EMANCIPATION OF THE RURAL FAMILY IN CONTEMPORARY NIGERIA

PROCEEDINGS

of the

29th ANNUAL NATIONAL Congress

of the

RURAL SOCIOLOGICAL ASSOCIATION OF NIGERIA (RuSAN)

held at

LANDMARK UNIVERSITY, OMU ARAN, KWARA STATE

Between

12th – 16th October 2020

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GENERAL INFORMATION

The Nigerian Rural Sociological Association (NRSA) was formed on January 7, 1981. Its inaugural congress was held from November 7 to 11, 1983 with the theme "Agriculture and Social Development in Nigeria".

NRSA is a broad-based professional association with membership cutting across universities, agricultural research institutes and other agricultural/rural development agencies both from the public and private sectors. Membership is open to all professionals who are interested in advancing the development of the rural folks.

This volume is the proceeding of the 28th Annual National Congress held at Obafemi Awolowo University, Ile-Ife between 7th and 11th October 2019. The plenary papers contained herein were peer reviewed before publication.

The association gratefully acknowledges the moral and financial contributions of many organisations and individuals to the success of the congress.

The following represents the timeline of the conferences held in the recent past.

Year	Theme	Editor-in-Chief	Venue/Location
2019	Transforming Nigeria's Rural Environment: The Sociological Perspective	Prof. Kolawole Adebayo	Obafemi Awolowo University, Ile-Ife
2018	Rural Social Fortification and Development in Nigeria	Prof. Kolawole Adebayo	Ahmadu Bello University, Zaria
2017	Grassroots Development and Dividend of Democracy	Prof. Kolawole Adebayo	Michael Okpara University of Agriculture, Umudike
2016	Conflict, Peace Building and Rural Development	Prof. F. A. Kuponiyi	Federal University of Oye-Ekiti, Oye-Ekiti
2015	Changing Social Values, Transparency and Sharp Practices – Impacts on Agricultural and Rural Development	Prof. F. A. Kuponiyi	Ladoke Akintola University of Technology, Ogbomoso
2014	Social Engineering on Sustainability of the Agricultural Transformation Agenda	Prof. F. A. Kuponiyi	University of Benin, Benin
2013	Perspectives on changing rural social organisations, structures and institutions and implications for agricultural development strategies in sub-Saharan Africa	Prof. F. A. Kuponiyi	University of Uyo, Uyo

Year	Theme	Editor-in-Chief	Venue/Location
2012	Challenges and Approaches to Sustainable Rural Development in sub-Saharan Africa	Prof. F. A. Kuponiyi	University of Ibadan, Ibadan
2011	Socioeconomic Analysis of Entrepreneurial Education Food security Poverty alleviation Linkages in Nigeria	Prof. F. A. Kuponiyi	Fed Coll of Agric Produce Tech, Hotoro, Kano
2010	Approaches towards the Transformation of Rural and Agricultural Economy in Nigeria	Prof. A. A. Ladele	University of Agriculture, Makurdi
2009	Globalization of the Socio-Political Economy of Rural Development	Dr. A. A. Ladele	Akure
2008	Policy Advocacy Role in Agricultural and Rural Transformation in Nigeria	Dr. A. A. Ladele	Umudike
2007	Powering Agricultural Rural Transformation Process in Nigeria.	Dr. A. A. Ladele	BOWEN, Iwo
2006	Unlocking the Agricultural and Rural Potentials of Nigeria	Dr. A. A. Ladele	UNAD, Ado-Ekiti
2005	Promoting Rural and National Economic Transformation through Agricultural Revolution	Prof. A. A. Jibowo	OOU, Ago-Iwoye

CONTENT

INVITED PAPERS

SPEECH DELIVERED BY THE NATIONAL PRESIDENT OF RURAL SOCIOLOGICAL ASSOCIATION OF NIGERIA (RUSAN) AT THE OPENING CEREMONY OF THE 29TH ANNUAL CONGRESS, 11TH – 16TH OCTOBER, 2020, AT LANDMARK UNIVERSITY OMU-ARAN, KWARA STATE, NIGERIA

Prof. O.B. Oyesola
Professor of Rural Sociology at the Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan and the President of the Rural Sociological Association of Nigeria

PROTOCOL

It is my pleasure to welcome you all to the 29th Annual RuSAN Congress holding here at one of the best privately owned universities campus of Landmark University, Omu Aran tagged "LANDMARK 2020" with the theme "Emancipation of the Rural Family in Contemporary Nigeria".

ADDRESS

The Rural Sociological Association of Nigeria (RuSAN) is the umbrella body for all rural sociologists in Nigeria covering different fields, viz: agriculture, sociology, extension, human ecology, medicine, engineering, education, public health and environment. Rural Sociological Association of Nigeria is an Associate member of International Rural Sociology Association (IRSA) with headquarters in USA and Nigeria Forum for Agricultural Advisory Services (NIFAAS).

It is a privilege for me to serve in the last four (4) years as the 6th National President of this Association, building on solid foundation of our past heroes. I want to specially appreciate every member of RuSAN for standing solidly behind us in the last four (4) years, you are the secret behind all our achievements. Thank you all.

The 2020 RuSAN Congress is to discuss Emancipation of the Rural Family in Contemporary Nigeria. Contributions of rural families to national development can never be over emphasized, rural households are key to: provision of raw materials to the industries, provision of labour, ensuring food security, improved national economy etc. Despite these enormous contributions, researches have shown that the wellbeing of rural families is relatively poor compared to their urban counterparts. It is evident that rural families are working tirelessly, but their urban counterparts and the elites are reaping their harvest, this could be termed "slavery".

Considering the dogged efforts of rural families to achieve improved wellbeing, it is pertinent to say that they deserved more than they are getting now. Most rural families in Nigeria engage in farming as primary occupation, using hand tools for their farming activities with little or no support from the government, a situation that could be seen as slavery in this contemporary epoch. Rural families must be set free from this slavery, dependence and subjection. Based on well-researched papers to be presented at this Congress, am hopeful that at the end of this Congress, we will be able to come up with a road map on how to champion the emancipation of the rural families. Against this backdrop, this Congress focuses on the following sub-themes:

- Evolution and transitions in rural family life;
- Coping strategies of rural farm families with Climate Change, Environmental and Socio-Economic challenges;
- Democracy, Political Participation, Government Policies and Rural Family Life;
- Rural Family responses to Globalization ICTs and Communication Systems;
- Farming Systems and structural changes in Rural Family enterprises;
- Integration and survival strategies of Rural Families in cottage industries and non-farm vocations;
- The challenges of crime and criminality on livelihood of Rural Families; and
- The Rural Families and emerging trends in traditional health care and beliefs systems.

The 2020 Congress is a Virtual Congress, this is in compliance with the Federal Government of Nigeria guidelines on C-19. I want appeal to RuSAN members all over Nigeria to adhere strictly to all C-19 protocols as stipulated by World Health Organisation (WHO), Nigeria Centre for Disease Control (NCDC) and other certified health related bodies; the Lord will continue to protect us. Amen! WHO made it clear that COVID 19 will be with us for some years and we must come up with ways to cope and continue with our normal daily activities despite this reality. In response to this "New Normal", the Association has decided to continue our Capacity Building virtually next month (November, 2020), it will be a bi-monthly training for a period of 1 hour. As an Association, it is our desire to improve the research, analytical, teaching prowess and livelihood diversification of our members despite the presence of COVID 19.

Conclusively, we want to appreciate the Vice-Chancellor of this prestigious University (Landmark University), Prof. Adeniyi Olayanju, for the red-carpet welcome given to RuSAN, thank you, Sir. We also appreciate the support of the

Dean, Faculty of Agriculture, Prof. O. M. Bamiro, Head Department of Agricultural Extension and Rural Development who is also the COC Chairman, Dr. Ajala A. O., COC members and all our Chairmen and Rapporteurs for each technical session across the country, we are indeed grateful.

On behalf of the NEC members of RuSAN, I wish all participants a fruitful Congress. Thank you.

EMANCIPATION OF THE RURAL FAMILY IN CONTEMPORARY NIGERIA

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INTRODUCTION

The globalization phenomenon has made the globe or the universe a federated world or global village in which a growing trend or practice in one part of the global village impacts on all the other sections even if in varying degrees. Globally, quality of life such as environment, housing, people's happiness, work, marital satisfaction and total wellbeing of the populace.

Nigeria is an integral component of the federated word. The current population of Nigeria is 195.9 million as at 2018 and 208,678,557 as of Friday, January 1, 2021, based on Worldometer[1] elabouration of the latest United Nations data.

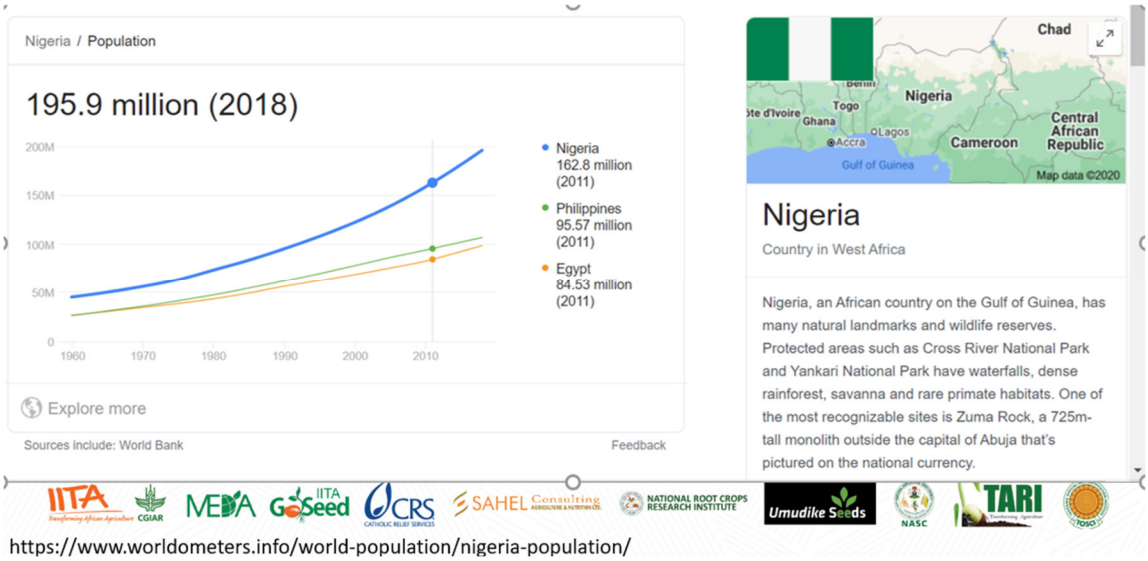


Figure 1: Comparative advantage of Nigerian population to other countries

Nigeria 2020 population is estimated at **206,139,589** people (Figure 1) at mid-year according to UN data. Nigeria population is equivalent to **2.64%** of the total world population (Table 1).

Nigeria ranks number **7** in the list of countries (and dependencies) by population. The population density in Nigeria is 226 per Km^2 (586 people per mi^2). The total **land** area is 910,770 Km2 (351,650 sq. miles), **52.0 %** of the population is **urban** (107,112,526 people in 2020) and the **median age** in Nigeria is **18.1 years**.

All these figures will increase to 401,315,000 people by 20250 (Table 2).

[1] https://www.worldometers.info/world-population/nigeria-population/

Table 1: Nigerian Population from 2000 to 2020

Year	Population	Yearly % Change	Yearly Change	Migrants (net)	Median Age	Fertility Rate	Density (P/Km²)	Urban Pop %	Urban Population	Country's Share of World Pop	World Population	Nigeria Global Rank
2020	**206,139,589**	2.58 %	5,175,990	-60,000	18.1	5.42	226	52.0 %	107,112,526	2.64 %	7,794,798,739	7
2019	**200,963,599**	2.60 %	5,088,916	-60,000	17.9	5.67	221	51.2 %	102,805,995	2.61 %	7,713,468,100	7
2018	**195,874,683**	2.62 %	5,001,439	-60,000	17.9	5.67	215	50.3 %	98,610,801	2.57 %	7,631,091,040	7
2017	**190,873,244**	2.64 %	4,913,003	-60,000	17.9	5.67	210	49.5 %	94,525,016	2.53 %	7,547,858,925	7
2016	**185,960,241**	2.66 %	4,822,793	-60,000	17.9	5.67	204	48.7 %	90,546,177	2.49 %	7,464,022,049	7
2015	**181,137,448**	2.71 %	4,526,850	-60,000	17.9	5.74	199	47.8 %	86,673,094	2.45 %	7,379,797,139	7
2010	**158,503,197**	2.68 %	3,927,636	-60,000	17.9	5.91	174	43.5 %	68,949,828	2.28 %	6,956,823,603	7
2005	**138,865,016**	2.58 %	3,316,233	-34,000	18.0	6.05	152	39.1 %	54,288,918	2.12 %	6,541,907,027	9
2000	**122,283,850**	2.53 %	2,867,103	-19,005	17.9	6.17	134	34.9 %	42,627,440	1.99 %	6,143,493,823	10

Table 2 showing the population forecast for Nigeria from 2020 to 2050

Year	Population	Yearly % Change	Yearly Change	Migrants (net)	Median Age	Urban Pop %	Urban Population	Country's Share of World Pop	World Population	Nigeria Global Rank
2020	206,139,589	2.62%	5,000,428	-60,000	18.1	52.00%	107,112,526	2.64%	7,794,798,739	7
2025	233,343,112	2.51%	5,440,705	-60,000	18.5	55.80%	130,312,056	2.85%	8,184,437,460	6
2030	262,977,337	2.42%	5,926,845	-60,000	19.1	59.40%	156,299,881	3.08%	8,548,487,400	6
2035	294,986,051	2.32%	6,401,743	-62,360	19.9	62.70%	184,887,647	3.32%	8,887,524,213	5
2040	329,066,615	2.21%	6,816,113	-62,360	20.7	65.70%	216,083,536	3.58%	9,198,847,240	4
2045	364,711,807	2.08%	7,129,038	-62,216	21.5	68.60%	250,285,391	3.85%	9,481,803,274	4
2050	401,315,000	1.93%	7,320,639		22.4	71.50%	287,130,349	4.12%	9,735,033,990	

Source: https://www.worldometers.info/world-population/nigeria-population/

The itemised basic infrastructures necessary for tolerable human existence by rural family are generally lacking in Nigeria and most of the developing.

- No functional motorable roads- Roads made up of innumerable pot holes
- Deplorable lack of potable water, both for drinking and for various household chores.
- No Good health care facilities to serve needs of the people
- No Good Electricity
- No standard Schools
- Marginalized farm incomes
- High rates of youth migration
- Risks from Climate Change
- Biodiversity loss
- Environmental degradation -floods and associated soil and gully erosions
- COVID-19 pandemic

Government Interventions

- Local Government Reforms in 1976
- River basin and rural development authorities
- World Bank assistance in executing agricultural development projects
- Welfare schemes to improve the living conditions of many Nigerians
- Directorate of Food, Roads and Rural Infrastructure (DFRRI)
- National Economic Empowerment and Development Strategy (NEEDS)
- Local Government Economic Empowerment and Development Strategy (LEEDS)
- Social Welfare Funds etc….

Agriculture as a vehicle for rural emancipation

Nigerian Agricultural System

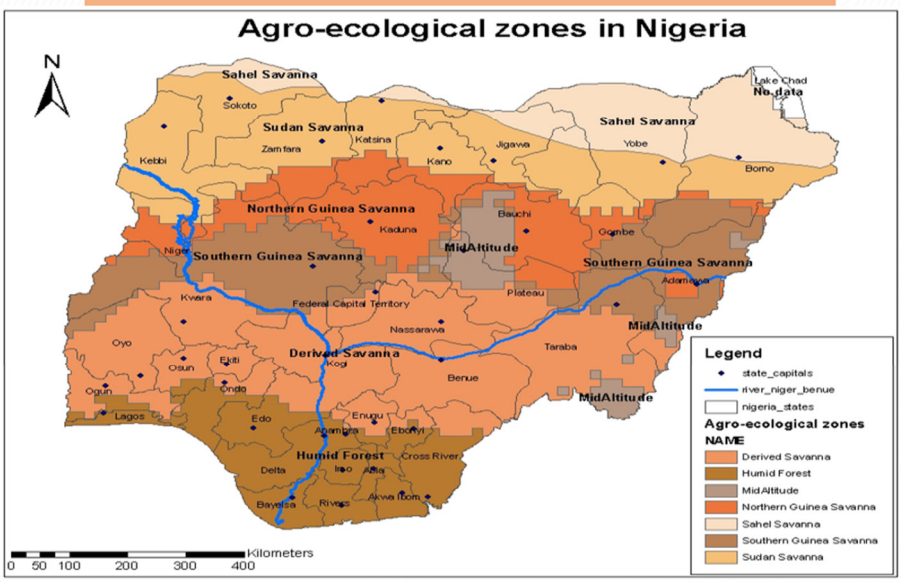
BASICS-II

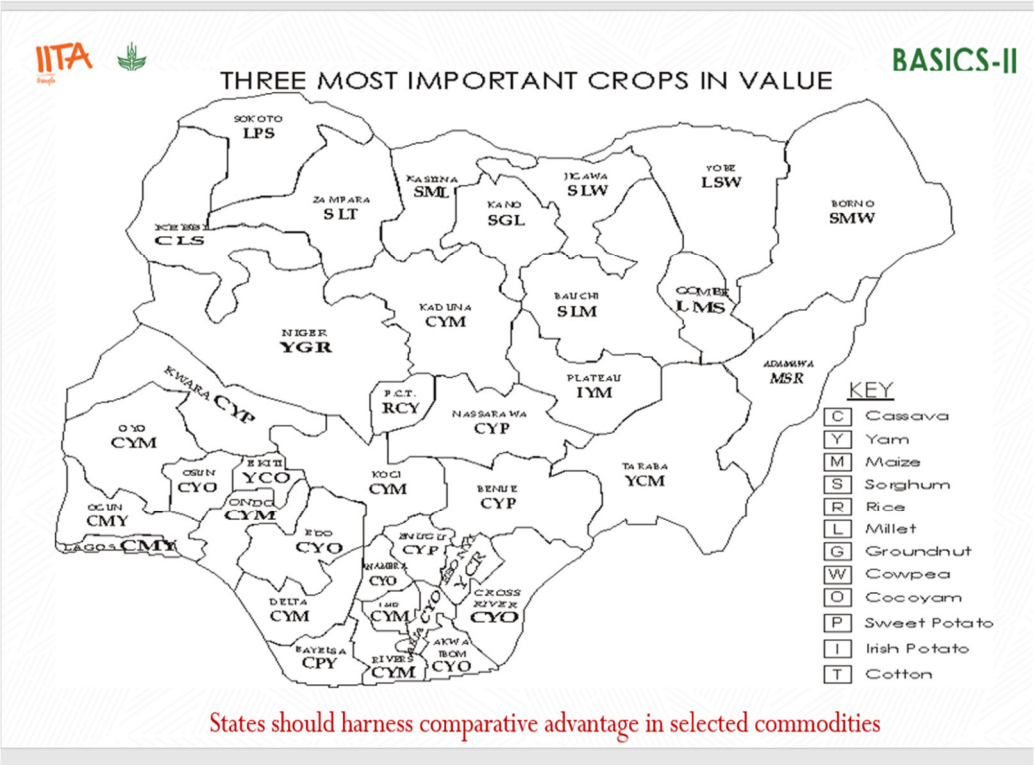
- Agriculture is the largest employer of labour in Nigeria
  - 30 % of the population on full time basis and
  - about 50 % on part time basis.
- Nigeria is endowed with substantial natural resources which include:
  - 68 million hectares of arable land,
  - freshwater resources covering about 12 million hectares,
  - 960 kilometres of coastline and
  - ecological diversity - crops and livestock, fisheries and forestry products.
- Ample and reliable rainfall, uncountable agrarian communities, moderate sunshine etc.

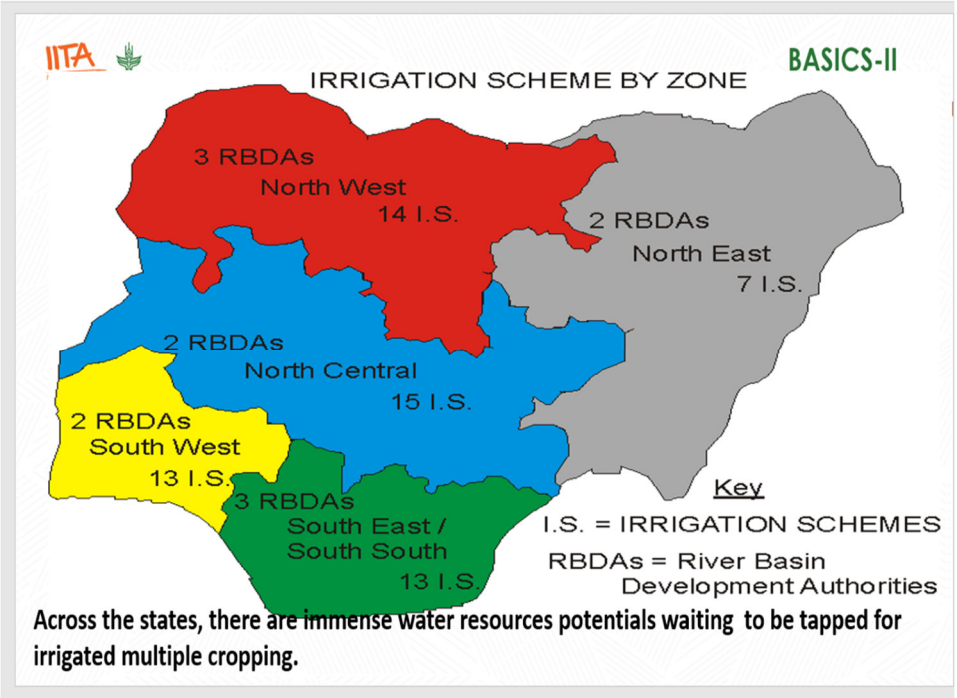
Slasher | Boom Sprayer | Harvester

Agro Ecological Strength...

BASICS-II







The Bottlenecks

Despite the potential of agriculture and agribusiness to emancipated rural families, the following are bottlenecks impending on its functionality:

- constrained access to land
- very low level of irrigation development (< 1% of cropped land under irrigation)
- weak Agricultural extension system
- high rural - urban migration
- poor quality agricultural inputs
- rural infrastructural deficit

- under funding of research institutes
- poor access to credit
- inadequate storage facilities
- poor access to markets
- Poor farming methodologies
- poor transport infrastructure
- farmers-herdsmen clashes

Cassava as a case study

Cassava is the third-largest source of food carbohydrates in the tropics, after rice and maize[2]. Cassava is a major staple food in the developing world, providing a basic diet for over half a billion people.[3] It is one of the most drought-tolerant crops, capable of growing on marginal soils.

Cassava (Manihot esculenta Crantz) (Figure 2) was introduced into central Africa from South America in the sixteenth century by the early Portuguese explorers (FAO, 2006). It was probably the emancipated slaves who introduced the cassava crop into southern Nigeria, as they returned to the country from South America via the islands of Sao Tome and Fernando Po. At that time there were Portuguese colonies off Nigeria's shores. Cassava, however, did not become important in the country until the end of the nineteenth century when processing techniques were introduced, as many more slaves returned home.

Cassava is largely consumed in many processed forms in Nigeria with about 90% of cassava is processed as food while not more than 10% is used for industrial production and less than 1% of cassava output is exported. Also, the dietary calorie equivalent of the daily per capital consumption of cassava in Nigeria is estimated to be 238kcal and *gari*, chips, flour and mostly fermented paste are major forms in which cassava is consumed. Its use in the industry is well known, but is gradually increasing, especially as import substitution becomes prominent in the industrial sector of the economy. There have also been innovations around using cassava peels for animal feed as a substitute for maize.

Figure 2: Cassava plant
Source: IITA

Cassava, the neglected crop of the down-trodden, is fast becoming an elite food crop in sub-Saharan Africa (Sanni, 2015). Cassava's combined abilities to produce high yields under poor conditions and store its harvestable portion underground until needed make it a classic "food security crop". As reported by Nweke et al. (2002) cassava development in Africa passed several stages from a famine reserve crop during periods of scarcity and drought serving as a source of calories in the diets of rural consumers; a food and cash crop with improved technology and involving a broad adoption of high yielding varieties and mechanization of certain processing stages (grating, pressing, frying and milling) and now becomes an industrial crop, providing raw material for the starch, ethanol, sorbitol, flour, and animal feed industries.

Cassava is grown in all agro-ecological zones of Nigeria, but thrives in the rainforest and derived savannah areas (Sahel, 2016). Up until the early 1990s, cassava cultivation was mostly based on traditional low-yielding cultivars (with average yields of 7-10 MT/ha) and manual processing.

The Global Cassava Development Strategy (GCDS) influenced a number of larger initiatives including New Pan-African Development Initiative (NEPAD's Pan-African Cassava Initiative), Presidential Initiatives (PICs) in Nigeria (Figure 3) and Ghana, and the Cassava

[2] Fauquet Claude; Fargette Denis (1990). "African Cassava Mosaic Virus: Etiology, Epidemiology, and Control" (PDF). *Plant Disease*. 74 (6): 404–11. doi:10.1094/pd-74-0404.
[3] https://en.wikipedia.org/wiki/Cassava#cite_note-5

Transformation of African Development Bank (AfDB)[4] (Abass *et al.*, 2011; Sanni, 2011).

[4] https://taat-africa.org/tag/afdb/

Figure 3: Presidential Support for HQCF

Since the early 2000s, many states in Nigeria, have witnessed greater attention, by different actors, to the promotion of cassava as an industrial crop with the objectives of diversifying farmers' incomes, enhancing foreign exchange earnings and increasing employment opportunities. The development of the cassava market achieved in States has enhanced a stepwise adoption of high-yielding cultivars (with on-farm yield potential up to 25 MT/ha) and mechanization of labour-intensive processing stages (grating, pressing, roasting, drying and milling) with very basic equipment.

Nigeria has implemented a cassava incentive and subsidy scheme that has given the sector a competitive advantage. Nigeria is the world's largest producer of cassava (59 million tonnes per annum) (Figure 4), while Thailand is the largest exporter of cassava starch[5].

[5] https://en.wikipedia.org/wiki/Cassava

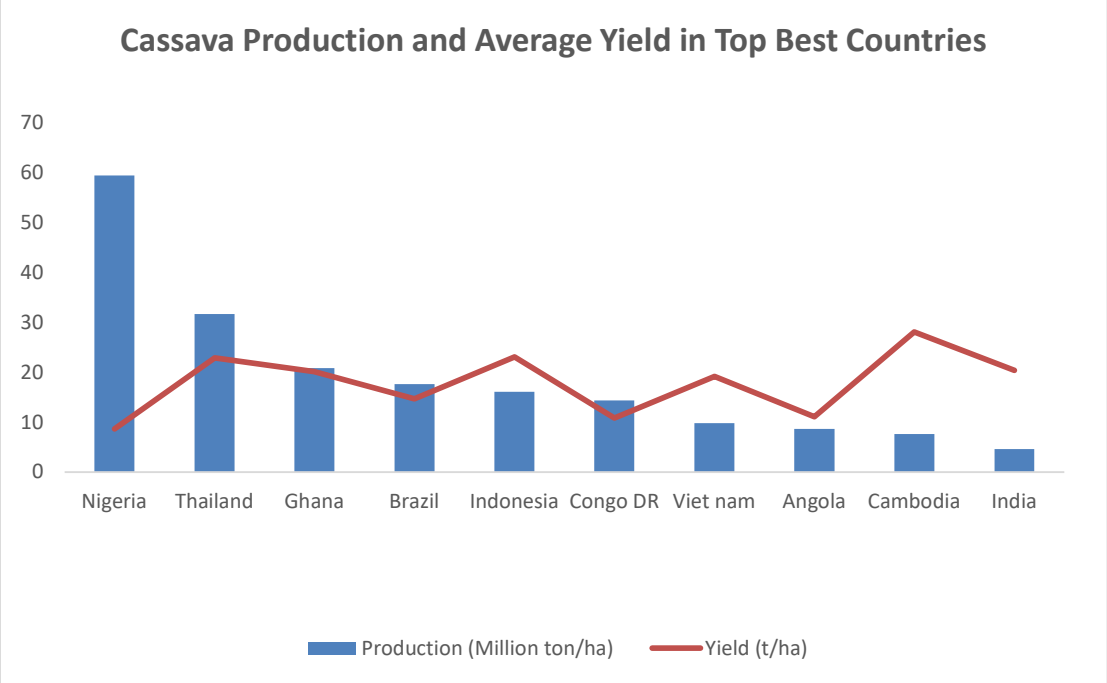


Figure 4: Cassava Production and Average Yield in Top Best Countries
Source: FAOSTAT (2020)

Nigeria's average yield of 8.68 MT per hectare, is very low compared to the 28 MT and 23.1 MT average yield per hectare produced respectively in Cambodia and Indonesia, the other leading cassava producers in the world (FAO, 2020). In the world market, African countries were not among the leading importing and exporting countries as observed by The Observatory of Economic Complexity (OEC) 2019. Thailand is the leading exporter of cassava followed by Viet Nam and Cambodia (in cassava flour and starch/chips and pellets) though her production level was not as high as that of Nigeria. According to FAO Food Outlook, 2018, a total of about 20 million tonnes of cassava flour and starch was exported globally in 2014 and this was increased to 22 million tonnes in 2017 (Figure 5). Thailand led the cassava exporting world by exported 9.5 million tonnes of cassava flour and starch, and also, chips and pellets of 12.2 million in 2017. The Nigeria export value was $1.25million with quite embarrassing infinitesimal (0.057%) share of the world cassava export which stood at $2.19billion in 2017[6].

[6] The Observatory of Economic Complexity (OEC) (2020). https://oec.world/en/visualize/tree_map/hs92/export/show/all/0714/2017/en/Accessed April 12, 2020.

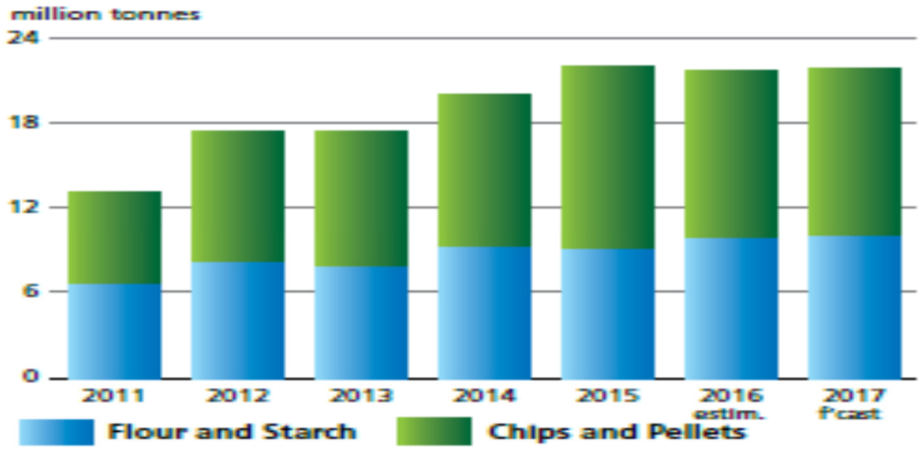


Figure 5: World trade in cassava products (chips and pellets equivalent)
Source: FAO (2017)

Moreover, China Japan, Indonesia are among the world leading importer of cassava products (flour, starch, chips and pellets). China is world leading importer of cassava products, importing an estimated 9.5 million tonnes of flour and starch and also accounted for 63% world share of cassava import value in 2017. The top 10 cassava exporter globally (Table 3) include; Thailand, Vietnam, USA, Costa Rica and China, Netherlands, Spain, Egypt, Honduras and Indonesia respectively. Thailand exported a total cassava valued at $1.19billion while China's total cassava import in 2017 stood at $82.5million. Moreover, China, United Kingdom, USA, Netherlands and Canada are among the top 10 leading cassava importing countries with China ranked number one, exporting cassava worth of $1.37billion while Canada's cassava export was $57.8 million.

Table 3: Top Ten Importers of Cassava in the World Market

	2014	2015	2016	2017
Total	**17,380**	**21,444**	**21,260**	**22,081**
Flour and Starch	**7,554**	**8,497**	**9,375**	**9,577**
China	3,813	4,205	4,922	5,535
Japan	916	851	884	980
Indonesia	880	1,256	1,339	752
Malaysia	525	586	580	622
Others	1,412	1,600	1,650	1,688
Chips and Pellets	**10,880**	**13,021**	**12,016**	**12,229**
Thailand	6,927	7,458	6,411	6,661
Viet Nam	2,995	3,607	3,241	3,200
Cambodia	808	1,805	2,182	2,230
Others	150	150	181	137

Source: Source: FAOSTAT (2019); Otekunrin and Sawicka (2019)

The recent transfiguration of cassava from a low profile commodity into an industrial raw material, coupled with the new cassava revolutionary policies of the Federal Government of Nigeria have resulted into a serious surge in the demand for cassava and cassava-based products both locally and internationally (Figure 6).

Figure 6: *Gari* and other traditional staples from cassava.
Source: National Cassava Summit.

