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Effects of Climate Change on Fluted Pumpkin Production and Adaptation Measures Used Among Farmers in Rivers State

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Abstract

The importance of fluted pumpkin crop in rural household economy cannot be over emphasized. Farmers in the South South Nigeria depend greatly on fluted pumpkin for its many uses. The production however is beset with a myriad of constraints of which climate change is one of the most outstanding. The study assessed the effects of climate change and adaptation measures used by fluted pumpkin farmers in Ikwerre Local Government Area(LGA) of Rivers State, Southsouth Nigeria. Multi-stage sampling technique was used to select respondents for the study. Out of the twelve communities that make up Ikwerre LGA, six communities were randomly chosen from which one hundred and eighty fluted pumpkin farmers were proportionately selected. Interview schedule and focus group discussion were used to elicit in depth information from respondents. Data were analyzed using percentage, frequency count and mean. Tables and charts were used in presentation of data. The result of the study showed that 51 percent of the respondents were female, majority were married (77 percent) and were full time farmers (79 percent). Relatively large proportion had no formal education (42 percent) and indicated both consumption and sale (79 percent) as the major aim of production. The respondents perceived that unpredictable climate condition, changes in rainfall pattern, changes in rainfall distribution, reduced yield of fluted pumpkin and reduction of family income were the major effects of climate change on fluted pumpkin production. A combination of fluted pumpkin production with other income generating activities was shown to be the most widely used adaptation strategy by respondents. Based on the results of the study it was recommended that improved extension services that can provide the needed farming inputs (fluted pumpkin seedlings, fertilizers e.t.c) as well as useful and relevant information on climate change and adaptation strategies should be made available to the people.

Key words: Climate change, effects, fluted pumpkin production, adaptation measures

Introduction

Some traditional crops are central to the culture and survival of a community of people. And any improvement in the production of such crops will surely enhance the standard of living of such people. Fluted pumpkin (*Telfairia occidentalis*) belongs to the family Cucurbitaceae and it is a crop of commercial importance grown across the low land humid tropics of West Africa with Nigeria, Ghana and Sierra Leone being the major producers (Nkang et.al., 2003). The fluted pumpkin is used as a leafy green vegetable and grows in several African countries. Its name, fluted, refers to the shape of the female flower. It is a tropical vine grown mainly for the leaves which constitute an important component of the diet of many people in West African countries and for its edible seed, (Fagbemi et.al., 2005). The young shoots and leaves of the plant are the main parts used in soup especially in southern and eastern Nigeria. Common names for the plant include fluted gourd, fluted pumpkin, iroko and *ugu*. The plant is dioecious, perennial and tolerates drought to a reasonable extent. It is usually grown trellised. It needs a well drained soil, some water and some sun. Fluted pumpkin (*Telfairia Occidentalis* Hoof) is a crop of commercial and nutritional importance to the people of Rivers State. Nutritionally, it is grown mainly for the leaves and its edible seed. Commercially, production of fluted pumpkin serves as a major source of income to households in Rivers state.

Over the past 100 years, the earth's average surface temperature has risen by about 0.74°C (Direct Gov., 2010). Most researchers agree that global temperatures will rise further (by how much depends on future emissions of green house gases) and if the temperature rise is high, changes are likely to be so extreme that it will be difficult to cope with them (Ozor, 2009 and Nest, 2011;). Eboh (2009) noted that countries in Sub-Saharan Africa, including Nigeria are likely to suffer the most because of their geographical location, low incomes, and low institutional capacity, as well as their greater reliance on climate-sensitive renewable natural resources sectors like agriculture. In Nigeria, agricultural production is largely non-mechanized, therefore weather/climate assumes significance in every stage of production. Farmers depend on climate signals as a major determinant of their farming activities. This makes climate very significant in the production of crops. Unfortunately, climatic conditions are no longer predictable as they used to be in the past. Farmers have encountered a series of loses as a result of change in climate (Apata et.al. 2009; Ozor, 2009 and IPCC, 2007). Fluted pumpkin though is known to tolerate drought to a reasonable extent is adversely affected by the variations in climate. All stages of production of fluted pumpkin is affected by the variation in climate. Unfortunately, Astrologists have it that variation in climate may not be avoided entirely because of inability of countries to stop the emission of green house gases. Therefore the basic way to mitigate it is by building up resilience or adaptation strategies to help farmers cope with the effect of this change. Bearing the commercial and nutrition importance of fluted pumpkin in the study area, it becomes very imperative to inquire on the

extent and aspect these variabilities in climate affect the production of fluted pumpkin as well as identify the viable adaptation strategies used by these fluted pumpkin farmers. This will surely help them to cope with the vagaries of climate thereby enhancing their production activities. It is against this background that this paper assessed the perceived effects of climate change on fluted pumpkin production in Rivers state and the adaptation measures used by the farmers. Specifically, the paper determined the fluted pumpkin farmer's perception of climate change and identified climate change adaptation strategies used.

