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Effects of climate change on Telfairia occidentalis (Fluted pumpkin) Production in Ahoada East Local Government Area, Rivers State

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Abstract

The study assessed the effects of climate change and adaptation measures used by Telfairia farmers in Ahoada – East L.G.A of Rivers State, Nigeria. Multi-stage sampling technique was used to select respondents for the study. Data were analyzed using simple descriptive statistics (percentage, frequency and mean). The result of the study showed that 63.3 percent of the respondents were female, majority were married (66.7 percent). A large proportion of the respondents had formal education (60 percent). Reduced yield of Telfairia occidentalis and reduction of family income were among the major effects of climate change on Telfairia occidentalis production. Diversifications (farm and non – farm) and mixed cropping were among the most widely used adaptation strategies by respondents. Therefore, it was recommended that relevant agencies (public and private) should make inputs (Telfairia occidentalis seedlings and pod, fertilizer as well as useful and relevant information) accessible to Telfairia occidentalis farmers, 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, farmers are encouraged to diversify and go into other viable income generating activities (farm and non – farm) to cushion the effects of climate change, extension service should be strengthened through organizing adult education programmes for farmers to expose them to climate change strategies, programmes should be put in place to attract young people into farming, especially young school leavers and young graduates, affordable climate change adaptation technologies should be appropriated and developed for resource-poor farmers to adopt.

Key words: Climate change, effects, Telfairia occidentalis production, Adaptation strategies

INTRODUCTION

Climate change and agriculture are correlated processes, both of which take place on global scale. Climate change has become one of the most significant challenges militating against food and nutrition security in Nigeria and the sustainable development goals. It has been described by authors in various ways

according to their understanding and perception of the phenomenon. According to Intergovernmental Panel on Climate Change (IPCC) (2007), climate change is defined as statistically significant variations that persist for an extended period typically decades or longer. Ozor (2009), defined climate change as change in climate over time, whether due to natural variability or as a result of human activity and is widely recognized as the most serious environmental threat facing our planet today. On the other hand, the United Nations Framework Convention on Climate Change (UNFCCC), defines climate change as a change of climate which is attributed directly or indirectly to human activity, that alters the composition of the global atmosphere and which in addition to natural climate variability observed over comparable time periods.

Climate change therefore can be precisely defined as all changes in climate due to human activities or natural events. IPCC (2007) concluded that Africa is one of the most vulnerable continents to climate change owing to "multiple stresses and low adaptive capacity". In Nigeria, just as in many African countries, climate is an important factor in agricultural production because our agriculture is still rain fed. Unfortunately, the climate is no longer what it is used to be. Farmers have encountered losses following the signals of weather in their agricultural activity. Also the low infrastructural capacity of the farmers contributes to their high dependency on rain fed agriculture. Bearing in mind the contributions of the agricultural sector to the economy and wellbeing of the citizenry, government as well as different agencies has put in reasonable effort in combating climate change and its menace. The poor result gotten from all these efforts is a vivid indication that the effort of the government and other agencies is yet to be adequate. Studies have indicated that the effects of this climate change on African agriculture are mainly negative (Adeniyi, 2013; Nest, 2011 and Onyeneke and Madukwe, 2010). Several adverse effects of climate change in Nigeria at large and Rivers State in particular have been identified by researchers which includes; flooding, off-season rains, drying up of lakes, over 100,000 farming families moving southwards as a result of the

desertification, increasing incidence of disease, declining agricultural productivity, and rising number of heat waves, changes in the frequency and intensity of droughts, water shortages, worsening soil conditions, disease and pest outbreaks on crops and livestock, rise in sea level due to melting of ice caps; changes in dates of onset and end of the rainy season; reduced rainfall amounts in some areas and increased rainfall amounts in others, increase in intensity of atmospheric disturbances such as thunderstorms and line squalls (Orebiyi, *et al*., 2012; Ifeanyi – Obi, *et al*., 2013 and Ogbo, *et al*., 2013).

Some crops are central to the culture and survival of Ahoada people. Telfairia occidentalis (Fluted pumpkin) is one of them. ***Telfairia occidentalis*** is a tropical vine grown in West Africa as a leafy vegetable and for its edible seeds. Common names for the plant include **fluted gourd**, **fluted pumpkin**, **ugu** (in the Igbo language), and **ikong-ubong** (in the Efik and Ibibio languages). *T. occidentalis* is a member of the Cucurbitaceae family and is indigenous to southern Nigeria. The fluted gourd grows in many parts of Nigeria, but is mainly cultivated in south east and south south Nigeria. It is used primarily in soups and herbal medicine. Telfairia occidentalis is a rich source of vitamins and minerals, carbohydrate, salts, protein and fat and contribute to a well – balanced diet of many people and for its edible seeds (Fagbemi, *et. al*., 2005). They are the best resources for overcoming micronutrient deficiencies and provide smallholder farmers with much higher income and more jobs per hectare than staple crops. Any improvement in the production of fluted gourd will surely enhance the standard of living of people.

