Scientific Journal Warsaw University of Life Sciences – SGGW
Problems of World Agriculture volume 23(XXXVIII), number 3, 2023: 61-73
DOI: 10.22630/PRS.2023.23.3.12

Emeka Osuji[1]✉, Christiana Igberi[2], Emmanuel Osang[3], Akunna Tim-Ashama[4], Esther Nwachukwu[5]
[1,2,3] Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State, Nigeria
[4] Alvan Ikoku Federal College of Education, Owerri, Imo State, Nigeria
[5] Federal University of Technology, Owerri, Imo State, Nigeria

Climate Change and Sweet Potato Production; Empirical Insights from Ebonyi State, Nigeria

Abstract. Climate change poses significant challenges to agriculture and land productivity particularly in regions heavily dependent on rain-fed agriculture like Ebonyi State, Nigeria. This study analyzed the effects of climate change on sweet potato production in Nigeria. Multi-stage sampling procedure was used to select 301 respondents. The drafted questionnaire was used for data collection following the specific objectives of study. Descriptive statistics, land productivity model, and multiple regression model were used for the data analysis. Results revealed that the majority of respondents (64.1%) were males, married (73.1%), young (42.2%), experienced (55.5%) and relatively educated (49.8%) with household and farm sizes of 7 and 1.8 hectares. The majority of the farmers (41.5%) were aware of changes in climate. Farm sizes of 1.1-2.0 hectares produced the highest land productivity (1769.831 hectares) in the state from about 51.5% of the farmers. Rising temperature, rainfall, and number of rainy days, influenced sweet potato production negatively; while sunshine hours and relative humidity had significant positive influences. Poor access to extension and services, land fragmentation, capital, inadequate information concerning climate change, and high cost of input resources constrained potato cultivation. The study recommends farmers to practice climate smart agricultural techniques and to seek early climate change information to mitigate negative effects of changing climate on sweet potato production.

Keywords: temperature, rainfall, sunshine, relative humidity, multi-stage, land productivity

JEL Classification: Q12, Q18

Introduction

Despite being historically farmed, sweet potato is gradually becoming an important commercial crop among Africa's rural poor. The crop is currently and widely farmed as a significant staple food in several African nations, including Gambia, Ghana, and Nigeria, where it is grown by peasant and small-holder farmers (Abdurahman et al., 2017). Globally, about 133 million tons is produced annually, making sweet potato (*Ipomoea batatas [L.] Lam*) one of the world's most significant, adaptable, and underutilized food crops (Akande et

[1] Department of Agriculture, Alex Ekwueme Federal University Ndufu Alike Ebonyi State, Nigeria, e-mail: osujiemeka2@yahoo.com; https://orcid.org/0000-0001-8605-834X; Corresponding author
[2] Department of Agriculture, Alex Ekwueme Federal University Ndufu Alike Ebonyi State, Nigeria; https://orcid.org/0000-0002-6841-8812
[3] Department of Agriculture, Alex Ekwueme Federal University Ndufu Alike Ebonyi State, Nigeria
[4] Department of Agricultural Science, Alvan Ikoku Federal College of Education Owerri Imo State, Nigeria; https://orcid.org/0000-0002-0556-9437
[5] Department of Agricultural Economics, Federal University of Technology Owerri Imo State, Nigeria; https://orcid.org/0000-0002-3728-1550

al., 2017). In developing nations including Nigeria, the crop is regarded as the most unseen cultivated food crop after rice, wheat, maize, and cassava (Alemu &Addisu, 2021). It is the only root and tuber crop in Sub-Saharan Africa with a 125% per capita annual rate of increase in output (FAO, 2022). Sweet potato is particularly beneficial in developing nations since it is a food security crop for the poor holder farmers who often cultivate it for subsistence gains. It supplies an essential source of nutritional carbs for human and animal consumption. It is also high in carotenoids and pro-vitamin A.