We now have more branded and fortified *gari* types; Yellow *gari* (Ibo), White *gari* (Bendel), White *gari* (Ijebu), *Gari*vita (*lebu*), Packaged *Gari* plus (milk, groundnut, peanuts, sugar, etc), Soya-*gari, fruited gari* (Figure 7).

Figure 7: Selected Packaged and Branded *Gari* Samples

It is a widely consumed Nigerian food with an estimated 4.2 million tons produced in 2009 (NBS, 2010). With large numbers of West Africans in the diaspora and large international supermarkets chains, poor packaging and inconsistent quality limits Nigeria's participation in the lucrative export market opportunities in Europe and North America. The size of the high-quality *gari* market is estimated conservatively to be 455,000 tons/ per year, 65,000 tons from export to the diaspora and 390,000 demand from super markets, equivalent to 2.73 million tons of fresh roots per year. The growth rate of *gari* has been put at an average of 5% per annum, primarily due to population growth, increasing urbanization, and export to the regional West African market. It already provides livelihoods to more than 5 million value chain actors such as farmers, village level processors (often poor rural women), equipment manufacturers, traders (wholesale and retail), and transporters. Just a week of COVID-19 lockdown, cost of *gari* rose up with 30-35% hike in April, 2020 (Table 4).

Table 4: Hike in Price of *Gari* during COVID-19 Lockdown (April, 2020)

Company/Source	Standard of measure	Current Price/Tonne	Previous Price/Ton	Remark
Tosmat Foods and Agro Products, Oyo-Iseyin Road, Aladiye Village, Oyo West Local Government, Oyo State Tel: 08098329653; 08035683808 Email: tosmatfoods@gmail.com	Tonne	200,000.00	130,000.00	Cassava price now 28,000 as against 18,000 per tonne
Kofo Agro Farms Limited, Iseyin-Ibadan Road, Iseyin, Oyo state	Tonne	220,000.00	150,000.00	Cassava price now 25,000 as against 17,000 per tonne
Al Fawaz Farms Limited, Iseyin-Ado Awaye, Iseyin, Oyo state	Tonne	250,000.00	180,000.00	High Price of roots and COVID 19 pandemic
Niji Foods Limited, Ilero – Otu Road, Ilero,	Tonne	200,000.00		High price of roots

Oyo state

Annual demand for starch in Nigeria is estimated at 250,000MT and High-Quality Cassava Flour (HQCF) (Figure 8) stands at 504,500 MT and these requirements are usually met by limited quantities of locally produced corn starch and cassava starch and a bigger bulk of imported corn starch and cassava starch from America, Asia and even South Africa.

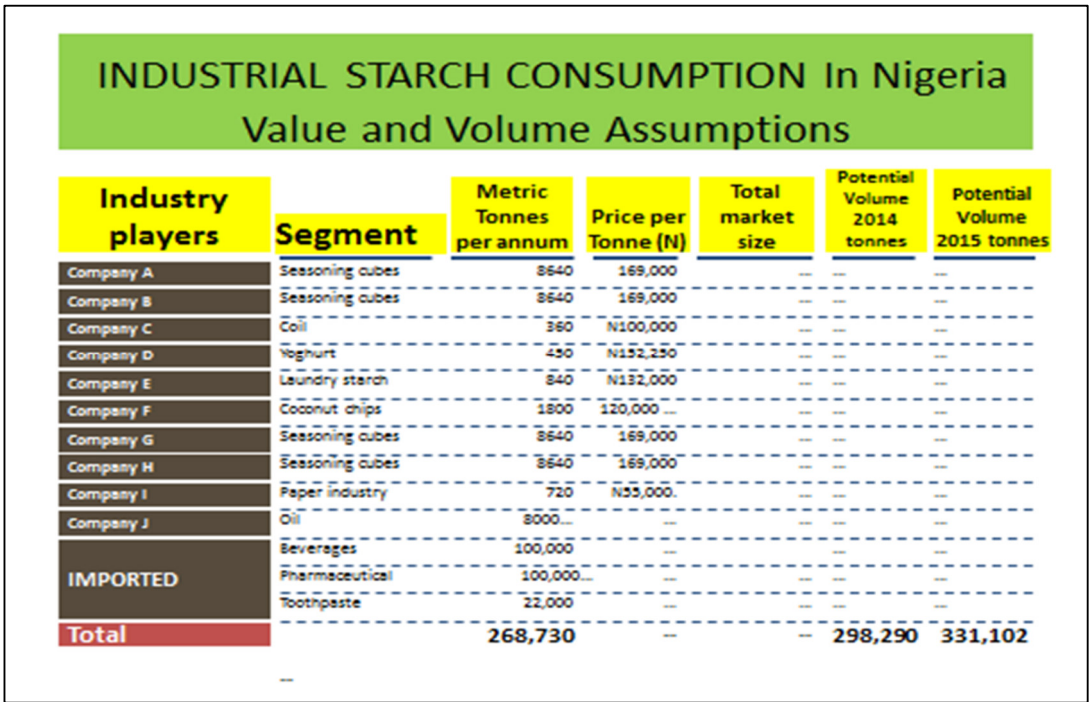
HQCF

Cassava-Wheat Bread

Cassava Chin Chin

Figure 8: Promoted the innovative inclusion of High-Quality Cassava Flour in wheat bread.
Source: IITA

Recently, it was discovered that starch is usually imported by the pharmaceutical firms who take undue advantage of the low tariff (5%) to import more than the amount they require for sale to other end users. To further grow the local content and handle the effect of COVID-19, the Pharmaceuticals firms, CBN and stakeholders are now workings towards local production of Pharma grade starches. This is huge opportunity for investors. Nigerian Breweries intend that by 2020, 60% of their raw materials will be sourced locally while Nestle and Unilever also projects that by 2020, 50% of their raw materials will be sourced locally. It therefore becomes imperative to leverage on the massive opportunity in the agro-based industries. Very few existing starch companies produces food grade cassava starch for their main customers who are multi-national food and beverages processing companies like Nigerian Breweries, Nestle, Cadbury, Unilever and others (Figure 9).



INDUSTRIAL STARCH CONSUMPTION In Nigeria
Value and Volume Assumptions

Industry players	Segment	Metric Tonnes per annum	Price per Tonne (N)	Total market size	Potential Volume 2014 tonnes	Potential Volume 2015 tonnes
Company A	Seasoning cubes	8640	169,000	--	--	--
Company B	Seasoning cubes	8640	169,000	--	--	--
Company C	Coil	360	N100,000	--	--	--
Company D	Yoghurt	450	N152,250	--	--	--
Company E	Laundry starch	840	N132,000	--	--	--
Company F	Coconut chips	1800	120,000	--	--	--
Company G	Seasoning cubes	8640	169,000	--	--	--
Company H	Seasoning cubes	8640	169,000	--	--	--
Company I	Paper industry	720	N55,000.	--	--	--
Company J	Oil	8000	--	--	--	--
IMPORTED	Beverages	100,000	--	--	--	--
	Pharmaceutical	100,000	--	--	--	--
	Toothpaste	22,000	--	--	--	--
Total		268,730	--	--	298,290	331,102

Figure 9: Industrial Starch Consumption in Nigeria. Source: PIND, September, 2017

Cassava starch has many remarkable characteristics, including high paste viscosity, high paste clarity, and high freeze-thaw stability, which are advantageous to many industries (IITA, 2005). High-quality Food Grade Cassava Starch is simple unfermented starch. Thus, while simple in principle, the manufacture of a good cassava starch requires great care. The production of cassava starch requires a conscious adherence to good manufacturing practice (GMP) in order to produce a safe and suitable starch in conformity with ISO 22000. The multinationals in the Food and Beverages Industry relies more on high-quality products.

Clear cut opportunities that can be harnessed from the emerging industrial cassava enterprises with over 20 million job opportunities abound (direct or indirect) in Figure 10.

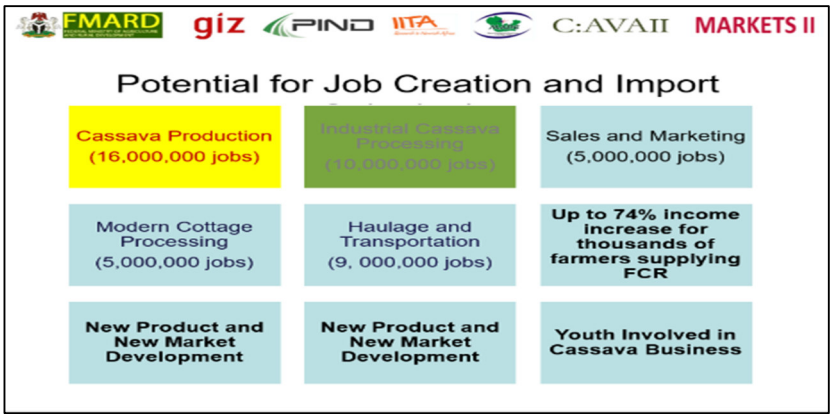


Figure 10: Potential for Job Creation and import for cassava and cassava products
Source: Cassava Summit, 2017

Varietal Development and transition to sustainable seed system

The Nigerian cassava production involve six million subsistence farming systems, mostly dominated by men equipped with informal seed system by recycling stems from the previous harvest, small farm size (less 1 ha), and low technical know-how on agronomic practices. The integrated efforts by IITA, NRCRI, RTEP, ADPs and other stakeholders gave birthed to improved

cassava varieties like TMS 30572 up to 2004 and by 2006, there was Official release of 10 improved cassava varieties selected from 43 varieties screened under the pre-emptive management of cassava mosaic disease (CMD). Those varieties were used in wheat bread formulations (Shittu et al., 2007) (Figure 11).

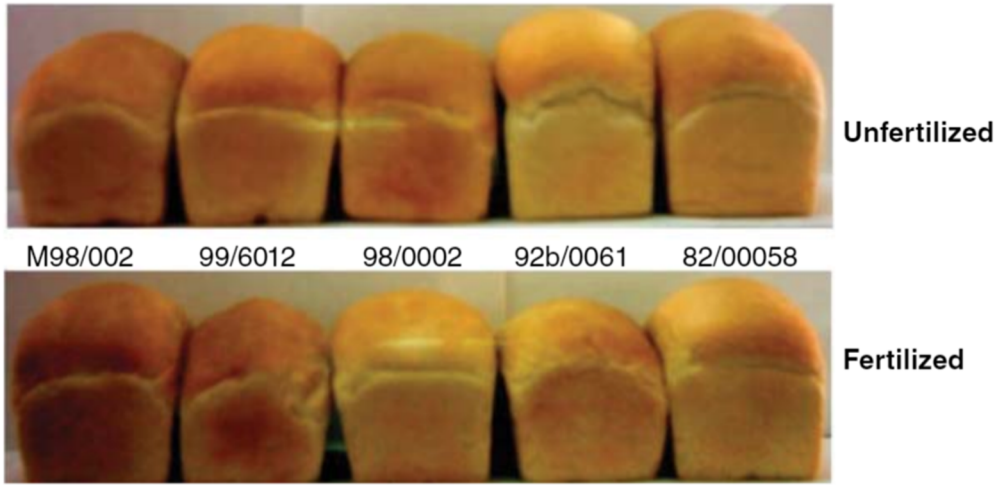


Figure 11: Composite Bread sample by substitution 10% of WF with flours from different cassava genotypes bread by IITA. Source: Shittu et al., 2007.

IITA, through its Integrated Cassava Project (ICP) implemented in the South-south and southeast States of Nigeria in 2002 heavily campaigned for commercializing cassava production. It distributed to farmers planting materials of high-yielding CMD-resistant varieties of cassava coupled with on-farm trainings on appropriate agronomic technologies and management practices. Findings showed that farmers' yields have doubled from an average of 11T/ha to 25T/ha.

The success was completed by other cassava projects especially the 'cassava: Adding value for Africa' project that ensured consistent supply of raw materials through multiplication of newly released IITA cassava varieties, coaching and mentoring farmers that surround processing facilities for HQCF and linking value chain actors to markets (c:AvA; http://cava.nri.org/). CAVA 2 (2019-2019) also ensure appropriate markets for cassava fresh root producers to intermediate factories who were also linked to end user markets (Figure 12).

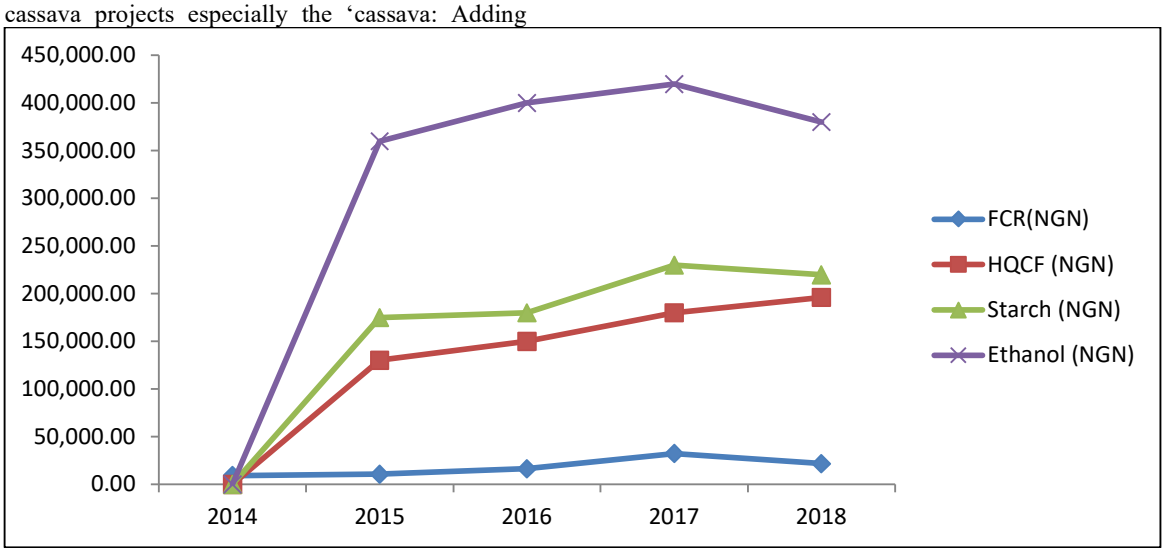


Figure 12: Price trends for cassava roots and products
Source: C:AVA 2

Neglect in further supports in terms raw material supply, business skills, credit facilities, market access and insecurity from herdsmen ravage of farms might are major challenges (IITA-CEDP, 2008). The transition of cassava from traditional to industrial crop exerts pressures on the fragile and week raw root supply. Nigerian will need 80 -90 million tonnes of cassava roots to cater for its conversion to *gari*, *fufu*, chips and the industrial intermediate products-HQCF, starch and ethanol.

The supply of high yielding, starch, dry matter and disease resistant cassava roots to for the processors is becoming a herculean task. Producers must embrace competitive commercial cultivation of their farms with combination of high-quality seeds, viable agro inputs and mechanized farms. The good news is the emergence of processor-led model of cassava seed system in Nigeria through the Building an economically sustainable integrated cassava seed system (BASICS) Project sponsored by Bill and Melinda Gates Foundation. Once the project is able to deploy more interventions to different states of the federation, it is expected that cassava stem will be available in commercial quantities as required during and after the project.

Figure: BASIC Model, IITA, 2020

Project Components and Outcomes — BASICS-II

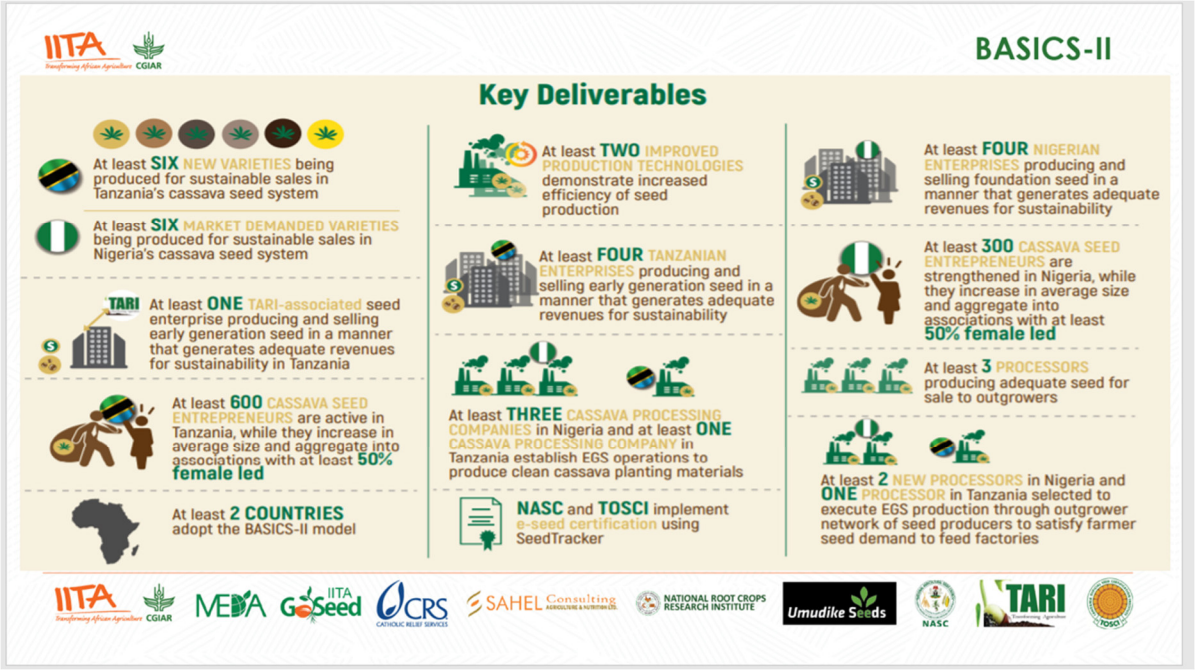
Component	Primary Outcomes
Component 1	New cultivars emanating from cassava breeding programs are integrated into seed systems in a manner that facilitates their marketing, production, sales, and uptake.
Component 2	Seed enterprises are established in Nigeria and Tanzania that produce EGS (equivalents of breeder and foundation seeds) in a reliable and economically sustainable manner for sale to independent, private seed entrepreneurs who sell seeds to farmers.
Component 3	Decentralized, commercially viable seed enterprises [cassava seed entrepreneurs (CSEs)] in Nigeria and Tanzania demonstrate sustained production and sales, and increase in average size and aggregation into associations to facilitate marketing, quality control, and other services to validate a commercial seed model that can be replicated.

Project Components and Outcomes — BASICS-II

Component	Primary Outcomes
Component 4	At least four processor-associated seed systems are successfully developed, demonstrating that processors can produce seeds for their farms and outgrowers in an economically sustainable and replicable manner.
Component 5	Functional policies and regulatory capacities are established to promote quality in cassava seed systems and facilitate disease management without stifling the development of seed systems with unsustainable costs.
Component 6	Seed system model is scaled in Nigeria and Tanzania and replicated in at least two more countries through the engagement of additional development partners, including AGRA and the TAAT program taking advantage of TAAT's strong links with country programs on cassava in Africa.

Expected benefits

The project aims to establish an innovative, commercially and economically viable stem business model. This model seeks to increase yield by 40% by implementing the rapid propagation technology-autotropic hydroponic system (SAH) which will enable smallholder farmers to provide high-quality cassava roots to industrial processors and thus improve their income. BASICS' vision is that by 2019, smallholder cassava growers will be buying high-quality stems of their preferred varieties and planting them with improved agronomic practices.



The future of Nigerian agriculture and rural emancipation lies in encouraging more of such bold groups of young farmers to innovate their way to farming stardom.

Elements of efficient agricultural value chains

Basic infrastructure	**Production and storage support**	**Marketing & business support**
▪ Roads and transportation ▪ Communications ▪ Rural energy distribution ▪ Water and Irrigation access and regulation ▪ Products from Agricultural Research (genetic and production hardware plus information for efficient productivity)	▪ Production input supply merchants ▪ Farm machinery manufacturers and suppliers ▪ Extension services providing "Know-how and innovation" to producers • Producer associations and cooperatives • Weather forecasting • Storage infrastructure	▪ Market information services ▪ Market intelligence ▪ Chambers of commerce ▪ Trader and Sector support groups ▪ Technical and business training services ▪ Local marketing centres • Export promotion – trading houses
Financial support	**Policy reform, regulation, incentives and safety nets**	
▪ Credit services ▪ Banking services, note and electronic ▪ Crop / farm risk insurance schemes ▪ Trading exchanges ▪ Futures markets	▪ Land tenure policy and taxation ▪ Government policy regulation for trading ▪ Safety net functions, such as food aid, price support schemes ▪ Investment grants ▪ Arbitration and reform councils-based dialogue between private sector apex groups and Government select committees ▪ Legal reforms and dispute settlement • Regional and international trade policy groups	

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PRESENTED PAPERS

EFFECTS OF RURAL-URBAN INTERACTIONS ON RURAL DWELLERS' PARTICIPATION IN COMMUNITY-BASED PROJECTS IN EDO AND ONDO STATES, NIGERIA

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ABSTRACT
It is a fact that a large proportion (70%) of Nigeria's populace are domiciled in rural areas and primarily engaged in agriculture as their source of livelihood. However, in-spite of the various government rural development interventions, the much-desired improvement in the infrastructural and economic conditions of most rural areas in the country seems to be a mirage as a gap exists between the urban and the rural areas in terms of their level of development. This study therefore examined the effects of rural-urban interactions on rural dwellers' participation in community-based projects in Edo and Ondo States, Nigeria. Well structured interview schedule was used to elicit information from 300 respondents selected across the two states. Findings from the study revealed that majority (61.7%) of the respondents indicated a high level of participation in the community-based projects based on rural-urban interactions. Similarly, strong and positive relationship exist between the types of the community-based projects and rural dwellers' level of participation in the projects with Educational projects (r=0.500); Health projects (r=0.635); Water projects (r=0.586); Social development projects (r=0.700); p< 0.05respectively. The study concludes that a positive relationship exists between the rural area and the urban centres in terms of sustainable development. Therefore, the study recommended that rural-urban interactions should be harnessed by the stakeholders involved in community development projects and policy making in Nigeria to promote the standard of living in the rural areas.
Keywords: Rural-urban interactions, Rural dwellers, Participation, Community-based projects

INTRODUCTION
Rural development and agricultural development are pre-requisites for stimulating economic growth and poverty alleviation in developing countries of Africa such as Nigeria. It has been established that at the very heart of rural development are peasants who are small scale farmers, tenants, shareholders, labourers of the land which form the main agricultural labour force all of whom find livelihood in agriculture (Aderonmu, 2010). Similarly, Muoghalu (1992) asserted that rural development is of national importance in Nigeria because of the following reasons: In 1963, 80.7% of the national population were resident in the rural areas and that the proportion had gone down to 70.1% and 69% between 1985 and 1990 respectively.

Rural-urban interactions on the other hand, refer to the network of relationships which exist between the rural and the urban communities. According to Tacoli (2002) the network of small, medium sized and large urban centres are vocationally efficient in that urban areas allow cluster of services, facilities and infrastructures that cannot be economically located in small villages to serve a widely dispersed population in supplying both agricultural and non-agricultural services: it is from the urban areas that innovation trickle down to the rural populace. Buttressing this assertion, Oyesola and Oladeji (2006) avowed that the flow of people, goods, money and information between rural and urban areas are important elements of rural development. Similarly, according to von Braun (2007) rural and urban areas co-exist along a continuum with multiple types of flows and interactions

Consequently, Whande (2009) categorised rural-urban interactions into two distinct but linked forms namely: spatial and sectorial interactions. Spatial rural- urban interaction which has to do with linkages across space include flow of people, social network, flow of information, flow of technology, financial flow such as remittances or cash transfer to rural homes and exchange of ideas, while the sectoral interaction is based on income generating activities to earn a living from either agricultural or non-agricultural activities.

Despite all the interventions by the successive regimes in Nigeria, the rural areas still battle the problem of lack or shortage of basic amenities and this is an indication of the failure of these laudable interventions to accelerate the development of the rural sector.

Human Development Report (2018) revealed that Nigeria is one of the poorest among the poor countries of the world with the rank of 157 out of 189 and Human Development Index (HDI) value of 0.532 and a life expectancy of 54years for female, 53 years for male; 44% literacy rate and 70% rural population living on less than 2 dollars per day and lacking adequate access to clean and safe water, education and health care facilities, electricity, housing and good road networks. Moreover, current estimate showed that the rural population which constitutes about 70% of the entire population of over 170 million people is neglected in terms of infrastructural development and this has in turn made most of the rural areas in

the country qualitatively and quantitatively depopulated and progressively less attractive for socio-economic advancement (Laah, Abba, Ishaya and Gana, 2013). This according to Ekpebu and Ukpon (2012) suggests the need to give adequate attention and funds to promote basic supportive infrastructure such as electricity supply, markets, good access road and affordable transport system as well as improved agro-allied industry in Nigeria. Therefore, this study examined the effects of rural-urban interactions on rural dwellers' participation in community-based projects. The study specifically:

1. identified the level of satisfaction derived by the respondents from rural-urban interactions;
2. indicated the rural dwellers' level of participation in the Community-based Projects; and
3. determined the effects of respondents' out-flow and in-flow rural-urban interactions on their participation in CBPs.

The hypothesis for the study was stated in the null form as: Ho_1: there is no significant relationship between the types of the community-based Projects executed in the study area and rural dwellers' level of participation in the community-based projects.

METHODOLOGY

The study was conducted in Edo and Ondo States, Nigeria. Multi-stage sampling technique was used to select 300 rural dwellers (respondents) for this study. The instrument of data collection was well-structured, validated and pre-tested interview schedule. Additional information was gathered from the respondents through Focus Group Discussion (FGD).

RESULTS AND DISCUSSION

Level of satisfaction derived by the respondents from rural-urban interactions

Results on Table 1 show that most (53.7%) of the respondents derived high level of satisfaction from their rural-urban interactions. This finding corroborates that of John (2014) that rural-urban interactions help people to develop knowledge and skills in the urban areas which are used to improve farming back in the rural areas. The implication is that rural-urban interactions could create a foundation for future generations by improving the infrastructural and social services needed for notable development.

Table 1: Categorization of the respondents based on the level of satisfaction derived from rural-urban interactions.

Level of satisfaction	Frequency	Percentage (%)
High	161	53.7
Low	139	46.3

Source: Field survey, 2019 * High at satisfaction value >2.00

Respondents' level of participation in the Community-based Projects

Results on Table 2 show that majority (61.7%) of the respondents indicated that the level of participation in the community-based projects based on rural-urban interactions was high. This implies that rural dwellers often participate in community projects based on felt needs and mutual benefit that can be derived from such projects. This could be used to stimulate more holistic participation in the provision of other basic infrastructures in developing their communities.

Table 2: Distribution of the respondents based on level of participation in the community-based Projects due to rural-urban interactions

Level of participation	Frequency	Percentage (%)
High	181	61.7
Low	115	38.3

Source: Field survey, 2019 * High at >2.00

Effects of respondents' out-flow and in-flow rural-urban interactions on their participation in CBPs

Result on Table 3 reveals that the respondents' perceptions were favourable with 52.0% and 60.3% respectively. This implies that rural-urban interaction can stimulate rural dwellers' participation in community-based projects.

Table 3: Distribution of the respondents based on the effects of out-flow and in-flow rural-urban interactions on their participation in community-based projects in the study area.

Perception (out-flow to urban)	Frequency	Percentage (%)
Favourable	156	52.0
Unfavourable	144	48.0
Perception (in-flow to rural)		
Favourable	181	60.3
Unfavourable	119	39.7

Source: Field survey, 2019* Favourable at out-flow value >56.07 and in-flow value> 52.26

Relationship between the types of the community-based Projects and rural dwellers' level of participation in community-based projects

Result of the correlation analysis in Table 4 reveals that a positive and significant relationship exist between the types of projects: educational projects (r=0.500); health projects (r=0.063); water project (r=0.586); social development projects (r=0.700); drainage project (r=0.653); and respondents' level of participation in community-based projects. It could therefore be inferred that the rural dwellers level of participation depends on the types of community-based projects they were involved in. This implies that the more the type of project is related to the needs of the respondents, the more their level of participation in such projects. The null hypothesis is therefore rejected.

Table 4: Relationship between the types of the community-based Projects and rural dwellers' level of participation in the community-based projects.

Variables (Types of projects)	r-value	p-value	Decision
Educational projects	0.500	0.000	S
Health projects	0.635	0.000	S
Water projects	0.586	0.000	S
Social development projects	0.700	0.000	S
Drainage projects	0.653	0.000	S

Source: Field Survey, 2019 Significant at p< 0.05(S= Significant)

CONCLUSION

The study concludes that a positive relationship exists between the rural area and the urban centres in terms of sustainable development. As evident from the study, the relationship between the level of satisfaction derived from rural urban interaction, types of Community-based Projects and rural dwellers' participation in the community-based projects is a reflection of the need to further apply the bottom-up approach to all rural development policies and projects in Nigeria. Based on the findings of this study, the following recommendations were therefore made:

- Local leaders, individuals, social groups, community development experts and governments should harness the potentials of rural-urban interactions in improving the provision of basic infrastructures in the rural communities; and
- Rural dwellers should be encouraged by community leaders, community development association and trade groups to participate in all projects instead on concentrating on just few ones.

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RURAL OUTMIGRATION AND ITS IMPLICATIONS FOR RURAL LIVELIHOODS: A CASE OF THE GUJBA LOCAL GOVERNMENT AREA OF YOBE STATE

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ABSTRACT
It is certain that migration out of agriculture is considered an aspect of the economic development process, although policy makers have long feared that migration out of rural areas reduces agricultural production and consequently affecting food security. This paper is a review of the growing literature with more credible statistical identification that evaluates the effects of migration on agricultural production and other outcomes among rural households. Generally, migration may not negatively affect agricultural production in rural areas, once households shift on one of several margins to reduce the lost labour impact. As a result of remittances received by the households from the migrants, it enables the households to have one of several different types of investment. When investment occurs, the type of investment depends upon relative local returns to investment in agriculture, off-farm investment, or human capital investment. Some innovative recent work also documents the role of migration in catalyzing technical change. In this connection therefore, future policies regarding rural out-migration should be concerned with enhancing the positive effects while mitigating any negative effects.
Keywords: Migration, off-farm, Agriculture, Investment, Rural Labour

INTRODUCTION
Rural outmigration is generally and historically a major component of development process. Economic growth since time immemorial was predicated on the shift of labourers from agriculture to service and manufacturing sectors of the economy particularly witnessed during the industrial revolution. Out-migration of rural population is mostly a decision taken at the level of the family due to the fact that the migrants believe that they will find jobs with higher prospect of return to the household (Brauw, 2019). This position is taken as relevant due to the fact that as migrants leave their homes and move to the other places out of agricultural sector by joining jobs that will be productive to rural areas, the urban areas as well as international communities. Certain development literature shows that, on average, migration is quite beneficial to those who migrate (Young 2013).

Despite that rural outmigration seem to contribute to the development process of the migrant's destination, its policy implications are often quite contentious, particularly as negative perceptions are built around migrants. The focus of this review is that, a key factor of concern to developing country's governments is food security for their populations. In a situation where the government is convinced that such will cause food insecurity, then government tries to introduce policies that will lead to the restriction of rural outmigration in the name of improving food security. Under the guise of maintaining food security, some governments have used explicit barriers to movement, such as China's hukou system, which assigns government benefits associated with one's place of residence (Mallee 1995). Such restrictions may lead to them is allocation of economic resources either geographically (Jalan and Ravallion, 2002) or across sectors (Adamopolous et al. 2017) over time.

However, it is still not out of place to presume that, as migrants leave the household it is certain that those left behind do find ways to substitute for the lost labour of the migrant, mitigating any potential reduction in output. It is also most likely that successful migrants do send back remittances to family members or others remaining in the origin. Those remittances can potentially be used to overcome constraints on agricultural production (Taylor andMartin, 2001, Yang, 2011).

Causes of rural outmigration
As a matter of fact, nothing happens without a cause and thus, the outmigration of people from the rural sector is predicated on a number of factors which include natural and made disasters such as floods, drought and armed conflict / insurgency as is the situation in Gujba around 2014. Other factors may include unemployment, poverty, marriage, perceived opportunities at the destination, and absence of social amenities. Therefore, the factors leading to outmigration depends on where it happens and the focus of this discussion is concerned with area that has been saturated in armed conflict.

Impacts of outmigration on agricultural production
On a general note, it can be accepted that outmigration from the rural areas can have some negative or positive impacts on agricultural production of smallholder farmers at the initial stage of migration. The impact could be negative in situation where labour migration occurs and no replacement has been found to immediately replace

the migrant labour. But in a situation where some ways have been found to replace the migrant labour either through hiring labour or capital substitute, migration may not have any negative effect on agricultural production, instead it may even be positive. However, while we consider outmigration in general, it is pertinent to understand that forced outmigration as in the case that happened in Gujba Local Government due to Boko Haram insurgency differs as it may not produce the same result since it is not a planned outmigration where only few a member or some members of a family migrate. Under forced migration almost every member of the family or community is involved and mostly remittance is not expected.

