RESOURCE-USE EFFICIENCY OF FLUTED PUMPKIN (TELFARIAOCCIDENTALIS) PRODUCTION AS AID TO POVERTY ALLEVIATION IN SOUTH-SOUTH PART OF NIGERIA

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ABSTRACT: *The rural areas in Nigeria are worse hit by poverty which is a ban on the standard of living on the people. Fluted Pumpkin (TelfariaOccidentalis) is a crop produced for the economic importance of its leaves, fruits, seeds to the citizenry. This study therefore sought to examine the Resource-Use Efficiency of Fluted Pumpkin (TelfariaOccidentalis) Production as aid to poverty alleviation in Isoko South Local Government Area, South-South part of Nigeria. Cross-sectional data were obtained through well structure questionnaire administered to 60 fluted pumpkin farmers drawn using simple random sampling technique from the study area during the 2015 production season. Data were analysed using descriptive statistics, poverty line analysis, efficiency ratio analysis, and a 3-Point Likert Scale Rating. Results showed that majority (40%) of the respondents were within the age bracket of 31>40 years, with mean age of 38.9years while 66.7% of the respondents were females. 53.3% had farming experience of 1-5years, with mean value of 4.88years. 58.3% had 1-4 persons in their household size, with mean value of 4 persons. The efficiency ratio of hired labour (0.683), quantity of seed used (0.167), quantity of herbicide used (0.109), portrayed that these resources were over-utilized. Also the efficiency ratio of family labour (1.474) and quantity of fertilizers used (6.087), showed that the farmers were inefficient in the use of these resources.The poverty level analysis indicated that 20% of the studied population was within the extremely poor group while 70% were within the moderately poor group and only 10% fell within the group of non-poor. The results also revealed the major constraints faced by farmers to include: lack of access to credit facilities, high cost of transportation, lack of storage facilities, and scarcity of viable seeds; it is therefore recommended that the government and financial institutions should provide credit facilities to the farmers for improved yields and efficient resource-use of inputs in the production of fluted pumpkin in the study area.*

KEYWORDS: Resource-use, Poverty analysis, Farmers, Fluted Pumpkin, Nigeria.

INTRODUCTION

Nigeria is a country endowed with both human and natural resources, but it is still classified among the poorest countries in the world with the greater part of its citizenry living below the poverty line of less than one dollar per day (World Bank, 2000, 2002 and 2004). The United Nation Development Programme (UNDP, 2002) report had shown that over 60% of the Nigerian population is part of the 1.8 billion people in the world living below poverty line. According to Coker (1998), poverty is characterized by low calorie intake, poor housing conditions, inadequate health services, poor qualities of educational facilities, low life expectancy, high infant mortality, low income, unemployment and underemployment. This is in consonance with the opinion of Ekong, (2003), that the effect of poverty are evident in inability to feed well, poor health and high susceptibility to health problems, infant mortality,

low life expectancy, poor housing, or lack of shelter; others include: single- parent families, street children due to parental neglect or abuse, inability to send children to school, high school drop-out rates, mental derangement, prostitution, development of slum settlement in cities, increased male out-migration from rural to urban areas in search of menial jobs, restiveness of unemployed youths, increase in drug abuse, violent crimes, loss of self- esteem, powerlessness or inability to participate meaningfully in social and political life. The incidence and the depth of poverty over the past few decades in Nigeria continue to deteriorate. The Federal Government of Nigeria had in the past designed and implemented some poverty alleviation programmes which include the followings:- National Accelerated Food Production Programme in 1972; the Nigerian Agricultural and Co-operative Bank in 1973;

> the Operation Feed the Nation in 1976, to teach the rural farmers how to use modern farming tools.; the Green Revolution Programme in 1979, to reduce food importation and increase local food production; the Directorate of Food, Roads, and Rural Infrastructure (DFRRI) in 1986; the Family Support Programme and the Family Economic Advancement Programme in 1993; and theNational Poverty Eradication Programme (NAPEP) in 2001 to replace the previously failed Poverty Alleviation Programme.