Furthermore, sweet potato is an important resource in underdeveloped nations due to its high levels of nutrition, productivity, and low levels of input utilization (Bassey et al., 2019). China is reported as the world's largest producer of sweet potato (75.80 million tons per year) (FAO, 2022). Currently, Nigeria is now Africa's leading producer of sweet potato, with an annual production of 3.46 million metric tons, and the world's second largest producer after China (Chikezie et al., 2019). Sweet potato, unlike cereal crops (rice, wheat, and maize), is not a globally traded commodity, and its prices are mainly decided by domestic supply and demand, making it an intriguing case study in Nigeria. Crop productivity is projected to suffer as greenhouse gases build in the atmosphere, causing global warming and concomitant changes in hydrological regimes (Arora, 2019).

Climate change has, in fact, been extensively observed to have an impact on crop productivity in Africa and Nigeria, particularly sweet potato cultivation (Asrat &Simane, 2018). Despite advances in agricultural technology such as the use of inorganic fertilizers, modern land preparation, planting of early season crops, farm mechanization, the use of agrochemicals, improved seed varieties, irrigation system expansion, and genetically modified crops, among others, weather and climate continue to be major challenges to agricultural production (Diriba et al., 2019). Climate change, according to the Intergovernmental Panel on Climate Change (IPCC), is a change in the state of the climate that can be defined by changes in the mean and/or weather variability that lasts for a protracted period of time, generally decades. Changes in global warming could also be caused by human-induced variables (Ebele &Emodi, 2016). Globally, it is regarded as the most important environmental issue confronting the world, wreaking havoc on agriculture and changing life patterns and general living circumstances (FAO, 2022). It has ramifications like disrupting seasonal cycles, hurting ecosystems and water supplies, impacting agricultural farming systems and food production, raising sea levels, and so on (Elia, 2017). However, agriculture's survival is dependent on climate, and the two are intertwined since they both occur globally. In Nigeria, climate change is having a severe influence on agricultural activity (Haider, 2019). Sweet potato production in the country has come under serious threat; as a result, both yearly and domestic output have decreased, impoverishing farmers and limiting their financial returns (Esan &Omilani, 2018).

Climate change has limited sweet potato growers' ability to increase their acreage cultivation, resulting in low and poor output. Potato farmers' vulnerability to growing poverty is exacerbated by low output yield, and thus deteriorating their living conditions. Land degradation caused by climate change hinders sweet potato production, productivity, yield, output, and revenue of farmers in general (Gray, 2021). Land degradation results in land fragmentation and does not support or encourage soil management measures and farm mechanization required for sweet potato development (Feleke et al., 2019). Again, in Nigeria, around 90% of sweet potato farmers are small-scale farmers who cultivate fragments of land and rely exclusively on rainfall rather than irrigation systems, making climate change a

significant contributor to sweet potato output in Nigeria (Ifeanyi-Obi &Asiabaka, 2014). The variability and irregularities of rainfall patterns and distribution limit sweet potato output and skew economic returns of sweet potato farmers who rely on it for survival and economic livelihoods (Lemessa et al., 2019). Higher temperatures distort seed germination and cause tremendous harm to potato plant growth and leaf development. Higher temperatures also affect the storability of harvested potato tubers.

Similarly, sweet potato farmers in Ebonyi State have equally had their share of adverse climate change effects and this portrays the true purpose of the study. Climate change has influenced sweet potato production and yield in the state, thereby creating artificial food scarcity and food insecurity in the state. Based on economic theories on food demand and supply gap, which posit a greater demand on food commodities against low supplies, calls for immediate actions and policies to sustain food production and security in the state are increasingly relevant. However, this study differs from previous studies on cereal crops such as rice, wheat, maize, sorghum, and tuber crops such as cassava, yam, cocoyam, (Boansi, 2017; Wang et al. 2018; Asfew &Bedemo, 2022; Rettie et al., 2022; Mariem et al., 2021) because it focuses on sweet potatoes. Sweet potatoes are one of Nigeria's under-exploited and forgotten food crops which contributes significantly to Nigeria's gross domestic product, as the country is the major producer in Africa and second largest producer in the world. The study contributes to the knowledge and body of literature by empirically highlighting the effects of climate change on sweet potato production. Further, this study is the first study in sub-Saharan Africa and Nigeria to use climate variables (temperature, rainfall, sunshine, and relative humidity) to express how climate change influences sweet potato production.

The objective of the study is to assess how climate change affects sweet potato production in Ebonyi State, Nigeria.