In a study conducted by Lukas (1987), which examines the impacts of migration on agricultural production outcomes by adopting time-series data to study the impacts of outmigration from Malawi, Mozambique, the former homelands of South Africa, Botswana, and Lesotho on crop production and livestock accumulation at the aggregate level. He noticed a general reduction in food and livestock production in the short-run whereas in the long-run there seems to increase in both food and livestock production. However, with forced rural outmigration such as what happened in Gujba Local Government Area, there use to be serious reduction in agricultural production, since farms are abandoned in such for survival affecting food security and livestock production on a large scale.

Among the most recent studies from China, it revealed that outmigration does not affect overall production; however, it actually reduces the variability of agricultural income. Both remittances and migration have effects on agricultural income, but any lost income due to migration is made up when migrants send back remittances which are used to supplement the lost labour (Taylor etal. 2003). The adopted instruments of measurement were community migrant network, and remittance norms. Using weather shocks as instruments and panel data, Giles (2006) observed that village-level outmigration only has lower variation in agricultural income which is as a result of higher flows of remittances, which improve informal insurance within the village. As a result, households in higher migration villages are better able to deal with shocks than those in low migration villages.

According to a study conducted by Quisumbing and McNiven (2010) using panel data collected in Mindanao, the Philippines, they found no effect of either internal or international migration on agricultural production. In a similar kind of study conducted by Miluka etal, (2010) confirmed similar results from the family left behind in terms of either internal or international out-migration. De Brauw (2010) uses the Vietnam Living Standards Survey data and found evidence of a shift from labour-intensive (specifically, rice) to land-intensive crops (maize and legumes) among households sending away seasonal migrants, but no net impact on agricultural production. Garip (2014) uses both focus groups and econometric methods to study the impacts of internal migration on source households in Nang Rong, Thailand, and found that richer households simply report hiring labour to replace the labour of migrant children, while poor households are better able to invest in agriculture using remittances.

Impacts of migration on household

The general impact of migration on households from rural areas varies with the factors such as impact on nutrition, education, capital investments and rural labour

a) **Impact on child nutrition**: one of the negative effects of rural outmigration is that it affects nutritional level of children. It is certain that investments in young child nutrition (e.g., children under 5 years old) have been shown to lead to improved outcomes throughout the life course (Hoddinott et al. 2008). Outmigration could in one-way lead to lack of adults to care for the children however; remittance could also lead to improvement in the quality of nutrition. Using panel data, Yue et al. (2016) find suggestive evidence that children under 30 months old with migrant mothers have slower mental development than children with mothers who are present, suggesting that such children may be neglected in exchange for the benefits of higher family income from migration.
b) **Impacts on Education**: in some countries, basic education attendance is nearing compulsory and universal, so migration is not likely to affect basic education attendance among younger children. However, migration is more likely to affect investments in education among older children, (Antman 2013, Dustmann and Glitz 2011). This may not be the same with the situation in the areas affected by insurgency such as Gujba Local Government Area because for many, they were forced out of the area but on the other hand it helped them attained higher education since they migrated mostly to the state capital. This has given even women the opportunity to attain higher education. The negative effects should therefore not be considered as general phenomena with migration.
c) **Capital investments**: several authors have found evidence consistent with a positive association between migration and housing investments through remittances. De Brauw and Giles (2018) find that relatively poor

households in high migration villages are more likely to make investments in housing than those in lower migration villages. Considering international migration, Osili (2004) uses an innovative sample of Nigerian migrants in the United States who are matched to source households in Nigeria and finds substantial housing investments in Nigeria.

d) **Rural Labour**: Generally, it is believed that in terms of rural labour, migration people particularly the youth affect the labour strength which will in turn affects agricultural production. Indeed, even with the return of relative peace to the area, significant labour loss has been recorded already and many may not be willing to return as they harness new opportunities.

CONCLUSION

In this paper, we tried to review the numerous effects generated by outmigration on communities in rural areas with a special focus on Gujba Local Government Area of Yobe State. This is relevant because the area has been under the threat of Boko Haram insurgency for number of years leading to serious forced outmigration. The review largely utilised data collected from different areas at different points in time by different scholars.

RECOMMENDATIONS

a) Rural outmigration policies should be designed considering the positive and negative impacts
b) Rural – urban migration should not be curtailed without addressing the push and pull factors
c) The nature and causes of the outmigration should be ascertained before any restriction policy should come in to place
d) Find alternative means of livelihood to forced migrants at the destination rather than considering them mere IDPs that only need to be provided with short-term assistance

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AN ASSESSMENT OF THE ROLES OF NORTH EAST COMMODITY ASSOCIATION (NECAS) TOWARDS IMPROVING AGRICULTURAL OUTPUT OF SMALL-SCALE FARMERS IN BUNI YADI, GUJBA LOCAL GOVERNMENT AREA OF YOBE STATE, NIGERIA

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ABSTRACT
The study was conducted with the view of determining the roles of NECAS towards improving agricultural output of small-scale farmers in Buni Yadi. The research was built on the following objectives; determine the contributions of NECAS in improving agricultural output of small holder farmers, examine whether the farmers have been benefiting from the initiatives, determine whether the farmers have been utilising the loans appropriately and find out repayment process. The study utilised both primary and secondary data covering the year 2018 and 2019. A purposive sampling method was adopted to enable the researcher select only those who have benefited as sample. A total of 50 respondents were selected from the beneficiaries in Buni Yadi. Questionnaires were distributed to some while others were interviewed. The data obtained was subjected to descriptive statistical analyses. It was observed that NECAS is helpful; however, the loans were not given at the right time as it extends toward the end of the rainy season. Due to this poor timing, it translates in to a situation where many monetize the materials given to them and spend it on different things. Equally it was observed that some that were given such loans are not farmers and thus, immediately monetize the materials and spend the money. There is therefore the need for NECAS to always consider the timing for giving out the loans, there should be proper supervision after giving out the loans and also to verify the farms before such is approved.
Keywords: Agriculture, Output, Farmers, Loans, Improving

INTRODUCTION
North East Commodity Association (NECAS) is an association of farmers established to carter for the important agricultural needs of farmers. The operational area of the NECAS is the north eastern part of Nigeria by according farmers in the area particularly small holder farmers the opportunity to improve their farm output. It is built on the mission of shopping innovative solution in modern agricultural practice by providing quality farming implements, access to affordable finance, world class extension services and markets. On many occasions the agricultural environment for both old and young farmers of small holders do encounter several problems which have to do with lack of information, financial capability, inadequate or obsolete agricultural tools, inability to access government support leading to poor output. Lack of farmers' association could be a contributing factor to these problems which can be arrested through establishing farmers associations.

The emergence of Farmers' association such as North East Commodity Association (NECAS) was in response to farmer-felt needs such as sharing of local resources (land, labour, water) and determination of the market situations in relation to prices of goods and access to the market. Other more contemporary needs revolve around access to services such as credit facilities, supply of agricultural implements, and information services to guarantee food and social security (Wennink et al., 2007). Prior to contemporary era, cooperatives held the platform for farmers association; however, they were generally controlled by government and thus, subject to failure (Chilongo, 2005). Dependency on government led to poor accountability, highly dependent on state subsidies culminating in to being economically non viable. As a result of state control, most cooperatives failed to compete in the open-market economies, and eventually collapsed (World Bank, 1995 cited by Abaru et al., 2006). It is certain that cooperation among farmers in the pursuit of common solution to common problems is one of the surest ways of scaling up small holder farmers in spite of the shortcomings that may be encountered (Grigoryan et al., 2008). It is in this connection that many countries particularly the developing countries doubles in to the formation of farmers associations (Carney, 1996). It is therefore not out of way that NECAS was established to serve the interest of farmers in the northeastern region of Nigeria.

Roles of farmers associations
The farmers' associations such as NECAS have been rendering a variety of services both to the farmers and to the government. Although their roles may have varied with the emphasis of development, they are generally essential instruments for carrying out processes in line with improving agricultural productivity, food security and indeed various rural reconstruction policies. The following constitute among others the major functions that the farmers' associations including NECAS have been performing:

a. Access to relevant information in relation to season and good timing

b. Supporting farmers both technically and financially to be able to sustain the tempo of attaining high output.
c. Assist farmers to have access to farming facilities.
d. Enable farmers to have access to agricultural support provided by government.
e. Formation of synergy that will speed up and guarantee the process of export to other parts of the world.
f. Ensure that a platform is created which allow for the participation of farmers in government project.
g. Establish collabourations between farmers, local and international investors. (Olu, 2017).

Problems associated with NECAS activities

Despite being beneficial to the farmers in the area, NECAS faces several constraints hindering its operations which include among others:

1. Majority of the beneficiaries of NECAS loans were not the persons meant to benefit from it. Mostly the urbanites who are not farmers happened to be on the highest scale of benefit with few rural farmers on the scale of benefit.
2. There have been serious allegations of corruption in the system where officials of the association are fingered as it is believed that they connive to buy back the products given to the beneficiaries at a much lower price.
3. There is also problem with some beneficiaries who have failed to repay their loans.
4. Materials were given to beneficiaries such as herbicides, fertiliser, seeds and sprayers but were left without money to facilitate farming activities such as for hiring tractors and labourers to assist on the farms.

Objectives of the study are to;

i. Determine the contribution of NECAS in improving agricultural output of small holder farmers.
ii. Examine if the farmers have been truly benefiting from the initiatives of NECAS.
iii. Examine whether the farmers have been utilising the loans acquired through NECAS appropriately.
iv. Understand whether farmers who benefited from the loans through NECAS have been repaying their loans.

The hypothesis of the study is stated as follows;

There is no association between the quantity of materials given to farmers and output of agricultural activities

METHODOLOGY

The study was conducted in Buni Yadi, a town completely displaced by the Boko Haram insurgency at one time. The farmers were distorted where most of them became depended assistance from Government and NGOs. A total of fifty beneficiaries of NECAS were identified via purposive sampling during the period 2018 and 2019. Questionnaires were distributed to some of them while others were interviewed. The data was analyzed using descriptive statistics with the aid of SPSS.

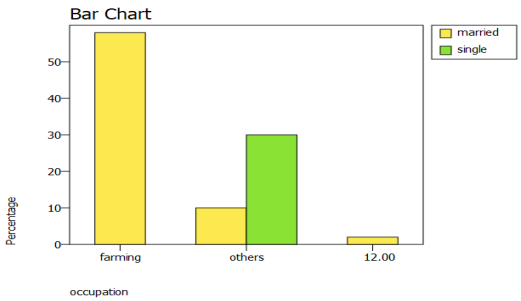

Figure 1: Occupation and marital status of respondents

RESULTS AND DISCUSSION

The presentation of the results is done utilising cross tabulations shown in the charts as follows:

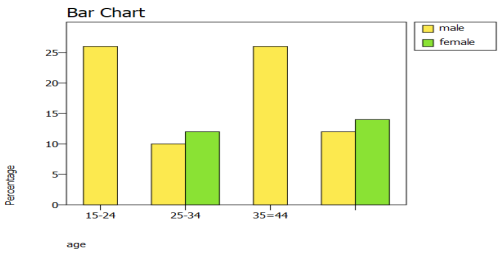

Figure 2: Age and Sex of respondents

The chart revealed a crosstab of occupation and marital status showing that 58% of the respondents were married and farmers. 10% were married but engaged in other businesses, 30% were single and none is a farmer and only 2% married but showing reservation.

The chart revealed a crosstab of age and sex showing our respondents within the age 15-24 and 35-44 were all male while 25-34 have 10% males and 12% females. Respondents within the age 45 and above have 12% males and 14% females which suggest than more older females than older males were given the loans while more younger males than females were given the loans.

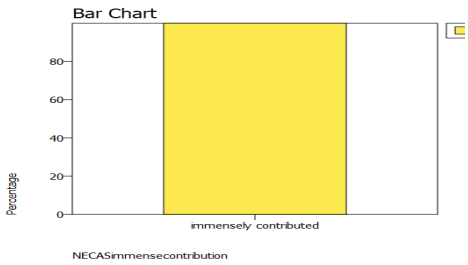

Figure 3: Immense contribution and presence of farmers association

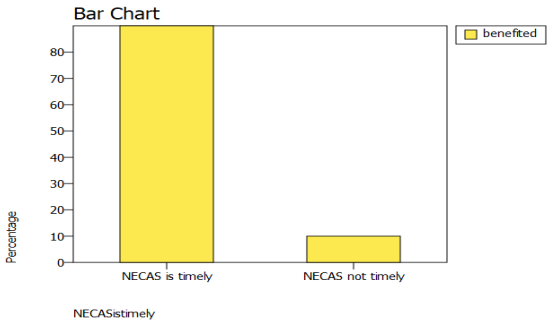

Figure 4: being timely and of benefit

The chart revealed a crosstab of immense contribution of NECAS and the presence of such association before now. All respondents agreed that it is of immense benefit and that such association was not in existence before now.

The chart revealed a crosstab of NECAS being timely and have benefited. The charts revealed that 90% of respondents agreed that it is timely and they have benefited from it. 10% of the respondents were of the view that it was not timely. This may be because they got the loans at the end of the season or maybe it could have come earlier than now.

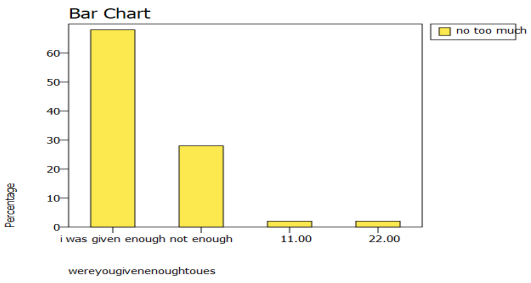

Figure 5: given enough and not too much

The chart revealed that 68% of the respondents agreed that they were given enough and 28% said they were not given enough.

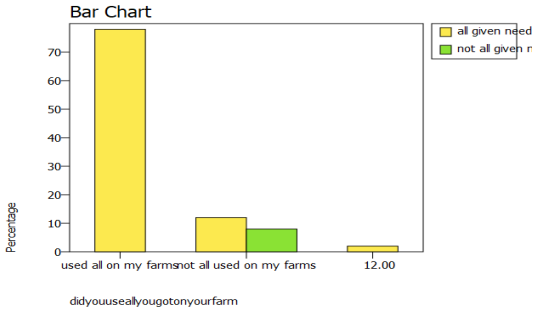

Figure 6: used all on their farms and given the needed

The chart revealed 78% of the respondents used all on their farms and were given what they needed 10% got what they needed but did not use all on their farms 8% were not given all they needed and thus did not use all on their farms.

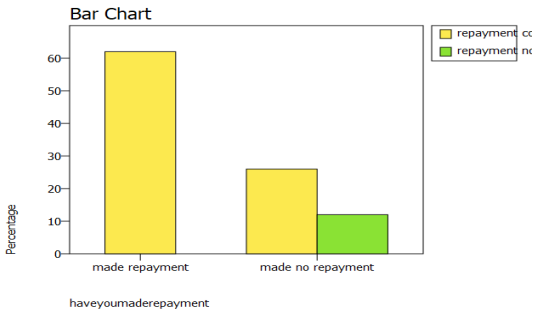

Figure 4: made repayment and process is comfortable

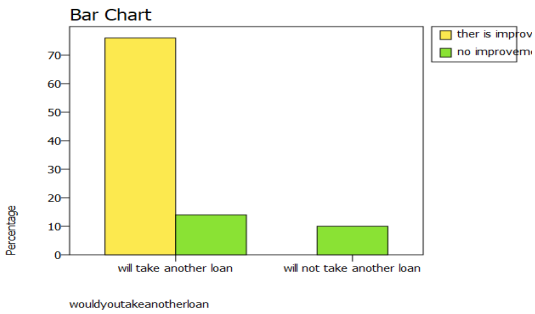

Figure 5: will take another loan and there is improvement

The chart revealed 62% of the respondents have agreed that they have made repayment and they were comfortable with the repayment process26% have not made repayment while they agreed the process is comfortable. Only 12% have not made repayment and were of the view that the process of repayment is not comfortable.

The chart revealed 76% of respondents agreed there is improvement and will take another loan, 14% said there is no improvement but will

take another loan while only 10% said they will not take another loan and there is no improvement with regard to their farm output.

Table/ Crosstabs: Chi-square tests

Statistic	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	11.85	3	.008
Likelihood Ratio	11.36	3	.010
Linear-by-Linear Association	.08	1	.775
N of Valid Cases	50		

From Table 3, the calculated P value 11.85 is greater than the table value 7.815 at df 3, we reject the null hypothesis that, there is no association between the quantity of materials given to farmers and improvement in agricultural therefore we conclude that there is association between the quantity of materials given to farmers and improvement agricultural.

The initiatives of NECAS have immensely benefited the farmers as pointed out by the respondents. That there was no such association benefiting farmers in area to the extent of what NECAS is doing today. The findings also observed that farmers in the area have been benefiting from the activities of NECAS going by the views of the respondents who are themselves beneficiaries. Respondents agreed that NECAS is timely and they were given enough to use on their farms. A total of 90% agreed that NECAS is timely however 31.11% were of the view that what was given to them was not enough. Respondents were of the view that they utilised their loans appropriately as claimed to be used all materials on their farms. All the respondents were of the view that what they got was not too much and would even want to get more. A total of 67.39% agreed that they needed all things given to them and have made repayment

CONCLUSION

In conclusion it is clear that despite the challenges there are existing constraints in relation to the activities of NECAS which involves corruption by some of its officials, giving no serious consideration to persons who are supposed to benefit more from its activities, some significant milestones have been achieved. Farmers were able get loans to help in improving their farming output and to be paid over a period of time; this has also served as a motivation to bring many people particularly the youth in to the farming activities.

RECOMMENDATIONS

The following are recommended based on the outcome of the study;

1. More of such farmers' association should be established to enable more farmers to benefit.
2. Actual verification of beneficiaries' farmland should be done to ensure that only real farmers benefit from the loans
3. Appropriate timing of giving loans to farmers should be considered before giving such loans in order to avoid displacement of goal.
4. There should be a follow-up supervision after giving out the loans to the farmers to ensure that the loans are utilised for what it was made.

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COMPOUND FARMING UNDER A CHANGING CLIMATE: EVIDENCE FROM EMOHUA LOCAL GOVERNMENT AREA OF RIVERS STATE

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ABSTRACT
The study assessed effects of climate change on compound farming in Emohua Local Government Area of Rivers state. A two-stage sampling technique was used to select 120 respondents for the study. Data for the study was collected with the aid of questionnaire complemented with interview schedule and analyzed using descriptive statistics namely percentages, frequency and mean. Result showed that the compound farmers perceive climate change to be increase in atmospheric temperature ($\bar{x}$=3.5), increase in rainfall ($\bar{x}$=3.4) and fluctuation in rainfall pattern ($\bar{x}$=3.2). The major effects of climate change on compound farming in the study area include reduction in crop yield (95%), decrease in overall family income (95%), unpredictable planting time/season (100%), increase weed infestation (100%) and unusual crop pest and disease infestation (97%). More Extension coverage and provision of improved seedlings will help strengthen farmers' capacity to overcome the effects of the change in climate. Formation of farmers association will immensely contribute in building the capacity of compound farmers in climate change hence overcome the effects more effectively.
Keywords: Compound farming, effects, Climate change, crop production

INTRODUCTION
Agriculture remains pivotal to Nigeria both as a source of food for her increasing population and as a prime employer of labour. It is a key sector in the economy contributing about 41% of the nation's GDP (Aye and Ater, 2012). Despite the significance of agriculture, it is threatened by the challenges of adapting to adverse climatic conditions (African climate policy centre, 2011). Madu (2012) explained that the impacts of climate change are spatially diverse and developing countries like Nigeria will be more in jeopardy due to their reliance on climate-sensitive sectors. Compound farms are intensively cultivated fields found around or close to home or compound houses and they are normally under permanent cultivation producing in and out of season for the farm families. This buttresses the potentials of compound farming and the important need to enhance compound farming as the livelihood of huge proportion of the rural poor will be improved through this. Furthermore, Compound farming could play an important role in helping to reduce greenhouse gas (GHG) emissions that contribute to climate change because it ensures green vegetation in the compound that facilitate absorption of Green House Gases (Ifeanyi-obi, Angba, Aja, Abuta… et al., 2019). Unfortunately, the benefits of compound farming are not being optimally harnessed due to ignorance of the rural people on the potentials it holds for them (Zerihun, Weyessa and Adugna, 2011). In addition, the predominance of rain-fed agriculture in Nigeria exposes local farmers to the adverse consequences of climate change. It is important to understand how these farmers are affected by the change in climate in order to profer effective advisory services. This research seeks to address this gap. The broad objective of the study was to examine the effects of climate change on compound farming in Emohua Local Government Areas of Rivers State. Specifically, the study assessed compound farmer's perception of climate change and the perceived effects of climate change on compound farming in the study area.

METHODOLOGY
The research was conducted in Emohua Local Government Area of Rivers State. A two-staged sampling procedure was used to select sample for the study. The first stage was the random selection of six (6) communities from the 10 communities in the local government, which includes Emohua, Ali mini, Rumuji, Obella- Ibaa, Odouha and Ndele. In the second stage Snow ball sampling techniques was used to develop the list of all compound farmers in the area and 20 households from each of the 6 communities selected randomly from list giving a total of 120 households for the study. Data were collected using structured questionnaires complemented with interview schedule for illiterate farmers.

RESULT AND DISCUSION
Compound farmer's perception of climate change
Result in Table 1 showed that out of eight variables used to capture farmer's perception of climate change on compound farming, farmers consented to all. Farmers mainly perceive climate change to be increase in rainfall ($\bar{x}$=3.4), atmospheric temperature ($\bar{x}$=3.5) and fluctuation in rainfall pattern ($\bar{x}$=3.2). This result agrees with Sofoluwe, Tijani, and Baruwa (2010) which found that farmers perceive climate change to be increase in temperature and rainfall. Similarly, Anselem, Ignatius, Josephat, Anthony…et al, (2011) reported that farmers perceived climate change to be erratic rainfall, delay in the onset of rain, long period of dry season and heavy wind with intense heat wave on the increase.

Statements	SA	A	D	SD	MEAN
There is increase in atmospheric temperature	74(66.1)	30(26.8)	1(0.9)	7(6.3)	3.5*
There is decrease in atmospheric temperature	31(27.7)	28(25.0)	30(26.8)	23(20.5)	2.5*
There is increase in rainfall	57(50.9)	53(47.3)	1(0.9)	1(0.9)	3.4*
There is decrease in rainfall	30(26.8)	40(35.7)	22(19.6)	20(17.9)	2.7*
Fluctuation in rainfall pattern has increased	52(46.4)	42(37.5)	7(6.8)	11(9.8)	3.2*
There is generally undefined weather condition	44(39.3)	39(34.8)	10(8.9)	19(17.0)	2.9*
Occurrence of extreme weather condition has increased	55(49.1)	26(23.2)	9(8.0)	22(19.6)	3.0*
Solar radiation (sunshine) has increased much	47(42.0)	39(34.8)	10(8.9)	16(14.3)	3.0*

Source: Field survey, 2019
* Agreement with the statement,
** Disagreement with the statement

Effects of climate change on compound farming in the study area

Table 2 showed that the major effects of climate change on compound farming were increase weed infestation ($\bar{x}$=2.6), incidence of unusual crop and disease ($\bar{x}$=2.3), unpredictable planting time/season ($\bar{x}$=2.2), reduction in crop yield ($\bar{x}$=2.0), increase rate and intensity of flooding ($\bar{x}$ = 2.0), decrease in overall family income ($\bar{x}$ = 2.0), reduction of available food in the house ($\bar{x}$ = 2.0) and increases poverty rate ($\bar{x}$ = 2.0). The finding shares same views with earlier research (Tologbonse, Auta, Bidoli, Jaliya, Onu and Issa, 2010; Chikezie, Ibekwe, Ohajianya, Orebiyi, Henri-Ukoha, Osuji and Gbolagun, 2016) which reported that the major effects of climate change on farmers are reduction in crop yield, unpredictable planting time and season, increase in flooding.

Table 2. Effects of climate change on compound farming

Effects	E	ME	SE	MEAN
Reduction in crop yield	19(17.0)	66(58.9)	23(20.5)	2.0*
Increased seed dormancy	37(33.0)	39(34.8)	19(17)	1.6**
Incidence of unusual crop pest and disease infestation	14(12.5)	44(39.3)	52(46.4)	2.3*
Unpredictable planting time/season	23(20.5)	42(37.5)	47(42.0)	2.2*
Increase rate of crop withering	20(17.9)	38(33.9)	44(39.3)	1.6**
Increase rate and intensity of flooding which reduced yield	17(15.2)	63(52.6)	21(18.8)	2.0*
Increase in erosion rate that reduce soil fertility	39(34.8)	41(36.6)	14(12.5)	1.4**
Decrease in overall family income	22(19.6)	46(41.1)	40(35.7)	2.0*
Limited ability to practice integrated/missed farming	10(8.9)	39(34.8)	40(35.7)	1.8**
Ineffectiveness of some agro-chemicals due to weather fluctuation	8(7.1)	3(2.7)	0	0.1**
Increase heat stress on crops leading to crop failure	26(23.2)	55(49.1)	19(17.0)	1.7**
Reduces food availability in the house due to high crop failure	22(19.6)	55(49.1)	30(26.8)	2.0*
Contribute to increased poverty	24(21.4)	46(41.1)	34(30.4)	2.0*
Increases cost of production generally due to repeated farm procedures	7(6.2)	56(50.0)	43(38.4)	2.2*
Increases weed infestation	5(4.5)	24(21.4)	81(72.3)	2.6*
Increases heat stress on livestock/animals	5(4.5)	12(10.7)	3(2.7)	0.3**
Reduces potency, fertility and productivity of some animal species	6(5.4)	6(5.4)	4(3.6)	0.2**
Increases diseases incidence in livestock's	2(1.8)	10(8.9)	7(6.2)	0.3**
Mortality rate of livestock's have generally increased	3(2.7)	6(5.4)	10(8.9)	0.4**
Led to scarcity of pasture for livestock's	3(2.7)	11(9.8)	2(1.8)	0.2**
Increased resistance to indigenous remedies for livestock's illnesses	5(4.5)	12(10.7)	5(4.5)	0.3**

Source: Field survey, 2019
***severe effect, **not severe effect**

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it was concluded that farmers in the study area are experiencing change in climate which is affecting their compound farming activities. Increased extension services through the Agricultural Development Programme (ADP), provision of improved crop varieties by government and NGO's and training workshop to build compound farmers capacity to the effects of climate change was recommended.

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DIVERSIFICATION INTO NON-FARM ACTIVITIES AMONG RURAL HOUSEHOLDS IN EMURE LOCAL GOVERNMENT AREA OF EKITI STATE

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ABSTRACT

This article examines the diversification into non-farm activities among rural households in Emure local government area of Ekiti State. Multi-stage sampling was used in selecting 240 rural farm households but only 221 questionnaires were completed. Data collected were described using frequency distribution, percentages while Pearson Product Moment Correlation (PPMC) was used to measure the effect of some socio-economic correlates on participation of farm households in non-farm activities. Result revealed that the mean age of the respondents were 47.5, most sample households are of low-income with mean monthly income of ₦6,215.50 for farming and ₦2,475.50 for non-farm activities. Majority (62.90%) of the rural household engaged in farming with non-farm activities, 24.43% in farming activities only while 12.67% were involved in only non-farm activities. Rural farm households were distributed into different types of activities (farm and non-farm) categorized into farming (production), manufacturing, sales, services and enterprise. The PPMC result established that there were significant relationship between age (r=0.280; p=0.003), household size (r=0.227; p=0.001) of respondents and the level of participation in non-farm activities, but no significant relationship between year of schooling and participation in non-farm activities (r=-0.353; p=0.521). Conclusively, rural farm households make use of increasingly diverse combinations of resources and assets to meet up with their arising needs by seeking alternative sources of income through participation in non-farm activities.

Keywords: Diversification, non-farm activities, rural household

INTRODUCTION

Farming and rural non-based activities still have untapped potential to generate employment opportunities for Africa's rising youth population (Food and Agricultural Organisation, 2017).

Non-farm activities according to Haggblade *et al.,* 1989 cited in Takeshima *et al.,* 2018 is defined as "all activities other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing" including "agro-industrial activities which store, process and market agricultural commodities".

The non-farm-sector has increased its share in both economy and employment in Nigeria. Recently, in 2014-2016, the Non-Farm-sector in Nigeria accounted for 79% of gross domestic product (GDP) (58% by the service sector, and 21% by the industry sector) (World Bank 2018) and employed approximately 50% of the workforce (Groningen Growth and Development Centre 2018). Despite such an economic transformation, close to 70 percent of the population still live under the poverty line of 1.25 dollar per day in purchasing power parity (World Bank 2018), and in 2015, approximately 30 percent of the active labour force (22.4 million out of 76.9 million) are either unemployed or underemployed (Adesugba and Mavrotas 2016).

The purpose of this article is to find out if diversification to non-farm activities compliments the income accrued from agricultural production and improve the welfare of farm households in rural Nigeria. Therefore, it will be interesting to ask the following questions about Nigeria's rural setting, more particularly rural farming communities' household in Ekiti state; what are the levels of participation of rural households in non-farm activities? What are the natures of non-farm activities involved by rural farm households? Would non-farm activities generate higher income than sales of agricultural products? Based on the above, this article aims at determining the effect of socio-economic correlates on participation of farm households in non-farm activities.

METHODOLOGY

The study was carried out in Emure Local Government Area of Ekiti State. There are 10 political wards in the LGA namely; Odo Emure I(8 polling units), Odo Emure II(5 polling units), Odo Emure III(9 polling units), Odo Emure IV(9 polling units), Oke Emure 1(10 polling units) , Oke Emure II(11 polling units), Ida Mudu I(10 polling units), Ida Mudu II(8 polling units) and Ogbontioro I (15 polling units) (Independent National Electoral Commission, INEC, 2015).

Study population was all the rural households in Emure LGA. The sample frame was collected from the Local Government Area. Random selection method was used to select 240 rural farm households

Multi-stage sampling was used in selecting the sample size. In the first stage, out of the 10 political wards, 40% of the political wards with highest polling units were purposely selected namely-, Oke Emure 1(10 polling units), Oke Emure II (11 polling units), Ida Mudu I (10 polling units) and Ogbontioro I (15 polling units). The

second stage involved the selection of 50% of the polling unit- Oke Emure 1(5 polling units), Oke Emure II (6 polling units), Ida Mudu I (5 polling units) and Ogbontioro I (8 polling units), in total is 24 polling units. The last stage is selecting ten (10) rural farming households from each of the polling units. In total, 240 rural farm households were targeted, only 221 questionnaires were completed.

Data collected were described using frequency distribution, percentages while Pearson Product Moment Correlation (PPMC) was used to measure the effect of some socio-economic correlates on participation of farm households in non-farm activities.

RESULTS AND DISCUSSION

Socioeconomic characteristics of rural farm household head

Table 1 displays the characteristics of rural farm household heads. Result revealed that the mean age of the respondent were 47.5 and this indicates that the household heads are determined to cope with the physical enthusiasm needed for either farm or non-farm activities they are engaged in. This implies that they have the ability to achieve and adopt innovation on any of the activities they practice. The result also suggests that most sample households are of low-income (based on mean monthly income of ₦6,215.50 for farming and ₦2,475.50 for non-farm activities).the low earning suggests that majority of the non-farm activities engaged in, are low return activities. The household size is 7; agricultural households is always characterized by large families which increases the probability of involvement in either farm or non-farm activities. Consequently, the rural household had low year of schooling ($\bar{x}$= 5) and 11 year of farming/business experience.

Table 1: Socioeconomic characteristics of rural farm households

Characteristics	Measuring unit	Mean	Minimum	Maximum
Age	Years	47.5	25	110
Household size	Number	7	1	15
Years of schooling	Years	5	0	10
Years of farm/business experience	Years	11	1	45
Monthly Farming income	Naira	6215.50	2,500	50,000
Monthly Non-farm income	Naira	2475.50	2,000	70,000

Field survey (2020)

Nature of non-farm activities

Results in Table 2 revealed that majority (62.90%) of the rural household engage in farming with non-farm activities, 33.48% in farming activities only while 12.67% were involved in only non-farm activities. This implies that majority of the rural household diversified into various activities both farming and non-farm-oriented economy which had enabled them to cope with their family needs.