The Nigeria Human Development Index (HDI) ranking for poverty deteriorated from dismal level of 142nd position of 174 countries in 1998 to 151st position by 2001 (UNDP, 2002). The rural areas are the worse hit by poverty. According to Federal Office of Statistics (FOS, 1999), it can be said that rural areas in Nigeria are synonymous with poverty (FOS). This situation requires urgent attention towards reducing poverty level among the rural populace. It is an obvious fact that the major source of livelihood of the poor people in the rural areas is mainly agriculture and hence boosting agricultural production would result in poverty reduction. The production of fluted pumpkin may be one of the means to tackle the problem of poverty among rural farmers in the country. This is because it is a source of income to its producers, high nutritional value to the consumers and it is of enormous industrial importance.

Fluted pumpkin (*TelfariaOccidentalisCucurbitaceae*) is the first in the indigenous vegetable crops priority rating of South-Eastern Nigeria, (Ayinde, et al., 2010). This is in accordance with the preference of farmers, researchers and extension agents. It is one of the most important vegetable in Nigeria referred to as "Ugu" in Igbo, "Ikobo" in Yoruba and "Umeehee" in Urhobo and Isoko languages (Akoroda 1990).

TelfariaOccidentalis is a leafy vegetable, and it is an important component of the traditional farming systems and daily diet of Nigerian, which is mainly grown for its high nutritive value, (Enabulele and Ilavbarhe, 2001). Consumers of fluted pumpkin have increased tremendously over the years; the reason for this increase and acceptance is that the seeds, shoots, leaves and stems are consumed as food by man and fodder for animals.

Fluted pumpkin is a perennial crop grown on well-drained soils, slightly shaded and mulched but not so soggy soils (Idowu, Alimi, Tijani&Okobi, 2007). However, in the study area, the crop is grown on poor soils as an annual during the rainy season and also during the dry season around rivers or water sources. It is grown alongside with crops such as cassava, melon, pepper and yam.

Fluted pumpkin is very important in the diet of children, men, women, nursing mothers as well as livestock due to its high nutritive value. Fluted pumpkin plays an important role not only as

the major source of vitamins in diets but also as a source of livelihood for the majority of farmers who grow and sell this vegetable. (Akoroda 1990).

Efficiency of resource use is a very fundamental strategy that leads to increase in productivity, according to research carried out by Kwananshie, Garba&Ajilimar, (1997). The study was conducted to isolate the factors that affect profitability and determine their effects on the production of fluted pumpkin in Okehi Local Government Area of Kogi State. Their finding was that fluted pumpkin production was profitable in the study area and that variables used such as farm size, family labour and quantity of seeds were significant at $p<0.05$ which implies that output could still be increased to some extent by increasing these significant variables.

Three types of efficiency are identified in the literature. These are technical efficiency, allocative efficiency and overall or economic efficiency, (Farrel, 1957; Olayide and Heady, 1982)

> Technical efficiency is the ability of a firm to produce a given level of output with minimum quantity of inputs under a given technology. Simply put, it is the most technically efficient way of combining different inputs for maximum production, policy formulation and decision making. Technical efficiency focuses on physical productivity which is characterized by the relationship between the observed output and some ideal potential output. The measurement of a firm`s specific efficiency is based upon deviation of the observed output from the best production frontier, (Kadiri, Eze, Orebiyi, and Onyeagocha, 2014)

> On the other hand, allocative efficiency is a measure of the degree of success in achieving the best combination of different inputs in producing a specific level of output considering the relative prices of these inputs.

> Economic efficiency is a product of technical and allocative efficiency (Olayide and Heady 1982). In other reasoning, the efficiency of a firm is its success in producing as large an amount of output as possible from given sets of inputs. Maximum efficiency of a firm is attained when it becomes impossible to reshuffle a given resource combination without decreasing the total output.

The dream and expectation of any farmer is to use little resources to get the maximum profit possible with the right and appropriate technology employed in the production process in which high profit can be realized. The agricultural farmer employs different techniques to the resources in the best proportion with the best technology known to him and he expects to get the highest yield possible (Ajibefun, 2002).

