whose findings reported a family size of 6-10 persons in Ika South LGA of Delta State. The distribution of respondents by educational level revealed that most (67.47%) of the respondents had one form of formal education or the other which include 7.23% had primary education, 38.55% had secondary education. However, 32.53% had no formal education, while 21.69% had tertiary education. This depicts that majority of the respondents are educated, will be better equipped in adoption of farming innovations and hence greater productivity. With respect to farming experience, 43.37% of the respondents were shown to have 1-10 years of farming experience, 34.94% had 11-20 years of farming experience, while 21.69% of had above 21 years of farming experience. This implies that most of the respondents have vast farming experience and are better skilled in the yam production enterprise. They know high-yielding variety, variety with better acceptance by consumers, weed resistant variety and also better equipped with the appropriate timing for planting, wedding and fertilizer application. The mean farm size was estimated to be 1.95ha, most (54.22%) of the respondents cultivated 1-2 hectares of land, while 33.73% cultivated 3-4 hectares. However, only 12.05% cultivated over 4 hectares. This finding agrees with Osayande and Osarenren (2015) whose report showed that most of farmers cultivated between 1-2 hectares of land in Edo state. This by implication shows that yam female farmers in the study area are usually small-scale yam farmers who cultivate for household consumption as support to their husbands. Majority (67.47%) of respondents were cooperative members, while 32.53% of respondents does not belong to any cooperative society. Similarly, majority (57.83%) of the respondents had contact with extension agent in the last planting season. However, 42.17% of the respondents reported otherwise. This finding do not agree with that of Ilemobayo and Ijigbade (2019) who reported that majority of yam farmers in Oyo state do not have contact with extension agent.

Table 1: Socioeconomic Characteristics of Respondents in the Study Area

Variables	Frequency	Percentage (%)	Mean(x)
Marital status			
Married	53	63.86	
Single	13	15.66	
Widowed	17	20.48	
Total	83	100	
Age			
21-30	15	18.07	
31-40	16	19.28	
41-50	41	49.39	**40.61**
51 and above	11	13.26	
Household size			
1-5	23	27.71	
6-10	43	51.81	**8.06**
11-15	10	12.05	
16-20	7	8.43	
Total	83	100	
Educational Level			
No formal	27	32.53	
Primary	6	7.23	
Secondary	32	38.55	
Tertiary	18	21.69	
Total	83	100	
Farming Experience			
1-10	36	43.37	
11-20	29	34.94	
21-30	18	21.69	
Total	83	100	
Farm size (ha)			
1-2	45	54.22	**1.95**
3-4	28	33.73	
>4	10	12.05	
Cooperative membership			
Yes	56	67.47	
No	27	32.53	
Total	83	100	
Extension visit			
Yes	35	42.17	
No	48	57.83	
Total	83	100	

Source: Field Survey, 2023

Costs and Returns of Yam Production

Table 2 below shows the costs and returns of production in the study area per hectare. The profitability analysis showed that the Total Variable Cost (TVC) amounted to an average of ₦614,157, with a total fixed depreciated cost of ₦23,780 which culminate to an average total cost (ATC) of ₦637, 937. The TVC contributed about 96.27% in yam cultivation, while only 3.73%

was contributed by cost of fixed inputs. This implies that variable inputs are the most important items in yam production cycle in the study area, they are frequently referred to as the running cost, unlike the fixed counterpart. This finding agrees with Musa et al., (2020) and Akintunde et al., (2022). Among all the inputs used, the cost of yam seed constituted almost 32% of all the cost of input. This implies that yam seed was the most costly input in the production of yam in the study. The average net revenue obtained from yam production by women farmers in the study area was N1,069,185 from the sales of grade 1,2,3 and seed yams. With grade 1 yams generating the highest revenue of N465, 143, follow by grade 2, N236, 756, seed yams ₦213,341 and grade 3, N153, 945. Furthermore, the Gross Margin (GM) and Net Farm Income (NFI) were calculated to be ₦455,028 and ₦431,248 respectively. Also, the benefits cost ratio is 1.68. The analysis for the profitability of yam production by women in the study area shows the enterprise to be a profitable venture. The return on investment of the enterprise showed a ₦1.68 profit for every Naira invested by the respondents. The result of this analysis agreed with Musa et al., (2020) where return on investment, gross margin and net farm income revealed that yam farming in Zing LGA of Taraba state is a profitable enterprise.