Table 2: Nature of non-farm activities

Nature of non-farm activities*	Frequency (n=221)	Percentage (%)
Farming activities only	74	33.48
Farming with non-farm activities	139	62.90
Non-farm activities only	28	12.67

Field survey (2020)
*Multiple responses

Participation of rural households in non-farm activities

Table 3 shows the sample distribution of different types of activities (farm and non-farm) engaged by rural households categorized into farming (production), manufacturing, sales, services and enterprise. Under farming, majority (70.59%) of the respondent engage in crop production, 46.15% were agro-processors while 31.67% were engaged animal production. This shows that crop production and processing of agricultural products is the major source of income in the study area. It is evident from this study that the rural households process cassava into garri, oil palm seed into palm oil/palm kernel cake. Table also illustrated other occupations (non-farm) the rural households diversify into. Under manufacturing, 13.57% were engaged in tailoring; under sales, 6.79% were engaged in sales of agro-products like chemicals, seeds, poultry equipment, etc; under services, 22.17 were bricklayers; under enterprise, 5.88% were employed into private companies as casual workers, security, labourers, etc. This revealed that most of the households earn income from more than one source. This implies that the rural households were economically active in the non-farm activities

PPMC test of relationship between selected socioeconomic characteristics and level of participation of farm households in non-farm activities

The PPMC result in the table 4 established that there was significant relationship between age of respondents (r=0.280; p=0.003) and the level of participation in non-farm activities. This implies that the age of the respondents was part of determining factors and positively related to their participation in non-farm activities. Youths were at the fore front, participating in non-farm activities with their earnings increase early in life than adult. The table further reveals that there is significant relationship between household size of the respondents (r=0.227; p=0.001) and level of participation in non-farm activities. This implies that rural households with large family size will participate in non-farm activities to make ends meet. This implies that households with greater number of members have greater task to cater for their household, thereby they diversify into non-farm activities in order to meet up with their arising needs. There is no significant relationship between year of schooling and participation in non-farm activities (r=-0.353; p=0.521). This implies that education is not dependent on the rural household participation in non-farm activities.

Table 4: PPMC test of relationship between selected socioeconomic characteristics and level of participation of farm households in non-farm activities

Level of significance is 0.005

Variable	r-value	p-value	Decision	Remark
Age	0.280	0.003	S	Reject Ho
Family size	0.227	0.001	S	Reject Ho
Year of schooling	-0.353	0.521	NS	Accept Ho

Field survey (2020)

CONCLUSION

Conclusively, rural farm households make use of increasingly diverse combinations of resources and assets to meet up with their arising needs by seeking alternative sources of income through participation in non-farm activities. This income were used to augment the amount spent on their agricultural production, cater for their family during the planting season when there is little or no agricultural produce to sell.

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ROLE OF TRADITIONAL MEDICINE IN PRIMARY HEALTH CARE IN NIGERIA

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ABSTRACT
Traditional medicine, in recent times, has continued to receive increasing acceptance in Nigeria among many other African nations. According to World Health Organisation (WHO), a vast majority of people in Africa have turned their attention to Traditional Medicine for their primary health care needs because of the challenges of modern health services. For many people in these countries especially those living in rural areas, traditional medicines remain the only available, affordable, and easily accessible source of health care. This paper has tried to trace the historical background of traditional medicine in Nigeria, its contributions and progress made so far in health care delivery. Also considered various types of traditional medical services, and reasons for growing patronage. This paper adopted a literature review approach in discussing the role of traditional medicine in primary health care in Nigeria. Despite various challenges facing traditional medicine, it has contributed immensely to the development of health care delivery system in Nigeria. The paper therefore, recommends that in order to adequately maximize the health-care coverage of the multi-populated traditional Nigerian villages and communities with varied health challenges, ailments, and sicknesses there is need for the formalization of the traditional health care services by integrating traditional medicine into the health care delivery systems of various local and state governments in Nigeria.
Keywords: Medicine, Nigeria, Primary Health Care, Traditional role

INTRODUCTION

Traditional health care providers are health care practitioners who typically have little or no formal or modern medical training from recognised medical institutions but are recognised as Traditional Doctors by local communities (Agbor and Naidoo, 2011). One need to undergo a training to become a Traditional Healer. The apprentice through such trainings, learns their job in exchange for continuing labour for an agreed period of time after which he or she is expected to acquire the skills to be on his/her own. This training aspect prepares practitioners of the African Traditional Medicine to be hardworking, responsible, accommodating, good listeners as well as having a sense of pride in themselves, their culture, tradition, and society.

Traditional Medicine is seen as the sum total of knowledge, skills, and practices based on indigenous beliefs, theories, and experiences passed on from generations to generations for the need of maintaining good public health, local health care diagnostic services, health care prevention, and the treatment of illnesses affecting people. Traditional Medicine has gained increased patronage in the world over (Rainer, 2013). Traditional medical care services are usually provided by practitioners who are popularly referred to as Traditional Healers (THs) (Gandu, 2019). Traditional Medicines are important and possess effective therapeutic regimens in the management of a wide spectrum of diseases some of which may not be effectively managed using Modern Medicine.

Historical background of traditional medicine in Nigeria

The oldest form of healthcare known to mankind is Herbal medicine. Herbs had been used by all cultures throughout history. Herb was an integral part of the development of modern civilization. Primitive man observed and appreciated the great diversity of plants available to him which provided food, clothing, shelter, and medicine. Medicinal use of plants in Nigeria seems to have been developed through observations of wild animals, and by trial and error. As time went on, each tribe added the medicinal power of herbs in their area to its knowledge base. Most of the pharmacopoeia of scientific medicine was derived from the herbal lore of native peoples well into the 20th century. Most of the drugs commonly used today are of herbal origin. It therefore means that every culture has explored and used plants for medicinal purposes.

Traditional medical practices which include the use of herbs/plants and other products from plants and animal parts as well as spiritual procedures, were the main remedies for nearly all kinds of ailments prior to the advent of Modern Medicine in most Sub-Saharan African countries, (Mahomoodally, 2013). Despite the increase in the use of Modern Medicine in African countries at the threshold of the 21st century, the use of Traditional Medicine is also witnessing huge patronage as more Africans continue to rely on it for their health care needs. In Africa, particularly Nigeria, new drugs are not often affordable thus up to 80 % of the population use medicinal plants as remedies (Hostettmann and Marston, 2002).

Various types of traditional medical services

Non-western medicine that has wide spread use and utilisation, is known in different countries by different names. For example, in the countries of Asia such as India, called AYUSH which stands for Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homoeopathy (Samal, 2016).

In the case of China, it is referred to as *Acupuncture;* in North America, it is popularly referred to as Complementary and Alternative Medicine, Chiropractic, Homeopathy, (Robinson and Zhang, 2011). In Nigeria, it is referred to as Traditional or herbal Medicines (Awodele, Amagon, Wannang, and Aguiyi, 2014). Others refer to it as Magic medicine, (Abbott, 2014, Raphael: 2011), and Alternative Therapies in Health and Medicine (Barrett, Kiefer, and Rabago: 1999).

Contribution of traditional medicine to health care delivery

Bone setting: Traditional bone setting (TBS) is an important health care service provided by traditional health practitioners in Nigeria. This involves the manipulation of dislocations, fractures, and sprains, through the use of massaging, splints, and salves which is similar to modern orthopedics practices. In case of a broken leg, the patient is made to lie down with the fractured leg lying flat. Herbal dressings are placed on the leg before planks or sticks are tied around the leg with a string or stem of a climbing plant.

Obstetrics and gynaecology: The specialist in Traditional medicine in this area, is called Traditional Birth attendant (TBA) or traditional midwife. The World Health Organisation (1976) defines a traditional birth attendant (TBAs) as any person who assists the mother at childbirth and who initially acquired her skills delivering babies by herself or by working with other birth attendants. The TBA duties are similar to that of a modern professional midwife. However, TBAs use herbs to aid delivery and managed difficulties in births with the aid of incantations.

Traditional mental healers: Mental healers traditional medicine specialised mainly in the treatment of mental disorders. The Traditional mental specialist are known to play an important role in the treatment of mental health problems and that these traditional psychiatrists are important resource in the provision of primary mental health services (WHO, 1990). In central Sudan, Ehab, Nor, and Mohammad (2012) examine the treatment outcome of psychotic disorders by traditional healers of 129 in-patients. Their study reveal that traditional mental healers provide an important force in the treatment of psychiatric disorders.

Traditional Surgeons: Another form of medical service provided by Traditional African Medicine is traditional surgery. Traditional surgical operations vary across cultural groups in Nigeria and other African economies and societies. Making of tribal marks on the face or body of the client are some of the traditional surgeries in Nigeria. In some cases, Traditional surgical operations carried out on both male and female in the form of circumcision, removal of whitlows, cutting of the uvula (Uvulectomy), draining of pus in abscesses and so on.

Reasons for growing patronage of traditional medicine

Inadequacies in health system

According to the World Health Organisation, one third of the global population has no regular access to essential modern medicines, and about half of the population in parts of Africa, Asia and Latin America, faces shortage of minimum healthcare. According to the World Health Organisation (2019) there are four doctors per 10,000 patients in Nigeria and patients wait for hours to be seen. In the U.S, the ratio is 26 doctors per 10,000 people and 28 doctors per 10,000 patients in the UK. This reveals the glaring inequities in health care delivery in Nigeria.

Affordability has been identified as one of the reasons for high patronage of Traditional Medicine in terms of cost-involvement in treatment of an ailment. Ogunlusi, Okem and Oginni (2007) in their study, established that most people visit traditional bone setters because they provide cheaper and quicker services than modern medicine.

The only form of health care that is available, affordable and accessible in some rural communities is herbal medicine. in the areas of chronic and psychic ills, tuberculosis, boils, infertility, hernia, asthma, hypertension, diabetes and malaria, herbal medicine has indeed demonstrated efficacy where modern medicine has either failed to produce equally good results or has simply ignored the need for systematic attention and research.

Criticism against traditional medicine

Despite the apparent positive contributions of Traditional Medicine to health care, the proponents of modern health care system have contrary opinions on the utility value of herbal medicine as they perceive traditional medical practices as comparatively inferior. Some of the principal criticisms includes lack of scientific and verifiable based evidence and effectiveness, absence of set rules and standards, and none existence of formalized training. Traditional health practice on the basis of such claims is dismissed as customs rather than an effective form of health care (Helman, 2007).

CONCLUSION

Traditional medicine is a practical and in-expensive move towards better Health. For the development of Primary Health Care, traditional medicine must serve as a proper interface between hospital and specialist practice as well as additional means of preventive and after-care.

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PERCEPTION OF THE FISH FARMERS ON APPLICATION OF AQUACULTURE PRACTICES IN NIGER STATE, NIGERIA

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ABSTRACT
The study examined the Perception of the Fish Farmers on Application of Aquaculture Practices in Niger State, Nigeria. A sample size of 231fish farmers were selected in the state using multi-stage sampling method. Structured questionnaire complimented with interview scheduled. Data collected were analyzed using descriptive statistics. The findings revealed that fish farmers agreed that use of aquaculture practices can greatly improve farmers' skills ($\bar{X}$ = 4.78), improved practices provide higher yield/income than the old ones ($\bar{X}$ = 4.68) and training is required to correctly apply the improved practices ($\bar{X}$=4.61). Furthermore, environmental pollution ($\bar{X}$ = 3.0) and unfavorable weather conditions for fish growth ($\bar{X}$ = 2.95) were the major constraints to improve aquaculture practices. It is recommended that fishermen should put in place every measure to avert environmental pollution and other hazardous chemicals in the stud area. Also, extension officers and research institutes should ensure that fish farmers adequately access improve fingerlings that will enhance their productivity.
Keywords: Fish-farmers; Application; Aquaculture; Practices

INTRODUCTION
Nigeria has large population of fish consumers with a total consumption of more than 1.36 million metric tons while fish imports make up about 740, 000 MT annually (George *et al,* 2012). This ever-increasing demand for fish is due to a number of factors such as high population, growth rate, increasing national income and increasing costs of other sources of animal protein such as livestock, it occupies a very significant position in the primary sector, providing employment for over a million people and contributing about 50% of the annual protein intake in Nigeria particularly the riverine communities (Federal Department of Fisheries, 2011). Fish as a veritable source of high-quality protein and essential vitamins and minerals is also crucial to human in the context of institutional development and change protein calorie malnutrition are widely recognize as important health hazards, leading to poor health, working efficiency and low productivity (Ipinmoroti and Adesina, 2011). However, the level of awareness of fishing policies of the resource poor fisher folk was low because of lack of understanding of the benefits (Arowolo, 2019). The application of aquaculture practices in Niger State has assumed a popular dimension in recent years starting from immediate communities around the NIFFR, New Busa and spreading by trickle-down effect to communities far and wide along the shorelines and hinterlands of Niger State. Specifically, this study tends to determine the perception of the fish farmers on application of aquaculture practices and identify the constraints to improved aquaculture practices application

METHODOLOGY
The research was conducted in Niger State. The State is in the Guinea Savannah ecological zone of Nigeria. Niger State covers a total land area of 74,224km^2 thus accounting for about eight percent of Nigeria's land area. About 85% of its land area is good for arable crop production (Niger State Geographical information system, 2015). It is located within longitude 3^o 30' and 7^o 20' East and latitude 8^o 20' and 11^o 30' North, with a population of about 3,950,249 and with a growth rate of 3.2%, the State has estimated population of 5,586,000 in 2017 (Niger State Geographical Information System, 2015). The population of the study consists of culture fish farmers in Niger State area. Multi stage sampling was adopted for this study. In the first stage, random selection of one L.G.A from each of the agricultural zones (Katcha, from zone 1, Bosso from zone II and Borgu from zone III). In the second stage, random selection was used to select three (3) were randomly selected communities from each of the L.G.A selected to get nine (9) communities. The third stage involved proportionate selection of 10% of fish farmers from each of the communities to get sample size of 231 respondents

Table 1: Sample outlay of the respondents

Agric Zone	L.G.A	Communities	Sample Frame	Sample Size
I	Katcha	Katcha	342	34
		Baddegi	205	21
		Gbakogi	270	27
II	Bosso	Bosso	167	18
		Lapai Gwari	185	19
		Togwai Dam	285	29
III	Borgu	New Bussa	302	30
		Monnai	311	31
		Fakun	220	22
Total	**3**	**9**	**2287**	**231**

Data was collected from the fish farmers with the use of questionnaire and interview schedule. Data were analysed using descriptive and inferential statistics. Objective i and ii were achieved using descriptive statistics. Perception of fish farmers on the application of aquaculture practices objective i was measured by means of putting a set of perception statements against 5-point likert scale which ranges from strongly agree (5), agree (4), undecided (3), disagree (2) strongly disagree (1). The cut-off mean was calculated as (1+2+3+4+5)/5 = 3. Also, objective iii was subjected 4-point Likert type rating scale was used to measure the constraints to adoption of aquaculture practices across a continuum of 'very serious' (4) 'serious', (3) undecided' (2), not a constraint (1) A weighted mean score was computed and compared to the cut-off mean i.e (1+2+3+4)/4 = 2.5. The decision rule is any mean score ≥2.5 is serious, <2.5 is not serious

RESULTS AND DISCUSSIONS

Perception of the Fish Farmers on Application of Aquaculture Practices

Table 2 indicated the perception of fish farmers on the application of aquaculture practices in the study area. The finding indicated that respondents agreed with the following perception statements; the use of aquaculture practices can greatly improve farmers' skills ($\bar{X}$ = 4.78), implying that proper utilisation of aquaculture practices tend to improve farmers skills in fish farming. Also, improved practices provide higher yield/income than the old ones with mean value of ($\bar{X}$ = 4.68), implying that adoption of improved aquaculture practices will not only enhance the yield but also have positive effect on the income of fisher forks. These finding agreed with Sanni (2017), who reported that adoption of aquaculture practices exposes farmers to increase income, yield and new skills. Moreover, training is required to correctly apply the improved practices ($\bar{X}$ = 4.61), the improved practices make use of more inputs to give higher output than the old practice ($\bar{X}$ = 4.53). Moreover, respondents furthered agreed with the following perception statements improved practices meet my satisfaction ($\bar{X}$ = 4.50). Also, respondents agreed that the practices are cost effective ($\bar{X}$ = 4.25). In addition, the respondents agreed that most of the practices are environmentally friendly ($\bar{X}$ = 4.16), most of the practices requires patience to achieve desired result ($\bar{X}$ = 4.05).

Table 2: Perception of the fish farmers on application of improved aquaculture practices

Variables	Sum	Mean	Decision	Rank
The use of aquaculture practices can greatly improve farmers' skills	1104	4.78	Agreed	1st
The improved practices provide higher yield/income than the old ones	1081	4.68	Agreed	2nd
Training is required to correctly apply the improved practices	1065	4.61	Agreed	3rd
The improved practices make use of more inputs to give higher output than the old practice	1047	4.53	Agreed	4th
Improved practices meet my satisfaction	1040	4.50	Agreed	5th
The practices are cost effective	982	4.25	Agreed	6th
Most of the practices are environmentally friendly	961	4.16	Agreed	7th
Most of the practices requires patience to achieve desired result	935	4.05	Agreed	8th

Sources: Field survey, 2019

Constraints to Improved Aquaculture Practices Application

Table 3 showed that the following were serious constraints my respondents in the study area, environmental pollution ranked 1st with mean value of with mean value of ($\bar{X}$ = 3.0). This implies that environmental pollution such as use of toxic chemical is a serious constraint to improve aquaculture practices in the study. This was followed by unfavorable weather conditions for fish growth ranked 2nd with mean value of ($\bar{X}$ = 2.95), implying that unpleasant condition of weather condition such as waves and wind were serious constraints to improve aquaculture practices in the study area. These agreed with Arowolo *et al.* (2019), who stated that environmental pollution and unfavorable weather condition were the major constraints affecting fisher forks in Kainji Lake Basin. Also, flooding of ponds during rains was ranked 3rd with mean value of ($\bar{X}$ = 2.90), flood mostly arise from excessive downpour that wash away fish forks pond together with their fish. Moreover, lack of technical know-how for the production of zoo planktons was ranked 4th with mean value of ($\bar{X}$ = 2.86), this was followed by no effective policy ranked 5th with mean value of ($\bar{X}$ = 2.85), this implies that lack of technical know-how in the production of zoo-plankton and effective government policy were one of the serious constraints to improve aquaculture practices in the study area. Furthermore, scarcity of improved fingerlings was ranked 6th with mean value of ($\bar{X}$ = 2.84). This agreed with Baruwa *et al.* (2015), who reported that majority of Fishermen Lagos State, Nigeria, lacked access to improve fingerlings.

Table 3: Constraining factors to improved aquaculture practices application

Variables	Sum	Mean	Decision	Rank
Environmental pollution	693	3.0	Serious	1st
Unfavorable weather conditions for fish growth	682	2.95	Serious	2nd
Flooding of ponds during rains	669	2.90	Serious	3rd
Lack of technical know-how for the production of zoo planktons	661	2.86	Serious	4th
No effective policy	658	2.85	Serious	5th
Scarcity of improved fingerlings	656	2.84	Serious	6th

Sources: Field survey, 2019

CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that fishermen agreed that aquaculture practices can greatly improve farmers' skills and improved practices provide higher yield/income than the old ones. The most constraining factors to improve practices in the study area were environmental pollution, unfavorable weather conditions for fish growth and flooding of ponds during rains. It is recommended that fishermen should put in place every measure to avert environmental pollution such as use of hazardous chemicals that are toxic to fishes. Also, extension officers and research institutes should ensure that fish farmers adequately access improve fingerlings that will enhance their productivity

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COVID-19 LOCKDOWN LIVELIHOODS COPING STRATEGIES AMONGST RURAL WOMEN IN EKITI STATE, NIGERIA

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ABSTRACT
This study assessed COVID-19 lockdown livelihood coping strategies among rural Women in Ekiti State. The specific objectives were to describe the socioeconomic characteristics of the respondents, identify the factors influencing their involvement and to identify the livelihood coping strategies utilised during the pandemic among rural Women in Ekiti State. Random sampling technique was used to select 120 rural women from five communities in Ado Ekiti. Data was collected through the use of interview schedule. Data was analyzed using descriptive statistics. Results show that most of the respondents (66.7%) are educated and spent at least 12years in school with mean monthly income of N4,000.00. Factors influencing their involvement in utilising coping strategies are unemployment (26%), poverty (25%), employment with private firms (15%), low income (12%) and loss of job (7%). The livelihood coping strategies adopted by women so as to save their family from starvation and meet their household's daily consumption are sending children to where they are distributing palliative this was ranked first and was closely followed by reduction of daily food consumption while production of hand sanitizer and begging for food stuff/money during radio programme was the least livelihood coping strategies utilised by rural women during the COVID 19 lockdown. It is recommended that, rural women in the study area should be supported by both private and public organisation in the distribution of palliatives, empowerment and conditional cash transfer programme which will help them to stand back on their feet.
Keywords: Covid-19, livelihoods, coping strategies and rural women.

INTRODUCTION
The corona virus disease of 2019 (COVID-19) pandemic led to total lockdown for more than 30 days in Ekiti state. WHO categorized Nigeria as one of the 13 high-risk African countries with respect to the spread of COVID-19. According to Marbot, 2020, amzat *et al* 2020, Nigeria is among the vulnerable African nations, given the weak state of the healthcare system. Hence, total Lockdown was helpful, as it limited economic activities which help to curtail the spread of the virus. On the other hand, the lockdown increased the rate of Unemployment and poverty. Though, these two factors had been a crucial problem in the country, it became more prevalent due to unpredictable variations of COVID 19.

During the lockdown, there were global social disruptions which restricted global social relations in daily interaction; there was very low access to quality food which is the most basic requirements for human growth and development, some people lost their jobs and there was no income. Various efforts made by both government and non government organisation to cushion its effect on individuals but there was a gross shortage of palliatives in the form of foodstuffs and cash and there was no proper coordination in the distribution of the meager palliative available for the less privileged citizens.

Women are known to be responsible as primary caretakers of children, maintenance of household and food preparation. According to FAO, 2011, women are more concerned about the general welfare of the family. Considering their roles at all levels they are aware that when people lack secured access to sufficient safe and nutritious food for normal growth and development, food insecurity abounds, (UN and FAO 2011). Hence, they will not hesitate to use any methods in acquiring food for household's survival. In order to cushion the adverse effect, rural women in the state adopt some livelihoods coping strategies to support their households this is because without other income sources, their families will have no means to survive. The study assessed covid-19 lockdown livelihood coping strategies amongst rural Women in Ekiti State. The specific objectives were to.

1. describe the socioeconomic characteristics of the respondents
2. identify the factors influencing their involvement in utilising livelihood coping strategies
3. identify the livelihoods coping strategies utilised during the pandemic amongst rural Women in Ekiti State.

METHODOLOGY
Random sampling technique was used to select 120 rural women from five communities in Ado Ekiti which are Oshodi community, Aba Medi, Iyana Emirin, Ilokun and Ago Aduloju. Data was collected through the use of interview schedule. Coping Strategies Use Index (CSUI) was employed to access the extent of use of livelihoods coping strategies adopted by women. This were adapted from Falowo and Adebo (2014) and

modified to include information gathered from prel iminary assessments this was classified into four gr oups namely:

Consumption strategies: includes reduction of daily food consumption, sending children to where they are distributing palliative.

Expenditure strategies: includes begging for money/foodstuffs from friend/neighbors, purchase food on credit and begging for food stuff/money during radio programme.

Income strategies: includes the sales of face mask.

Occupation diversification strategies: include backyard farming, face mask production and production of hand sanitizer.

This was measured on a 4-point rating scale of frequently used (4), occasionally used (3), rarely used (2) and not used (1). Mean was used to rank the livelihoods coping strategies in descending order to reflect the significance. Data was analyzed using descriptive statistics.

RESULTS AND DISCUSSION

Socioeconomic characteristics of rural women in Ekiti State

Most of the respondents were in their active ages between 25-50years. At this age bracket, they are expected to be willing to take risk and easily strive for a livelihood to have food so as to feed their families no matter the circumstances. Most of the identified rural women (66.7%) spent at least 12years in schooling which implies that they are been predisposed to innovation on how to change life pattern and have acquaint them with various knowledge needed for livelihood diversification. This is consistent with various studies Falowo and Adebo (2014) and Alabi *et al* (2019) that high educational status is expected to predispose individual to innovations and better ways to cope with challenges.

Table 1: Distribution of respondents by socioeconomic characteristics

Socioeconomic characteristics	Frequency	Percentage	Mean
Age			35 years
<20	8	6.7	
21-30	28	23.3	
31-40	60	50.0	
>40	24	20.0	
Household size			
<4	17	14.2	
4-8	75	62.5	6 persons
>8	28	23.3	
Education			
No formal education	10	8.3	
Primary	30	25.0	
Secondary	52	43.3	
Tertiary	20	16.7	
Others	8	6.7	
Years of schooling			
<6	10	8.3	12 years
6-12	82	68.4	
>13	28	23.3	
Income			
<5,000	8	6.7	N4,000
5,000-10,000	64	53.3	
11,000-15,000	20	16.7	
>15,000	28	23.3	

Source: Field survey, 2020

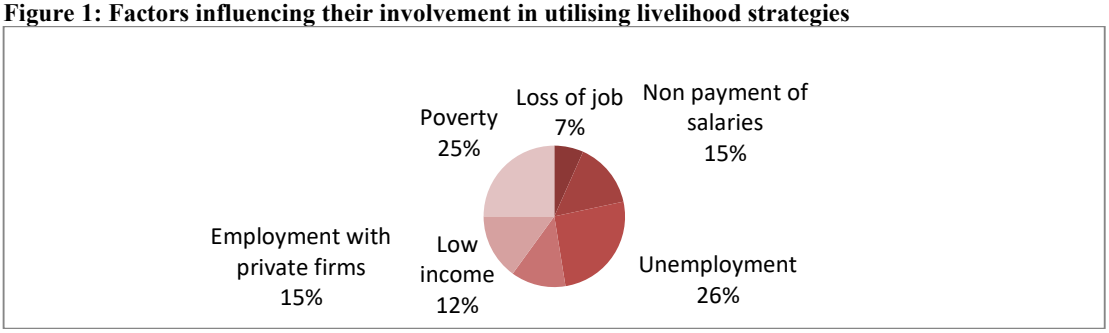
Majority of the respondents (85.8%) had more than four persons per family but depended on an average monthly income of N4,000. This is less than the World Bank Standard of US$1 per day for people in developing countries. This is an indication that respondents has meager earning from their occupation and attributed to their low income, Matemilola and Elegbede 2017 noted that not less than 70% of the Nigerian population is surviving on less than a dollar per day while food insecurity prevalence in the low stands at 71%. The implication is that households do not have sufficient savings that could save them in time of hardship.

Factors influencing their involvement in utilising livelihood strategies

Results in Figure 1 reveals that the factors influencing the respondent's involvement in utilisation of livelihood strategies during the Covid-19 lockdown. Most of the respondents

(26%) were influenced by unemployment, poverty (25%), employment with private firms (15%). The least were low income and loss of job and which are12% and 7% respectively. This could be attributed to the fact that revenue inflow into private establishments reduced during the pandemic. Therefore, many private establishments had to lay off staff so as to sustain production.

Figure 1: Factors influencing their involvement in utilising livelihood strategies



Source: Field survey, 2020

Livelihood coping strategies

Data in table 3 shows that the sending children to where they are distributing palliative was ranked first, this was closely followed by reduction of daily food consumption, sales of face mask was ranked third while production of hand sanitizer and begging for food stuff/money during radio programme was the least livelihood coping strategies utilised by rural women during the COVID 19 lockdown. This implies that some of the methods adopted are temporary responses used during hardship.

Table 2: Livelihood coping strategies

Coping strategies	Percentage	Rank
Sending children to where they are distributing palliative	85	1st
Reduction of daily food consumption	80	2nd
Sales of Face mask	75	3rd
Purchase food on credit	70	4th
Begging for money/foodstuffs from friend/neighbor	65	5th
Backyard farming	55	6th
Face mask production	45	7th
Production of hand sanitizer	35	8th
Begging for food stuff/money during radio programme	20	9th

Source: Field survey, 2020

CONCLUSION AND RECOMMENDATIONS

The Factors influencing the respondent's involvement in utilisation of livelihood coping could be attributed to the fact that revenue inflow into private establishments reduced during the pandemic and many private establishments had to lay off staff so as to sustain production. Coping strategies used are temporary responses used during hardship. Hence, rural women in the study area should be supported by both private and public organisation through empowerment, distribution of palliatives and conditional cash transfer programme which will help them to stand back on their feet and these should be properly monitored to get to the targeted citizens. There should be flexible measures to support smaller enterprises, those in the informal economy and others who are vulnerable to offset hardship.

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GENDER DIFFERENCES IN PERCEIVED EFFECTS OF CLIMATE CHANGE AND ADAPTATION STRATEGIES BY ARABLE CROP FARMERS IN IWO LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

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ABSTRACT
The study examined differences in perceived effects of climate change and adaptation strategies by male and female arable crop farmers. It also identified the constraints to the effective management of climate change in Iwo Local Government Area of Osun State. A three-stage sampling procedure was employed to select 120 respondents from Iwo Agricultural Development Zone using a validated structured interview schedule. Data were analyzed using descriptive and inferential statistics such as frequency, percentage, bar chart, weighted means, independent t-test and correlation analysis. The findings revealed that 39.3% of male and 55.6% of female farmers were middle-aged. Majority of the male (97.6%) and 55.6% of female were married. More males (41.7%) than females (30.6%) had secondary education. Using weighted mean scores, the three most employed adaptation strategies for males were mixed cropping (2.63); mulching (2.58) and use of improved varieties (2.25) while the females adopted mixed cropping (2.58); mulching (2.50) and diversification to non-farm activities (2.25). Correlation between climate perception and adaptability was significant for males ($r=2.25$, $p<0.05$) but not among females. Using independent t-test, there was no significant difference between the male and female perception of climate change and adaptation strategies. In conclusion, both male and female though demonstrated a moderate level of perception and adopted some adaptation strategies but were faced with certain constraints such as inadequate weather information and measurement facilities, as well as enterprises financing. To mitigate the effects of climate change on crops, all stakeholders should be involved in addressing the identified constraints faced by farmers.
Keywords: Gender, Arable crops, copping strategies, Climate change, Cropping system

INTRODUCTION

Climate change is understood as the identifiable or quantifiable changes in the mean and/or the variability of climate properties which continues for a prolonged period (United Nations Framework Convention on Climate Change, 2011). As such, it refers to significant changes in global temperature, precipitation, wind patterns and other measures of climate that occur over several decades or longer. Generally, these changes are brought about by natural variability or resulting from the aftermath of human activities. The role of human activity is mostly emphasized as a major precursor to climate change (Rahman, 2013) This is because human activities chiefly drive the release of greenhouse gases into the atmosphere which in turn heralds the increase in the earth's temperature. The resulting global warming initiates other changes in the climate properties, such as changes in rainfall patterns, the frequency and distribution of weather events such as droughts, storms, floods and heatwaves, among others (Reidy, 2016; Arora, 2019).

Adams *et al.* 2017 while highlighting its fundamental role in human welfare, observed that the fact that agricultural productivity is chiefly dependent on climate which makes the sector highly vulnerable to climate change effects. Even though the impact of climate change is very comprehensive, its sweeping effects are more visibly felt in agriculture, on which the food production and economy of the world depend (Lykhovyd, 2018; Arora, 2019). These highlight the imperative of climate change adaption strategies in agriculture which is important to improve farmer's production and income; and to buffer the production system against climate changes (Jat *et al.*, 2014).

The evidence of gender differences in climate vulnerability premised on the existence of gender inequality in access to productive resource and uneven representation has been upheld as primary to climate change adaption strategies (Adzawla and Kane 2019). In light of the above, the study examined gender differences in farmers perception of climate change effects and adaptation strategies.

METHODOLOGY

The study was carried out among 120 arable crop farmers in Iwo Local Government Area (LGA) of Osun State using a three-stage sampling procedure. In the first stage, three agricultural development cells were randomly selected from the available eight agricultural development programme cells. In the second stage, 2 communities were randomly selected from each of the agricultural development programme cells given a total of six communities. Finally, 20 respondents were randomly selected from each of the community giving a total of 120 respondents. Data were collected using a structured interview schedule. The dependent variable was adaptation strategies while the independent variables were the socio-economic and farm characteristics as well as the perception of climate change effect. Data were analyzed using descriptive and inferential statistics such as frequency, percentage, bar chart, weighted means, independent t-test and correlation analysis.

RESULTS AND DISCUSSION

Perception of climatic change effects on crop

Results in Table 1 showed that male and female respondents both ranked the decreasing trend of rainfall as the most perceived effect of climate change with a Weighted Mean Scores (WMS) difference of 0.12 in favour of male respondents. While the male respondents ranked rise in temperature (WMS=4.24) and late commencement of rainfall (WMS= 4.07) as second and the third most important effect of climate change respectively, the female respondents ranked both rises in temperature and increase in the rate of rainfall (WMS=4.08) as the second most perceived effect of climate change. This shows that men are more likely to perceive climate change effect more than women. Other studies on gender differential on climate change perception corroborating our findings have also reported change in rainfall as perceived by 87.2% of men and 76.7% of women (Swai *et al.,* 2012). Similarly, slightly more men (98.3%) than women (97.2%) in Bahi and Kondoa Districts, Dodoma Region of Tanzania and about nearly all respondents, male (92.1%) and female (85.0%) in three provinces in Vietnam's Mekong River Delta, perceived the rise in temperature as an effect of climate change (Swai *et al*., 2012; McKinley *et al*., 2016).