In a bid to help farmers increase productivity, the focus is usually on whether farmers are using better and improve technologies. It is however necessary to investigate whether these farmers are even making maximum use of what is available to them in terms of farm inputs (Fasasi, 2006). Farmers might use resources rationally but not at the economic optimal level. As the aim of every agro-business firm is to maximize profit while minimizing cost, it is pertinent to determine the efficiency of resource-use.

Several studies in Nigeria have been carried out to analyze resource-use efficiency as well as profitability of crops and more specifically vegetables.

Udoh&Akpan (2007) in their study estimated the efficiency of resource use among urban vegetable (*Talinumtriangulare*) farmers in AkwaIbom State, Nigeria; and reported that waterleaf farmers were inefficient in the use of these resources with land and manure being underutilized. In terms of profitability, Udoh&Akpan, (2007) reported that farmers made profit of ₦I76,590.35 per hectare.

Ala, (2013) examined profitability and resource use efficiency of yam production by women in Bosso Local Government Area of Niger State, Nigeria, using farm budgeting technique, multiple regression and MVP/MFC ratio. The result of his research work revealed that farmers obtained a net profit of ₦112,450.85/ha and the MVP/MFC ratio test revealed that farm size, quantity of fertilizer used and farm labour were underutilized by the farmers.

Similarly, Omonona et al. (2011) in their study on profitability and resource use efficiency among Ofada rice farmers in South West, Nigeria, adopted the marginal value product (MVP) approach and found that all identified resources were underutilized

More specifically, Ayinde, Akerele and Ojeniyi, (2007); Idowu.,Alimi, Tijani and Okobi, (2007), examined economic factors affecting the production of fluted pumpkin using a modified costs-returns approach and regression analysis. They reported that fluted pumpkin production was profitable under existing production systems with an average monthly net income of ₦6,205.90/ha on a mean farm size of 0.301 hectare. Cost of fertilizer and farm size were however underutilized.

Inefficiency in the use of available resources according to Gani and Omonona (2009), has hindered increased food production hence low income among the farmers across the nation.

Efficiency is very important to increase agricultural production. This is expanded and sustained by farmers through efficient use of resources. Liu and Zhuang (2000), argued that financial constraints affected technical efficiency because of the quantity of input used, the timing of input usage, which was affected by finance, and also influenced the farm output. It is pertinent to note that inspite of the existence of favourable tropical climate for its production in south western Nigeria, the scarcity and exorbitant price of the product necessitated an in-depth investigation into its profitability and production efficiency in the study area.

Kibaara, (2005) identified level of education, age of the household head and gender of the household head to be associated with technical efficiency. Kibaara (2005) also reported that credit, and off-farm income, reduce technical inefficiency.

Furthermore, Olayide and Heady (1982), opined that agricultural productivity is the index of the ratio of the value of total farm output to the value of the total inputs used in production. They went further to identify the main objectives of any society as the attainment of optimal high level of living standard with a given amount of effort as any increase in the productivity of resources employed in production amounts to progress.

Ajibefun (2002), observed that education and membership of farmers' associations were some of the most important factors increasing efficiency; educational level and farming experience have been reported to have a positive and significant impact on technical efficiency while extension contact has also been reported to have a positive and significant relationship with efficiency (Imoudu and Toluwase, 2005).

The resource use efficiency of fluted pumpkin production has been grossly inhibited by several technical problems which among many were:

• Lack of inputs, pests and disease infestation, & problem of storage facilities & land acquisition.

• Inadequate information about input and output prices, and poor road network respectively.

• Lack of credit facilities.

• The output which is the leaves has not been able to meet the demand for human food.

• The inability of farmers to combine resources efficiently with other factors affect real farm profit.

The general objective of this study, thus, was to determine the resource use efficiency of fluted pumpkin (*TelfariaOccidentalis*) production in Isoko South Local Government Area, Delta State, Nigeria.