Methodology

The study was conducted in Ikwerre Local Government Area (LGA) of Rivers State in the South South zone of Nigeria. Ikwerre LGA comprises of twelve communities namely; Isiokpo, Aluu, Apani, Elele, Igwuruta, Ipo, Omademe, Omagwa, Omarelu, Omuanwa, Ozuaha, and Ubima. The area has tropical climate, with relatively high density of rainfall making it suitable for fluted pumpkin production. The area has a large expanse of thick rain forest, adequate availability of arable land for cultivation purposes, innumerable good virgin forest which accounts for their excellence in agricultural produce and returns.

Multi-stage sampling procedure was used for this study. First, six communities were randomly selected from the twelve communities that make up Ikwerre L.G.A. Secondly, one hundred and eighty fluted pumpkin farmers were proportionately selected from the six communities. Interview schedule and focused group discussion was used to elicit information from the respondents. Data obtained was analyzed using simple statistical tools such as percentages, frequency counts and mean. Tables were used in presentation of data.

Result and Discussion

Socio-economic characteristics of respondents

Table 1 show that 51% of the respondents were female while 49% were male. This implies that females were relatively more involved in fluted pumpkin production than males; this is not a surprise as vegetable production in most part of Nigeria is done mostly by women. Also it was shown that majority of the fluted pumpkin producers were married (77%), while 10% are still single, 9 percent are separated, 3% were widows and the remaining 1% widower. This implies that the greater percentage of the fluted pumpkin farmers are married.

The percentage distribution of respondents by household size shows that 44% maintained a household of 1-5 persons, 42% had household of 6-10 persons, 11% had 11-15 persons, while only 2% maintained household size of 16-20 persons. This implies that majority of the producers maintain small household size. Also 79% of the respondents were found to be full time farmers. This agrees with the findings of Ifeanyi-obi et.al., (2011); Ekong (2010); Ozor, (2010); Mgbada, (2010);

Akpabio, (2006) , which noted that majority of rural dwellers has farming as a major livelihood activity.

The percentage distribution of respondents by other occupation engaged in, shows that out of a total number of 180 farmers interviewed, 62% indicated trading to be other occupation engaged in, 32% indicated public servant, 1% indicated artisan while the remaining 4% indicated others like trap setting and fishing. This implies that other than fluted pumpkin production majority of the respondents engage in trading.

It was also shown that respondent's major aim of fluted pumpkin production is for both consumption and sale (79%) with only 11% producing for sales alone and 10% for consumption alone. The mean years of the total years spent in farming (farming experience) by the respondents was found to be 11 years while the farm size was found to be within an average size of 8 plots. Table 1 further shows the distribution of respondents by level of education attained. It was revealed that 42% of the respondents have no formal education while the remaining 58% of the respondents are educated at different level and this implies that, farmers in the study area are literate enough to adopt new technologies easily since they can read and write.

TABLE 1
Socio-economic Characteristics of Respondents

Sex	Frequency	Percentage
Male	88	48.9%
Female	92	51.1%
Total	180	100.0
Marital status		
Single	18	10.0%
Married	138	76.7%
Separated	16	8.9%
Others (widow)	6	3.3%
Widower	2	1.1%
Total	180	100.0
Household Size		
1 – 5	80	44.4%
6-10	76	42.2%
11- 15	20	11.1%
16-20	4	2.2%
Total	180	100.0

Sex	Frequency	Percentage
Male	88	48.9%
Female	92	51.1%
Are you a full time farmer		
Yes	142	78.9%
No	38	21.1%
Total	180	100.0
Occupations		
Artisan	2	1.1%
Trading	112	62.2%
Public Servant	58	32.2%
Others	8	4.4%
Total	180	100.0
Aim of Production		
Consumption and sale	142	79%
Sales	20	11%
Consumption	18	10%
Level of education attained		
No formal education	76	42.22%
Primary education	40	22.22%
Secondary education	29	15.56%
OND and equivalent	23	13.33%
Tertiary education(HND,BA,BSc and above)	12	6.67%
Total	180	100.0

Source: Field Work, 2011

Other crops Cultivated by Respondents

Table 2 show that other crops cultivated by fluted pumpkin farmers include; maize which has a frequency of 48, yam 40, pepper 26, okra 40, cassava 38, 2lantain 2, pineapple 1, cucumber 4, melon 12 and cocoyam 1. This implies that maize is a major contributor to the income of the producers in Ikwerre Local Government Area since many of the respondents indicated that they cultivate it.