Table 1: Perception of climate change effects on crops

Perception of climate change effects on crops	Male		Female		
	*WMS	Rank	*WMS	Rank	Diff
The decreasing trend of rainfall availability has had any negative impact on crop yield over the years.	4.29	1	4.17	1	0.12
The temperature rise has had a negative impact on crop yield.	4.24	2	4.08	2	0.16
Late commencement of rainfall will have an adverse effect on crops in term of germination and growth	4.07	3	4.03	4	0.04
Rain cessation earlier than usual reduces the yield crops.	3.96	9	3.92	7	0.04
Unpredictable weather changes favour diseases prevalence, which will affect crop health	3.86	10	3.75	9	0.11
Land portions have been less suitable for crop cultivation due to climate changes.	3.14	12	3.42	11	-0.28
Increase in evaporation of soil moisture will affect crop yield negatively	4.06	4	3.97	5	0.09
The increase in the rate of rainfall will have a positive impact on crop growth	4.05	8	4.08	2	-0.03
Increase in ambient temperature will affect the rate of photosynthesis negatively	3.30	11	3.22	12	0.08
Had there been any significant change in temperature within the last 10 years	4.06	4	3.94	6	0.12
The negative impact of wind on the crop growth	4.06	4	3.64	10	0.42

***Note WMS = Weighted Mean Score**

Relationship between perception of climate change effect and adaptation strategies of male and female farmers

Results in Table 2 showed the degree of relationship between climate change perception and adaptation strategies of male and female farmers and the total sample. For the male respondents, there was a significant correlation between the perception of climate change effect and climate change adaptation strategies ($r=0.229$, $p<0.05$). However, for the female farmers, the correlation between the perception of climate change effect and adaptation strategies was not significant. For the total sample, the perception of climate change effect was significantly correlated with climate change adaption strategies ($r=0.234$, $p<0.05$). These results suggest that how male and female perceived climate change effect may not be significantly different as reported earlier but their perception may vary by their adaptation strategies. For example, while male farmers perception of climate change effect significantly associated with their choice of climate change adaption strategies, female perception of the effect of climate change did not influence their adaptation strategies.

Table 2: Relationship between the perception of climate change effect and adaptation strategies of male and female farmers

	Coeff	N	p-value	Decision
Male	0.2287	84	0.0120	Significant at p<0.05
Female	0.2001	36	0.2419	Not significant
Total	0.2336	120	0.0325	Significant at p<0.05

CONCLUSION AND RECOMMENDATION

The findings of this study revealed that there was no significant gender difference in the perceived climate change effects. Specifically, the male and female respondents both ranked decreasing trend of rainfall and its attendant effect on crop yields as the most perceived effect of climate change. While the male respondents ranked rise in temperature and late commencement of rainfall as second and the third most important, the female respondents ranked both rises in temperature and increase in the rate of rainfall as the second and third most perceived effect of climate change. In summary, they both demonstrated a moderate level of perception of climate change effect. Although more male farmers than females were consistently likely to adopt mixed cropping, mulching, use of improved varieties, crop rotation, adjustment of planting period and irrigation. However, the difference in the adaptation strategies was not significant. Male and female farmers both ranked inadequate weather information and measurement facilities, as well as enterprises financing as the two most important constraints to climate change adaptation strategies. To mitigate the effects of climate change on crops, all stakeholders should be involved in addressing the identified constraints faced by male and female farmers.

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ADAPTATION STRATEGIES TO CLIMATE CHANGE, CHALLENGES AND THE BENEFITS DERIVED BY AKOKO RURAL FARMERS IN ONDO STATE

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ABSTRACT
This study examined the strategies adopted by the Akoko rural farmers against climate change, challenges and benefits derived. The research design for this study is cross-sectional. Multi-stage sampling technique was used to delineate the study area into strata from where four communities were systematically selected, followed by a random selection of 400 respondents. A structured questionnaire and in-depth interview guide were utilised to elicit both qualitative and quantitative data. Accordingly, twenty in-depth interviews (IDIs) were conducted. The data from the questionnaire were analysed statistically and presented in a descriptive manner, while the IDIs were analysed using content analysis. The findings revealed that, farmers resorted to practices such as, use of cover crops (96%), bush fallow (89.1%), prompt weeding of the farm (88.8%), changing in the timing of land preparation (86.3%), control of weed as a measure for managing the risk of damage by wild fire (77.9%). The challenges faced are: scarcity of land due to removal of plantation in climate change prone area (64.2%), and increase in number of weeding period (57.6%). The benefits derived are: reduction in incident of rotten seedling (74.9%), increase in farm-yield (91.1%), reduction in the incident of fire outbreak on farmland (68.2%). The study recommends that government should ensure that (a) farmers have access to land to increase their ability and flexibility to change production strategies; and (b) there should be enough climate change related information from government toward guiding the farmers in farming activities.
Keywords: climate change, adaptation strategies, agriculture

INTRODUCTION

In relation to climate change, adaptation is defined by the Intergovernmental Panel on Climate Change (IPCC., 2001) as "an adjustment in natural or human system in response to actual or expected climate stimuli or the effects moderates harms or exploits beneficial opportunities". This definition shows that climate change is the driver of new conditions, and that responses or adjustments are directly related to the impacts of climate change (i.e., warmer temperatures, changing precipitations patterns, sea level rise, melting glaciers, and so on. Many adaptive measures have been identified accordingly, e.g., sea wall to protect against storm surges; drought-tolerant seeds, and efficient irrigation systems to respond to water scarcity; and changes in government structures to handle inter-basin water disputes (Adger, Agrawala, Mirza, Conde and O'Brien, et al., 2007; IPCC., 2014)

Climate change has become one of the most challenging and complex problems facing humanity, and it is likely to have significant consequences on every facets of human development (IPCC.,2014; (United Nations Development Programme) UNDP, 2008). Although, measures to reduce greenhouse gas emission which has been directly linked to the change in climate can significantly influence the rate of magnitude of future climate change. Most especially, as it has been projected by Scientists that temperature would increase up to the 4 degrees Celsius by the end of the century, (Parry, Canziani, Palutikof, vander Linden and Hanson, 2009).

It is increasingly recognised that society will have to adopt some measures towards adapting and alleviating the effects of climate change over the coming decades, regardless of mitigation efforts (UNDP, 2008). The complexities of climate change require developing and implementing a sufficiently complex at all scales, from the International, to the national, to the community, and down to the household and individual levels (Girvetz, Ramirez-villegas, Claessens, Lamanna and Navarro-Racines, 2018). Efforts to adapt to the impacts of inevitable climatic changes, why at the same time drastically reducing green house gas emissions, will require transformations at a rate and scale that is unprecedented in human history and it has to be holistic in nature (Lal, Delgado, Groffman, Millar and Dell, 2011). The challenges of climate change adaptation and a mitigation requires societies to adapt to not only new biophysical conditions, but also to new understandings of human environment relationships (Nyong, Adesina and Osman-Elasha, 2007).

The prediction of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) that climate change would have a significant effect on agricultural production in many African countries is gradually becoming a reality (IPCC, 2014). Presently, there is a reduction in agricultural yield in some African countries, Nigeria inclusive, and, this is currently posing a serious threat to food security (IPCC, 2014). Over the years, farmers have been devising means toward ameliorating climate variability (Onyeneke and Madukwe, 2010). But, the current trend of change in climate is making agricultural activities unpredictable, the profession is also becoming unprofitable and uninteresting (Lobel, and Burke, 2008). Farmers in Africa therefore, need to employ both the indigenous and the newly introduced adaptation practices so as to cope with both current climate variability and future climate change.

Several scholars have contributed to the debate on farmers' adaptation to climate change. Smit and Skinner (2002) developed a typology for classifying and characterising agricultural adaptation options in detail, focusing on Canada. Onyeneke and Madukwe (2010), worked on farmers' crop perception of climate change and adaptation strategies taken to reduce the negative impacts of climate in the southeast rainforest zone of Nigeria. These scholars discussed farmers' adaptation to climate change, with little efforts directed toward looking at the challenges faced and benefits derived by these farmers. It is very pertinent therefore, to identify a climate-specific element of Akoko farmers' adaptation behaviour, the challenges and benefits, in order to facilitate a societal response to the changes in climate that scientists have predicted.

This study therefore, seeks to identify the strategies adopted by Akoko rural farm families, Ondo State, against climate change; the challenges faced from the adoption of these strategies; and, the benefits derivable from the adopted strategies.

Theory of planned behaviour and rural farmers' adaptive strategies

The theory of planned behaviour by Ajzen and Fishbein, (1980) was employed to explain Akoko farmers' strong intentions to change and adopt strategies towards ameliorating the effects of climate change, their ability to persevere, and the confident that the adopted strategies would lead to an increase in productivity motivate them into action.

METHODOLOGY

This study was conducted in Akoko North East, Akoko South-West, Owo and Ose local government areas (LGAs) in Ondo North Senatorial district, Ondo State. Multistage sampling technique was adopted for the selection of 400 respondents. While 20 in-depth interviews (IDI) were also conducted. Quantitative data was analysed using tabulations, cross tabulations, means, simple frequencies, percentages while qualitative data were analysed using content analysis.

DATA ANALYSIS AND DISCUSSION

Demographic characteristics of the respondents show that, there were more 226 (57.4%) males compared to females 168 (42.6%) in this study. The disparity observed in the respondents' gender was an indication that farming constitute a male-dominated occupation. The respondents' ages ranged between 18 years and 63 years. Specifically, 18 (4.6%) of the respondents are aged between 18 and 29 years, 82 (20.8%) are aged between 30 and 39 years, 184 (46.7%) are aged between 40 and 49 years, 102 (25.9%) are aged between 50 and 59 years, and 8 (2%) are 60 years and above. This indicates that, the respondents are in their active years. About half 165(42.0%) of the total respondents had no formal education, 140 (35.5%) had completed primary education, 77(19.5%) are holder of secondary school certificate, while a minute 12(3.0%) had tertiary education, this ranges from Colleges of education, polytechnic and University. By implication, 77.5% of the respondents possess educational certificates below secondary school level. The summary of the analysis of the data collected on respondents' monthly income shows that 14 (3.6%) and 15(3.8%) of the respondents respectively earn between N 2,500 and N 4,999 and between N 5,000 and N 7,499 while 14 (3.6%) and 351 (89.1%) of the respondents respectively earn between N 2,500 and N 4,999 and naira and lastly N 7,500 and N9,999 naira each. Thus, a majority (89.1%) of the respondents earn between N 2,500 and N 4,999.

The farmers agreed to have been using the following adaptive measures; removal of plantation in the area where future climate change may render them less productive (70.1%); control of weed as a specific measure for managing the risk of damage by wild fire (77.9%); creation of watch group to watch farm against wild fire (63.2%); relocating to new fertile land outside Akoko area (76.4%); changing in the timing of land preparation activities (86.3%); prompt weeding (88.8%0; change in planting depth of seeds and seedling (78.7%); bush fallow (89.1%); and, mulching or use of cover crops (96%).

The challenges faced by the farmers as reported, range from: extinction of some local crops (59.9%); time consumption of irrigation farming (78.7%); scarcity of land for farming due to frequent relocation (64.2%); increase in the number of weeding periods. The benefits derivable as responded to by the farmers are; an increase yield of farm produce as a result of the usage of organic manure (91.1%); reduction in the incident of rotten seeds and seedling as a result of changing in planting depth of seed and seedling; prevention of farm lands from being consumed by fire due to formation of rotational watch group by farmers (68.2%).

CONCLUSION AND RECOMMENDATION

Climate change and its impact on farming activities has necessitated the need for Akoko farmers to adopt some strategies which aim at reducing the negative effects of climate change on them. The farmers through their responses to questionnaire and the in-depth interviews conducted agreed to have adopted different strategies. These strategies according to them, though helpful, yet, come with challenges which also have some negative impacts on them and their profession. The study therefore recommends that: government should ensure that (a) farmers have access to land to increase their ability and flexibility to change production strategies; (b) there should be enough climate change related information from government toward guiding the farmers in farming activities, most especially, concerning the appropriate time to embark of planting; and,

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ASSESSMENT OF YOUTH INVOLVEMENT IN ORGANIC PRODUCTION OF ARABLE CROPS IN OSUN STATE, NIGERIA

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ABSTRACT
The study assessed the youth involvement in organic production of arable crops in Osun State, Nigeria. A Multistage sampling procedure was used to elicit information from about 108 respondents using well-structured interview scheduled. The data collected were summarised using descriptive and inferential statistics. Results show that the mean age of respondents was 35 ± 8years, mean year of formal education was 13 ± 3 years and mean income per month was ₦35,000 ± 11,300. The respondents were moderately (49.1%) involved in using organic farming in their maize production with 80.6 percent using for cassava production. Furthermore, results show that there were positive and significant association between the level of involvement and marital status (χ^2=18.900, p≤ 0.01) and relationship with years of farming experience (r = 0.263, p≤ 0.01) among others. The study concluded that the youth had moderate level of involvement and recommended among others that provision and access to credit facilities by agricultural development stakeholders would facilitate youth organic agricultural production

Keywords: Assessment, youth, involvement, organic farming

INTRODUCTION

The country's economic mainstay before the oil boom was agriculture. The practice of organic agriculture in an organised manner is still new to the country, with less than ten years of application. However, it was reported that in 2010, land under organic production increased to 11,979 ha with 517 producers (Olaito, 2014). Organic farming in Nigeria is beginning to emerge, from a cursory review of the sector in 2014; we have very few farmers adopting the practices under the tutelage of some institutions like universities, research institutes, or some private organisations. Ines (2017) stated that arable farming is a type of crop production that produces a wide range of annual crops. There have been several studies on youth involvement in organic agricultural production but there is paucity information on youth involvement in organic agricultural production of arable crops. This stimulates the effort to assess the youth involvement in organic agricultural production of arable crop in Osun State, Nigeria.

A null hypothesis that there is no significant relationship between the socio-economic characteristics of youth and their involvement in organic agricultural production of arable crops was tested.

METHODOLOGY

The study was conducted in Osun state, which is one of the 36 states in Nigeria. The population of the study was youth, who were mainly participating in production of arable crops in Osun state with age range between 18years to 40years. A Multistage sampling procedure was used to select 108 respondents.

RESULTS AND DISCUSSION

Results in Table 1 show that higher percentage (53.7%) were female with mean age was 35 ± 8years and mean year of formal education was 13 ± 3 years. This is in agreement with the findings of Muhammad - Lawal *et al*. (2009) that the experience of youth in farming depends on the skills acquired and their interest.

Table 1: Distribution of respondents according to socio-economic characteristics, n=108

Variables	Frequency	Percentage	Mean	Standard Deviation
Age (years)				
20-30	38	35.2	34.54	7.81
31-40	48	44.4		
41-50	19	17.6		
Above 50	03	2.8		
Sex				
Male	50	46.3		
Female	58	53.7		
Years of formal education				
5-10	35	32.4	13.08	3.21
11-15	39	36.1		
16-20	34	31.5		
Average monthly income (₦)				
20,000-30,000	43	39.8	35,000	11,300
31,000-40,000	28	25.9		
41,000-50,000	25	23.1		
51,000-60,000	12	11.1		

Source: Field Survey, 2018.

Youth involvement in activities of organic agricultural production of arable crops

Results in Table 2 among others show that crop rotation (mean = 2.47) ranked the highest of all the organic farming activities involved in by the respondents in production of arable crops.

Table 2: Youth Involvement in activities of Organic Agricultural Production of Arable Crops n = 108

Organic production of Arable crop variables	NI Freq (%)	SI Freq (%)	MI Freq (%)	FI Freq (%)	Mean Score
Crop rotation	11(10.2)	7(6.5)	10(9.3)	80(74.1)	2.47
Mulching	_	22(20.4)	21(19.4)	65(60.2)	2.40
Use of green manure	21(19.4)	1(0.9)	25(23.1)	61(56.5)	2.17
Planting of cover crops	4(3.7)	39(36.1)	12(11.1)	53(49.1)	2.06
Manual weeding	19(17.6)	2(1.9)	44(40.7)	43(39.8)	2.03

Grand mean = 1.95
Source: Field Survey, 2018

Level of Involvement of Youth in Organic Production of Arable Crops

Results from Figure 1 show that 49.1 percent of the respondents were moderately involved in organic production of arable crops.

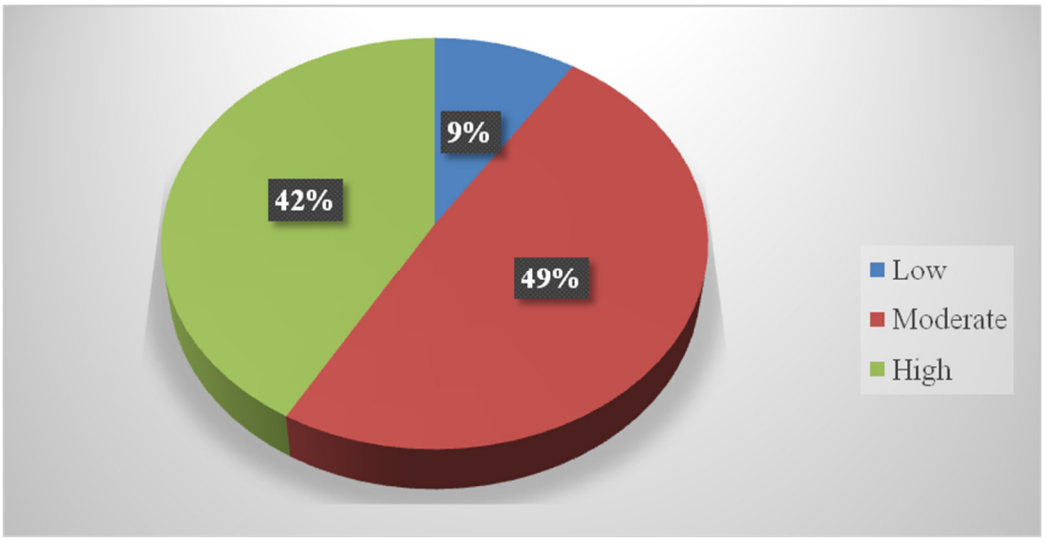

Fig. 1: Pie chart showing the level of involvement in organic production of arable crops
Source: Field Survey, 2018.

Hypotheses Testing

Results of chi-square analysis in Table 3 and 4 show that were positive and significant association between the level of involvement and marital status (χ^2 = 18.900, P ≤ 0.01) and relationship with years of farming experience (r = 0.263, p≤ 0.01) among others. This is contrary to the view of Ajayi *et al.* (2011) that gender is no barrier to active involvement in agriculture production activities.

Table 3: Chi-square analysis showing association between selected socio-economic characteristics of respondents and level of involvement in organic production of arable crops n = 108

Variable	χ^2 - value	D. f	C	P-value	Decision
Sex	22.412**	2	0.415	0.000	S
Marital status	18.900**	4	0.386	0.001	S
Cosmopoliteness	14.184**	2	0.526	0.000	S

**Significant at P≤ 0.01;
χ^2 = Chi-square
Source: Field survey, 2018.

Table 4: Correlation analysis showing the relationship between some selected socio-economic characteristics and the involvement of respondents in organic production of arable crops n = 108

Variable	r- value	p-value	Decision
Household size	-0.209*	0.030	S
Years of formal education	-0.200*	0.038	S
Years of farming experience	0.263**	0.006	S

**Significant at P≤ 0.01;
S = Significant
Source: Computed from field survey, 2018

CONCLUSION

The study concluded that the youth had moderate level of involvement and recommended among others that provision and access to credit facilities by agricultural development stakeholders would facilitate youth organic agricultural production

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COPING STRATEGIES OF WOMEN FARMERS WITH HOUSEHOLDS' FOOD INSECURITY IN OGBOMOSO AGRICULTURAL ZONE, OYO STATE

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ABSTRACT

Women are actively involved in agricultural production in Nigeria but despite their unique contributions to national food production, food access, availability and utilisation remain a major challenge to the entire population. This study, therefore, assessed the coping strategies used by women farmers on households' food insecurity in Ogbomoso agricultural zone of Oyo State. Multistage sampling procedure was used to select 202 women farmers in three blocks of Ogbomoso agricultural zone for this study. Data were collected on the socio-economic characteristics, the available coping strategies and the extent of use of available coping strategies, Data collected were analyzed using descriptive statistics and Weighted Mean Score (WMS). The mean age of the respondents was 51 years. Majority (92.6%) were married with an average households' size of 7 members. All the respondents indicated skipping of meal and eating of low-cost meals as coping strategies for food insecurity. The extent of use of available coping strategies against food insecurity was selling of livestock to purchase food (WMS=1.69). It was revealed that a positive and significant relationship exist among (income, r=0.579; p-value =0.000, age, r=0.501; p-value =0.000, farm size, r=0.579; p-value =0.000) and household food insecurity. The study therefore recommends that collection of forest products for sale such cashew, mango, mushroom and selling of livestock production should be more encouraged by the respondents so as to reduce food insecurity in the study area.

Keywords: Coping Strategies, Women Farmers, Food Insecurity, Household

INTRODUCTION

In many African countries, Nigeria inclusive, food security both nationally and at household level is disappointing, Ahungwa *et al* (2013) reported that food insecure household was over 40 percent in 2005. Food as basic necessity of life is regarded as the basic means of sustenance, and an adequate food intake in terms of quantity and quality is a key for healthy and productive life (FAO, 2012). Nigerian agriculture is dominated by the farming households who produce the bulk of food in the country, despite their unique contributions to national economy, food access, food availability and food utilisation remain a fundamental challenge to the population. According to Food and Agricultural Organisation (2002), Nigerian farming households including women farmers are faced with serious food security problems. This among other challenges has led to the unimpressive performance of the agricultural sector in meeting the food needs of the Nigerian population both at the households and national levels therefore the main objective of the study is to determine the household food insecurity of women farmers in Ogbomoso, Oyo State, Nigeria. The specific objectives are to: 1. Describe the socioeconomic characteristics of women farmers in the study area. 2. Examine the available coping strategies and the extent of use of available coping strategies on household food insecurity among the respondents in the study area.

METHODOLOGY

The study was carried out in Ogbomoso Agricultural Zone of Oyo State, Nigeria. The Study area is made up of five (5) Local Government Areas (LGAs) which are, Ogbomoso North, Ogbomoso South, Oriire, Surulere and Ogo-Oluwa LG Areas. The zone experience both wet and dry season annually. A multistage sampling technique was employed for the selection of respondents for this study.in the first stage purposive sampling method was used to select three (3) blocks out of five (5) blocks in the study area based on rurality. The second stage involves random selection of 40 percent of the total number of cells from each block. The third stage involved the random selection of 3 percent of the total number of villages in the selected blocks making a total of number of 16 villages selected for the study. Finally, 40 percent of the total registered women farmers were randomly selected from each of the villages to give a total of 202 respondents sampled for the study. Primary data were collected through the use of well-structured questionnaire using interview schedule. The data collection instrument was administered on each of the respondents (women farmers). Data on social economic

characteristics included age, marital status, household size, farm size (hectares), years spent in school and income per annum. The available coping strategies and the extent of use of available coping strategies adopted by the respondents to deal with food insecurity include skipping of meals, eating of low-cost meal, backyard farming etc. food and nutrition technical assistance (FANTA) was used to examine the household food insecurity of the respondents. Data on socio economic characteristics were analyzed using descriptive statistics. The Pearson's Product Moment Correlation (PPMC) was used in analyzing household food insecurity.

RESULT AND DISCUSSION

Socioeconomic characteristics of women farmers

Table 1 revealed that respondents mean age, household size and farm size were 51.4 years, 6.07 persons and 1.40 hectares of land respectively. This implies that majority of the respondents are in their active and productive age of an average household member with farm size less than or equal to 2 hectares, practicing subsistence farming with mean annual income of 438, 000 naira which may not adequately carter for their needs. The mean age of the respondents is in line with Adebayo (2012), which states that the majority of farmers in Nigeria were between the age ranges of 40 – 55 years. Majority (92.6%) of the respondents were married which is expected to influence the level of food provision to the household this finding corroborates with the work of Gordon and Craig (2001) that maintain that marital status influences the level of participation in farming, non - farm activities and household food security status. it was also revealed in the study that majority (56.9%) of the respondents spent less than or equal to 6years in school which implies that had just the basic primary education.

Table 1: Socio - economic characteristics of women farmers (n = 202)

Socioeconomic characteristics	Frequency	Percentage	Mean
Age			
≤ 40		10	
41 – 50		37	
51 – 60		42	
61 – 70		11	**51**
Marital Status			
Single	1	0.5	
Divorced	1	0.5	
Widowed	11	5.4	
Separated	2	1.0	
Married	187	92.6	
Household size			
≤ 3	3	1.5	
4 – 5	62	30.7	
6 – 7	113	56.0	**6.07**
8 – 9	24	11.9	
Farm size (hectares)			
≤ 2	201	99.5	
3 – 5	1	0.5	**1.40**
Income			
≤ 400,000	104	51.5	
401,000 - 500,000	57	28.3	
501,000 - 600,000	37	18.3	
601,000 - 700,000	3	1.5	
701,000 - 800,000	1	0.5	**438,000**
Years of schooling (years)			
≤ 6	115	56.9	

Socioeconomic characteristics	Frequency	Percentage	Mean
7 – 9	-	-	
10 – 12	84	41.6	
13 – 15	2	1.0	
16 – 18	1	0.5	**7.7**

Source: Field Survey, 2019

Adopted available coping strategies and Rank order of coping strategies by the respondent

Table 2 revealed that 100 percent of the respondents' adopted skipping of meals and eating of low-cost meal as coping strategies for food insecurity. Majority (99.0% and 96.5%) of the respondents adopted selling of livestock and collection of forest product as coping strategies, other coping strategies used were: attended parties (5.9%), Fasting (1.0%) and collection of leftovers at parties (1.5%). This implies that skipping of meals and eating low-cost meal were the most available copping strategies majorly adopted by the respondents. In an earlier study Gupta *et al* (2015) also established that food insecure households often use four groups of coping strategies to deal with food insecurity while selling of livestock to purchase food with a Weighted Mean Score (WMS) of 1.70 and ranked 1 was the most available coping strategies and fasting by the respondents which had a WMS of 0.01 ranked 17 was the least available coping strategies, it thus implies that respondents utilised resources within their immediate environment. Similar findings were reported by Adisa and Okunade (2011) in a study of adoption and diffusion of the concept of women in agriculture.

Table 2: Adopted available coping strategies and Rank order of coping strategies by the respondent

Available Coping Strategies	Frequency	Percentage	WMS	Rank
Skipping of meals	202	100	0.94	6
Borrowing food from neighbors / friends	56	27.7	0.76	8
Eating of low-cost meals	202	100	1.21	4
Backyard farming	75	37.1	0.22	13
Livelihood diversification	144	71.3	1.12	5
Buying food on credit	180	89.1	0.66	9
Reduction in meal size	180	89.1	0.89	7
Fasting	2	1.0	0.01	17
Selling of livestock to purchase food	200	99.0	1.70	1
Borrowing money to purchase food	121	59.9	0.51	10
Attending parties	12	5.9	0.06	14
Collection of forest products	195	96.5	1.39	3
Collection of leftovers at social functions	3	1.5	0.04	15
Black soap production	43	21.3	0.41	11
Selling of firewood/charcoal	175	86.6	1.45	2
Gift from friends	188	93.1	0.41	11
Support from society	29	14.4	0.02	16

Source: Field Survey, 2019

Household food insecurity

All the respondents (100 percent) submitted that they have to eat some food that they really do not want to eat because of lack of resources to obtain other types of food, while 1% of the respondents' household member go a whole day and night without eating anything because there was not enough food. This implies that majority household lack free access to food (Table 3).

Table 3: Distributions of respondents according to household food insecurity

Food security index	Frequency	Percentage
In the past 4 weeks, did you or any household member have to eat some foods that you really did not want to eat because of lack of resources to obtain other types of food?	202	100.0
In the past 4 weeks, were you or any household member not able to eat the kinds of food you preferred because of lack of resources?	201	99.5
In the past 4 weeks, did you or any household member have to eat smaller meal than you felt you needed because there was not enough food?	200	99.0
In the past 4 weeks, did you or any household member have to eat a limited variety of foods due to lack of resources?	199	98.5
In the past 4 weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	199	98.5
In the past 4 weeks, did you worry that your household will not have enough food?	96	47.5
In the past 4 weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	16	7.9
In the past 4 weeks, did you or any household member go to sleep at night hungry because there was not enough food?	8	4.0
In the past 4 weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	2	1.0

Source: Field Survey, 2019

Table 4 shows the result between the relationship of selected socio economy characteristics and household food insecurity of the respondents at 1% level of significance shows that age (r = 0.50, p = 0.00) and farm size (r = 0.58, p = 0.00) exhibited positive and significant relationship with households' food insecurity. Similarly, significant relationship (p = 0.01) existed between poor transportation (r = 0.330, p = 0.000) and poor road (r = 0.330, p = 0.026) on household food insecurity status.

Table 4: Relationship between selected socioeconomic characteristics and household food insecurity of the respondents (PPMC).

Socio-economic characteristics	r – value	p – value	Remark	Decision
Age	0.501	0.000**	S	Reject H_{o1}
Household size	- 0.304	0.000**	S	Reject H_{o1}
Farm size	0.579	0.000**	S	Reject H_{o1}
Years spent in school	0.192	0.006	S	Accept H_{o1}
Income	0.579	0.000**	S	Reject H_{o1}

**Significant at 1% level. S = significant, R/H_o = reject hypothesis

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATION

Based on the findings of this study, Age farm size, household food security and income significantly analyzed the coping strategies of women farmers and household food insecurity. Based on the findings, respondents should be empowered to increase their farm size through access to soft loan that will enable them acquire the necessary inputs for ultimate expansion of food availability through production programme that specifically target women farmers such as provision of input and disbursement of loans which would help them to move towards food security should be enacted in the study area.

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GENDER DIFFERENCES IN THE ADOPTION OF COCOA REHABILITATION TECHNIQUES IN ILE-OLUJI/OKE-IGBO LOCAL GOVERNMENT AREA OF ONDO STATE, NIGERIA

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ABSTRACT
The study assessed gender differences in the adoption of cocoa rehabilitation techniques in Ile-Oluji/Oke-Igbo Local Government Area (LGA), Ondo State. It identified the rehabilitation techniques adopted, determined the level of adoption, and identified the constraints to adopting the techniques on gender basis. Multi-stage sampling procedure was used to select 120 respondents from randomly selected five wards in the LGA. Data were collected using structured interview schedule. Data were analyzed with descriptive statistics such as frequency count, percentages and mean. Results show that the mean age of the respondents was 48 years. Majority (84.17%) had 11 years cocoa farming experience. Majority (87.63%) male and female (82.61%) adopted selective tree replanting technique. Both males (62.88%) and females (65.22%) were at medium level of adoption. Furthermore, both male (Mean=2.00) and female (Mean=1.96) identified unavailability of village extension worker as constraint to adoption of the techniques. In conclusion, male adopted the cocoa rehabilitation techniques more than their female counterpart, hence, enlightenment programmes on the techniques should be organised by government and non-governmental organisations to encourage more female adopters.
Keywords: Gender, Rehabilitation, Adoption, Cocoa.

INTRODUCTION

Gender refers to the roles, characteristics, behaviours, activities, attributes and opportunities that any society considers appropriate for girls and boys, and women and men. It is a socially constructed definition of women and men (Manandhar, Hawkes, Buse, Nosrati and Magar, 2018). Cocoa (*Theobroma cacao Lineus*) is one of the world's most important perennial crops and plays a prominent role in the economy of Central and West Africa (Fonkeng, 2014). Cocoa was introduced into Nigeria in 1874 and has since gained prominence rapidly in the country such that in the early seventies, cocoa production has spread to all the agro ecological zones in Nigeria (Oluyole, 2010).

Cocoa was a major agricultural export crop and a top foreign exchange earner in the 1950s and 60s. Prior to the discovery of crude oil in commercial quantities in the 1970s, Nigeria was the world's second largest producer of cocoa. Average cocoa production declined from 420,000 tons in the 1960s to 170,000 tons in 1999. Production climbed to 389,272 tons between 2000 and 2010, but fell back to 192,000 tons in 2015 and 2016. After dropping to fourth place, Nigeria is now the sixth largest producer (Proshareng News, 2017). In view of the need for increased cocoa production, institutional effort such as cocoa rehabilitation programme need to be sustained. Cocoa rehabilitation according to Akinnagbe (2015) is the process whereby unproductive cocoa farms can be made productive by extending the economic life of a cocoa plantation. Gender analysis examines the different roles, rights, and opportunities of men and women and relations between them. It also identifies disparities, examines why such disparities exist, determines whether there are potential impediments to achieving results, and looks at how they can be addressed (United States Agency for International Development, 2011). There is need for gender specific data on farmers' level of adoption of cocoa rehabilitation techniques, so as to sustain any intervention in promoting cocoa production which is a major foreign exchange earner in Nigeria, hence the study.