The specific objectives of the study included to:

1. Describe the socio-economic characteristics of fluted pumpkin farmers in the study area;

2. Examine the resource use efficiency in fluted pumpkin production.

3. Ascertain the poverty status of the respondents in the study area.

4. Identify constraints encountered by fluted pumpkin farmers in the study area.

The findings of this study would be of immense significance to Vegetable Farmers Associations in Delta State, Agricultural Development Programme (ADP), Agricultural Research Institutes, Federal Ministry of Agriculture and Rural Development of Nigeria and other Agencies that are involved in production and policy formulation on resource-use efficiency of vegetable production, thereby making some relevant information available to agricultural planners and policy makers thatwouldsolve the problems encountered by farmers of fluted pumpkin, and increase their efficiency in the study area.

METHODOLOGY

The Area of Study

Delta State is an oil and agricultural producing state of Nigeria, situated in the region known as the South-South geo-political zone with a population of 4,698,391 (males 2,674,306; females; 2,024,085). (Federal Republic of Nigeria, 2007).The study was carried out in Isoko South Local Government Area, Delta State, which comprises of 11 communities and only four communities were purposively selected due to high population of fluted pumpkin farmers in those communities. These communities include; Emede, Uzere, Irri and Aviara. Isoko South Local Government Area is bounded in the north by Isoko North Local Government Area, West by Ughelli North Local Government, East and South by Ndokwa East and Bayelsa State

respectively. It has a land area of about 102km^2 with a population of about 227,692 made up of 114,391 males and 113,301 females based on the National Population Census,(2006).

Isoko South Local Government Area lies in the ecological zone of the rain forest. In Isoko South Local Government Area, there is no extreme weather condition, the annual mean rainfall and temperature is 1500mm/annum and 31^{0}C (87.8^{0}F) respectively. Rainfall seasonality is between June/July and September/October. The climate is suitable for the cultivation of arable crops (Delta Beckons, 2011).

Sampling Procedure

The study area, Isoko South Local Government Area has 11 communities namely, Oleh, Irri, Emede, Igbide, Aviara, Uzere, Enhwe, Olomoro, Umeh, Orie and Erowha. Only four communities were purposively selected due to high population of fluted pumpkin farmers in those communities. These communities include; Emede, Uzere, Irri and Aviara. Fifteen(15) farmers were then randomly selected from each community making a total of sixty (60) respondents. The study covered the year 2015 cropping season of fluted pumpkin production in the studied areas. Sixty (60) well-structured questionnaire were distributed to fluted pumpkin farmers and all questionnaire administered were completely retrieved.

Analytical Framework

Descriptive statistical tools such as mean, frequency distribution and percentages were used to analyze the socio-economic characteristics of fluted pumpkin farmers. Efficiency ratio analysis andPoverty Line Analysis were used to determine the resource use efficiency and poverty level of the farmers.

The explicit function of the model specification is stated as:

$$Y = f\left(X_1, X_2, X_3, X_4, X_5, \mu\right)$$

Where

Y = Value of the output of fluted pumpkin leaves produced (₦)

X_1 = farm size (Ha)

X_2 = labour (man days)

X_3 = quantity of seeds (Kg)

X_4 = quantity of fertilizer (kg)

X_5 = quantity of herbicides (litres)

μ = error term

Poverty Line Analysis: The World Bank (1999) poverty line was used to determine the poverty status of the respondents. Based on this line, people with per capita income of less than one dollar per day were classified as extremely poor, those with more than one dollar but less than two dollars per day were moderately poor and those that earned above two dollars per day were non- poor. Using the World Bank (2009) monetary standard of measurement of one dollar to one hundred and ninety nine naira (~~N199~~) equivalent as at December 2015 and converting to per capita annual income, the following groups were classified:

Per Capita annual income < N72,635.00 = extremely poor

Per Capita annual income >N72,635.00< N145,270.00 = moderately poor

Per Capita annual income> N145,270.00 = non-poor

Efficiency Ratio Analysis: TheEfficiency Ratio(MVP/MFC ratio) was used to test the resource use efficiency in fluted pumpkin production. According to Adesimi, (1982), Olayemi, (1998), Emokaro and Erhabor, (2006), a production input is efficiently utilized if the ratio of the VMP/input price equates to unity, a ratio less than unity indicates over-utilization of production inputs while a ratio greater than unity shows that resources are under-utilized.