Materials and methods

The research was carried out in Ebonyi State, Nigeria. The state is a significant grower of sweet potatoes in Nigeria. It consists of twelve Local Government Areas. According to the National Bureau of Statistics, the area's population in 2006 is estimated to be 3,490,383. The respondents were chosen using a multi-stage sampling approach. In the first stage, four local government areas (LGAs) were chosen from each of the state's three agricultural zones; Ebonyi North, Ebonyi South, and Ebonyi Central, for a total of 12 LGAs. In the second step, four independent communities were chosen at random to form 48 communities. Three villages were chosen in the third stage to make 144 villages. The final and last stage involved a random selection of 5 sweet potato growers, for a total of 720 responses. The study relied on primary data collected via a structured questionnaire. The questionnaire was developed in accordance with the study's specific goals and was pretested before being administered to the sampled respondents. The study questionnaire covered the 2022/2023 farming season. The purpose for the questionnaire pre-testing was to assess its substance and reliability for the research. According to the distribution of questionnaires among respondents, only 301 questionnaires were considered useful for data analysis. Data were analyzed using descriptive statistics, land productivity model and multiple regression technique. The land productivity model is specified as:

$$L_p = \frac{To}{Ti} \text{ ..... (1)}$$

where:
Lp = Land productivity measured in Naira.
To= Total output measured in Naira
Ti = Total input used in production measured in Naira.

The multiple regression model is stated as follows:

$$Y = F(b1 * X1 + b2 * X2 + b3 * X3 + b4 * x4 + b5 * x5) + e \text{ ..... (2)}$$

where:
Y= Land productivity of the potato farmers (Naira).
bi= Parameter estimates.
X1= Temperature (Measured as dummy; Increased =1, Otherwise = 0).
X2= Rainfall (Measured as dummy; Increased =1, Otherwise = 0).
X3= Number of rainy days (Measured as dummy; Increased =1, Otherwise = 0).
X4= Relative humidity (Measured as dummy; Increased =1, Otherwise = 0).
X5= Sunshine (Measured as dummy; Increased =1, Otherwise = 0).
e = Error term.

Results and discussion

The socio-economic characteristics of sweet potato farmers are shown in Table 1. According to the data, 42.2% of the farmers were between the ages of 41 and 50, with a mean age of 48. This suggests that the farmers were middle-aged people and physically fit enough to carry out their sweet potato growing (Fierros-Gonzalez &Lopez-Feldman, 2021). Males made up 64.1% of sweet potato farmers, while females made up 35.9%. This means that males dominate sweet potato production due to their access to lands, farm inputs, financing facilities, and so on, as opposed to female farmers who had restricted access to agricultural inputs. Furthermore, agricultural production entails certain work that only male farmers can do due to their physical strength (Feleke et al., 2019).

The majority of farmers were married (73.1%), meaning that married farmers have additional family labor as a result of their marriage (children) and, in most cases, dependents living with them. This also demonstrates that married farmers are more focused, dedicated, and committed to their agricultural operation than single farmers (Fischer et al., 2017). According to the table, 32.9% of farmers had elementary education, 13.6% had higher education, and 3.7% had no formal education. Thus, 49.8% of the farmers had a secondary education, implying that the farmers can read and write, as well as analyze and grasp farm production techniques and activities aimed toward enhanced potato output (Alemu &Addisu, 2021). The majority of farmers (59.5%) had family sizes ranging from 5-8 people, with a mean household size of 7. This suggests that the sweet potato farmers' household size was rather substantial and providing support to their production operations. A large home offers more family labor than a small household (Keba, 2019).

