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Productivity Analysis of Telfairia Based Cropping Systems of Women Farmers in Ahiazu Mbaise Local Government Area of Imo State, Nigeria.

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Abstract

The study investigated the productivities of telfairia based cropping systems of women farmers in Ahiazu Mbaise Local Government Area of Imo State, Nigeria. Purposive and random sampling techniques were used to select both the location and respondents for the study. Data on socioeconomic and productivity variables were collected by means of structured questionnaire. The descriptive statistics, total factor productivity and ordinary least squares multiple regression techniques were used to analyze the data collected. The study showed that land, labour capital and education had varying levels of factor productivities in the various telfairia based cropping systems and these variables also significantly influenced the total factor productivities in these cropping systems. The study advocated the formulation and implementation of policies that will release and make more land available to female farmers. It also recommended easier access to capital for the farmers, to enable them acquire inputs that could improve their productivities and enhance output.

Keywords: Telfairia, Imo State, Total factor productivity

1. Introduction

The population of the world is increasing at an alarming rate. It has been projected to grow to 8.2 billion by the year 2025 and is likely to approach 9.3 billion in 2050 (DESA, 2000). Feeding such rapidly projected growing population is becoming a big problem. It is estimated that agricultural productivity will have to double over the next two decades to keep up with population growth. Nigeria has advantage in the production of variety of fresh crops especially vegetables (NFDO, 2005). Vegetables are nourishing foods because they contain most of the substance needed to increase man's resistance to disease such as: iron and essential oils. Vegetables are therefore complementary foods of the first order, and are much very important for man's health. A balanced diet should contain 250 – 325g of vegetables and an average of 285g per person per day is recommended for a balanced human diet (Attavar, 2000).

Agricultural production in Nigeria is dominated by small holder farmers who produce the bulk of the food consumed in the country. Vegetables are widely grown by local smallholder

farmers all over the Country. One of the major vegetables produced is the fluted pumpkin; *Telfairia occidentalis.* It is an important crop whose production has continues to increase and which and forms an important condiment in the national diet (Ibekwe and Adesope, 2010).

Fluted pumpkin can be cultivated on the flat land or on mounds or ridges. In home gardens, they are frequently grown along a fence or next to a tree, thus allowing the fruit to hang from a branch. They are also raised along stakes of various types including bamboos (Akoroda, 1990) cited in Nwauma and Omonoma (2010). Fluted pumpkin can be planted along side with other crops like maize, okra and cassava. Fluted pumpkin does well at lower attitude and medium to high rainfall and will do well on sandy soil provided fertilizer is applied but has a more robust growth in rich well drained soil.

Fluted pumpkin is the most important and extensively cultivated food and income generating crop in many parts of Africa (Adebisi – Adelani *et al.,* 2011). They can give high yield per unit area of land and hence generate high income for the farmers. It is one of the leading green leafy vegetables which is often grown and consumed in rural, urban and peri-urban areas in Nigeria and is produced by mostly the small holder farmers who earn their living from it, using limited farm input. Fluted pumpkin is also one of the commonest, popular cut herbs grown in south-eastern Nigeria and belongs to the family of cucurbitaceae.

The poor resource base of smallholder farmers has continued to restrict their ability to increase their scale of production. Low productivity of factor inputs are commonplace even as old techniques and low yielding varieties are used. The situation is much more precarious among female farmers, who, due to cultural and economic reasons find it difficult to access modern production techniques and inputs. Their scale of operation is always seems to be declining, their productivity low and output and profit marginal.

If agriculture is to become the major income earner for the country, and if citizens are going to enjoy some level of food security and good nutrition, it is important that issues of factor productivity and the profitability of smallholder farmers are addressed. This will give the needed impetus that will drive the sector to higher productivity.

This study has the following objectives i. to determine the level of productivity of factors used in the production of fluted pumpkin by women farmers; ii. to determine the factors that influence the productivity of the women farmers.

2. Materials and Methods

The study was conducted in Ahiazu Mbaise Local Government Area of Imo State, Nigeria. The Local Government Area has an area of 114square km and a population of 170, 902 at the 2006 census (NPC, 2006). It lies within the tropical seasons and has two major seasons. The rainy seasons starts in April and runs through to October, and the dry season which starts in October and ends in March. The soil in the area is fertile, though with varying acidity. The topography of the area is generally flat with a gentle slope and with few hilly undulating lands thus making it difficult for erosion to occur. The farmers in the area are mostly small-holders farmers who practice shifting cultivation and mixed cropping. The major crops grown in this area include: telfairia, melon, maize, cassava and yam.

