FACTORS AFFECTING THE CULTIVATION AND AVAILABILITY OF YAMS (*Dioscorea spp.),* IN NIGER STATE NORTH-CENTRAL NIGERIA

[1]Goshie, Samuel Ndagi, [2]Mamman Rashidu, [3]Thomas Tanko PhD, [4]Buda Mohammed Kabir
Department of Biology, Niger State College of Education, Minna, Niger State.
[1]**E-email**: ndagijob2@Yahoo.com

Abstract
Yams (Dioscorea spp.) is one of the major food crops grown in Niger State. The crop is grown for its nutritive, economic and social benefits. In spite of all these importance, research on factors militating against its cultivation has been inadequate. Against this background, a survey was conducted on factors affecting it cultivation and availability of the crop in the state. This study was conducted to investigate factors affecting cultivation and availability of the tubers in major producing areas across the state. The study was conducted in Bossso, Minna metropolis, paikoro and Shiroro Local Government Areas. Thus population of eighty (80) peasant farmers and eighty (80), Yam marketers were randomly selected from markets across the Local Government areas under investigation. Four hypothesis were formulated to guide the research work and data collected were analyzed using Chi-Square. The result revealed high cost of Yam seedlings and insecurity are significant factors affecting cultivation of Yams at ($p<0.5$) in Niger State and this have rejected hypothesis 1 and 2.Consequently the findings showed that seasonal variation and insecurity are significant factors hindering the availability of the tubers in Niger State with value ($p<0.05$), thereby rejecting hypothesis 3 and 4. It is recommended among others that farmers should form cooperative society to enable them obtain subsidized loans for individual, group and government to purchase Yam seeds to boost production and subsequent availability in the State and country at large. In the same vein Government should reinforce robust security in production areas to counter the activities of criminals constituting insecurity.
Key words: Factors, Cultivation, Availability, Yams

Introduction

Yam according to Nahanga and Becvarova (2015) is a tuber crop of the family *Dioscorea specie* and accordingly there are more than 600 species, out of which six (6), are socially and economically important, International Institute of Tropical Agriculture (IITA,2009). It is cultivated in commercial quantities in several states of the middle belt of Nigeria (Benue, Edo, Niger, Nassarawa), and also eastern states of (Edo, Anambra) of Nigeria. It is also cultivated for subsistence in many other states of Nigeria. It could be eaten boiled, fried or pounded. It is special food in many cultures particularly the Gbagys of Niger and Nassarawa states of Nigeria and also the Igbo of Eastern Nigeria. It has a great potential for export and to serve as alternative cash crop revenue to fuel, especially now that oil revenues are dwindling and also due to the burdensome fuel subsidy regime, but its cultivation and availability in Niger State, is hampered by certain factors which will make it fail as revenue earner. This can be said to be the crux of this research.

Justification

Nigeria from time immemorial has been an agricultural/farming nation, with its vast arable land. Earnings from farm produce sustained its people at that time, and produce like Cocoa, timber, cotton come to foe, but with the advent of oil this once thriving sector was neglected, as Nigeria came to depend solely on oil, which came to constitute between 80-85% of its foreign exchange earnings. For us as a nation this narrative has to change, particularly due to the rapid decline of oil revenues coupled with the so-called subsidy regime and expanding population. This research will focus on one crop that has a great potential/prospect to earn the Niger state and Nigeria foreign exchange, i.e., Yam a tuber crop if cultivated in commercial quantities and the researchers shall dwell solely on factors that affects its cultivation and availability in Niger-State, North-Central Nigeria.

Brief History of Yam

Yam collectively is the most common name for Plant species in the genus ***Dioscorea*** (family: ***Dioscoreaceae***), which form edible tubers. Yams are perennial herbaceous vines that are cultivated for the consumption of their starchy tubers in Africa, Asia, Latin America, the Caribbean and Oceania. According to Fact-Sheet-Yam (USDA Wisconsin Department of Public Instruction), Yams are said to have originated from Africa, Asia, and the Carribean. Africans call yams nyami which is where we got the word yam from. Yams are cylindrical and vary in in size and shape. Some of the largest Yams have weighed 100 pounds and several feet long. Yams have a dense white purple or red flesh, and scaly brown skin with dark spots. Nutritionally yam is a major staple food consumption, providing food for millions of people in West Africa, and is eaten in different forms such as fufu, pounded yam, Amala in Nigeria, boiled and roasted (Aidoo 2009). In Africa. Yam is also said to have a shelf life of six months, but you will have a hard time finding a true yam on a shelf in an American grocery store.