METHODOLOGY

The study area was Ile-Oluji/Oke-Igbo LGA, Ondo State. Multistage random sampling procedure was used to select the sample for the study. The first stage involved random selection of five out of ten wards in Ile-Oluji/Oke-Igbo L.G.A. Second stage involved the random selection of one community in each ward to make a total of 5 communities. The third stage involved random selection of an average of 20 percent of male and

female adopters of the cocoa rehabilitation techniques from each community to make a total of one hundred and twenty (97 male and 23 female) respondents. Structured interview schedule was developed and used to collect quantitative data from the respondents. The data were analyzed using descriptive statistics such as frequency counts, percentages and mean.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

Data in Table 1 show that the mean age of the respondents was 48 years. The data further show that most (80.83 percent) of the cocoa farmers that adopted the cocoa rehabilitation techniques were male and few (19.17 percent) were female. This implies that, male are the active producers and adopters of cocoa rehabilitation techniques in the study area. The data further show almost half (49.17 percent) had between 7 and 12 years of formal education and the mean years of formal education is 12 years. This implies that almost half of the respondents had secondary school education and may be willing to adopt innovations because educated people tend to adopt innovations more readily than those that are not formally educated. The data further reveal that most (84.17 percent) started cocoa farming in 11 years above. The mean years of farming experience is 20 years.

Table 1: Distribution of respondents according to their socioeconomic characteristics (n=120)

Characteristics	Frequency	Percentage
Age (years)		
21 – 40	41	34.17
41 – 60	56	46.67
61 – 80	23	19.97
Mean	**48**	
Gender		
Male	97	80.83
Female	23	19.17
Years of formal education		
No formal education	23	19.17
1 – 6	27	22.50
7 – 12	59	49.17
13 – 18	11	9.16
Mean	**12**	
Cocoa Farming Experience (years)		
1-5	2	1.67
6-10	17	14.17
11 and above	101	84.17
Mean	**19.05**	

Source: Field Survey, 2018

Rehabilitation techniques adopted on gender basis

Data in Table 2 show that none (0.00 percent) of the male and female respondents adopted complete farm replacement and grafting method. Some (47.42 percent) of male and some (47.83 percent) of the female respondents adopted phased farm replanting technique. Most (88.66 percent) of the male and all (100.00 percent) of the female respondents adopted planting under the old trees technique. Most (87.63 percent) of the male and 82.61 percent of the female respondents adopted the selective tree replanting technique.

Table 2: Rehabilitation techniques adopted by the respondents on gender basis male (n=97) female (n=23)

Cocoa rehabilitation technique	Male				Female			
	Yes		No		Yes		No	
	F	%	F	%	F	%	F	%
Complete farm replacement	0	0.00	97	100.00	0	0.00	23	100.00
Phased farm replanting	46	47.42	51	52.58	11	47.83	12	52.17
Planting under old tress	86	88.66	11	11.34	23	100.00	0	0.00
Selective replanting	85	87.63	12	12.37	19	82.61	4	17.39
Grafting	0	0.00	97	100.00	0	0.00	23	100.00

Source: Field Survey 2018

Level of adoption of cocoa rehabilitation techniques

Data in Table 3 show that 8.25 percent of male had the mean score between 1 and 5.97 (Low), 62.88 percent had the mean score between 5.98 and 10.27 (Medium) and 28.87 percent had the mean score between 10.28 and above (High). Meanwhile for female, 17.39 percent had the mean score between 1 and 5.43 (Low), 65.22 percent has the mean score between 5.44 and 9.33 (Medium) and 17.39 percent had the mean score between 9.34 and above (High).

Table 3: Level of adoption of cocoa rehabilitation techniques on gender basis male (n=97) female (n=23)

Level	F	Percent
Male		
Low (1-5.97)	8	8.25
Medium (5.98-10.27)	61	62.88
High (10.28 and above)	28	28.87
Female		
Low (1-5.43)	4	17.39
Medium (5.44-9.33)	15	65.22
High (9.34 and above)	4	17.39

Source: Field Survey 2018

	Male	**Female**
Mean=	8.13	7.39
Standard Deviation=	2.15	1.95

Constraints to adoption of cocoa rehabilitation techniques on gender basis

Data in Table 4 show the constraints affecting the adoption of cocoa rehabilitation techniques. The constraints were arranged in descending order thus: unavailability of village extension worker (mean= 2.00), personal bias or feelings toward the techniques (mean= 1.90), lack of improved seedlings (mean=1.89) , high labour cost (mean= 1.80) and land tenure system (mean= 1.73) are more severe for male cocoa farmers in the study area thereby may discourage them from adoption of cocoa rehabilitation techniques but the female cocoa farmers considered unavailability of village extension worker (mean= 1.96), land tenure system (mean= 1.91), diseases and pest (mean= 1.83), high labour cost (mean= 1.78) and lack of improved seedlings (mean= 1.78) as major constraints. Unavailability of village extension worker is the most severe for both male and female while land tenure system is more severe for female than male.

Table 4: Constraints to adoption of cocoa rehabilitation techniques on gender basis

Constraints of Adoption	Male (Mean)	Rank	Female (Mean)	Rank
Unavailability of village extension worker	2.00	1st	1.96	1st
Personal bias or feeling towards the techniques	1.90	2nd	1.70	6th
Lack of improved seedlings	1.89	3rd	1.78	4th
High labour cost	1.80	4th	1.78	4th
Land tenure system	1.73	5th	1.91	2nd
Diseases and pest	1.72	6th	1.83	3rd

Source: Field Survey, 2018

CONCLUSION AND RECOMMENDATIONS

The study revealed that most of the adopters of the cocoa rehabilitation techniques were male while few were female. Also, unavailability of village extension worker was the most severe constraint for both male and female respondents while personal bias or feelings toward the techniques was the most severe constraint for male respondents and land tenure system was the most severe constraints for female respondents. Based on the findings it was recommended enlightenment programmes on cocoa rehabilitation techniques should be organised by governmental and non-governmental organisations to encourage more female adopters and the ADP extension agents should train more farmers on cocoa rehabilitation techniques to increase the production of cocoa in Nigeria.

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FARMERS' LEVEL OF ENGAGEMENT IN TOMATO POSTHARVEST HANDLING ACTIVITIES IN KADUNA STATE, NIGERIA

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ABSTRACT

Tomato is an important fruit vegetable which provide numerous nutrients to the body as a result of presence of higher amounts of lycopene, carotenoid with antioxidant properties useful in reducing the incidence of some chronic diseases. Despite the level of production, tomato are lost at a frightening rate of 30-50% annually as a result of poor handling. In this study, level of engagement of farmers in various postharvest handling activities was investigated. Multistage sampling procedure (purposive and random sampling) was used to select 231 respondents. Structured questionnaire was used for data collection, descriptive and inferential statistical tools were used for analysis. Majority of openfield farmers (94.8%) were found to be male with 15 years of farming experience (63.6%) and majority (54.1%) produced less than 5000kg of tomato annually. Most (65.4%) had low engagement level in handling tomato and majority (58.9%) incurred high rate of losses. There was significant relationship between years of experience (-0.163, $p<0.05$), farm size (0.279, $p<0.05$), quantity of tomato produced ($r = 0.272$, $p<0.05$) and losses incurred. Significant relationship also existed between level of engagement ($r = -0.163$, $p<0.05$) and the rate of losses incurred. The study therefore recommends that government and other NGOs should assist tomato farmers with processing and storage facilities. Also extension agents should organise workshop and training for farmers on modern techniques of postharvest handling of tomato to improve their level of engagement in order to reduce the rate of losses incurred for better rural family enterprises.

Keywords: Level of engagement, Postharvest handling activities, Tomato postharvest losses, Tomato farmers

INTRODUCTION

Tomato (*Lycopersicon esculentum*) is one of the most widely grown vegetables in the world and an important component of the daily diet, consumed both in its fresh form and in paste form. It is a good source of vitamins A and C and other essential minerals and cultivated over the vast area of land in the world. About thirty-two percent of food produced globally was lost and not eventually consumed by intended people due to the problem of inadequate postharvest handling activities which eventually results in greater losses. Therefore, reducing the food losses and waste could be one of the important global approaches for realizing a sustainable food future. In Africa, the losses are even higher between thirty and fifty percent which occur mainly along the supply chain, where fruits and vegetables losses are estimated to be fifty percent or more and this estimate is increasing because losses occur at every stage of the supply chain (FAO, 2011)

Nigeria ranks 16th of the leading producer of tomato in the world and has the proportional benefits and prospective to top the world in both production and exports. Regrettably, Nigeria still experiences high level of postharvest losses. It is therefore pertinent to examine the level of engagement in various postharvest handling activities of tomato among farmers in Kaduna State to ensure reduction in the rate of losses for adequate food security.

The objectives of the study are as stated;

1. Describe the socio-economic characteristics of tomato farmers in the study area.
2. Ascertain the level of engagement in postharvest handling activities by the respondents.
3. Determine the rate of postharvest losses of tomato incurred by the respondents in the study area

The hypotheses of the study are as stated;

$H_0$1: There is no significant relationship between the respondents' socio-economic characteristics rate of postharvest losses incurred.

$H_0$2: There is no significant relationship between respondents' level of engagement in postharvest handling activities and rate of losses incurred.

METHODOLOGY

The study was conducted in Kaduna state North Western zone of Nigeria. Multi stage sampling (purposive and random) procedure was adopted to select 231 respondents for this study. Purposive sampling technique was also used to select 20% of LGAs prominent in tomato production from Kaduna states.

RESULTS AND DISCUSSION

Age: The result (Table 1) reveals that little above the average (51.5%) farmers were within age range of 41 to 50 years with the mean age of 47.8 years. This suggests that tomato farming is dominated by young people which are considered to be in their productive and active years. This agrees with the findings of Wachira (2012) where the mean age of farmers was 47.5 years in a related study.

Farmers' years of experience: The result reveals that majority (63.6%) of farmers had 15 years of experience. This implies that tomato farming is an age long profession of the respondents in the study area. This agrees with the report of Ajayi *et al* (2010), who stated that larger proportion (68.9%) of farmers had the same years of farming experience.

Tomato farm size: The results from Table 1 shows that few (41.6%) farmers had between 1 – 2 acres of tomato farmland. The total number of acreages cultivated by the farmers denotes that food production in Nigeria is characterized mainly by small scale farmers. This is consistent with the findings of Daudu, Chado and Igbashal (2009) in a related study that larger percentage (37.2%) of the respondents had small farm size of less than two acres.

Quantity of tomato produced: The result (Table 1) reveals that little above average (54.1%) of farmers produced tomato of between 5001 and 10,000kg in the year 2016, while only 1.3% produced above 20,000kg. The low production could be attributed to the outbreak of *Tuta absoluta* (Leaf miners) in the Northern part of Nigeria.

Table 1: Distribution of respondents' socio-economic characteristics

Variable description	Openfield Farmers (n=231)		
Age (Years)	**F**	**%**	**Mean**
≤ 30	3	1.23	
31 – 40	42	18.18	
41 – 50	119	51.52	47.8± 7.8
51 – 60	56	24.24	
≥ 61	11	4.76	
Years of experience			
≤ 10	47	20.35	
11-20	147	63.64	15.80±SD
21-30	33	13.85	
>31	5	2.16	
Size of tomato farm (acres)			
≤ 1	65	28.14	
1.0 – 2	96	41.56	4.2±28.5
> 3	70	30.30	
Quantity produced (kg)			
≤ 5000	48	20.77	
5001 – 10000	125	54.11	53.06±37.45
10001 – 15000	30	12.98	
15001 -20000	25	10.83	
> 20000	3	1.30	

Distribution of respondents' level of postharvest handling activities

The result from Table 2 shows that farmers' level of engagement was low in the use of sharp knives for harvesting tomato ($\overline{x}$=0.06). Respondents' level of engagement was low in the following activities; spreading of tomato on a verandah at home ($\overline{x}$=0.05). Respondents' level of

engagement was low on sorting according to different sizes before packaging ($\bar{X}$=0.81). On the packaging activities of tomato, respondents' level of engagement was low in the use of collapsible slatted wooden box ($\bar{X}$=0.06). Farmers' level of engagement was low in the pot-in-pot method ($\bar{X}$=0.03). However, the result shows that farmers have never transported tomato with the use of cool van ($\bar{X}$=0.29). More so, it was discovered that farmers always engage in slicing and sun drying ($\bar{X}$=1.08).

Table 2: Distribution of respondents' level of postharvest handling activities of tomato

Postharvest handling activities parameters	Openfield Farmers (n = 231) Frequency of engagement			
	Always	Occasionally	Never	
	F	F	F	Mean
Use of sharp knives for harvesting fresh tomato	10(4.3)	3(1.30)	218(94.4)	0.06
Spreading the tomato on a verandah at home	20(8.7)	6(2.6)	205(88.7)	0.05
Sorting of tomato according to different sizes	30(13.0)	98(42.4)	103(44.6)	0.81
Packaging with collapsible slatted wooden box	10(4.3)	5(2.2)	216(93.5)	0.06
Preserving fresh tomato using pot - in- pot method	0	0	231(100.0)	0.03
Use of cool van for transporting tomato	3(1.3)	61(26.4)	167(72.3)	0.29
Slicing and Sun drying of tomato	37(16.0)	167(72.3)	27(11.7)	1.08

Categorisation of respondents' level of engagement on various PHAs

The result from Table 3 reveals the summary of respondents' level of engagement in various postharvest handling activities of tomato where it was observed that majority (65.4%) of the farmers had low level of engagement in various postharvest handling activities of tomato, while only few (34.6%) of farmers were highly engaged. This suggests that majority of the farmers were not highly engaged in various postharvest handling activities which attributed to high rate of losses incurred

Table 3: Categorisation of respondents' level of engagement on PHAs

Level of Post-harvest Handling Activities	Open field farmers (n=231)	
	F	%
Low	151	65.37
High	80	34.63
Mean ± SD:	24.71 ± 7.72	
Minimum:	16.00	
Maximum:	48.00	

The rate of postharvest losses incurred by tomato farmers

The distribution on the losses incurred by the respondents from Table 4 shows that 58.9% of farmers incurred high rate of tomato losses while only 41.1 percent incurred low-rate losses. The high rate of losses incurred could be linked to their low level of engagement in various postharvest handling activities required for tomato. This is in agreement with Ladapo (2010) in a related study.

Table 4: The rate of losses incurred among tomato farmers

Rate of losses incurred	Tomato farmers n=231)	
	F	%
Low rate of losses	95	41.13
High rate of losses	136	58.87
Mean	12.51	
SD	8.90	
Minimum	0.60	
Maximum	74.60	

PPMC analysis between selected enterprise characteristics and losses incurred

The result from Table 5 shows that there is significant relationship between farmers years of experience ($r = -0.163$, $p<0.05$), size of tomato farm ($r = -0.279$, $p<0.05$), quantity produced ($r = -0.272$, $p<0.05$) and the rate of losses incurred. This suggests that years of experience, size of tomato farm and quantity produced have significant influence on the rate of tomato losses among farmers in the study area.

Table 5: Correlation between selected enterprise characteristics and losses incurred

Variables	Openfield farmers (n = 231)		
	r- value	p-value	Decision
Age	0.050	0.467	Not significant
Years of experience	-0.163	0.032	Significant
Size of tomato farm(acres)	0.279	0.042	Significant
Quantity produced / bought last year (kg)	0.272	0.045	Significant

Relationship between farmers' levels of engagement in PHAs and the rate of losses

The result from Table 6 shows that there is significant relationship between farmers' ($r = -0.163$, $p<0.05$) level of engagement in various postharvest handling activities of tomato and the rate of losses incurred. The negative relationship between level of engagement and rate of losses implies that the more the tomato farmers engage in various postharvest handling activities of tomato, the less the rate of losses to be incurred and vice-versa.

Table 6: Correlation between respondents' level of engagement in PHAs and the losses

Variables	Tomato Farmers (n = 231)		
	r – value	p – value	Decision
Level of engagement in postharvest handling Activities	-0.163	0.037	Sig

Note: r = correlation coefficient, p = significance level, Sig = Significant

CONCLUSION AND RECOMMENDATION

There was low level of engagement in postharvest handling activities among the farmers and this could be the major reason for incurring high rate of losses. More so, farmers' level of engagement in various postharvest handling activities were related to the high rate of losses incurred. The study concludes that level of engagement in various postharvest handling activities were significantly related to the losses incurred. Therefore, tomato farmers should be enlightened on the modern ways of postharvest handling activities to reduce the rate of losses of tomato by adopting technologies of some research institutes that will be of benefit.

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FAMILY INSTABILITY AS CORRELATE OF CRIMINAL ACTIVITIES IN TRAILER PARK COMMUNITIES IN OYO STATE, NIGERIA

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ABSTRACT
Nigeria has witnessed a phenomenal rise in criminal activities in recent years. It is observed that the security and safety of Nigerians become a major concern during this period of COVID-19 pandemic as the country recorded many cases of rape, theft, arm-robbery, drug abuse, internet fraud, among others. While there are many studies on family instability and criminal activities, there are few studies on family instability and criminal activities in trailer park communities. It is against this backdrop that this study examined family instability as a correlate of criminal activities in selected trailer park communities in Oyo State, Nigeria. The study drew on social disorganisation theory. On methods, a total of 420 respondents were randomly selected through stratified and purposive sampling techniques. The study adopted mixed methods (questionnaire and interview). While 420 copies of questionnaires were administered to the respondents, 12 participants were chosen from the 420 respondents for interviews. On analysis, both descriptive statistical tools (such as frequency distribution tables, percentile method, mean and standard deviation, used to summarise and describe the data) and inferential analytical tool (logistic regression technique, adopted to test the hypothesis) were used for analysis. Responses from the interviews were analysed using content analytical technique. The results showed that family instability is a correlate of criminal activities in trailer park communities. Based on this result, the study concluded that family instability is a major determinant of criminal activities in trailer park communities in Oyo state, Nigeria.
Keyword: Family Instability, Criminal activities, Trailer parks communities

INTRODUCTION

Family structure has provided economic success and social order over the years and the current problem facing the world can be adduced to the decline in the nuclear family and the urge in a new individualistic culture (Mullens, 2004). There is evidence showing that the family process plays a key role in inducing social and behavioural problems among youths or in protecting them from such problems. Family warmth and connectedness serve as a protective factor against many of the risky behaviours engaged in by adolescents (Pergamit, Huang and Lane, 2012). The structure of the family affects the development of children either positively or negatively. The children of divorced parents are twice as likely as children from intact families to display a lower level of conduct and delinquent behaviour (Amato, 2001). Studies have reported that adolescents from intact families (two birth parents) are less likely to be regular drinkers, smokers, and criminals (Glendinning, Schucksmith and Hendry, 1997) than those from either reconstituted or single-parent families.

Nigeria has witnessed a phenomenal rise in criminal activities in recent years. It is observed that the security and safety of Nigerians become a major concern during this period of COVID-19 pandemic as the country recorded many cases of rape, theft, arm-robbery, internet fraud among others. While there are many studies on family instability and criminal activities, there are few studies on family instability and criminal activities in trailer park communities. It is against this backdrop that this study examined family instability as a correlate of criminal activities in selected trailer park communities in Oyo State, Nigeria.

Theoretical Framework: Social Disorganisation Theory

The concept of social disorganisation theory was applied to the explanation of crime, delinquency, and other social problems by sociologists at the University of Chicago in the early 1900s, because of the booming industrial nature of the city and its increase in the population of immigrants of diverse racial and ethnic backgrounds. The theory states that communities' social disorganisation, itself affected by a set of environmental/structural characteristics, accounts for spatial variations in (urban) crime rates.

While this theory has many elements, this study focuses on only element that is relevant to this study, which is family disorganisation. Family disorganisation can be referred to as the breakdown of a family system. It may be associated with

parental overburdening, divorce, physical or verbal abuse, or loss of significant others who served as role models for children or support systems for family members. Sampson (1987) argued that marital and family disruption may decrease informal social controls at the community level. To them, macro-level family disruption had large direct effects on rates of juvenile crime by both whites and blacks. However, family disorganisation has a great influence on crime, this is because, family structure and family functioning ability play effective roles on individual delinquent behavior.

METHODOLOGY

Three trailer park communities in Oyo State, Nigeria were selected for this study. The selected trailer park communities were Orile-Igbon, Sabo and Elekara. These trailer parks were chosen because they are the major and most commercial trailer parks in Oyo State. A total of 420 respondents were randomly selected through stratified and purposive sampling techniques. The study adopted mixed methods (both questionnaire and interviews were used to collect data). While 420 copies of questionnaires were administered to the respondents, 12 participants were chosen from the 420 respondents for interviews. On analysis, descriptive statistical tools (such as frequency distribution tables, percentile method, mean and standard deviation) were used to summarise and describe the data. And inferential analytical tool (logistic regression technique) was adopted to test the hypothesis. Content analysis was used to analyse the qualitative data. This study conformed to the laid down procedures in carrying out this.

Table 1: Criminality among Residents in the Trailers Park: What are the types of criminal activities among residents of the trailer park communities?

Criminality	very often		Often		Sometimes		Rarely		Never	
	Count	%	Count	%	Count	%	Count	%	Count	%
Armed Robbery	67	18.0%	75	20.2%	145	39.0%	61	16.4%	24	6.5%
Sexual Harassment	173	46.5%	83	22.3%	46	12.4%	37	9.9%	33	8.9%
Kidnapping	24	6.5%	27	7.3%	37	9.9%	191	51.3%	93	25.0%
Theft	108	29.0%	133	35.8%	62	16.7%	39	10.5%	30	8.1%
Drug Abuse	133	35.8%	112	30.1%	70	18.8%	31	8.3%	26	7.0%
Gambling	106	28.5%	164	44.1%	39	10.5%	34	9.1%	29	7.8%
Terrorism	27	7.3%	34	9.1%	175	47.0%	76	20.4%	60	16.1%
Vandalism	38	10.2%	174	46.8%	68	18.3%	63	16.9%	29	7.8%
Cultism	36	9.7%	37	9.9%	186	50.0%	77	20.7%	36	9.7%
Cybercrime	31	8.3%	28	7.5%	38	10.2%	182	48.9%	93	25.0%

Source: Researcher's fieldwork (2019)

From Table 2, over 75% of the respondent indicates that occurrence of armed robbery in trailers parks exist with sometimes, often and very often at 16.4%, 39.0%, 20.2%, and 18.0% respectively; while 16.4 percent perspective on armed robbery is rare occurrence and 6.5% said it has never occurred. Further analysis revealed that sexual harassment is ranked as number one criminal act in the trailer park as its occurrence is high, followed by drug abuse, gambling, theft, vandalism, armed robbery, cultism, terrorism, cybercrime with the least in the rank as sexual Harassment. This means that sexual harassment is very paramount. A female participant of the FGD expressed that:

Sexual harassment is too high here. Our daughters are in danger here. At least we hear cases of rape three times in every week in this community. Most victims of this are those girls that sell things to trailer drivers and the travelers. In fact, we have set up a community to look into cases of rape in this community, but the incident has not reduced. I'm using this opportunity to call on the relevant agencies to come to our aid. Our daughters are getting pregnant almost every day (*FGD; Petty trader; Female; Elekara, 2019*).

Another participant stressed that: "sexual abuse is so bad here. You will see middle-aged and elderly men fiddling or touching breast or buttocks of young/adolescent girls hawking. I will blame this on poverty. Most families here are poor; they

have no choice than to send their young/adolescent girls to the street to hawk. This gives an opportunity to the middle-aged and elderly people mostly commercial motorists to abuse them sexually" (*FGD; Petty trader; Female; Elekara, 2019*). However, one commercial motorist in Sabo expressed that:

We should not blame only the sexual abusers for sexual abuse in this community. Some of the teenage girls are so bad. Sometimes, they seduce you to collect money from you. Some of them have taken this as a business. They will allow you to touch their breasts, buttock, romance them and even have sex with them for money. I will blame this on poverty and family. Some parents are not responsible (*FGD; Motorist; Male; Sabo, 2019*).

Likelihood Ratio Test

Effect	Likelihood Ratio Tests			Pseudo R-Square (Extent of Relationship between Family Instability and Criminal Activities)	
	Chi-Square	Df	Sig.		
PTD	342.991	12	0.000		
				Cox and Snell	.602
				Nagelkerke	.642
				McFadden	.333

Model 1	Estimate	Standard error	Wald	Df	Sig
Family instability	1.15	.345	17.654	12	0.03

Pseudo R-Square of Nagelkerke was 64.2%. This implies that family instability accounted for 64.2% of the variation in criminal activities in the trailer park communities. Model fitting and individual parameter tests are significant. This means that family instability is positively correlated with criminal activities in the trailer park communities. Thus, an increase in family instability in the trailer park communities leads to an increase in criminal activities. From table 6, the researcher inferred that family instability in Trailers Park positively affects the rate of criminality in trailers parks since the model fitting and individual parameter test is significant. From the table, the estimate was 1.15, which implies that for any further increase in family instability, criminal activities in the trailer park communities would increase by 1.15, and it is significant at 0.03. This implies that there is a positive relationship between family instability and criminal activities in the trailer park communities.

RESULT AND DISCUSSION

The study revealed that family instability is positively correlated with criminal activities in the trailer park communities. Thus, an increase in family instability in the trailer park communities leads to an increase in criminal activities (Krohn, 1986; Skogan 1986; Sampson and Groves 1989; Roncek and Maier 1991; Rountree and Warner, 1999). Some studies revealed that the level of residential instability increases, the rate of criminal activities also rises (Boggess and Hipp, 2010; Haynie and South, 2005). According to Boggess and Hipp (2010), the neighbourhoods with more stability would have lower crime rates while neighbourhoods with a more transitory population or more neighbourhood changes would have greater crime and disorder because the higher rates of residential turnover disrupt social networks. Occupational mobility would lead to resettlement in more desirable neighbourhoods characterized by higher economic status, greater stability, and less heterogeneity (Bursik and Grasmick, 1993). The study of Haynie and South (2005) revealed that residentially mobile adolescents exhibit higher rates of violent behaviour compared to non-mobile adolescents.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the study concluded that family instability is one of the emergent structures in the selected trailer park communities, which produced criminal activities in the selected trailer park communities. The study also concluded that the common criminal activities in the selected trailer park communities include sexual harassment, drug abuse, gambling, theft, vandalism, armed robbery, cultism, terrorism, cybercrime. The study revealed that drug abuse is a

form of criminal activity in the selected trailer park communities. As a form of criminal activity, the most common forms of drug abuse in the trailer park communities include smoking, cannabis, tramadol, codeine, nicotine, refinol, biolin, madara, and among others. Finally, the study concluded that sensitization of the general public on the effects of drug abuse, adequate formal and informal security systems, provision of basic amenities and creation of employment opportunities in the trailer park communities would mitigate criminal activities in the trailer park communities. Based on this, the study recommended that government of Oyo State, Nigeria should focus on controlling social variables such as equality, unemployment, and population or fertility to ensure criminal activities are less favourable in the region.

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ASSESSMENT OF RURAL HOUSEHOLDS' KNOWLEDGE ON WATER QUALITY FOR DOMESTIC PURPOSE IN EWEKORO LOCAL GOVERNMENT, OGUN STATE, NIGERIA

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ABSTRACT

The quality of water consumed is central to proper functioning of body system as water plays important roles in body regulation. This study assessed the knowledge of rural households on water quality parameters in Ewekoro Local Government, Ogun State. Purposive sampling was used to obtain primary data from 60 rural households with the aid of interview schedule and questionnaire. Data were analyzed with the use of percentage, frequency count, mean and Pearson Product Moment Correlation. Result showed that 55% of the rural households were female with mean age of 47.62 years and average household size of 4 persons. Result further showed that most (73.3%) of the respondents were married while 33.3% had secondary education. About 91.7% and 75% sourced their drinking water from community borehole and streams respectively. All (100%) the respondents had high knowledge that pure water is free of germs, colourless and odourless while 90% agreed that pure water is tasteless. The overall score on knowledge showed that the respondents had high knowledge of water quality parameter for drinking purpose. The result further showed that 53.3% and 58.3% made use of boiling and alum as means of water purification prior to drinking. The study concluded that the rural households in the study area had high knowledge of water quality which also reflected in their water purification technique. It is recommended that treated water should be tested before drinking.

Keywords: Water quality, Knowledge, Rural health, Domestic use

INTRODUCTION

Water has been described as of the natural resources that have gained relevance in developmental purposes both in the rural and urban areas (Adejuwon and Adelakun, 2012). Aside its role in agriculture, industrial and domestic purposes, it also plays important role in maintaining man's body osmoregulation thereby making it an essential nutritional need of humanity. Access to safe water plays contributes immensely to the well being of an individual. Consumption of contaminated water poses great health risk and leads to various diseases such as dysentery, cholera, diarrhea among others (Adejuwon and Adelakun, 2012). Rural areas in Nigeria have limited access to safe and uncontaminated water for drinking. They rely on rivers and streams as source of water for domestic purposes (Nkwocha *et al.,* 2017) which are infected with anthropogenic discharges (Ajai *et al., 2011*. An environmental impact assessment on the consequences of cement production by Lafarge cement factory in Ewekoro local government in Ogun State by Abdus-Salam and Adeoye (2019) showed that the surface water samples displayed higher values of some heavy metals contents than the standards proposed by WHO, EPA, NAFDAC and SON which are as a result of anthropogenic activities. The submission of Meo (2004) and Baby et al (2008) also showed that dusts emitted from cement production contain contaminants harmful to life. Aside the contamination of the surface water, occurrence of natural physic-chemical characteristics can also affect the underground water (Abdus-Salam and Adeoye, 2019).

METHODOLOGY

The study was carried out in Ewekoro local government area of Ogun State, Nigeria. It is one of the twenty local governments in the State. bounded in the North by Abeokuta and Ifo in the South. It lies between the Latitude of 6. The study employed purposive sampling for the selection of three communities in Ewekoro Local government based on their nearness to the cement factory while proportionate sampling was used to select 60 rural households for data gathering. The socioeconomic characteristics were measured at nominal and ordinal levels. Knowledge of the respondents was measured at ordinal level as Yes (1) and No(0.0). Method of water treatment was measured at nominal level as boiling (1), Addition of alum(2),

Herbal method (3), No method (4) and Chlorination (5).

RESULTS AND DISCUSSION

Socioeconomic characteristics of rural households in **the study area**

The result presented in Table 1 showed the outcome of the socioeconomic characteristics of rural households in the study area. According to the finding, 55% were female while 45% were male. This shows that both men and women were well represented in the sampling while the higher number of the female sex suggests that the communities were dominated by women. Also, the result showed that the average age of the respondents was 47.6 years. This indicates that they were still active and agile and possessed the strength to pull resources together to achieve communal goals as submitted by Iwuchukwu et al (2015) that people in their youthful age are energetic and have the ability to bring about infrastructural development in their communities.

Table 1: Socioeconomic characteristics of rural households in the study area (n=60)

Socioeconomic	Frequency	Percentage	Mean
Age			47.6 years
Sex			
Male	27	45	
Female	33	55	
Marital status			
Single	4	6.7	
Married	44	73.3	
Divorced	12	20.0	
Education			
No formal	20	33.3	
FSLC	18	30.0	
SSCE	14	23.3	
Tertiary	8	13.3	
Household size			4 persons

Source: Field survey, 2020

Sources of water used in the study area

The result in Table 2 showed that Borehole (91.7%) and stream (75.0%) were the main sources of water used for drinking and other domestic purposes in the study area. The boreholes according to the respondents were constructed by the government and through the collective efforts of the inhabitants of the communities. This shows that the rural communities have a way of pulling resources together to provide needed infrastructures. However, they switched to the use of streams whenever there is no electricity to power the borehole. That the rural people depend on river and stream was supported by the submission of Nwokocha et al (2017) who established that the main source of drinking water in rural areas was stream and river

Table 2: Sources of water for drinking purpose in the study area (n=60)

Sources of water	Yes F (%)	No F %
Borehole	55 (91.7)	5 (8.3)
Tap water	13 (21.7)	47 (78.3)
Stream/ river	45 (75.0)	15 (25)
Well water	20 (33.3)	40 (66.7)
Rain water	15 (25)	45 (75)

Source: Field survey, 2020

Knowledge of the respondents on water quality

Tables 3a and 3b showed the knowledge of the respondents on water quality and the categorization of their knowledge respectively. According to the Table 3a, all the respondents had proper knowledge on the basic physical features of pure water such as being colourless, odourless among others. They also had knowledge that a pure water should be free of germs and that it promotes good health. Therefore, the categorization of their knowledge as presented in Table 3b showed that they had high knowledge of water quality for domestic use.

Table 3a: Knowledge of the rural households on water quality (n=60)

Knowledge	True	False
Pure water is free of germs	60 (100)	0 (0.0)
Good water is colourless	60 (100)	0 (0.0)
Pure water is odourless	60 (100)	0 (0.0)
Pure water has taste	6 (10)	54 (90)
Source of water does not determine its quality	8 (13.3)	52 (86.7)
Impure water should be purified	60 (100)	0 (0.0)
Good water promotes good health	60 (100)	0 (0.0)
Pure water can contain some impurities	2 (3.3)	58 (96.7)
There is no need to purify water	8 (13.3)	52 (86.7)
Impure water causes diseases	60 (100)	0 (0.0)
Poor water quality can damage body tissues	60 (100)	0 (0.0)
Stagnant water is good for drinking	4 (6.7)	56 (93.3)

Source: Field survey, 2020

Table 3b: Categorization of the knowledge of the rural households in the study area (n=60)

Variables	Status	Score range	F (%)
Knowledge of water purification	Low	0-5	0 (0.0)
	High	6-12	60 (100.0)

Source: Field survey, 2020

Purification techniques used by the respondents

Table 4 showed that boiling of water (46.7%) and the use of alum (41.7%) were the methods commonly used by the respondents to purify water prior to consumption. It is commendable that the rural households based on their knowledge of water quality took step purify water, however, the percentage of those purifying is low compared to their knowledge of water quality. This implies that knowledge alone is not power but the applied knowledge. The assertion of Ibrahim et al (2017) showed that rural people had low level of water purification.