Table 1. Socio-economic characteristics of sweet potato farmers

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Age			**Cooperative membership**		
20-30	77	25.6	Yes	121	40.2
31-40	89	29.6	No	180	59.8
41-50	127	42.2	**Participation in workshop/training**		
51& above	08	2.7	1-2	108	35.9
Mean	**48**		3-4	182	60.5
Sex			5-6	06	1.9
Male	193	64.1	7 & above	05	1.7
Female	108	35.9	**Mean**	**3.3**	
Marital status			**Farming Experience**		
Single	45	14.9	1-10	32	10.6
Married	220	73.1	11-20	98	32.6
Divorced	22	7.3	21-30	167	55.5
Widow/widower	14	4.7	31-40	04	1.3
Level of education			**Mean**	**26**	
Primary	99	32.9	**Source of Capital**		
Secondary	150	49.8	Banks	55	18.3
Tertiary	41	13.6	Friends/relatives	69	22.9
Non formal	11	3.7	personal savings	100	33.2
Household size			Co-operatives society	34	11.3
1-4	110	36.5	Other	43	14.3
5-8	179	59.5	**Source of land**		
9-12	07	2.3	Inheritance	193	64.1
13-16	05	1.7	Lease/rent	14	4.7
Mean	**7**		Gift	23	7.7
Occupation			Purchase	26	8.6
Farming only	199	66.1	Pledge	45	14.9
Farming and others	102	33.9	**Source of labor used**		
Farm Size			Family	125	41.5
0.1-1.0	105	34.9	Hired	101	33.6
1.1-2.0	125	41.5	Both	75	24.9
2.1-3.0	33	10.9			
3.1 & above	38	12.6			
Mean	**1.8**				
Extension contacts					
1-2	51	16.9			
3-4	234	77.7			
5-6	12	3.9			
7& above	04	1.3			
Mean	**3.7**				

Source: Field survey data, 2022. Compiled by author.

The majority of sweet potato farmers, 66.1%, were simply engaged in farming operations, while 33.9% were engaged in farming and other associated professional endeavors. This means that the sweet potato growers make a living through farming and other occupations. These involved activities enable them to support their individual family members and dependents (Korji & Kebede, 2017). About 41.5% of the farmers had farm sizes ranging from 1.1 to 2.0 hectares, with a mean hectare size of 1.8. This means that the farmers cultivated less than 2 hectares of land and that the acreage used for sweet potato

production is quite limited. This was also to be expected given that land in rural agricultural regions is typically fragmented and insufficient for big cultivations (Lemessa et al., 2019).

Approximately 16.9% of farmers had 1-2 physical encounters with extension agents, while the majority, 77.7%, had 3-4 physical contacts. The average number of extension contacts was four, implying that sweet potato farmers had modest interactions with extension agents. These physical connections assist the farmers in learning practical and innovative experiences related to sweet potato cultivation. This was intended to increase crop yield and farm revenue for potato growers in general (Mamaru &Lemma, 2022). According to the data, the majority of farmers, 59.8%, do not belong to cooperative groups, while 40.2% do. This means that the farmers' smaller minority profited from their cooperative groupings in terms of access to knowledge, farm inputs, financial facilities, and other services. Belonging to a cooperative group improves farmers' farming efforts in general (Makuvaro et al., 2018).

The majority of farmers (60.5%) attended workshops/trainings three to four times every farming season. Approximately 35.9% participated 1-2 times. The mean participation score of 3.3 indicates that the sweet potato growers attended at least three agricultural workshops/trainings. The training helps with information gathering and a proper grasp of agriculture production methods (Mamaru &Lemma, 2022). The bulk of the farmers, 55.5%, have been producing sweet potato for 21-30 years, implying that the farmers have extensive farming expertise. The average agricultural experience was 26 years, indicating that sweet potato farmers were well-versed in farm management and production activities. Experienced farmers often outdo inexpert farmers (Oniah, 2019). Farmers obtained finance through a variety of channels, 18.3% obtained from banks, 22.9% got from friends/relatives, 33.2% obtained capital from personal savings, and 11.3% through co-operative societies. This typically suggests that the majority of farmers saved money to begin producing potatoes.