Cultivars of Yam

According to IITA(,2009),Species and Varieties of Yam include the following, white yam, Yellow yam, water yam ,Chinese yam, wild bitter Yam, bitter Yam, cush-cash yam(www.teezab.com.ng)

In Africa many species of Yams abound, but the most cultivated species in Africa includes the following according to Christian and Olugbenga (2017), white yam (*D. rotundata*), Water yam (*D.alata*), Air potato (*D. bulbifera*), and Bitter yam (*D. dumetorum*)

Yam Production in Niger State

Nigeria and Niger State are part of the global community and there is a worrisome trend that indicates that the rising demand for food due to population and real income growth will definitely lead to increasing global food security and worsening hunger and malnutrition particularly in a developing country like ours (Nmadu, Coker,Adams(2017).According to the report of the Niger State Bureau of Statistics (2012),stated agriculture as the major occupation of its people, with about 85% of its population engaged in farming, The report also mentions Yams,Rice,Groundnuts,Maize amongst several others as crops grown. Yam as a staple food crop in Niger state, should not serve only as an integral vehicle for food security, but should also serve as a source of income (Nahanga and Becvarova 2015). According to Zinash and Yisa (2000), Niger state serves as one of the major Yam producing states in Nigeria and statistics show that the state produced over 2.3 metric tons of yams representing more than 10% of the total yam produced in Nigeria annually. The Yam producing local government areas include Shiroro, Rafi, Munya, Paikoro Bosso, Mariga, wushishi.

Research Hypothesis

For the purpose of research, the following hypothesis were formulated,

H_o1: High cost of seedlings is not a factor affecting the cultivation of Yams in Niger state.

H_o2: Insecurity is not a factor affecting the cultivation of Yams in Niger State.

H_o3: Season (climate) is not a factor affecting the availability of Yams in Niger State

H_o4: Insecurity is not a factor affecting the availability of Yams in Niger State.

Research Design

The method employed in this research is the survey method of collecting data.

Area of Study

The area of study is Minna metropolis and suburbs of Minna., Niger State, North-Central Nigeria. The markets surveyed in Minna includes the following, Yam markets in Bosso, Tungan-Goro , and Paiko(Paikoro) and Beji markets, all in suburbs of Minna, and Kuta market in Kuta (shiroro), a major yam growing town.

Population of Study
The population of the study comprises of Yam Marketers and Yam Farmers of BossoTungan-Goro markets located in Minna metropolis and Paiko and Beji markets located within suburbs of Minna, and Kuta market in Shiroro a major yam growing town.

Sample size/Method of sampling
The sample size comprises Eighty (80), Yam Marketers and Eighty (80), Yam Farmers in the aforementioned markets and all these were selected by random sampling.

Research Instrument
The main instrument used for data collection is a structured questionnaire, developed by the researchers. The instrument was validated by senior lecturers from School of Sciences College of Education, Minna. The questionnaire was divided into two sections. Section (A), provides information on the demographic data of the respondents, while section (B), provides answers to questions on the research.

Data Analysis
Chi-Square and Percentages were used in the Statistical Analysis

Table 1: Showing responses of respondents on factors affecting cultivation and availability of Yams in Bosso Market.

S/N	Questions	Yes	No	Total
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State	12 (60)	08 (40)	20
	b. season(climate) is a factor affecting the availability of yams in Niger State	13(65)	07 (35)	20
2.	a. Availability of Seedlings affects the cultivation of Yams in Niger State	12 (60)	08 (40)	20
	b. transportation is a factor affecting availability of Yams in Niger State	09(45)	11(55)	20
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State	07 (35)	13 (65)	20
	b. Lack of proper storage is a factor affecting the availability of Yams in Niger State	10(50)	10(50)	20
4.	a.High costs of seedlings affect the cultivation of yams in Niger State	13 (65)	07 (35)	20
	b.Lack of processing into other forms is a factor affecting Yam availability in Niger State	11(55)	09(45)	20
5.	a. Diminishing soil value(nutrients'), affects cultivation of Yams in Niger State	10 (50)	10 (50)	20
	b. Insecurity is a factor affecting the availability of Yams in Niger State.	08(40)	12(60)	20
6.	a. Disease infestation affects the cultivation of Yams in Niger State	10 (50)	10 (50)	20
	b.Interference of middle men is a factor affecting availability of Yams in Niger state	10(50)	10(50)	