Purposive, multistage and random sampling techniques were used in selecting the respondents for the study. First, One agricultural zone, Owerri Agricultural Zone was selected from the three agricultural zones in the State for the study. One Local Government Area, Ahiazu-Mbaise was purposively selected from the Agricultural zone because of the

concentration of women telfairia farmers in the area. Two autonomous communities noted for high production of the crop were also purposively selected from the numerous communities in the area. Five villages were randomly selected from each community giving a total of ten villages for the study. Six female farmers were randomly selected from each of the selected villages, giving a total of sixty respondents for the study. Structured questionnaire was used to collect data from the farmers.

The total factor productivity analysis was used to estimate the productivities of major fluted pumpkin based systems

According to Key and McBride (2003) TEP can be measured as the inverse of unit variable cost. This is so since TPF is the ratio of the output to the total variable cost (YVC) as shown in equation below

$$TFP = \frac{y}{TVC} \quad (1)$$

Where y = quantity of output in kilograms and

TVC = Total variable cost in Naira (₦)

Alternatively

$$TFP = \frac{y}{EP_i X_i} \quad (2)$$

where P_i = unit price of i^{th}variable input

X_i = quantity ofi^{th} variable input.

This methodology ignores the role of Total Fixed Cost (TFC) as this does not affect both the profit maximization and the resource use efficiency conditions. Four factors were hypothesized as the determinants of total factor productivity (TFP) on fluted pumpkin based farms. The factors were: farm size in hectares (Ti) Labour in man-days (T2), educational status of farm household head (T3) in years of schooling and fertilizer inputs in kilograms (T4). To examine the influence of these factors on TFP, the linear function of the multiple regression model was specified as shown in the equation

TFP = bo + biTi + E (3)

All the hypothesized factors were therefore incorporated into the regression equation. The data gathered on these factors were fitted by the OLS method using diverse econometric specifications, namely, the cobb-Douglas semi-log, quadratic and exponential functional forms. The model that gave the best fit was selected as the lead equation. The partial productivity estimates were the marginal products (MP) as shown in equation 4.

$$M_p = \frac{TFP}{T} \quad (4)$$

The multiple regression model is specified implicitly as;

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_{9)}$$

Y = total factor productivity of fluted pumpkin production (Kg/N)
X_1 = Age (years)
X_2 = Household size (number of persons)
X_3 = Gender (sex)
X_4 = Level of education (years)
X_5 = Farm size (Ha)

X_6 = Farming experience (years)
X_7 = Cost of labour (N)
X_8 = Cost of inputs (N)
X_9 = Capital (N)
ei = Error term

3. Results and Discussion

The socio economic characteristics of fluted pumpkin production among small holder female farmers were discussed under age, household size, level of education, farming experience, farm size.

The Table shows that modal age group was 41-50 years and it accounted for 28.33 percent of the pumpkin farmers. The mean age of the farmers was 52 years. This result implies that the women farmers are still in their middle age and should therefore be strong, healthy and capable of carrying out their farm activities. Onasanya (2009) classified productive age of farmers to be between 20 and 55 years. Thus majority of the respondents are still within the productive age and should have high productivity levels. Age has a negative influence on agricultural productivity because the older the farmers the lower their productivity.

The result also shows that majority of the respondents (about 72 percent) had household size of between 3 -6 persons. The average household size was about 4 persons. This result agrees with the National Population Commission (2006) census figures which put the national average household size at 4 persons. The household size of these farmers should have a positive influence on the productivity of the respondents because according to (Aruocha, 2006), the higher the household size, the higher the availability of labour and productivity.

The table shows that farmers that had no formal education accounted for just 5 percent of the respondents. Farmers who attained primary level of education only, made up the modal class and accounted for 41.67 percent of the total respondent. The level of education the farmers attains has a positive influence on agricultural productivity. This is because education increases her productivity by enhancing her ability to understand and evaluate new production techniques and technologies. Onyebinama (2001) asserts that higher level of literacy increases the ability of farmers to cope with the complexities of new technologies and the intricacies of new product and factors market.

The Table shows the mean for farming experience was also 18.5 years. Majority (50 percent) of the female pumpkin farmers had between 11 – 20 years of experience which implies that these farmers have engaged in farming activities for more than a decade. They should therefore be able to utilize this experience to achieve a positive result in their farming activities. Ibeagwa (2011) posits that experience is an important factor in the productivity of the farmer. Nwaru (2004) also asserts that the number of years a farmer has spent in the farming business may give an indication of the practical knowledge he has acquired on how he can overcome certain inherent farm production problems.

The table also shows that 33.33 percent of the female pumpkin farmers in the study area had farm size of between 2.1 – 2.9 hectares. The mean farm size was 1.95 hectares which is an indication that the female pumpkin farmers are basically smallholder farmers. According to Udoh (2005) vegetable farms are generally small managed farms. Farm size

may have a positive influence on the productivity of the farmers because according Adeniyi (2014) farm size increases the productivity and output of the farmer.

Table 1: Socioeconomic characteristics of women telfairia farmers in the area.