$$r = \frac{MVP}{MFC}$$

Where r = Efficiency ratio

MVP   = Marginal Value Product

MFC = Marginal Factor Cost

Decision rule: If

r = 1, implies optimum resource utilization

r = >1, implies resource under utilization

r = <1, implies resource over utilization

RESULTS AND DISCUSSION

Table 3.1: Socio-economic Characteristics of the Respondents.   (N=60)

Socio-economic Characteristics	Variables	Frequency	Percentage (%)	Mean/Mode
Age (years)	<30	15	25.00	
	31-40	24	40.00	38.9 years
	41-60	19	31.70	
	>60	02	3.330	
Sex	Male	20	33.30	
	Female	40	66.70	Female
Educational level	No formal education	03	5.00	
	Primary education	10	16.70	
	Secondary education	12	20.00	
	Tertiary education	35	58.30	Tertiary
Marital status	Single	24	40.00	
	Married	36	60.00	Married
	Widower	-	-	
	Divorced	-	-	
Farming Experience (years)	<1	05	8.33	
	1>5	32	53.33	4.88 years
	6>10	19	31.70	
	>10	04	6.67	
Cropping pattern	Sole	32	53.30	Sole
	Mixed	28	46.70	
Farm size (Ha)	<0.01	14	23.30	
	0.01>0.03	39	65.00	2.5 plot
	0.03>0.04	06	10.00	
	0.04>0.05	01	1.67	
Household size (persons)	1 – 4	35	58.30	
	5 - 8	24	40.00	4.00
	9 -12	-	-	
	>12	01	1.67	
Membership of co-operative society	Yes	24	40.00	Non members
	No	36	60.00	
Income Per Annum(₦)	50,000> 140,000	12	20.00	
	140,000> 230,000	42	70.00	176,000
	230,000> 320,000	06	10.00	
	320,000> 410,000	00	00.00	

Source: *FieldSurvey Data*, 2015.

Table 3.1. shows that majority (40%) of fluted pumpkin farmers in the study area were within the age group of 31> 40 years with mean value of 38.9 years; 66.70% of the farmers were females, 58.30% attended tertiary institutions, 60% of the respondents were married, 53.33% of the farmers had 1 - 5 years farming experience with mean value of 4.88 years. Majority (53.3%) of the farmerspractised sole cropping pattern, 65% of them had 0.01>0.03 ha. of farm size, 58.3% had household size of 1>4 persons, and 60% of the farmers did not belong to any

co-operative society. Majority (70.00%) of the farmers had ₦140,000>₦230,000 annual income in the year 2015, 20.00% had income range of N50,000>N140,000 while 10.00% had income range of N230,00>N320,000 with mean annual income of ₦176,000.

Table 3.2: Resource-use Efficiency Analysis of Variable Inputs.

S/N	Variable	Co-efficient	MFC	MVP	MVP/MFC	Inference
1.	Farm size (D_1)	0.564	660	974.84	1.477	Under-utilized
2.	Family Labour (D_2)	0.564	660	450.78	0.683	Over-utilized
3.	Quantity of seed (D_3)	0.041	800	133.6	0.167	Over-utilized
4.	Fertilizer (kg) (D_4)	-0.071	871.43	5304.39	6.087	Under-utilized
5.	Herbicides (D_5)	0.005	637.5	69.488	0.109	Over-utilized

Source: Computed from Field Survey Data, 2015.

Table 3.2 shows that 2 out of the 5 inputs used were under-utilized while three of them were over-utilized. The resource- use efficiency of farm size (land) (D_1) = 1.477 and the quantity of fertilizer used (D_4)=6.087 were greater than 1 which implied that these resources were under-utilized while resource-use efficiency of family labour (D_2)=0.683, quantity of seeds used (D_3) = 0.167 and quantity of herbicide used (D_5)= 0.109 were less than one, which indicated that these resources were over-utilized.