Table 2: Costs and Returns on Yam Production

Items	**Amount(₦)**	**Depreciation (₦)**	**Percentage (%)**
Variable costs			
Labour	154,366	-	24.20
Fertilizer	114,732	-	17.98
Yam seeds	201,213	-	31.54
Herbicides	23,166	-	3.63
Stakes	4,112	-	0.64
Transportation	21,368	-	3.35
Storage	91,349	-	14.32
Miscellaneous	3,851	-	0.60
Total variable cost	**614,157**		
Fixed costs			
Hoe		2,410	0.38
Land	15,621	-	2.45
Cutlass		1,121	0.18
Basin		1,467	0.23
Sprayer		3,161	0.50
Total fixed cost		**23,780**	100.00
Total cost	**637, 937**		
Revenue			
Grade 1	465,143		43.50
Grade 2	236,756		22.19
Grade 3	153,945		14.39
Seed yam	213,341		19.95
Total revenue	**1,069,185**		
Profitability Analysis			
Gross Margin	455,028		
Net Farm Income	431,248		
Benefit Cost Ratio	1.68		

Source: Field Survey, 2023

Factors Affecting Yam Output among Women Yam Farmers in the Study Area

Table 3 presents the results of a regression analysis examining factors affecting yam output in among women yam farmers in Wukari LGA. Inputs regressed were number of yam seeds, farm size, fertilizer, stakes, herbicides and labour. However, farm size and stakes were not significant. The model has an estimated R^2 value of 0.881. This implies that about 88.1% variation in the output of yam was caused by all the explanatory variables included in the model, whereas 11.9% accounted for errors not captured in the model. Overall, the regression model has a high F-value of 263.775, and highly significant at 1% probability level indicating, that the explanatory variables adequately explained the variation in yam output. From the analysis, number of yam seeds had a positive relationship with yield and a coefficient of 0.932 that is significant at 1% level of significance, indicating that for a unit increase in the number of yam seeds planted, yam output is expected to increase by 0.932 units. The coefficient for fertilizer was 0.698 and statistically significant at 1%, which means that the use of fertilizer is positively associated with yam output. The implication of this is that there will be a 0.698 increase in yield per unit increase in the use of fertilizer. The coefficient for herbicide was 0.561 and significant at 5% level of significance, indicating that the use of herbicide is positively associated with yam output. This also means that the continued use of herbicide by one unit will bring about a consequential positive increase on production by about 0.698. The coefficient for labour was 0.251 and significant at 5% level of significance, indicating that an increase in labour is associated with higher yam output.

Table 3: Factors affecting yam output among women yam farmers in the study area

Variables	Coefficients	**Std. Error**	T-values	**P-value**
Constant	-23.931	-101.467	-0.236***	0.0021
Number of Yam Seed	0.932	6.326	0.147***	0.0046
Farm size	0.069	0.072	0.958	0.7420
Fertilizer	0.698	0.388	1.799***	0.0132
Stakes	-0.078	-0.060	-1.300	0.0689
Herbicide	0.561	0.986	0.569**	0.0504
Labour	0.251	0.660	0.380**	0.0521
F-Value			263.775***	0.0004
R-Square (R^2)			0.881	

Source: Field Survey, 2023, ***Significant at 1% level, ** Significant at 5% level

CONCLUSION AND RECOMMENDATIONS

This research analyzed yam production among women in Wukari LGA of Taraba State. Results from the study revealed that married women who have had one form of formal education or the other with vast farming experience and large family size (mean size=8) and mean age of 40.61 years have discovered fortune in yam cultivation as they make huge profit of ₦455,028 (GM) and ₦431,248 (NFI) per hectare. Based on the findings of the research, the following recommendations:

1. More young women married or not married be encourage to advantage by participating in yam production.
2. Extension agent should teach and encourage farmers that with limited farm size they can maximize their production objective of maximization.
3. In other to reduce the cost of yam seeds, farmers should buy yam seed during harvest at cheaper price as the price of yam seed was shown to be high in the study.

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