Over the past 100 years, the earth's average surface temperature has risen by about 0.74^0C (Direct Gov., 2010). Most researchers agree that global temperatures will rise further (by how much depends on future emissions of greenhouse 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). Telfairia occidentalis though is known to tolerate drought to a reasonable extent is adversely affected by the variations in climate. All stages of production of fluted gourd are 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 greenhouse 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 Telfairia occidentalis in the study area, it becomes very imperative to inquire on the extent and aspect these variability in climate affect the production of fluted pumpkin as well as identify the viable adaptation strategies used by these 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 study assessed the perceived effects of climate change on Telfairia occidentalis (fluted gourd) production and farmers' adaptation measures in Ahoada East Local Government Area, Rivers State.

METHODOLOGY

The study was carried out in Ahoada East local government area of Rivers State, with headquarters in Ahoada town. Ahoada East Local Government Area covers an area of 314km^2. The Local Government Area is bounded to the north by Ogba/Egbema/Ndoni Local Government Area, to the east by Emohua Local Government Area, to the south by

Abua/Odual Local Government Area, and to the west by Ahoada West Local Government Area.

The significant occupation of the people of Ahoada East is farming. There are 3 clans in Ahoada - East (Akoh, Upata and Igbuduya). In Ahoada East L.G.A there are 28 Communities, Akoh clan is made up of 8 communities, Upata clan consist of 10 communities and Igbuduya has 10 communities. Two communities were randomly selected from each of the clans, giving rise to a total of 6 communities. A random sampling technique was employed to select 10 farmers each from the selected communities. This is to ensure an equal number of respondents from each of the selected communities. This gave rise to 60 farmers used in this study.

Data for this study were collected from fluted gourd farmers to determine the effects of climate change and the mitigation measures adopted by farmers. A well structured questionnaire was used to collect primary data. All the fluted gourd farmer respondents were administered structured questionnaire relating to their socio-economic characteristics, effects of climate change on fluted gourd production and mitigation strategies adopted.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of Telfairia occidentalis farmers

Table 1 indicates that 63.3% of the respondents were female while 36.7% were male. This implies that females were relatively more involved in fluted gourd production than males; this is not a surprise as vegetable production in most part of Nigeria is done mostly by women. This finding is in line with Ifeanyi – obi, Asiabaka, Matthews – Njoku, Nnadi *et al (2012).* Also it was shown that majority of the fluted pumpkin producers were married (66.7%). This implies that the greater percentages of the fluted pumpkin farmers are married.

The percentage distribution of respondents by household size shows that 50% maintained a household of 1-5 persons, 33.3% had household of 6-10 persons, 11.7% had 11-15 persons, while only 5% maintained household size of 16-20 persons. The average household size is six (6) persons. This implies that majority of the producers maintain small household size.

The table further shows the distribution of respondents by level of education attained. It was revealed that 40% of the respondents have no formal education while the remaining 60% 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. Experience is very important in every enterprise, especially in smallholder farming. Table 1 shows that majority of the respondents (70%) have over 10 years of experience. This indicates that they were well experienced because the more the years, the more the experience a person acquires in a given activity. With this years of experience, the farmers would be able to use indigenous and agronomic means to cushion the effects of climate change.

Table 1: Socio – economic characteristics of Telfairia occidentalis farmers

Sex	**Frequency**	**Percentage**
Male	22	36.7%
Female	39	63.3%
Total	**60**	**100.0**
Marital Status		
Single	12	20.0%
Married	40	66.7%
Separated	5	8.3%
Widow (er)	3	3.0%
Total	**60**	100.0
Household Size		
1 – 5	30	50.0%
6-10	20	33.3%
11- 15	7	11.7%
16-20	3	5.0
Total	**60**	**100.0**
Level of Education		

No formal education	24	40.0%
Primary education	15	25.0%
Secondary education	11	18.3%
Tertiary education	10	16.7%
Total	**60**	**100.0**
Farming Experience (years)		
1-5	**7**	**11.7**
6-10	**11**	**18.3**
11-15	**22**	**36.7**
15-above	**20**	**33.3**
Total	**60**	**100**

Source: Field operation, 2018

Other crops cultivated by Telfairia Occidentalis farmers in the study area.