According to Onyenweaku (1994), absolute or maximum allocative efficiency was achieved with respect to a particular resource if MVP/MFC =1; a resource is over utilized if MVP/MFC < 1 and under-utilized if MVP/MFC >1. Thus, to take risk, make profit and attain resource use efficiency, farm size (land) and quantity of fertilizer used should be increased by 15% and 61% respectively. On the other hand, inputs such as familylabour, quantity of seeds used and quantity of herbicide used should be reduced by 68%, 17% and 11% respectively. These results are in consonance with a prior expectation and close to those reported by Kadiri, Eze, Orebiyi and Onyeagocha (2014), that allocative efficiency of inputs of rice producers in Niger Delta Region of Nigeria did not attain optimal allocative efficiency of inputs.

Table 3.3: Poverty Status of Respondents in the Study Area

Poverty Status	Frequency	Percentage (%)
Extremely Poor	12	20
Moderately Poor	42	70
Non Poor	06	10
Total	60	100

The results of the study presented in table 3.3 indicate that 20% of the studied population were within the extremely poor group while 70% were within the moderately poor group and 10%

fell withinthe group of non-poor. This findings is almost in agreement with the findings of Ahmadu and Alufohai (2011) who reported that the average per capita annual income of yam farmers in Ika Area of Delta State, Nigeria, was N76,982.12 with majority (68%) of them having a per capita annual income above N59,000.00.

Table 4.0: Constraints Encountered by Farmers of Fluted Pumpkin Production.

CONSTRAINTS	FREQUENCY	PERCENTAGE (%)
Lack of access to credit facilities	49	81.67
High cost of transportation	45	75.00
Lack of storage facilities	38	63.33
Scarcity of viable seeds.	34	56.67
Seasonality in Production	29	48.33
Problem of land acquisition	27	45.00
Price fluctuation	25	41.67
Pest and disease infestation	22	36.67

Major constraints (Percentage$\geq$ 50.00%)

Based on the perception of the respondents (Table 4.0), 4 out of the 8 constraints under consideration were major (percentage>50.00%). The major constraints were lack of access to credit facilities (81.67%),high cost of transportation (75%), lack of storage facilities (63.33%), and scarcity of viable seeds (56.67%); The finding of lack of access to credit facilities as a major constraint is in consonant with the results of Okon and Enete (2009) who studied the resource use efficiency among urban vegetable farmers in AkwaIbom State, Nigeria. It is also corroborated by Enete and Achike who noted that if urban agriculture is to act as one of the options for tackling urban food insecurity, the urban poor (who are most often the urban farmers should be sufficiently empowered financially not only to apply purchased inputs in the right quantities but also to adopt innovations in their farming business. The minor constraints were seasonality in production (48.33%), problem of land acquisition (45.00%), price fluctuation (41.67%), and pest and disease infestation (36.67%).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings of the study revealed a moderate level of resource-use inefficiency and most of the farmers were within the group of moderately poor; thus, therefore, there is the need for

financial institutions in the area to make credit facilities available and accessible to the farmers so that they can afford to increase the efficiency of resource use in fluted pumpkin production in the study area which would be aid to poverty alleviation. There is also the need to educate the farmers to increase the acreage of land cultivated, increase the man-days of familylabour used, obtain viable seeds and also apply the right quantities of herbicides and fertilizers in order to boost production and profitability of the enterprise.

Recommendations

Within the context of the findings in this study, the following recommendations are made and they are aimed at improving resource-use efficiency of fluted pumpkin production in Delta State.

- Farmers should be encouraged to form cooperative societies or join existing ones formed by Government and Non-Governmental Organizations to enhance their access to credit facilities and enjoy economics of scale in procuring farm inputs as well as selling their farm produce in bulk. Farmers also should be educated to diversify their farming enterprises in order to improve their living standard if not already in existence yet.

- To improve on production of fluted pumpkin, there is the need for the government to intervene administratively to reduce the exorbitant price of fuel with its resultant hike in the cost of transportation. Establishment of efficient transport system at reduced and subsidized rate is another possible solution to minimize transportation constraint.

- Furthermore, programmes and policies that would supply improved variety of seeds and seedlings, provide modern storage facilities and training of farmers on best way to use the available storage facilities that would better the socio-economic status of farmers should be designed and implemented.

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