7.	a .Insecurity affects the cultivation of Yams in Niger State b. Varieties of Yams affects the availability of Yams In Niger State	08 (40) 10(50)	12 (60) 10(50)	20 20
8.	Labor cost affects cultivation of Yams in Niger State	12 (60)	08 (40)	20

Source: Field Data, 2023

Table 2: Showing responses of the respondents on factors affecting Yam cultivation and availability in Tungan-Goro market

S/N	Questions	Yes	No	TOTAL
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State b.Season(Climate) is a factor affecting the availability of Yams in Niger state	12 (60) 10(50)	08 (40) 10(50)	20 20
2.	a. Availability of Seedlings affects the cultivation of Yams in Niger State b. Transportation is a factor affecting availability of Yams in Niger State.	09 (45) 06(30)	11 (55) 14(70)	20 20
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State b.Lack of proper storage is a factor affecting availability of Yams in Niger state	12 (60) 13(65)	08 (40) 07(35)	20 20
4.	a. High costs of seedlings affects the cultivation of yams in Niger State b. Lack of processing into other forms is a factor affecting availability of Yams in Niger State	17 (85) 06(30)	03 (15) 14(70)	20 20
5.	a. Diminishing soil value(nutrients), affects cultivation of Yams in Niger State b.Insecurity is a factor affecting availability of Yams in Niger State	14 (70) 14(70)	06 (30) 06(30)	20 20
6.	A Disease infestation affects the cultivation of Yams in Niger State b. interference of middle men is a factor affecting availability of Yams in Niger state.	11 (55) 07(35)	09 (45) 13(65)	20 20
7.	a. Insecurity affects the cultivation of Yams in Niger State b. varieties Yams affects the availability of yams in Niger State	14 (70) 11(55)	06 (30) 09(45)	20 20
8.	Labor cost affects cultivation of Yams in Niger State	11 (55)	09 (45)	20

Source: Field Data, 2023

Table 3: Showing responses of the respondents on factors affecting Yam cultivation and Availability in Paiko market

S/N	Questions	Yes	No	Total
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State	01 (10)	09 (90)	10
	b.Season(climate) is a factor affecting the availability of Yams in Niger State	10(100)	00(00)	10
2.	A. Availability of Seedlings affects the cultivation of Yams in Niger State	02 (20)	08 (80)	10
	b. Transportation is a factor affecting the availability of Yams in Niger State	10(100)	00(00)	10
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State	04 (40)	06 (60)	10
	b. Lack of proper storage is factor affecting the availability of yams in Niger State	10(100)	00(00)	10
4.	a. High costs of seedlings affects the cultivation of yams in Niger State	10 (100)	00 (00)	10
	b.Lack of processing into other forms is a factor affecting the availability of Yams in Niger state	10(100)	00(00)	10
5.	a. Diminishing soil value(nutrients'), affects cultivation of Yams in Niger State	10 (100)	00 (00)	10
	b. Insecurity is a factor affecting the availability of Yams in Niger State	10(100)	00(00)	10
6.	a. Disease infestation affects the cultivation of Yams in Niger State	10 (100)	00 (00)	10
	b. Interference of middle men is a factor affecting the availability of Yams in Niger State	10(100)	00(00)	
7.	a. Insecurity affects the cultivation of Yams in Niger State	10 (100)	00 (00)	10
	b.Varieties of Yams affects its availability in Niger State	07(70)	03(30)	10
8.	Labor cost affects cultivation of Yams in Niger State	10 (100)	00 (00)	10

Source: Field Data, 2023

Table 4: Showing responses of respondents on Factors affecting Yam cultivation and Availability in Kuta market

S/N	Questions	Yes	No	TOTAL
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State	10 (100)	00 (00)	10
	b.Season(Climate) is a factor affecting the availability of Yams in Niger state	10(100)	00(00)	10