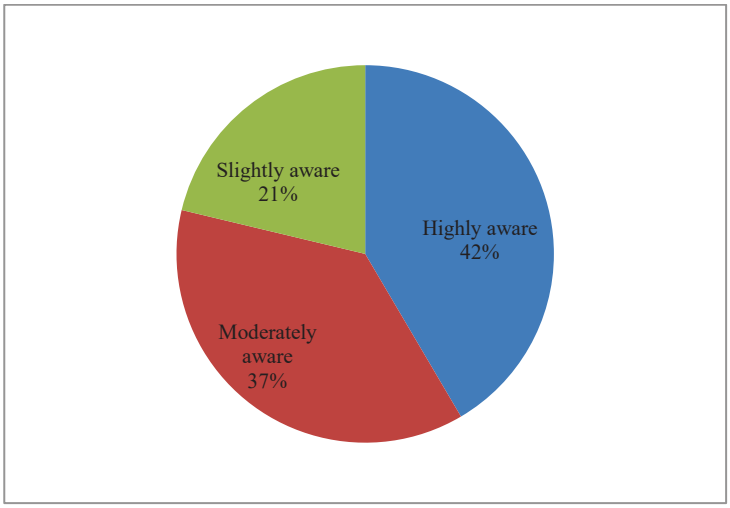

Fig. 2. The level of awareness of sweet potato farmers to climate change

Source: Field survey data, 2022. Compiled by author.

According to the table, farmers obtained their lands in a variety of ways: 14.9% obtained their land by promise, 8.6% through purchase, 7.7% through gifts, 4.7% through rent/lease, and 64.1% through inheritance. This means that the vast majority of farmers inherited their land. The rural areas are dominated by inherited rural lands (Prakash et al., 2021). About 41.5% of farmers employed family labor, 33.6% hired labor, and 24.9% used combined family and paid labor. This means that, in general, the majority of farmers employed family labor rather than hired labor, which might be attributed to the higher wages paid to hired laborers in rural regions. In most situations, hired labor is employed to supplement family labor (Roessali et al., 2019).

According to the data, 21.3% of farmers were barely aware of climate change; this might be due to a lack of information on climate change and fewer assaults or impacts on crop output (Ogbuabor &Egwuchukwu, 2017). Again, 37.2% were fairly informed, and 41.5% were extremely aware. This suggests that most sweet potato producers were aware of climate change (Figure 2).

This could be due to the hazards and destruction experienced in their farm operations and activities during the cropping year (Ogunbode, 2021). Again, the farmers opined being aware of climate change via agricultural workshops, trainings, seminars, cooperative unions, and other media sources. Awareness of climate change propels crop farmers to embrace agricultural climate smart practices and other innovative farming methods in mitigating adverse effects of climate change. This increases farm yield, enhances farm productivity, and farm income of the farmers (Diriba et al., 2019; Onyekuru &Marchant, 2017).

The land productivity of sweet potato farmers is shown in Table 2.

Table 2. Land productivity of sweet potato farmers

Size of land	Land productivity	Frequency	Percentage	Minimum productivity	Maximum productivity	Standard variation
0.1-1.0	1583.730 ha	105	34.9	1001.35 ha	1893.04 ha	0.14
1.1-2.0	1769.831 ha	155	51.5	1293.61 ha	1983.50 ha	1.91
2.1-3.0	1263.824 ha	41	13.6	1102.32 ha	1579.81 ha	0.53
Mean	15.3401 ha	-	-	-	-	-
Total	4617.385 ha	301	100.0	3397.28 ha	5456.35 ha	2.58

Source: Field survey data, 2022. Compiled by author.

Results from the table show that about 35% of the farmers recorded an estimated land productivity of 1583.730 hectares from 0.1-1.0 hectares of land. This implies an improvement in land productivity in the state looking at the size of land from which the value was estimated. About 14% had an estimated land productivity of 1263.824 hectares from 2.1-3.0 hectares of land; this implies a decrease in land productivity of about 79.8%. The decrease could result from an inability of the sweet potato farmers to effectively utilize their available land for cultivation (Oti, 2017). This could also result from both internal factors (production constraints) and external factors such as (climate change incidences, etc.) (Oti et al., 2021).

The majority of the farmers, 52%, had an estimated land productivity of 1769.831 hectares from 1.1-2.0 hectares. This implies that farmers who cultivated in this piece of land produced the highest land productivity relative to the other two hectares of land. This could mean that the sweet potato farmers utilized their limited and available resources (inputs) to efficiently maximize output and/ or farm returns (Abdurahman et al., 2017). The mean and

total productivity of the land was estimated at 15.3401 hectares and 4617.385 hectares respectively. This suggests that sweet potato land productivity in the state could be enhanced if farmers could maximize their inputs and resources effectively (Prakash et al., 2021).