TABLE 2
Other crops cultivated by fluted pumpkin farmers

Crops cultivated	Maize	Yam	Pepper	Okra	Cassava	Plantain	Pineapple	Cucumber	Melon	cocoyam
Frequency	48	40	26	40	38	2	2	4	12	2

Source: Field work 2011

*Multiple responses

Effects of climate change on fluted pumpkin production.

From Table 3, the results show that reduced yield of fluted pumpkin (3.27) and reduction of family income (3.06) were the major effects of climate change on fluted pumpkin production. Also, drying up of fluted pumpkin seedling after germination (2.93), pest and disease incidence (2.83), ineffectiveness of agricultural chemical (2.80), low maturity of fluted pumpkin pod (2.96), discoloration of fluted pumpkin leaves (2.99), increase cost of fluted pumpkin pod (2.90) and loss of land use (2.87) were also shown to be significant effects of climate change on fluted pumpkin. Respondents disagreed with the statement that stunted growth (2.38) and weed infestation (2.20) are significant effect of climate.

TABLE 3
Effects of Climate Change on Fluted Pumpkin Production

S/N	Effects of climate change	Mean
1.	Reduced yield of fluted pumpkin	3.27
2.	Reduction of family income	3.06
3.	Stunted growth of fluted pumpkin	2.38
4.	Drying up of fluted pumpkin seedling after germination	2.93
5.	Pest and diseases incidence	2.83
6.	Ineffectiveness of agricultural chemical	2.80
7.	Low maturity of fluted pumpkin pod	2.96
8.	Discoloration of fluted pumpkin leaves	2.99
9.	Increase cost of fluted pumpkin pod	2.90
10.	Loss of land use	2.87
11.	Weed infestation	2.20

Mean Score ≥ 2.50 is significant

Source: Field work, 2011

Adaptation strategies used by fluted pumpkin farmers

Table 4 show the adaptation strategies used by the fluted pumpkin farmers. The combination of fluted pumpkin production and other income generating activities (3.18) was shown to be the most widely used adaptation strategy by respondents. Delayed planting time(2.89), early harvesting(2.90), changing of planting location(3.03), improved yield by using fertilizer(2.71), Herbicides application (2.66), engage in irrigation practice(2.63), use of organic manure(2.87), mulching to reduce water loss(2.77), use of relative shade with trees on farms(2.81), mixed cropping(3.07), switching to other source of income(3.18), increase land cultivated(2.70), weather forecast technology(2.66) were also shown to be significant adaptation measures used by fluted pumpkin producers while drought tolerant species(2.42) and information from extension agents(2.22) were identified as non significant adaptation measures used by fluted pumpkin producers.

TABLE 4
Adaptation strategies used by fluted pumpkin farmers

S/N	Adaptation strategies	Mean
1.	Delayed planting time	2.89
2.	Early harvest	2.90
3.	Change planting location	3.03
4.	Improved yield by using fertilizer	2.71
5.	Herbicides application	2.66
6.	Irrigation practice	2.63
7.	Drought tolerant species	2.42
8.	Use of organic manure	2.87
9.	Mulching to reduce water loss	2.77
10.	Relative shade with trees on farms	2.81
11.	Mixed cropping	3.07
12.	Switching to other source of income	3.18
13.	Increase land cultivated	2.70
14.	Weather forecast technology	2.66
15.	Information from extension agents	2.22

Mean Score ≥ 2.50 is significant

Source: Field work, 2011

Conclusion and recommendation

The result of this study show that Fluted pumpkin farmers in Ikwerre Local Government Area are not left out in the threat posed by the change in climate. The effects of this change in climate as shown in the findings of the study are already militating against the production of fluted pumpkin. Based on that, the following recommendations were given to help the farmers tackle this canker worm that is gradually eating up their source of livelihood. The Government through the ADP should make input (fluted pumpkin seedlings, fertilizer as well as useful and relevant information) procurement more accessible to fluted pumpkin farmers. Also, farmers should be encouraged to form co-operative societies that will help them pool resources together to fight more vigorously the challenges/threats of climate change. Lastly, other viable income generating activities engaged in by farmers should be indentified and proper training given to farmers to enable them maximize the output from those activities.

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