2.	a. Availability of Seedlings affects the cultivation of Yams in Niger State b. Transportation is a factor affecting availability of Yams in Niger State.	06 (60) 09(90)	04 (04) 01(10)	10 10
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State b.Lack of proper storage is a factor affecting availability of Yams in Niger state	08 (80) 08(80)	02 (20) 02(20)	10 10
4.	a. High costs of seedlings affects the cultivation of yams in Niger State b. Lack of processing into other forms is a factor affecting availability of Yams in Niger State	10 (100) 08(80)	00 (00) 02(20)	10 10
5.	a. Diminishing soil value(nutrients), affects cultivation of Yams in Niger State b.Insecurity is a factor affecting availability of Yams in Niger State	10 (100) 10(100)	00 (00) 00(00)	10 10
6.	a. Disease infestation affects the cultivation of Yams in Niger State b. interference of middle men is a factor affecting availability of Yams in Niger state.	10 (100) 06(60)	00 (00) 04(40)	10 10
7.	a. Insecurity affects the cultivation of Yams in Niger State b. varieties Yams affects the availability of yams in Niger State	09(90) 10(100)	01(10) 00(00)	10 10
8.	Labor cost affects cultivation of Yams in Niger State	09(90)	01(10)	10

Source: Field Data 2023

Table 5: Showing responses of respondents on Factors affecting Yam cultivation and availability in Beji Market

S/N	Questions	Yes	No	TOTAL
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State b.Season(Climate) is a factor affecting the availability of Yams in Niger state	18 (90) 06(30)	02 (10) 14(70)	20 20
2.	a. Availability of Seedlings affects the cultivation of Yams in Niger State b. Transportation is a factor affecting availability of Yams in Niger State.	06 (30) 07(35)	14 (70) 13(65)	20 20
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State b.Lack of proper storage is a factor affecting availability of Yams in Niger state	13 (65) 13(65)	07 (35) 07(35)	20 20

4.	a. High costs of seedlings affects the cultivation of yams in Niger State	06 (30)	14 (70)	20
	b. Lack of processing into other forms is a factor affecting availability of Yams in Niger State	08(40)	12(60)	20
5.	a. Diminishing soil value(nutrients), affects cultivation of Yams in Niger State	14 (70)	06 (30)	20
	b.Insecurity is a factor affecting availability of Yams in Niger State	06(13)	14(70)	20
6.	a. Disease infestation affects the cultivation of Yams in Niger State	07 (35)	13 (65)	20
	b. interference of middle men is a factor affecting availability of Yams in Niger state.	12(60)	08(40)	20
7.	a. Insecurity affects the cultivation of Yams in Niger State	11(55)	09(45)	20
	b. varieties Yams affects the availability of yams in Niger State	10(50)	10(50)	20
8.	Labor cost affects cultivation of Yams in Niger State	06(90)	14(10)	20

Source: Field Data 2023

Table 6: Showing responses of Respondents on Factors affecting Yam cultivation and Availability in Niger State

S/N	Questions	Yes	No	TOTAL
1.	a. Availability of fertilizer affects the cultivation of Yams in Niger State	53 (66.25)	27 (33.75)	80
	b .Season(Climate) is a factor affecting the availability of Yams in Niger state	59(73.75)	21(26.25)	80
2.	a. Availability of Seedlings affects the cultivation of Yams in Niger State	35 (43.75)	45 (56.25)	80
	b. Transportation is a factor affecting availability of Yams in Niger State.	41(51.25)	39(48.25)	80
3.	a. Availability of improved seedlings affects the cultivation of Yams in Niger State	34 (42.50)	46 (57.50)	80
	b.Lack of proper storage is a factor affecting availability of Yams in Niger state	54(67.50)	26(32.50)	80
4.	a. High costs of seedlings affects the cultivation of yams in Niger State	56 (70.00)	24 (30.00)	80
	b. Lack of processing into other forms is a factor affecting availability of Yams in Niger State	43(53.75)	37(46.25)	80
5.	a. Diminishing soil value(nutrients), affects cultivation of Yams in Niger State	58(72.50)	22 (27.50)	80
	b.Insecurity is a factor affecting availability of Yams in Niger State	58(72.50)	22(27.50)	80

6.	A. Disease infestation affects the cultivation of Yams in Niger State	48 (60.00)	32 (40.00)	80
	b. interference of middle men is a factor affecting availability of Yams in Niger state.	44(55.00)	36(45.00)	80
7.	a. Insecurity affects the cultivation of Yams in Niger State	52(65.00)	28(35.00)	80
	b. varieties Yams affects the availability of yams in Niger State	48(60.00)	32(40.00)	80
8.	Labor cost affects cultivation of Yams in Niger State	48(60.00)	32(40.00)	80