The effects of climate change on sweet potato production are shown in Table 3.

Table 3. Effect of climate change on sweet potato production

Variable	Linear	Semi-log	Double-log	Exponential
Constant	30.0421 (0.3103)	7.0145 (4.1189)***	0.6106 (1.4721)	7.5194 (1.5021)*
Temperature (X_1)	-4.0150 (-4.0211)***	-0.9409 (-1.5130)*	-0.78955 (-2.5071)**	-20.5388 (-2.2023)**
Rainfall (X_2)	-0.6136 (-3.1124)***	-6.0630 (-1.0544)	-6.7418 (-2.4201)**	-0.9831 (-1.4322)
Number of rainy days (X_3)	-5.6030 (-2.0167)**	-10.3360 (-1.0412)	-4.9705 (-1.0002)	-14.5219 (-0.4150)
Evaporation rate (X_4)	0.3217 (1.0432)	0.7715 (2.1101)**	22.7982 (4.5402)***	0.8089 (4.4717)***
Sunshine hours (X_5)	18.0254 (3.5503)***	0.9262 (1.7512)*	24.4139 (0.5411)	0.8821 (3.5025)***
Relative humidity (X_6)	8.1203 (4.8036)***	0.8266 (1.0461)	40.3515 (1.2271)	7.4201 (0.9693)
R^2	0.8214	0.7641	0.7601	0.7971
F- ratio	42.1032***	10.3011***	21.2403***	15.8221***

Significant ***1%, **5% and *10%

Source: Field survey data, 2022. Compiled by author.

Data from Table 3 shows the true impact of climate change on sweet potato output. The linear functional form was used to determine this, considering the number of significant variables, greatest F-value, and R^2. The R^2 value of 0.8214 revealed that the climatic variables completely explained 82.14% of the overall fluctuations in sweet potato yield.

Temperature was negative and substantial at 1%, showing that rising temperatures reduce sweet potato yield. Increased warmth promotes the growth of soil micro-organisms, which spawn crop insect pests and diseases, impacting crop outputs, income, and long-term potato production. High temperatures harm sweet potato seedlings and phases of growth and development, reducing plant stature and deep root extension and resulting in low growth and yield (Oti et al., 2021).

Rainfall was negative and statistically substantial at 1%, showing that more rainfall reduces sweet potato crop yields. Increased rainfall poses possible threats to sweet potato crop production by generating intensive soil erosion resulting in stunted and destructive root and shoot growth. Increased rainfall degrades planted sweet potato crops, lowering yield and economic value (Asrat &Simane, 2018). More rainfall induces land flooding which limits sweet potato crop yield and worsens the state's local food security crisis (Elia et al., 2017).

The number of rainy days was negative and important at 5%, meaning that an increase in the number of rainy days affects sweet potato output via excessive land swamping and

destruction of vegetative topsoils (Oti, 2017). It also reduces the nutrient capacity of the soil, making it less productive (Ifeanyi-Obi &Asiabaka, 2014). A rise in the number of rainy days encourages the spread of numerous plant and crop diseases impacting sweet potato crop output (Fierros-Gonzale &Lopez-Feldman, 2021).

Sunlight hours were positive and statistically beneficial at 1%, meaning that an increase in sunlight hours improves sweet potato yield. Sunshine is essential for successful crop growth and development. It promotes photosynthetic activity in sweet potato plants, resulting in sustainable yield (Spore, 2019). Its importance in crop production cannot be relegated because it serves as a medium for food plants conversion for carbohydrates and encourages soil organisms' microbial activities (Sustrisno, 2023).

Relative humidity was positive and beneficial at 1%, meaning that an increase in relative humidity of 1% will result in an increase in sweet potato output. Relative humidity raises the moisture capacity of sweet potato lands, particularly during dry seasons, leading to greater sweet potato production and a more sustainable output (Sustrisno, 2023). Relative humidity improves water relation in plant formation, leaf growth, photosynthesis, pollination of plants, and economic production. It promotes seed development and germination while also improving soil moisture delivery (Makuvaro et al., 2018). However, the overall findings of the study reveal that climate change had both positive and negative impacts on sweet potato production in the study area.

The factors influencing sweet potato production of farmers are shown in Table 4.