Table 2 shows the other crops cultivated by Telfairia occidentalis farmers include. These crops are maize which has a frequency of 60, cassava with a frequency of 60, yam 14, pepper 54, okra 56, Plantain 45, melon 44 and cocoyam 26. This implies that maize and cassava are the major alternative sources of income to the Telfairia occidentalis farmers in Ahoada – East Local Government Area since many of the respondents indicated that they cultivate them.

Table 2: **Other crops cultivated by cassava farmers in the study area.**

Crops cultivated	**Frequency**

Maize	60	
Yam		14
Cassava		60
Okra		56
Plantain		45
Cocoyam		26
Pepper		54
Melon		44

Source: Field operation, 2016
Multiple responses recorded

Effects of climate change on Telfairia occidentalis production

Table 3 shows that reduced yield of fluted pumpkin (3.30) and reduction of family income (3.25) were the major effects of climate change on Telfairia occidentalis production. Also, drying up of Telfairia occidentalis seedling after germination (2.95), pest and disease incidence (3.07), ineffectiveness of agricultural chemical (2.97), low maturity of Telfairia occidentalis gourd pod (2.99), discoloration of Telfairia occidentalis leaves (3.05), increase cost of Telfairia occidentalis pod (2.98) and loss of farm land due to flood and erosion (2.95) were also shown to be significant effects of climate change on Telfairia occidentalis. Respondents agreed that stunted growth (3.18) and weed infestation (2.70) are significant effect of climate.

Table 3: Effects of climate change on Telfairia occidentalis production

S/N	Effects of climate change	Mean
1	Reduced yield of Telfairia occidentalis	3.30
2	Reduction of family income	3.25
3	Stunted growth of Telfairia occidentalis	3.18
4	Drying up of T. occidentalis seedling after germination	2.95

5	Pest and diseases incidence	3.07
6	Ineffectiveness of agricultural chemical	2.97
7	Low maturity of Telfairia occidentalis gourd	2.99
8	Discoloration of Telfairia occidentalis leaves	3.05
9	Increase cost of Telfairia occidentalis gourd	2.98
10	Loss of farm land due flood and erosion	2.95
11	Weed infestation	2.70

Mean Score ≥ 2.50 is significant **Source:** Field operation, 2018

Adaptation strategies used by Telfairia occidentalis farmers

Table 4 shows the adaptation strategies used by the Telfairia occidentalis farmers in Ahoada East local government area. The table shows that diversification to other sources of income (farm and non- farm activities) (3.61) and mixed cropping (3.58) are the most adaptive strategies adopted by Telfairia occidentalis farmers in Ahoada East local government. Other significant adaptive strategies adopted by Telfairia occidentalis farmers in the study area are late planting (2.76), harvesting early (2.87), changing of planting location (3.21), improved yield by using fertilizer (283), Herbicides application (2.72), engage in irrigation practice (2.51), use of organic manure (2.75), mulching to reduce water loss (2.69), use of relative shade with trees on farms (2.87), increase land cultivated (2.64), weather forecast technology (2.54), drought tolerant species (2.62) and information from extension agents (2.50).

Table 4: Adaptation strategies used by Telfairia occidentalis farmers

S/N	Adaptation strategies used by Telfairia occidentalis farmers	Mean
1	Late planting	2.76
2	Harvesting early	2.87
3	Change planting location	3.21
4	Improved yield by using fertilizer	2.83
5	Herbicides application	2.72
6	Irrigation practice	2.51
7	Drought tolerant species	2.62
8	Use of organic manure	2.75

9	Mulching to reduce water loss	2.69
10	Relative shade with trees on farms	2.78
11	Mixed cropping	3.58
12	Diversify to other sources of income (farm and non - farm)	3.61
13	Increase land cultivated	2.64
14	Weather forecast technology	2.54
15	Information from extension agents	2.50

Mean Score ≥ 2.50 is significant **Source:** Field Work, 2018

CONCLUSION AND RECOMMENDATION

There is no doubt that the climate is changing and as well exerting some negative effects on the environment and man's activities. Telfairia occidentalis production due to its dependence on climate variables and low infrastructural and technological development is significantly affected by this change. This study concludes that farmers in the Ahoada Local Government Area of Rivers State are already adapting to the change in climate.

To increase the farmers' resilience, the following recommendations are made to help the farmers tackle this menace that is slowly eating up their means of livelihood.

i. Relevant agencies (public and private) should make inputs (Telfairia occidentalis seedlings and pod, fertilizer as well as useful and relevant information) accessible to Telfairia occidentalis farmers.

ii. Since majority of the farmers are not educated, efforts should be geared towards educating the farmers, increasing agricultural extension activities in the study area.

iii. Telfairia occidentalis farmers should be encouraged to also go into other viable income generating agricultural activities to cushion the effects of climate change on their livelihood.

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