Source: Field Data, 2023

Analysis:

Table 7: Chi-square Analysis of Factors Affecting Cultivation of Yams in Niger state

S/N	Questions	Yes	No	Tot.	X^2	X^2Tab(2-1)df
1.	Availability of fertilizer affects the cultivation of Yams in Niger State	53	27	80	8.45^{*s}	3.841
2.	Availability of Seedlings affects cultivation of Yams in Niger State	35	45	80	1.45^{ns}	3.841
3.	Availability of improved seedlings affects cultivation of Yams in Niger State	34	46	80	1.80^{ns}	3.841
4.	High costs of seedlings affects the cultivation of Yams in Niger State	56	24	80	12.80^{*s}	3.841
5.	Diminishing soil value(nutrients),affects the cultivation of Yams in Niger State	58	22	80	16.20^{*s}	3.841
6.	Disease infestation affects the cultivation of Yams in Niger state	48	32	80	3.20^{ns}	3.841
7.	Insecurity affects the cultivation of Yams in Niger State	52	28	80	7.20^{*s}	3.841
8.	Labor costs affects cultivation of Yams in Niger state	48	32	80	3.20^{ns}	3.841

Table 7, high cost of Yam seedlings and insecurity are amongst factors affecting the cultivation of Yams in Niger state at ($p<0.05$), thereby rejecting hypothesis 1 and 2

Table 8: Chi-square Analysis of Factors Affecting Availability of Yams in Niger State

S/N	Questions	Yes	No	Tot.	X^2	X^2Tab(2-1)df
1.	Season (climate) is a factor affecting the availability of Yams in Niger state	59	21	80	18.05^{*s}	3.841
2.	Transportation is a factor affecting availability of Yams in Niger State	41	39	80	0.05^{ns}	3.841
3.	Lack of proper storage is a factor affecting availability of yams in Niger State	53	27	80	8.45^{*s}	3.841
4.	Lack of processing into other forms is a factor affecting yam availability in Niger State	43	37	80	0.45^{*ns}	3.841

5.	Insecurity is a factor affecting the availability of Yams in Niger state	58	22	80	16.20*^{s}	3.841
6.	Interference of middle men is a factor affecting availability of Yams in Niger State	44	36	80	0.80^{ns}	3.841
7.	Varieties of Yams affects availability of Yams in Niger state	48	32	80	3.20*^{ns}	3.841

Table 8, above shows that lack of storage facility and insecurity are vital factors affecting the availability of Yams in Niger state at ($p<0.05$), thereby rejecting hypothesis 3 and 4.

Discussion

The importance of Yams as a staple food not only Niger state but in Nigeria cannot be overemphasized. It has the potentials of been a foreign exchange earner for Niger state and also other yam growing belts if its cultivation and availability is enhanced. Its formulation i.e. processing into export forms can also boost our economy if its cultivation is given priority in Niger state. From the Table of results and analysis its worthy of note that several factors affect its cultivation and availability in Niger state and in extension other Yam growing belts of Nigeria.

Table 7 shows several factors that affects the cultivation of Yams in Niger state. The result shows that high cost of seedlings is a factor affecting its cultivation as the chi-square analysis showed a significant activity, there by rejecting hypothesis one which stated otherwise at ($P<0.05$) see (Table 7) and this is in agreement with (FAO, 2012) who reported decreasing yield and low annual growth rate of yam production in Nigeria due to high cost of seedlings. Verter et al, (2015) said that Yam production is one of the most expensive and labor intensive activity in Nigeria. Although not listed in our hypothesis (IITA, 2009) reported labor cost of Yam production in the forest areas from mounding to staking approximately accounts for 40% of production costs. The findings of this study (see Table 7 and 8)), chi-square analysis showed that insecurity is a factor affecting the cultivation and availability of yams in Niger state as the result showed a significant effect ($p<0.05$) thereby rejecting hypothesis two which stated otherwise and these agrees with the findings of (Muhammad,2015), who said that escalation of insurgency, banditry, herdsmen and farmers' clashes etc. affected Yam cultivation in Gombe, Nassarawa, Niger and other states in Northern Nigeria and has caused many farmers to abandon their farms for safety reasons.(Awodola and Oboshi(2015), stated that the farmers are no longer able to produce Yams in sufficient quantities to meet the demands of the people. Several factors have also been adduced to be responsible for the availability of yams in Niger state amongst (see Table 8) and one of such is season/climate, the Chi-square analysis showed that it is a significant factor ($p<0.05$), there by rejecting hypothesis three and this finding alludes to those of (King,2004),who reported that the world's most pressing issue is climate change and that it possess a greater threat than international terrorism, and this is because the potential permanent changes that that climate change has brought to our planets geological, biological and ecological systems suggests that over the next fifty (50), years climate change pose a greater threat and strains on our agricultural systems(IPCCC,2007) in building Nigerians response to climate change,2008).Table 8, also shows that lack of processing the Yams which are produced in excess when in season is a vital factor affecting its availability in Minna and in extension Niger state as it was a significant factor ($p<0.05$),therefore stake holders involved in the cultivation of Yams should look into ways of processing into other forms to ensure its availability when not in season.