Table 4: Water purification techniques used by the rural households in the study area (n=60)

Purification technique	Yes F %
Boiling	28 (46.7)
Addition of alum	25 (75.0)
Herbal method	0 (0.0)
None	9 (15.0)

Source: Field survey, 2020

CONCLUSION

The study concluded that the rural household had high knowledge of water quality and that their age and educational status influenced their knowledge of water quality. Only few of the rural households made step further to purify water before drinking.

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ETHNO MEDICINAL USES OF CHEWING STICKS IN IFEDORE LOCAL GOVERNMENT AREA OF ONDO STATE, NIGERIA

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ABSTRACT
Chewing sticks clean the teeth, disinfect the mouth and strengthen dental gums apart from their medicinal values to human health. Surveys of ethno medicinal uses of some chewing sticks species were carried out in Ifedore Local Government of Ondo State, Nigeria. Specifically, the study identifies the chewing sticks plant species used and their abundance, their medicinal uses and socio-economic contributions to the livelihood of the people. A multi-stage sampling procedure was used to select hundred (100) respondents from five (5) communities which were Ikota, Ero, Ibuji, Ipogun and Sokoto. A well-structured interview schedule was used to elicit information from the respondents in the area. Descriptive statistics was used to analyze the data collected from the respondents. The results obtained show a total of 14 plant species belonging to 11 families were preferred to be used as chewing sticks in the study area. The results further revealed that the very few people collected chewing sticks for sale generated below N5,000.00/annum since almost everybody had access to various species of plants used as chewing sticks. This contributes little to their livelihood. Examples of plants species used as chewing sticks in the study area include Pako-ijebu *(Massularia acuminata),* Epora *(Bridelia ferruginea)* and Egungun eia (*Phyllantus muellerianus).* The approaches that will aid their conservation of chewing sticks in the study area were recommended.
Keywords: Chewing stick, Ethno-medicine, Socio-economic contribution, Livelihood.

INTRODUCTION
The importance of chewing sticks cannot be over emphasized. Chewing stick serves dual purposes (cleaning of teeth and medicinal purpose). Chewing sticks are highly beneficial to prevention of diseases, maintenance of healthy teeth, and treatment to some sicknesses. Some of the plant species are believed to contain chemicals, similar to fluoride, which are released when the stick is chewed (Etukudo, 2000). They whiten teeth, freshen the mouth and strengthen the gums. The plant species contain valuable natural plant products, phytochemicals, antioxidants and microbial activities that are potentially useful to consumers contrary to the chemical toothpastes (Omotoyinbo and Kayode, 2008). Chewing is an act, form or process of taking herbs especially stem, root, leave and bark. Chewing sticks are therefore products of plant species noted for their folk dental and medicinal value. The increasing awareness of the dangers inherent in the uses of industrially produced chemical toothpaste as well as the high cost of the toothpaste has further led to the uses of chewing sticks. Standard Organisation of Nigeria (SON) in 2004 destroyed fake and substandard toothpastes (All Africa Global Media, 2004); National Agency for Drugs and Administration and Control (NAFDAC) in 2007 and 2009 banned importation of some toothpaste into Nigeria due to the allegation that they contained toxic substances called diethylene glycol suspected to cause liver and lung diseases (The Nation, 2007 and VOA, 2009).

METHODOLOGY
The study was carried out in Ifedore Local Government Area of Ondo State. Ifedore is one of the 18 Local Government Areas in the state. It consists of about fifteen (15) towns and many communities whose primary occupation of the populace is predominantly farming. The area is naturally endowed with different medicinal plants both indigenous and exotic species as well as wildlings and cultivated species.

A multi-stage sampling procedure was employed to select hundred (100) respondents used for the study. The first stage involves a random selection of five (5) communities. The

communities were Ikota, Ero, Ibuji, Ipogun and Sokoto. The second stage involves a random selection of twenty (20) respondents from each of the selected communities. Thus, a total of hundred (100) respondents were interviewed for the study, using a well-structured interview schedule.

Data were analyzed with the use of descriptive statistics such as percentages frequency, table and mean.

RESULTS AND DISCUSSION

Plant species used as chewing sticks and their abundance in the study area

A total of 14 plant species belonging to 11 families were observed to be widely used as chewing sticks in the study area (Table 1). Stems, branches, roots and barks were the parts used. The abundance of chewing stick plant species in the study area were presented in Table 1. The moderately abundant chewing stick species include Egungun eja (*Phyllantus muellerianus),* Lapala pupa (*Jatropha gossypifolia),* and Igosun (*Baphia nitida).* Some of the very abundant chewing stick plants include Ewuro (*Vernonia amygdalina),* Efirin *(Ocimum gratissimum,* Atori (*Glypheae brevis),* Botuje *(Jatropha multifida)* and Gauva (*Psidium gaujava).* However, the rare once include Pako Ijebu (*Massularia acuminate),* Epora (*Bridelia ferruginea),* Wonderful kola *(Buchholzia coriace)* and Osopupa *(Enantia chlorantha)* as presented in Table 1. This was corroborated by Etukudo (2000) and Falade (2020) that both edible wild plants and domesticated species provide chewing sticks. These rare species could be said to be presently endangered in the study area. They therefore require urgent efforts towards their conservation.

Etho-medicinal uses of Chewing Stick Plant Species in the Study Area

The medicinal values of chewing sticks were the reasons for its uses apart from teeth cleanness. According to the results of the study, the chewing sticks have direct dental benefits as well as general health of the body. This was in line with the findings of Etukudo (2000) and Princewill (2020) that chewing sticks have curative properties. The result of the findings further revealed that some of the sicknesses cured by chewing sticks in the study area include: teeth ache, mouth wound, sore gum, gum infection, fever, cough, pile, sore throat and black tongue (Table 1). The phytochemical compositions of the chewing sticks include alkaloid, tannin, resin, inulin, saponin and phenol. (Table 1).

Table 1: List of the preferred chewing sticks and their ethno-medicinal values in the study area by the respondents

S/N	Local Name	Botanical Name	Family	Abundance	Part Used	Medicinal value	Chemical Constituents
1.	Pako-ijebu	*Massularia acuminata*	Rubiaceae	Rare	Stem, branch	Aphrodisiac, oral hygiene, cough, gum sore, body pain, child birth, fever	Tannins, alkaloid, saponin, phenolics
2.	Atori	*Glypheae brevis*	Tiliaceae	VA	Stem	Oral hygiene, cough, fever, body pain	Tannins, alkaloids, saponin, flavonoid, phenolics
3.	Egungun Eja	*Phyllantus muellerianus*	Euphorbiaceae	MA	Stem	Oral hygiene, stomach pain, constipation, dysentery	Alkaloid, flavonoid, sterols, ellagitannins, lignans, triterpenes
4.	Epora	*Bridelia ferruginea*	Euphorbiaceae	Rare	Stem, root	Fever, purgative, headache, mouth wound, black tongue	Tannin, steroid, terpenoid
5	Wonderful kola	*Buchholzia coriacea*	Cappanaceae	Rare	Branch, root	Memory loss, diabetes, blood cleanser, high blood pressure, migraine	Sitosterol, Tannin, alkaloid, phenol,
6	Ewuro	*Vernonia amigdalina*	Asteraceae	VA	Branch, root	Malaria, diabetes, fever, dysentry, stomach pain, cough, purgative, cold	Vernodalin, vernomydin, saponnin
7	Efinrin nla	*Ocimum gratissimum*	Lamiaceae	VA	Stem	Pile, dysentary, stomachache, gonorrhea, sore throat	Thymol, gamma-terpinene, p-cymene and eugenol
8	Osopupa	*Enantia chlorantha*	Annonaceae	Rare	Stem, Root	Fever, cough, gonorrhea, typhoid fever, cold	Tannin, alkaloid, phenol, saponnin
9	Guava	*Psidium gaujava*	Malvaceae	VA	Stem, branch	Stomarchache, cough, oral hygiene, insomnia	Terpenoid, saponin, alkaloid, steroid
10	Lapalapa pupa	*Jatropha gossypifolia*	Euphorbiaceae	MA	Stem	Mouth cancer, mouth microbial, sore gum	Lignoid, terponoid, Saponin, tannin, phenolic, phenolic, flavonoid
11	Botuje	*Jatropha multifida*	Euphorbiaceae	VA	Stem	Nuerodermatitis, body pain, fever, deworming, gonorrhea	Cyanoglucoside, aponin, tannin, phenolic, phenolic, flavonoid
12	Casia	*Senna siamea*	Leguminoceae	VA	Branch, root	Stomach ache, gonorrhea, typhoid	Tannins, alkaloids
13	Dongoyaro	*Azadirachta indica*	Meliaceae	VA	Branch, root	Oral hygiene, malaria fever, headache	Tannins, alkaloids, flavonoid, saponin and phenolic compound
14	Igiosun	*Baphia nítida*	Fabaceae	MA	Stem	Body pain, rheumatism, swollen joint.	Saponins, Tannins, Flavonoids

Source: Field Survey, 2020

Key on abundance: VA= very abundant, MA= moderately abundance, R= rare

The study on socioeconomic contributions of chewing sticks to the livelihood of the people in the study area revealed that non-significant incomes of less than N5,000.00 per annum were generated from the sale of chewing sticks. This is because almost everybody had access to various species of plants used as chewing sticks for oral hygiene and medicinal purposes in the study area.

CONCLUSION AND RECOMMENDATION

Medicinal values and socio-economic contributions of chewing sticks to the rural dwellers cannot be over accentuated. Though, non-significant incomes were realized from collection and sales of chewing sticks in the study area due to its availability, but, the rural people have free access to them. The available plants species used as chewing sticks in the study area include *Massularia acuminata, Bridelia ferruginea, Baphia nitida, Glypheae brevis* and *Jatropha multifida.* Some of the sicknesses cured by chewing stick plant species in the study area include tooth ache, gum infection, cough, sore throat and black tongue. However, the presently endangered chewing stick species need urgent attention for domestication. And lastly, collectors and the general populace should be enlightened on the inherent dangers in the loss of species diversity now and for generations yet unborn.

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ADAPTATION STRATEGIES AND PERCEIVED EFFECTS OF WEATHER VARIABILITY AMONG POULTRY FARMERS IN EGBEDA LOCAL GOVERNMENT AREA OF OYO STATE

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ABSTRACT
It has been recognised that people make decisions in their environment not the way the environment is but the way they perceive it and this have the tendency to influence the adaptation strategies. The study examined the adaptation strategies and perceived effect of weather variability among poultry farmers in Egbeda local government area of Oyo state. Multistage sampling was used to select a total number of one hundred and seven (107) respondents. Data were analysed using both descriptive and inferential statistics (PPMC and Chi-square analysis). The result showed that most of the respondents were male (69.2%), married (90.7%) and had the highest (24.2%) age ranging from 25-35 years. Also, 55.1% had tertiary education and 41.6% earned annual income of ₦10,000-₦50,000. Also, most (70.1%) of the respondents perceived the effects of weather variability as high. The result further revealed that most (60.7%) of the respondents had high level of adaptation strategies. Chi-square and PPMC analysis showed that there were significant relationship between farming experience (χ^2 =14.430, p=0.025), perceived effect of weather variability and adaptation strategies. It is therefore recommended that adequate training support should be given to poultry farmers by stakeholders.
Keywords*:* Weather variability, adaptation strategy, perceived effects

INTRODUCTION
Poultry flocks are particularly vulnerable to climate change manifesting inform of weather variability because there is arrange of thermal conditions within which animals are able to maintain a relatively stable body temperature in their behavioral and physiological activities. Farmers are facing a lot of Challenges due to climate variation and it may not be clear in empirical terms what loss farmers incur but it is known to cause more harm to their production than good. Climate variation is one of the major threats to poultry production. Birds of different breeds /strains and of different age, sex, stage of production and reproduction respond differently to climatic variations (Alade *et, al.,* (2013).

The effects of weather variability mostly cause major losses result from a less efficient conversion of feed to meat to meat, which detrimentally impacts poultry health. Similarly, temperature above 21°c reduces feed intake, weight gain, egg production, poor shell quality and egg size (Renadeau, *et, al.*2010). Most times, decisions are made by people concerning their environment based on the way they perceived their environment but not as it really look like. The general objective of this study is to examine adaptation strategies and perceived effect of weather variability among poultry farmers in Egbeda LGA of Oyo state. The specific objectives are to; describe the selected socioeconomic characteristics of the respondents, to determine the respondents' perceived effect of weather variability in poultry farming and to assess the adaptation strategies used by respondents.

METHODOLOGY
The study was carried out in Egbeda local government area of Oyo state. Random sampling technique was used for the study. Out of 11 wards in Egbeda, 4 wards were randomly selected, namely; Owobaale, Egbeda, Olodan and Erunmu. A list of poultry farmers was obtained in all the four wards selected to have a sample of 48 in Owobaale, 43 in Egbeda, 39 in Olodan and 63 in Erunmu. Lastly, 55 percent of the registered farmers were selected to give 107 respondents.

RESULT AND DISCUSSSION
Table 4.1 revealed that most (69.2%) of the respondents were male while 30.8% were female. This is an indication that poultry farming are predominantly occupied by male farmers. Most (90.7%) of the respondents were married and age range of 25-35 years was recorded as the highest percentage (24.2%). This means that the respondents were in their active state. The result also revealed that the larger part (55.1%) of the respondents had their above secondary education.

The findings concur with the findings Babalola (2014) who reported that poultry farming was dominated by male and that there was high level of literacy rate among poultry farmers in Nigeria. Almost half (49.5%) of the respondents had years of experience. This indicates that the respondents have stayed relatively long enough for them to have gained practical experience about some of the weather risks and uncertainties associated with poultry production. Also, they might have suffered some kinds of disasters in the past and applied appropriate strategies. This finding is in consonant with the work of Danso-Abbeam *et al*. (2014) who showed a direct correlation between years of experience and probability of adopting new technology.

Table 4.1: Socioeconomic characteristics respondents

Variable	Frequency	Percentage
Sex		
Male	74	69.2
Female	33	30.8
Age		
25-35 years	26	24.2
36-44 years	22	20.5
45-55 years	24	22.2
56-64 years	21	19.5
Above 64 years	14	13.0
Marital status		
Single	10	9.3
Married	97	90.7
Educational level		
No formal education	4	3.7
Primary education	5	4.7
Secondary education	39	36.4
Tertiary education	59	55.1
Experience		
1—5 years	53	49.5
6-10 years	27	25.2
Above 10 years	27	25.2
Income		
₦10,000 – ₦50,000	47	41.6
₦50,000 – ₦100,000	21	23.3
Above ₦100000	39	35.1

The Table 4.2 shows that majority (70.1%) of the respondents had high level of perceived effect of weather variability on poultry rearing while 29.9% had low. This statement consonant with the findings by Ravichandran and Mohamed (2015) which says that there is low meat production or high mortality of the poultry birds.

Table 4.2 Perceived effect of weather variability on poultry rearing

Perception levels	Frequency	Percentage	Mean = 45.9
High	75	70.1	
Low	32	29.9	
Total	107	100.0	

The Table 4.3 shows that majority (60.7%) of the respondents of the respondents had high level adaptation strategies while 39.3% had low. Similar result of Ross (2010) reported that the roof should also be conditioned through ceiling to

prevent heat from coming directly to the house of the roof.

Table 4.3 Adaptation strategies used among poultry farmers

	Frequency	Percentage	Mean = 19.7
High	65	60.7	
Low	42	39.3	
Total	107	100.0	

Chi-square analysis shows that year of experience (χ^2 =14.430, p=0.025) is significantly related with adaptation strategy used. Also, PPMC shows that there is significant relationship between perceived effect and adaptation strategy (r=0.275, p=0.004). This implies that farmers' experiences influence the decisions that improve their practices and productivity. Similar work of Babalola (2014) found indirect correlation between experience and probability of adoption.

Table 4.4: Chi-square and PPMC analysis showing the relationship between the variables

VARIABLE	Chi-square	r-value	df	p-value	Decision
Sex	4.197		3	0.241	NS
Education	11.724		9	0.229	NS
Experience	14.430		6	0.025	S
Perceived effect		0.275		0.004	S

CONCLUSION AND RECOMMENDATION

Conclusively, most of the respondents were male, married and in their active age. Also, majority had formal education above secondary level. Most of them highly perceived effect of weather variability on poultry farming. Also, majority of them agreed that adaptation strategies used were high and there is correlation between perceived effect and adaptation strategies in the study area.

Based on research finding, the following are recommended;

- Adequate training support should be given to farmers on adaptation strategies used to mitigate the effect of weather variability.
- Public and private organisations should be actively involved in enlightment programmes through the use of information sources mostly used in the study area.

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FIELD SURVEY OF INSECTICIDE USED BY VEGETABLE FARMERS IN OGBOMOSO AGRICULTURAL ZONE, OYO STATE

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ABSTRACT
The use of synthetic insecticide has gained wide acceptability among rural farmers as a reliable means of controlling insect pests of agricultural products both in the field and store. However, over-reliance on this insecticide as a control strategy for insect pests is facing resistance due to rising impact on the environment, human health, animals and other non-target organisms. This study was conducted to determine the type of insecticide mostly used by vegetable farmers in Ogbomosho agricultural zone to control insect pests. Random selection procedure was used to select 100 vegetable farmers in seven villages in Surulere Local Government Area of Oyo state between 2018 and 2019 major planting season. Data were collected on socio-economic characteristics, available constraint, constraint encountered, types of fertiliser and type of insecticides used by the vegetable farmers. Data collected were analyzed by descriptive statistics. The mean age of respondents was 46 years. Majority (74. %) applied Cypermethrin as insecticide in the control of insect pests of vegetable and 56.6% frequently use urea as fertiliser. All the respondents encountered different constraints in their production. Some of the constraints are insect infestation, access to the insecticide and poor storage facilities. In view of the fact that Cypermethrin is used broadly among these farmers, it is important that label instructions should be followed strictly especially the recommended rate of application in order to reduce contamination on the vegetable and the environment.
Keywords: Cypermethrin, Insect pests, Vegetable farmers, Insecticides

INTRODUCTION
Vegetable production in Africa is as old as peasant farming though its cultivation is still at the household level with very few farmers producing on a commercial level. This could be due to the fact that crops such as cereals, roots, and tubers and body-building crops like legumes are given much attention though cereals and tubers form the bulk of food consumed in the tropics but they are deficient in minerals and vitamins compared to vegetable for the body requirement to guarantee good healthy living (Ogunlade, *et al*., 2011). Vegetable crop production in Africa has been plagued with an array of factors such as poor farm input, poor cropping systems, incidence of pest and diseases as well as poor soil productivity status (Nwangburuke, *et al.,* 2012). Vegetable is attacked by numerous herbivorous arthropod pests that feed on various plant parts such as roots, stems, leaves, flowers and seeds. The agricultural significance of pests on crop plant is the damage they cause which reduces the quality or quantity (or both) of yield. Often the first manifestation of the presence of a pest or disease is in the appearance of the crop which may exhibit particular type of pest damage or disease symptoms (Hein, 2003). The use of synthetic insecticide is becoming common among farmers as a reliable means of controlling insect pests of vegetables. Therefore, the importance of assessing pesticides of a better origin such as the pyrethroids cannot be overstated because of the obvious associated benefits such as less negative impacts on the environment, little or no residual effects on non-target organisms and easy bio-degradability among others. Hence the need to evaluate some commonly available insecticides against insect pests of vegetable in the study area.

METHODOLOGY
The study was carried out in Alagbede, Onikeke, Mayin, Gambari villages in Surulere Local Government Area of Oyo state and Gbede, Ote, Lasoju villages in Asa local government area of Kwara state due to the high percentage of vegetable farmers in these villages, majority of the farmers in this area are large scale vegetable

farmers. The zone experience both wet and dry season annually. The climate of the area favoured arable crop production. The respondents' in this study were the vegetable farmers in Ogbomoso agro – ecological zone. The sampling procedure used for this study was random selection of one hundred (100) vegetable farmers (as respondents) from Alagbede, Onikeke, Mayin, Ote, Gambari, Gbede and Lasoju villages. Frequency counts, percentages and mean were used to analyse the objectives of the study. Descriptive statistics (percentage) were used to analyse the socio-economic characteristics of vegetable farmers and constraints to vegetable production. Also, Gross Margin Analysis was used to determine the costs and returns of vegetable production in the study area.

RESULT AND DISCUSSION

Socioeconomic characteristics

Results on Table1 revealed that the mean age of the respondents was 46years with mean farm size distribution of 2.2 hectares practicing subsistent farming while mean annual income earn by the respondents was 220,000 naira. It implies that majority of the respondents are in their productive age.

Table 1: Distribution of respondents by socioeconomic characteristics

Socio - economic characteristics	Frequency	Percentage	Mean
Age of the respondents (years)			
≤ 30	2	2.0	
31– 40	24.2	24.2	
41 – 50	41	71.4	
51 – 60	31	31.3	
≥ 61	1	1.0	46.55
Sex			
1	50	50.5	
2	49	49.5	
Farm size (hectares)			
≤ 1	26	26.3	
1.5 – 2	41	41.1	
2.5 – 3	20	24.2	
3.5 – 4	9	9.1	
4.5 – 5	3	3.0	2.20
Income			
0 – 100,00	10	10.1	
101,000 – 200,000	49	49.5	
201,000 – 300,000	22	22.2	
301,000 – 400,000	17	17.2	
401,000 – 500,000	1	1.0	220,000
Occupation			
1	99	100	
Years of experience			
1 – 5	31		
6 – 10	37	31.4	
11 – 15	21	37.3	
16 – 20	9	21.2	
≥ 22	1	9.1	8.84
Association			
0	17	17.20	
1	82	82.8	
Total	99	100	

Source: Field Survey, 2019

Available constraints

Table 2 shows that the major constraint faced by the respondents in the study area is accessibility to fertiliser while nomadic invasion was the least available constraints encountered in the production of vegetable in the study area other constraints affecting the farmers are pest attack, insect infestation, access to insecticides and poor storage facilities problems.

Table 2: Available constraints

Constraints	Frequency	Percentage of Respondents
Insects infestation	74	74.7
Pests	86	86.9
Access to fertiliser	88	88.9
Access to insecticides / pesticides	72	72.7
Access to water e.g. irrigation	61	61.6
Other environmental conditions	50	50.2
Diseases	71	71.7
Crop failure	64	64.6
Poor transportation	65	65.7
Poor storage facilities	72	72.7
Nomadic invasion	41	41.4

Source: Field Survey, 2019

Constraint encountered

Table 3 shows the constraints encountered by the respondents in the study area. Majority 88.9% of the respondents faced the problem of in accessibility to fertiliser. About 86.9% also encountered different issue of pests attack, 74.7% of the respondents had insects infestation on their crops. Majority 72.7% were faced with inaccessibility to insecticides / pesticides while 61.6% of the respondents faced problem to access of water e.g. irrigation and 50.2% of the respondents faced different problem of environmental conditions thus access to fertiliser is the most faced constraints of the respondents in the study area.

Table 3: Constraints encountered

Constraints	Percentage
Insects infestation	74.7
Pests	86.9
Access to fertiliser	88.9
Access to insecticides / pesticides	72.7
Access to water e.g., irrigation	61.6
Other environmental conditions	50.2

Source: Field Survey, 2017

Constraints encountered (serious or not serious)

Table 4 revealed that majority 72.7% of the respondents faced serious storage facilities, next is diseases with 71.7% followed by poor transportation 65.6%, crop failure with 64.6% and nomadic invasion with 41.4% poor storage facilities is the most serious constraints faced by the respondents in the study area,

Table 4: Constraints encountered (Serious or not serious)

Constraints encountered	Percentage
Disease	71.7
Crop failure	64.6
Poor transportation	65.7
Poor storage facility	72.7

Nomadic invasion	41.4

Source: Field Survey, 2019

Types of fertiliser

The results on table 5 shows that urea had mean score of 2.55, followed by N.P.K with mean score of 0.74 and manure had 0.18 mean score.

Table 5: How frequent does the respondents use fertiliser

Type of fertiliser	Very Frequent	Frequent	Fairly Frequent	Not Frequent
NPK	-	14 (14.1)	45 (45.5)	40 (40.4)
Urea	56 (56.6)	41 (41.4)	2 (2.0)	
Manure	1 (1.0)	-	15 (15.2)	83 (83.8)
Others				

Source: Field Survey, 2019

Type of Insecticide (Active ingredients) used by the respondents

Table 6 shows that majority of the respondents 73.7% make use of cypermethrin, 11.1% use lambda-cyhalothrin, 9.1% use profenofos and 6.1% use dimethote. This implies that respondents in the study area use cypermethrin most as the active ingredient of insecticide to control insect pests of their crops. This study is however in line with the

Table 6: Type of insecticide (Active ingredients)

Insecticide (Active ingredients)	Percentage
Cypermethrin	73.7
Lambda-cyhalothrin	11.1
Profenofos	9.1
Dimethoate	6.1

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATION

This study revealed that there were significant differences in the type of insecticides used in control of insect pests of vegetable in the study area. Cypermethrin (active ingredient) is a synthetic insecticide majorly used in the study area and over-reliance on organochlorides and organophosphates or their derivatives as a control strategy for pest is facing resistance due to rising impact on the environment and health of human beings and their animals which is due to persistence in soils and bioaccumulation. The use of biological control agents, pesticides derived from natural sources, cultural control of pest and judicious use or complete abstinence from persistent pesticides is thus suggested as one of the way forward in the management of insect pests of vegetable.

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SMALL RUMINANT ANIMAL PRODUCTION AMONG RURAL HOUSEHOLDS IN AKINYELE LOCAL GOVERNMENT AREA OF OYO STATE: IMPLICATION FOR STRENGTHENING RURAL LIVELIHOOD

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ABSTRACT
Small ruminant animals play a very important role among most rural households. The study examined the production of small ruminant animals among rural households in Akinyele Local Government Area of Oyo State and its implication for sustainable rural livelihood. A total of one hundred and twenty heads of rural households were selected using simple random sampling technique. Data were collected from primary source using well-structured questionnaire and interview schedule. The data were analysed with descriptive statistics. Findings revealed that goat (85.0%) constitute the major small ruminant reared. Also, small ruminants were reared mostly under intensive system (59.2%) for regular income (97.5%). However, small ruminant animal production was constrained with high capital outlay, inadequate extension services and lack of credit facility. The need to strengthening rural livelihood vis-à-vis small ruminant animal production becomes central for rural households to take hold of the production capacity. A steady and consistent access to credit and extension services becomes necessary for the much-required in the rural livelihood system.
Keywords: Small ruminant, rural households, livelihood.

INTRODUCTION
Livestock production represents an important source of livelihood among rural households in developing countries. Specifically, small ruminant (sheep and goat) being an important category of livestock play a very important roles among most rural households. Its significance is evidenced in the food chain and overall livelihoods of rural households (Lebbie, 2004) which includes insurance cover over unforeseen circumstances such as medical bills and school fees (Oluwatayo and Oluwatayo, 2012), market product (meat) as well as other important non-market co-products and religion festivals (Dossa *et al.,* 2008).

Small ruminant serves as livestock that economically vulnerable rural households reared to improve their social and economic status. Apart from the aforementioned, the risk of loss from small ruminant deaths is negligible and due to the smaller average size, the animals are easier and quicker to sell than larger stock such as cattle thereby serving as a potential source of liquid cash in times of financial need for farm households (Oluwatayo and Oluwatayo, 2012).

There has been a growing trend in the diversification of source of income from crop production to small ruminants and other micro-livestock. The growing market demand for sheep and goat meat than other livestock in urban areas across West Africa (Peacock, 2005) presents an opportunity to increase income and sustain livelihoods of rural households. It was claimed that the potential of small ruminants if well harnessed in the rural communities can help along the pathway out of poverty (Dossa *et al.,* 2003; Peacock 2005). Based on this, the study examined the production of small ruminant animals among rural households in Akinyele Local Government Are of Oyo State.

The specific objectives of the study were to:

i. ascertain the types of small ruminant animal reared;
ii. examine the management system used in rearing small ruminant animal;
iii. ascertain the reasons for rearing small ruminant animal;
iv. examine the constraints facing small ruminant animal production.

METHODOLOGY
The study was conducted in Akinyele Local Government Area of Oyo State. Akinyele Local Government Area lies between latitude 7° 29/ to 7° 40/ and longitude 3° 45/ to 4° 04/ (NPC, 2006). The study Area falls within the forest and derived savannah zones of the country which makes it suitable for the production of wide range of crops and livestock.

The study population comprises of rural households engaging in small ruminant animal production. Four wards namely Arulogun, Akinyele, Amosun and Moniya were randomly selected from the existing twelve wards. Three villages were randomly selected from each of the selected wards making a total of twelve villages. Ten heads of rural households were randomly selected from each of the twelve villages making a total of one hundred and twenty respondents. Data were collected from the heads of households using well-structured questionnaire and interview schedule. Descriptive statistics was used to analyse the data.

RESULTS AND DISCUSSION

Types of small ruminant animal reared

Entries in Figure 1 revealed that 85.0% of the respondents reared only goat while very few (3.3%) reared both sheep and goat. The result could be attributed to the adaptive nature and socio-cultural importance of goat. According to Lebbie (2004) and Peacock (2005) goats adapt very well in arid regions and are tolerant to drought conditions than other livestock except camels. Rearing of both sheep and goat though by very few, implies shared characteristics in terms of acceptability and adaptability to varying environmental conditions which is in line with the submission of Najari *et al.,* (2005).

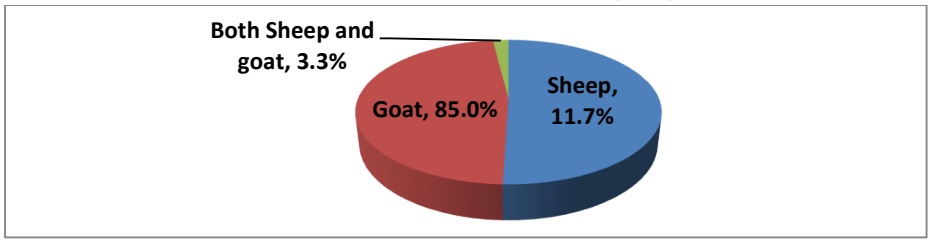

Figure 1: Types of small ruminant animals reared
Source: Field survey, 2018

Management system of small ruminant animal

Entries on systems of production show that more than half (59.2%) of the respondents reared small ruminant under intensive system. Though, Fakoya and Oloruntoba (2009) reported an extensive system of rearing small ruminant animals in south western Nigeria. The results imply that most rural households are becoming aware of the benefits of rearing animals under the intensive system as against extensive system. Avoidance of nuisance constituted to the environment and insecurity of the animals under extensive system may have necessitated the intensive system of production.

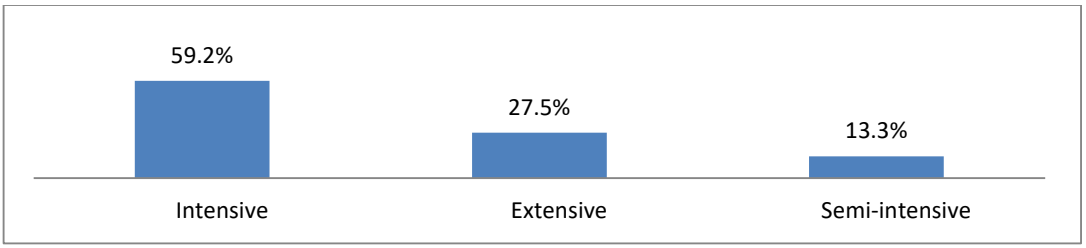

Figure 2: Management system of small ruminant
Source: Field survey, 2018

Reasons for keeping of small ruminant animal

Entries in Figure 3 show that small ruminant animals were reared majorly for regular income (97.5%). This result is in line with the findings of Oladeji and Oyesola (2008). This implies that earning of living income among rural households is critical for their sustainability and economic success. Again, a sizeable number of the respondents reared small ruminants rearing for the purpose of settling debts (67.5%), consumption (60.0%), etc. The results are indicative of various livelihood supports of small ruminant animal production among rural households in the study area. Hence, households in the study area rear ruminant animals to relieve themselves of one financial need or the other.