Table 4. Factors influencing sweet potato production of farmer

Perceived Constraints	***Frequency**	**Percentage**
High cost and low availability of labor supply	264	87.7
Poor knowledge in sweet potato farming	256	85.0
Inadequate farming lands	260	86.4
Poor extension access and services	152	50.5
Land fragmentation	247	82.1
Problem of storage facility	155	51.5
Inadequate capital	301	100.0
Inadequate information concerning climate change	265	88.0
Pests and disease attacks	261	86.7
High cost of inputs materials	301	100.0

*Multiple Responses

Source: Field survey data, 2022. Compiled by author.

The data from the table shows multiple responses indicating that the sweet potato farmers pointed out more than one perceived constraint influencing their sweet potato production. About 87.7% of the farmers observed high cost and low availability of labor supply; this means that there is shortage of labor supply coupled with the high cost charged by the laborers (Tadese et al., 2017). About 85.0% of the farmers noted poor knowledge in sweet potato farming; this implies that the level of illiteracy exhibited by the farmers affected their production outputs. 86.4% of the farmers acceded to inadequate farming lands, this implies that there is limited and inadequate lands which inhibits extensive cultivation (Roessali et al., 2019).

Poor extension access and services were indicated by 50.5% of the farmers. This implies that extension access and services were not sufficient and this affected both technical and practical innovations of potato production in the state (Tessema et al., 2020). About 82.1% of the farmers lamented about land fragmentation issues. This implies that ownership of lands in piecemeal distorted large-scale cultivation of sweet potatoes (Ugochukwu et al., 2019). 51.5% of the farmers complained of problems of storage facility, this implies that the preservation of sweet potato in the state was perceived as a problem influencing sweet potato production of farmers. This could be related to the issue of climate change (high temperatures) interfering with sweet potatoes storage (Oti et al., 2021).

Inadequate capital was observed by all the sweet potato farmers. This emphasizes the significance of capital in farm production activities and operations (Korji &Kebede, 2017). Inadequate information concerning climate change was indicated by 88.0% of the farmers. This means that inaccessibility of climate change information services influences sweet potato production negatively (Upadhyay et al., 2020). Lack of access to climate change information exposes farmers to adverse impacts of climate change. About 86.7% of the farmers indicated pests and disease attacks; this implies that the incidence of pests and diseases were felt by the sweet potato farmers.

Pests and disease attacks cause mayhem and destruction of planted potato crops (Wassihun et al., 2019). Conclusively all the sweet potato farmers complained of high cost of input materials; this implies that the rising cost of input materials significantly affected sweet potato production of farmers, which means that farmers were unable to get as much needed inputs as expected due to rising cost in input prices (Xiao et al., 2022; Zenbaba, 2021).

Conclusion

The findings of this study reveal that sweet potato farmers in Ebonyi State, Nigeria were young, predominantly male, married, experienced, and relatively educated to carry out their farming operations. The majority of the sweet potato farmers were aware of climate change disturbances with lesser percentages being moderately and slightly aware. The mean and total productivity of the land was estimated at 1.53401 hectares and 461.7385 hectares. High cost and low availability of labor supply, poor knowledge in sweet potato farming, inadequate farming lands, pests and disease attacks, inadequate capital, and high cost of input materials constrained sweet potato production in the state.

The study found that climatic variables such as temperature, rainfall and number of rainy days negatively influenced sweet potato production while sunshine and relative humidity influenced sweet potato production positively. However, with these findings, it is expected that policy makers in Nigeria will find this study a good reference material in formulating new policies and adjusting existing ones to ensure self-sufficiency in sweet potato production. Farmers should be encouraged to seek out climate change information early, to be favorably disposed to mitigate its negative effects on sweet potato production. Farmers should be encouraged to participate in agricultural workshops, trainings, and seminars to acquire new knowledge on modern agricultural practices and methods and climate change mitigation.

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For citation:

Osuji E., Igberi Ch., Osang E., Tim-Ashama A., Nwachukwu E. (2023). Climate Change and Sweet Potato Production; Empirical Insights from Ebonyi State, Nigeria. *Problems of World Agriculture*, 23(3), 61-73; DOI: 10.22630/PRS.2023.23.3.12