Recommendations

1. Given the impact of high cost of seedlings on Yam cultivation, the government and relevant stakeholders should consider implementing subsidies or support programs to alleviate the financial burden on farmers.

2. To address the impact of insecurity on Yam cultivation and availability, there is the need to improve and increase security in Yam growing areas in Niger State. Collaborative efforts between local communities, law enforcement, and relevant stakeholders can contribute to a safer environment for farmers.
3. Yam farmers should be educated and encouraged to adapt climate resilient farming practices to mitigate the effects of seasonal variations. This may involve promoting the use of adaptable Yam varieties and implementing strategies to cope with climate-induced challenges.
4. To enhance Yam availability, investment in proper storage facilities and processing units is essential. This will help reduce post-harvest losses and ensure a steady supply of yams throughout the year.

References

AIDOO, R. (2009). An Analysis of yam consumption patterns in Ghanaian urban communities.

Awodola, B. and Oboshi. (2015). Terrorism in Northern Nigeria: A threat to food security in Maiduguri Mediterranean Journal of social sciences', 6(3):11-17.

Christian A. and Olugbenga O. (2017). Encyclopedia of Applied Plant Sciences.Vol.3.

Fact–Sheet -Yam USDA Wisconsin Department of Public Instruction.

FAO (1985). Report@en.m.wikipedia.org.

FAO (1997). Report on the inter-center review of root and tuber crops research in the CGIAR.

FAO (2010). Food and Agricultural Organisation.FOASTADATA.FAO Rome, Italy.

FAO (2013). FAOSTAT Database (online 2014).

FINELIB.COM (2017). The Main Yam Producing areas in Nigeria about Niger State. Retrieved from www, nigerstats.gov.ng. Academic press. pp 435-441.

IITA. (2009). Yam (Dioscorea species). Available at:http://www.iita.org/yam (accessed 15 March 2014).

Inter governmental Panel on Climate change. (IPCC). (2007). Climate change, Impacts, adaptation and vulnerability report of working group 2 to the fourth assessment report of the IPCC Cambridge University press, Cambridge United Kingdom and New York.

King. D. (2004). Climate Change Science: Adaptation, mitigate or ignore? Science, 303,176-177.

Lebot, V, Dulloo, E. (2021).Global Strategy for the conservation and use of Yam genetic resources Global Crop Diversity Trust, Bonn, Germany.

Muhammad D. (2015). How Environmental degradation induces insecurity, insurgency. Environews Nigeria http://earthjournalism.net/stories/how-environmental degradation-induces.

Nahanga V. and Vera. C. (2015). Analysis of Yam Production in Nigeria. ACTA Universitatis Agriculture et Silvi culturae Mendeliane Brunensis. Vol. 63. No.2.

Niger State Bureau of Statistics (2012). Niger state Agricultural Statistics, Facts and Figures.

Nmadu, J.N. Coker A.A.A.,Adams E. (2017). Conference Proceedings of The 18th, Annual Conference of the Association of Agricultural Economics held at the Federal university of Agriculture Abeokuta, Nigeria 16th-19th October, 20017 UniversitalisAgriculturae et SilviculturaeMendelianaeBrunensis, 63(2):659-665 Verter Nahanga, Becvarova Vera (2015). An analysis of Yam Production in Nigeria.Acta.

Zinash, O and Yisa. M. (2000). Yam Production and Storage in Niger State. International Journal
for the history of Engineering and Technology. 1(2):135-138.