Socioeconomic variable	Frequency	Percentage
Age (years)		
21 – 30	2	3.33
31 – 40	12	20
41 – 50	17	28.33
51 – 60	14	23.33
61 – 70	15	25
Mean	51.75	
Household size (n. of persons)		
1 – 2	12	20
3 – 4	14	23.33
5 – 6	29	48.33
7 – 8	5	48.33
Mean	**4.37**	
Level of education (years spent in school)		
No of formal education	3	5
Primary education	25	41.67
Secondary education	19	31.67
Tertiary education	13	21.67
Farming experience		
1 – 10	9	15
11 – 20	30	50
21 – 30	16	26.67
31 – 40	3	5
41 – 50	2	3.33
Mean	18.5	
Farm size (hectares)		
0.01 – 0.9	12	20
1.1 – 1.9	17	28.33
2.1 – 2.9	20	33.33
3.1 – 3.9	15	25
Mean	1.95	

Source: Field survey, 2014

Total Factor Productivity

The result of the analysis for the estimates of partial factor productivity of the various telfairia based cropping systems is presented in Table 2.

Table 2: Partial Factor Productivity of telfairia based cropping systems

Variable	Production systems			
	TCM	TCcMz	TCYMz	TCMz
Land	0.8	1.2	1.8	2.20*
Labour	0.76*	0.53	0.72	0.61
Capital	1.34	2.21*	1.18	2.01
Education	1.62	1.53	1.88*	1.27

Source: Field survey, 2014.
Note: TCM –telfairia/cassava/melon; TCcMz – telfairia/cocoyam/maize; TCYMz – telfairia/cassava/yam/maize; TCMz – telfairia/cassava/maize
*indicates highest partial factor productivity estimate for each factor or variable across the enterprises.

The result shows that land had the highest partial factor productivity under the telfairia/cassava/maize system. It however had the lowest under factor productivity under the telfairia/cassava/maize farming system. Labour had its highest factor productivity under the telfairia/cassava/melon farming system and the lowest under the telfairia/cocoyam/maize system. Capital had the highest factor productivity under the telfairia/cocoyam/maize system, and the lowest factor productivity under the telfairia/cassava/melon farming system. Education had the highest factor productivity under the telfairia/cassava/yam/maize farming system and the lowest factor productivity under the telfairia/cassava/maize farming system.

Determinants of total factor productivity

The ordinary least squares multiple regression techniques was used to estimate the determinants of total factor productivity of the telfairia based cropping systems. The result of the analysis for the determinants of total factor production of telfairia based farming systems is presented in Table 3.

Table 3: Determinants of total factor productivity

TELFAIRIA based systems	Constant	Land	Labour	Capital	Education	R^2	F
TCM	-1954.912	19.679	-10.825	7.46E-006	5.032	0.744	49.809***
	(-2.815)***	(4.024)***	(-4.475)***	(1.933)*	(1.584)		
TCcMz	10.655	1.824	-0.157	3.23E004	0.350	0.801	47.169***
	(19.400)***	(4.394)***	(-4.761)***	(1.790)*	(0.870)		
TCYMz	3.866	0.851	-0.782	0.058	0.882	0.886	52.350***
	(2.259)**	(4.620)***	(-2.928)***	(2.412)**	(0.909)		
TCMz	-1.561E7	31.203	-3.138	1.447	-2.512	0.820	46.083***
	(-5.950)***	(3.575)***	(-1.602)	(0.290)**	(-0.816)		

Figures in parenthesis are the t-ratios,*significant at 10% level; **significant at 5% level; ***significant at 1 percent level.
Source: Field survey, 2014.

The result shows that the regressions gave a good fit with R^2 values ranging between 0.744 and 0.886. Land positively and significantly influenced the TFP in all the cropping systems. Labour had a negative influence on the TFP in all cropping systems but was however not significant in the telfairia/cassava/maize cropping system. Capital positively influenced TFP in all cropping systems, while education was not significant in any of the cropping systems. This result agrees with Ilemobayo *et al*. (2012) who found in their work on okra based cropping systems that land, labour and capital are major determinants of cropping based systems.

4. Conclusion and Recommendations

The study assessed the productivities of women telfairia based cropping systems in the study area. The result showed that most of the women telfairia farmers were middle age and had average household size of about 4 persons. It also showed that the partial factor productivities of the land and labour were highest under the telfairia/cassava/maize cropping system for land and telfairia/cassava/melon cropping system for labour. Capital and education had their highest partial factor under telfairia/cassava/cocoyam/maize for capital and telfairia/cassava/yam/maize cropping systems. The study also revealed that land and capital positively influenced the productivities of the various cropping systems.

The study recommends the formulation of policies that will release and make more land available for vegetable crop farming by women. Also, there is need to make capital more available to the women farmers for their farming activities. This may be done through reduced interest rates on loans or special loan schemes targeted at women farmers who show seriousness and dedication in their farming activities.

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