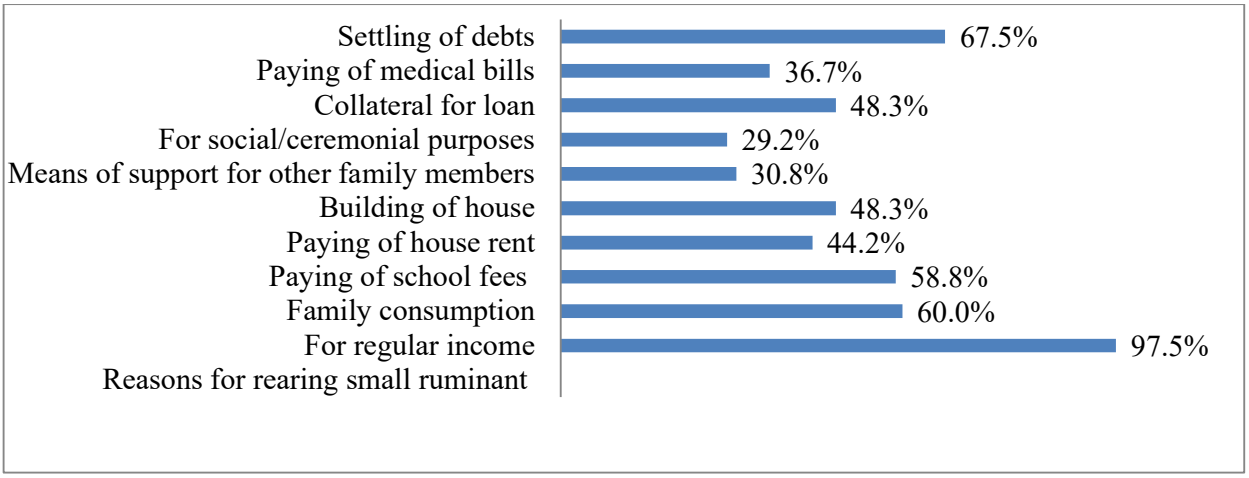

Figure 3: Reasons for keeping of small ruminant animals

Constraints facing small ruminant animal production

Entries in Table 2 revealed that high capital outlay (w = 159) was ranked 1st among the constraints facing small ruminant animal production. The result is connected with the choice of the intensive system of rearing small ruminant animals as earlier reported. The challenges remain critical in the production system of small ruminant animals because of the threat that will be exerted on the production capacity of the farmers as well as the productivity of the animals.

Table 2: Constraints facing small ruminant animal production

Constraints	Very serious	Serious	Not Serious	Weighted score (W)	Rank
High cost of feeding	30(25.0)	60(50.0)	30(25.0)	120	4
Lack of credit facility	30(25.0)	72(60.0)	18(15.0)	132	3
Problem of land availability	18(15.0)	73(60.8)	28(23.3)	109	6
High capital outlay	54(45.0)	51(42.5)	15(12.5)	159	1
Poor market demand	21(17.5)	67(55.8)	32(26.7)	109	6
Inadequate extension services	47(39.2)	48(40.0)	25(20.8)	142	2
Inadequacy of necessary input	26(21.7)	61(50.8)	33(27.5)	113	5

Source: Field survey, 2018

Implication for strengthening rural livelihood

Livelihood sources are at the heart of poverty reduction and food security issues in different policy environments. Majority of the world's poor live in rural areas in developing countries and depend on agriculture and its related activities as a source of livelihood. Small ruminant being an integral part of agriculture plays significant role in livelihood support for most rural households in developing countries. The increase in demand for meat and the lack of sufficient supply for instance, have created opportunities for rural households to fill the void to enhance the production prospects of small ruminant. However, the need to strengthening rural livelihood vis-a-vis small ruminant production becomes central since it reflects the ability of the farmers to take hold of the production capacity for improved life. It is therefore important that a steady and consistent access to credit and extension services is key for the much required in the rural livelihood system.

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ACTUALISING CONTRACEPTIVE PREVALENCE AMONG RURAL NIGERIAN HOUSEHOLDS: A POTENT WEAPON TO RURAL FAMILY HEALTHY LIVES

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ABSTRACT
The research used data from the 2018 Nigeria Demographic and Health Survey (NDHS) to determine the Contraceptive Prevalence (CP) differentials by residence (rural and urban). Family Planning (FP) awareness and utilisation were used as determinant variables against socio demographic factors by place of residence. Results revealed that 38.8% rural households have knowledge as compared to 64.5 urban households while only 11.5% rural households use any contraceptive method compared to 24.8% urban households. Implicit in the result is the fact that even though the utilisation of FP is generally low in Nigeria, it is extremely poorer among rural households. This result is far from achieving the desired Contraceptive Prevalence Rate (CPR) that will improve healthy lives. The study therefore suggests that if Nigeria will ever achieve the desired CP in order to improve the lives of the people, the rural household must be prioritized in all its designed programmes and policies.
Keywords: Contraceptive Prevalence, Family Planning, Rural, Household, Family, Health

INTRODUCTION
Achieving healthy lives is a function of many factors including reproductive health and family planning (FP) issues. This is clearly captured in the tenets of the Sustainable Development Goals (SDGs, 2030). Ensuring healthy lives and promoting well-being for all at all ages (Goal 3) will be made possible by a specific reduction of global Maternal Mortality (MM) to less than 70 per 100,000 live births and ending preventable deaths of new-borns and children under five years of age. The goal is to also reduce neonatal mortality to at least as low as 12 per 1,000 live births as well as ensure universal access to sexual and reproductive healthcare services including for family planning (FP), information and education, integration of reproductive health into national strategies and programmes. It is pertinent to note that Nigeria is still far from achieving the stated goal of maintaining healthy lives and optimal reproductive health among her populace. In year 2019, Nigeria recorded the highest fertility rate among sub-Saharan African nations with high maternal and infant mortality rates (United Nations, 2020). The under-five mortality rate as reported by NPC and ICF in 2019 was also as high as 132 deaths per 1,000 live births while the neonatal mortality rate is 39 per 1,000 live births (NPC and ICF, 2019). The situation as indicated is a major health challenge especially among rural households who at any point are more affected by these conditions due to socio-cultural factors (Adebola and Ewemooje, 2019).

One veritable tool to attaining this goal is to vigorously pursue an adequate improvement in the country's CPR. Despite worldwide progress made at CPR, Africa has continued to lag behind. The United Nations (2019) reported that in 2017, the CPR progressed globally to 63 per cent among women of reproductive age (15-45 ages) but remain much lower in Africa (36 per cent). Nigeria in 2013 recorded a CPR as low as 15% and as at 2018, the CPR remained as abysmally low as 17% (NPC and ICF International, 2019). Ofonime and Ikobong (2016) delineated that adequate knowledge has not always translated to uptake of FP in the rural communities because of prevailing socio-cultural beliefs. Besides, the uptake and utilisation of contraceptives in rural communities as adjudged by Atuahene, Atari, Adjuk and Obed, (2016) remained very low over the years particularly among rural households is making. This research work looked at the differential in contraceptive uptake by residence (rural and urban) and the proximate determinants in order to proffer solution that could bring improvement in the utilisation of contraceptive so as to control fertility and its associated upheavals.

METHODOLOGY
Sampling procedure and statistical analysis
Data for this research was gotten from the 2018 Nigeria Demographic and Health Survey

conducted using a two-stage stratified sampling technique. Stratification was achieved by separating each of the 36 states and the Federal Capital Territory into urban and rural areas. Overall, 74 sampling strata were classified and samples were differently selected in every stratum. In the first stage, 1,400 Enumeration Areas (EAs) were pinpointed and selected with probability proportional to EA size which was taken as the number of households in the EA respectively. A definite number of 30 households was then selected in every cluster for the second stage through an equal probability systematic sampling and this led to an approximate total sample of 42,000 households. Respondents included all women of reproductive years (age 15-49) in the selected households. The data collected for this study were analysed at three stages, namely; univariate, bivariate and multivariate. A variable is adjudged significant predictor of fertility level if the p-value associated with the Odds

Ratio is < 0.05. Analyses are carried out using SPSS version 25.

RESULTS AND DISCUSSION

Univariate Analysis

The result of characteristics background of respondents revealed that higher per cent of the respondents are in the age group 15-29 years (54.5 rural as compared to 46.5 urban). Almost two third of the rural respondents (57.6%) have no any form of education compared to only 22.2 % among the urban dwellers. More than two third of the rural respondents (63.5%) are poorer according the wealth index result while reverse is the case for urban dwellers where 63.2% live in richer households, and also have more than six household members (62.3%). As observed by Adebola (2020), despite the fact that the rural communities in Nigeria are more populated than the urban, the urban residents by their nature have more access to health facilities by all standards than the rural dwellers. Mother's education remains a significant factor in health decisions (Mutalik and Raje, 2017) and as revealed in this study, rural women have very poor educational status. Rural households are also poorer than urban dwellers, this as opined in Adebola (2019), is a factor responsible for their early marriage and lack of decision making about reproductive health including FP.

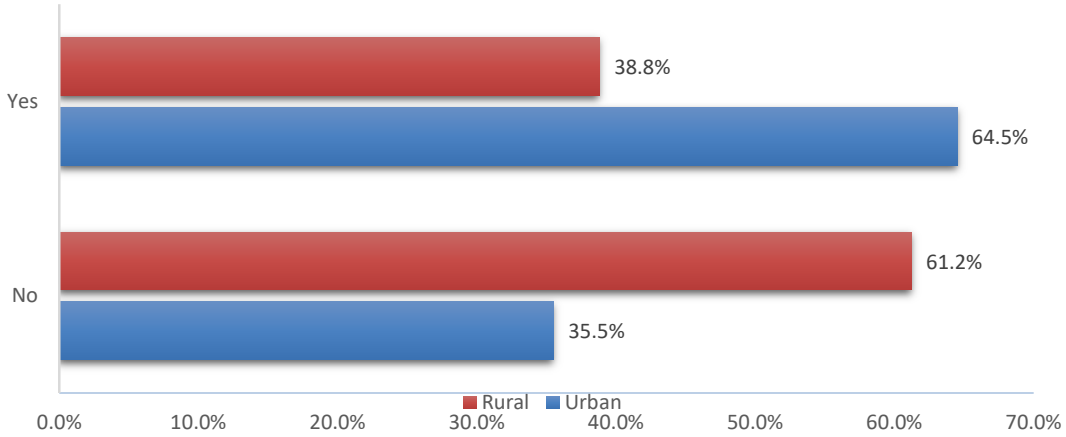

Figure 1: Family planning awareness by place of residence

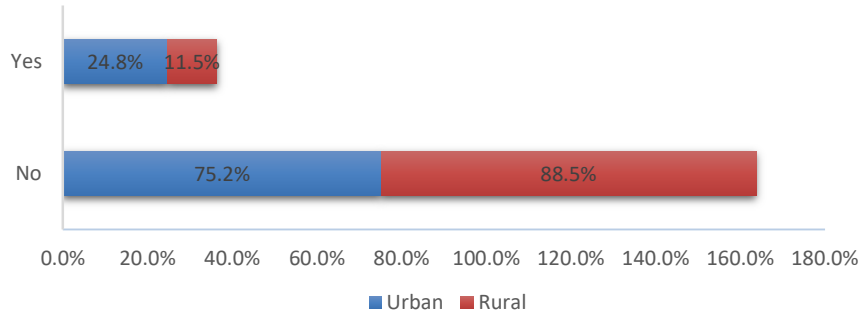

Figure 2: Family planning utilisation by place of residence

Figure 1 represents the awareness level of Family Planning among Nigerian households while figure 2 portrays the utilisation. As depicted, the awareness level among rural dwellers is poorer (38.8%) compared to 64.5% among those in the urban areas. The utilisation of FP is however generally poor among all people but extremely lower in the rural communities (11.5%) as compared to 24.8% in the urban centres (Figure 2).Okeowo and Olajide (2014) revealed that many rural women in Nigeria have an unmet need of FP resulting in perennial stress and unique roles of childbearing which affect their productivity and keep them perpetually poor.

Bivariate Analysis

The results of the bivariate analyses using Pearson Chi-square tests in the examination of the association between family planning utilisation and sociodemographic characteristics by place of residence show that all independent variables are significantly associated with the response variable irrespective of the place of residence.

Multivariate Analysis

The results show that FP utilisation increases with age for both rural and urban dwellers. Those who practise Islam and other religions are less likely to use FP than their Christian counterparts. For those who dwell in urban areas, South Westerners (OR = 1.44, CI = 1.24-1.66) are more likely to use FP while for rural dwellers, North Easterners (OR = 1.82, CI = 1.58-2.10) and South Westerners (OR = 1.41, CI = 1.18-1.69) are more likely to use FP. Also, FP utilisation significantly increases as level of education and wealth index increase irrespective of the place of residence. Employment significantly increase FP utilisation among the urban dwellers while it does not for rural dwellers. So also; never married, cohabitation and larger households (six or more people) significantly increase FP utilisation among both rural and urban dwellers. Nevertheless, early sexual debut (OR = 0.88, CI = 0.78-0.99) significantly reduce FP utilisation among rural dwellers while it increases utilisation among urban dwellers though not significantly.

The result as interpreted thus is in consonance with early researches to corroborate the poor utilisation of FP in Nigeria particularly among the rural communities. Religious practices as delineated by Ogboghodo et al (2017) is a major barrier to FP uptake especially among rural women. Husbands' disapproval is another socio-cultural factor inhibiting the utilisation of FP. This is observed more among the rural households in Nigeria (Ofonime and Ikobong, 2016).

CONCLUSION AND POLICY IMPLICATION

This research reveals the paucity of FP utilisation which results in the country's overall low CPR. The low utilisation is particularly extreme among the rural households. This in effect will prevent the realization of healthy lives by year 2030. The policy implication of this study is to find a way around the socio-cultural and socioeconomic factors including religion, low level of education, place of residence, as well as age at marriage which prevent FP utilisation in the rural areas. Government commitment and political will to policies and programmes that could help the country achieve an appreciable CPR level should be made a priority.

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THE CHALLENGES OF CRIME: A MENACE FOR RURAL AGRICULTURE

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ABSTRACT

Crime is a menace that threatens national security and it becomes more worrisome with its impact on the agricultural sector. The immediate challenges of crime in agriculture include inhibition of production as occasioned by terrorism, kidnapping, banditry, cattle rustling, destruction of crops by herdsmen; while corruption, albeit indirectly, also impacts negatively on agriculture. The Nigerian government will need to address the trend of pervasive insecurity occasioned by crime in order to keep on track the national agenda of self-sufficiency in food production. This study therefore aimed to examine the challenges posed by crime on rural agriculture. The study elaborated on a theoretical review of related articles and showed that the socio-economic implications of these crimes, especially on agriculture are grave. Suggested possible solutions to tackle the issues will be job creation and effective community policing while recommending a real need for anti-corruption reforms as these measures will boost the economy of the nation.

Keywords: Banditry, Insecurity, Unemployment, Corruption, Food Production

INTRODUCTION

Agriculture is a requisite for economic development as it provides food for all, raw materials for the industries, employment for the teeming population and foreign exchange earnings. Agriculture remains the largest sector of the Nigerian economy, employing 36.5 percent of the entire labour force (FAO, 2018). Agriculture, in spite of its importance is unfortunately plagued with challenges such as low technology, poor land tenure, poor access to inputs among others but these extant challenges are now compounded by the high incidence of crime especially in the rural areas where the bulk of agricultural activities take place.

Crime is an unlawful act or offence that is inevitable but punishable by the law (Durkheim 1893). It unleashes economic and psychological harm on its victims, threatens national security and thwarts development. It becomes very worrisome when it affects the living conditions of the rural population that is engaged in food production. Crime has displaced farmers, destroyed their livelihood and food production has consequently declined. As much as 78 percent of the world's poor people live in rural areas and rely largely on farming, livestock, aquaculture and other agricultural work to make a living (World Bank, 2014). Hence, there is a dire need to fight crime in order to stop further decline of the already bad economic outlook of the rural communities given that farmers who produce the bulk of food crops that feed the nation live in rural areas. This paper therefore assessed the effect of crime on rural agriculture towards making policy recommendations to address the challenges.

METHODOLOGY

The study adopted the historical research method. Data sources included journals, publications, books and other contemporary sources on the topic.

The study is premised on 2 theories: Broken Windows Theory of Zimbardo 1969 and the Rational Choice Theory of Gary Becker 1968. Broken Windows Theory posits that big crimes are encouraged when small crimes go unpunished while the Rational Choice Theory posits that every crime is committed consciously after the costs and benefits are compared by the criminal. Both theories preach deterrence through appropriate sanctions for criminal activities.

RESULTS AND DISCUSSIONS

The causes of crime include: lack of education, unemployment, poverty and economic deprivation, parental neglect, low self-esteem, alcohol and drug abuse among others. All the factors form an interconnected web held by poverty at the centre. Economic deprivation affects education which is key in the survival of individuals. Nigeria's unemployment rate stood at about 23 percent as at third quarter of 2018 (NBS, 2020) and this has correlations with the high rate of crime and criminality in both rural and urban areas (Ucha, 2010). Unemployment results in poverty,

thereby fueling and worsening crime. Poverty can also limit education, reduce self-esteem and cause drug abuse. Parental neglect can also make children become independent too early in life and this can exacerbate crime rate.

Major crimes and their effect on rural farmers: Among many, the major crimes that plague agriculture include: Herder/farmer clashes which involve a combination of the crime of trespass and wanton destruction of crops; kidnapping, which is the abduction of people for ransom; Banditry/Cattle Rustling which is forceful dispossession of farmers of their livestock. Others are Rape, a non-consensual sexual intercourse which has reached an alarming level in Nigeria even among women farmers; Boko Haram insurgency which is terrorism that has besieged the entire north eastern part of Nigeria for over 10 years; Corruption, a dishonest or fraudulent conduct especially by those in power.

Effects of crime on rural agriculture displacement of farmers/loss of livelihoods: Farmers are denied access to their farms. They are forced to relocate to safer places such as state capitals and sometimes become refugees in neighboring countries (Lenshi and Yenda 2016) and those who managed to stay have abandoned farming due to insecurity (Asiru *et al*., 2018). More than 3 million persons are reported to have been displaced or made refugees and more than 3,000 hectares of arable land have been destroyed by bandits in the last 8 years (Premiun Times 2018).

Loss of Man-hours, Assets and Lives: Women farmers are becoming victims of the prevalent dastardly crimes in rural areas; hence their contribution to agricultural labour is under threat. The incessant loss of cattle to rustlers has become a discouragement to investments in the livestock subsector while print and electronic media are awash with tales of destruction of lives and properties.

Decimation of the farming population, hampered food production and distribution: The population of farmers is being decimated through displacements as can be easily noticed in the rise in number of commercial motorcycle riders of northern descent in the north central states of Kwara and Kogi in recent years. Moreover, movement of farm produce down south has been hampered because roads are sabotaged by militants; commuters are ambushed while valuables are stolen and passengers are killed. All of these have translated into reduced agricultural production in the northern states of Yobe, Borno and Adamawa. For instance, the Brookings Institution in Washington reported a 76% drop in the production of grains such as corn, cowpeas, rice, sorghum and millet in the northeast region in 2015 (Kah, 2017).

Failure of agricultural intervention programmes: Corruption in the form of misappropriation of funds as well as usurping of subsidies on inputs, have been identified as reason for the failure of many previous agricultural interventions in Nigeria (Ozoani, 2019).

Increased cost of farming/revenue loss: Poor farmers now pay tax for protection and there are reports that the situation is so bad that soldiers are sometimes deployed to protect farmers at work on their farms in Borno State. Significant farm revenue is lost to crime in terms of stolen or wasted livestock and produce. For instance the biggest fish market in Bagga, Bornu state has been disbanded by bandits. Nigeria stands to gain up to US$13.7b annually in total macroeconomic progress if there is peace between farmers and herders in the middle belt (Mercy Corps, 2015).

Suggested solutions to crime and criminality in Nigerian agriculture: Government owes her citizens the primary duty of protection of lives and properties. In order to liberate farmers, the following measures are suggested: provision of social amenities, effective policing, disarmament of killer herders and establishment of cattle ranches, and anti-corruption war; among others.

I. **Effective policing, disarmament of killer herders, and establishment of cattle ranches:** Government has to disarm all unauthorized arm carriers especially indigenous herders and ethnic militia men and this is the time to actualize the Maputo declaration of earmarking a minimum of 10% of national budget for agriculture.

II. **Provision of Social Amenities/Job Creation and Poverty Reduction:** The job of government is to provide an enabling environment for businesses to thrive. Government should therefore work assiduously to provide the necessary infrastructure and opportunities for economic development in the rural areas.

III. **Anti-corruption War/Reform of Institutions:** There is a need to rejig the war against corruption through a concerted effort by all arms of government. The executive arm must allow true independence of the anti-corruption agencies such as the EFCC and the ICPC; while the judiciary needs drastic reforms to ensure speedy dispensation of justice.

CONCLUSION

The challenges of crime faced by rural farmers are enormous and undeserved; given the strategic importance of the rural sector to the nation's economy. These challenges are however surmountable if steps such as invoking appropriate sanction grids on offenders in addition to ensuring that all criminally acquired wealth are confiscated are taken. This will ensure healthy, prosperous and transparently managed societies and the agricultural sector will also be shielded from niggling crimes; consequently, resulting in enhanced agricultural productivity, improved livelihoods and creation of economic growth.

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FACTORS AFFECTING INFORMATION AND COMMUNICATION TECHNOLOGIES USE FOR RURAL WOMEN'S EMPOWERMENT IN SOUTHWESTERN NIGERIA

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ABSTRACT
The study investigated factors affecting rural women ICTs use for empowerment in Southwestern Nigeria. Five multistage sampling procedure was used to select 384 respondents using interview schedule on their personal and livelihood activities, use of ICTs and empowerment status. Data were subjected to descriptive statistics and linear regression at p=0.05. Findings reveal that most of the respondents personally (72.7%) found their enterprise with respondents' income from livelihood being ₦76,003.28±105,671.88. Respondents' livelihood activities were farming (crop cultivation; 70.5%), off-farm (agricultural produce processing; 37.2%) and non-farm (trading; 41.4%) activities respectively. The most utilised ICT tools were mobile voice call (1.45) and radio (1.43). Level of ICTs use and empowerment were low for 58.1% and 53.6% of the respondents respectively. The factors affecting the respondents' empowerment were years of former education (β=0.144;p=0.012) and ICTs use (β=0.118,p=0.026). Years of formal education and ICTs utilisation affects rural women empowerment; hence, literacy of rural women should be enhanced to improve the use of ICTs for empowerment

Keywords: Mobile voice call, agricultural produce processing, none-farm activities, years of formal education

INTRODUCTION

Information and Communication Technologies (ICTs) are being seen as very important instruments of economic and human growth; as they have become catalytic agent for sustainable development of nations. (Clare and Tam, 2015 and Voluntary Association for People Service (VAPS), 2016). ICTs has come with a lot of benefits particularly for information flow which has been peoples cardinal source of empowerment, especially for the rural women that needs a roundabout information (livelihood, reproductive, domestic even in their Agricultural production activities across the value chain) in their state of voicelessness and vulnerability. The benefits that comes with information offered by ICTs for people irrespective of their gender, race or clan especially the rural women who has been said to be voiceless and vulnerable cannot be under estimated. However, the marginalisation of rural women with reference to information flows, decision making and communication process entrenched poverty and may at large disempower them in which ICT has the capacity to empower those that has been using it by raising them from low to better wellbeing, improved their livelihood and make them to get over poverty (Mago and Mago, 2015).

In Nigeria, Radio, mobile phone television, newspaper, audio music and poster can boost and empower the educational and health status of rural women through school on air (Radio and Television programme) which offers adult literacy that can make them fit for national development even in local languages. Regardless of this, a lot of women were still unable to use the tools due to their disposition to ICT's, capacity to make decision at household level, as not all of them have access to ICTs usage utilises as expected to better their life.

Hence, it is important to know the issues that affect their enablement to utilise ICTs for their livelihood that will intimate result to their empowerment. Furthermore, the study ascertained the livelihood characteristics of the respondents, examined the use of ICT, and the empowerment status. It was hypothesised that there is no significant contribution of the selected independent variables to empowerment status of the respondents.

METHODOLOGY

The study was conducted in Southwest Nigeria. Multistage sampling procedure was embarked on to select 384 respondents for this study. Data collected via structured interview schedule were analysed using percentage, mean, weighted mean and linear regression at α 0.05.

RESULT AND DISCUSSION

Livelihood characteristics

The result in Table 1 reveals that greater percentages (72.7%) of the respondents personally funded their enterprise with the mean monthly income and years of formal education being ₦76,003.28±105,671.88 and 8.0±4.62 years respectively. This suggests that rural women are a bit literate and may earn enough income to cater for their daily needs and; hence may not be a liability to their husbands though with high income disparity.

Table 1: Respondents' livelihood characteristics

Variable	Frequency	Percentages	Mean
Enterprise sources of finance			
Self	279	72.7	
Family	74	19.3	
Friends	17	4.4	
Cooperative society	72	18.8	
Money lender	26	6.8	
Years of Education			
No formal education	44	11.5	
1-6	155	40.4	
7-12	144	37.5	8.0±4.62
13-18	38	9.9	
≥19	03	0.8	
Livelihood activities			
Farming activities			
Crop production	271	70.5	
Animal production	240	62.5	
Off-farm activities			
Processing of agricultural produce	143	37.2	
Marketing of agricultural produce	137	35.7	
Non-farming activities			
Trading	159	41.4	
Artisan	98	25.5	
Income from livelihood			
≤ 10,000	20	5.2	
10,001-50,000	129	33.6	
50,001-100,00	150	39.1	
≥100,001	52	13.5	₦76,003.28±105,671.88
Total	**384**	**100.0**	

Source: Field survey, 2017

Extent of utilisation of ICT components

Table 2 indicates that that voice call via mobile phone (1.45) has been the most commonly used ICT by the respondents for information followed by radio (1.43) and television (1.20) while mobile internet (0.28) and MMM (0.23) were the least used ICTs for information.

Table 2: Distribution of respondents' extent of utilisation of ICTs components, n=384

ICT tools	Daily	Weekly	Forth nightly	Monthly	Twice in a year	Yearly	Never	Weighted mean	Rank
Radio	79.2	11.5	3.1	0.8	0.3	0.3	4.9	1.43	2nd
Television	41.9	28.4	11.5	4.4	3.4	0.5	9.9	1.20	3rd
Mobile phone									
Voice call	88.3	4.2	1.0	0.8	0.3	0.3	5.2	1.45	1st
SMS	46.1	19.5	4.7	1.3	1.0	0.00	27.3	1.04	4th
MMS	6.5	7.0	2.3	1.0	0.8	0.00	82.3	0.23	6th
Mobile internet	12.2	4.7	2.3	1.0	0.00	0.3	79.8	0.28	5th

Level of Use	Frequency	Percentages	Range of scores	Mean /SD	Maximum	Minimum
Low	223	58.1	0.00-166.08	166.09±135.67	839.00	0.00
High	161	41.9	169.09-839.00			
Total	384	100				

Source: Field analysis outcome (2017)

Respondents' empowerment status (Disposition to ICT use and Decision-making domains)

Disposition to ICTs' use for empowerment

The result in Table 3 showed that more (68.5%) of the respondents considered it inadequate to possess only one ICT tool while 24.4% had unlikely disposition to that statement. The disposition to ICT-based information was worse (low) for 57.3% of them.

Table 3: Respondents' disposition to ICT uses for empowerment, n=384

Statements	Likely	Undecided	Unlikely
I consider it not good enough to possess only one ICT tool	68.5	7.0	24.4
I consider ICT information to bring about unstable mood	39.3	17.7	43.0
I see ICT tools as necessities and not a luxury	78.7	9.9	11.5
I always regard ICT information as unpleasant news	37.5	15.1	47.4
I consider that ICT information do not usually add value to women's life	35.4	14.8	49.7
I see ICT information usage gives self-confidence to women	68.5	15.6	15.9
I think ICT information do not ease off stress through the information it offers	43.5	19.5	37.0

Distribution of respondents by level of disposition to ICT use for empowerment

Level of disposition	Frequency	Percentages	Range of scores	Mean /SD	Maximum	Minimum
Worse off	220	57.3	64.00-77.07	77.08±16.72	119.0	64.00
Fair	154	42.7	77.08 -119.00			
Total	384	100				

Source: Field analysis outcome (2017)

Decision making ability at household level

Result in Table 4 shows that the respondents contributed most to decision on material acquisition (0.74) with the least decision involvement in community recognition issues

(0.52) at the household level with low level of decision making for 52.1% of the respondents.

Table 4: Distribution of respondents' extent of contribution to decision making at household level, n=384

Decision making Domain	To a large extent	To a lesser extent	To a least extent	To no extent	Weighted mean	Position
Acquiring of material things	49.0	44.0	6.3	0.8	0.74	1st
Health matters	56.5	38.0	4.9	0.5	0.65	2nd
Safety and security matters	51.6	37.8	9.9	0.8	0.63	3rd
Family matters (Intimacy)	52.1	37.8	8.1	2.1	0.63	3rd
Production enterprises	43.5	42.7	13.0	0.8	0.60	5th
Emotional matters	44.3	34.1	12.0	9.6	0.55	6th
Community recognition	34.4	41.7	13.3	10.7	0.52	7th

Level of household decision making	Frequency	Percentages	Range of scores	Mean /SD	Maximum	Minimum
Low	200	52.1	0.00-16.29	16.13±3.67	21.00	0.00
High	184	47.9	16.30-21.00			
Total	**384**	**100**				

Source: Field analysis outcome (2017)

Overall empowerment status of the respondents

The results in Table 5 indicated low level of empowerment for 53.6% of the respondents; not up to half were empowered, which might be caused by the low (52.1%; Table 6) decision making ability and low disposition to ICT use (57.3%, Table 5) as earlier identified.

Table 5: Overall level of respondents' empowerment status, n=384

Level of empowerment	Frequency	Percentages	Range of scores	Mean/SD	Maximum	Minimum
Low	206	53.6	0.03-5.19	5.20±1.57	9.78	0.03
High	178	46.4	5.20-9.78			
Total	384	100				

Source: Field analysis outcome (2017)

Factors affecting respondents' empowerment

The result in Table 6 shows that rural women's years of formal education (β=0.144), p=0.012) and ICT use (β=0.118, p=0.026) significantly determined their empowerment. Years of formal education can improve knowledge and insight that may enhance desired empowerment.

Table 6: Regression analysis of factors affecting respondents' empowerment, n=384

Variables	β-value	t-value	p-value	Decision
Rural women's age	0.089	0.886	0.376	Not significant
Years of formal Education	0.144	2.510	0.012*	Significant
Income per month	0.009	0.185	0.854	Not significant
Index of ICTs use	0.118	2.238	0.026	Significant

Source: Field analysis outcome (2017)

CONCLUSIONS AND RECOMMENDATION

The study also identified that the most commonly utilised ICTs were mobile voice call channel and radio with low level of use. They had unfavourable attitude towards the use they put their ICTs with low level in household decision making abilities. The respondents had low empowerment level. However, the respondents' years of formal

education and ICT use significantly determined their empowerment. The study recommends that educational stakeholders at all level of governments should make rural women's adult education available for enhancement of literacy and use of ICTs for empowerment.

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EFFECT OF CRIME ON RURAL FAMILY LIVELIHOOD IN OGBOMOSO AGRICULTURAL ZONE, OYO STATE

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ABSTRACT

The cost of rural crime is at its highest since return to democracy in Nigeria. However, the picture is not quite the same in every part of the rural areas. This study was, therefore conducted to find out the effects of crimes in rural family livelihoods in Ogbomoso Agricultural zone of Oyo State. In conducting this study, 90 rural families were selected from the zone through a multistage sampling procedure. Data were analyzed using both descriptive (frequency count, percentage and mean) and inferential (Pearson Product Moment Correlation) statistics using SPSS version 22. The result showed that prevalence crimes include: stealing /theft of all forms, invasion of farm by herdsmen, barn breaking, illegal hunting and arson/bush burning. The study also found out that crime posed major effects on rural family livelihoods which included loss of stored products, loss of resources, loss of soil fertility, loss of yield of crop, crop destruction and loss of work time. The frequency of occurrence of various crime was found to be positive and significantly related to the effects of crime on rural family livelihoods. The outcome of this study revealed that the effects of crime were massive on rural family livelihoods. The study recommended an urgent need to implement security framework at farm level to curtail the menace of crime/criminality in order to enhance rural family livelihoods.

Keywords: Crime, livelihoods, rural, family, effect, frequency

INTRODUCTION

Rural crime primarily refers to criminal acts that transpire within areas classified as being rural. These acts are generally the same acts (i.e., burglary, robbery, assault, etc.) that are frequently perpetrated in urban and suburban environments. Agricultural crime involves offenses that either target agricultural property or are committed on agricultural property (Dunkelberger, Clayton, Myrick, and Lyles 1992). While normally involving a wide spectrum of offenses, some of the more prevalent acts include agricultural theft, vandalism, illegal hunting/poaching, illegal dumping of trash/refuse, and trespassing. Overall, crime including corruption is much more pronounced in developing countries than in industrialized countries (Zvekic and Alvazzi del Frate, 1995). Similarly, the Corruption Perception Index from Transparency International shows that developing countries are mostly the ones being represented at the bottom of the list indicating high levels of corruption. Property crime is the most frequent type of crime exceeding, sometimes, even the 50% level. Within the developing world, Sub Saharan Africa (SSA) is the most affected by crime, while Asia is least affected (Zvekic and Alvazzi del Frate, 1995).

Crime has been found to hamper development of rural areas in a serious way. Ceccato (2016) points out that "crime and safety are important dimensions of sustainable rural development". In other words, persisting crime in rural areas is likely to result in unsustainable development, depriving people of their livelihoods and promoting the outmigration of often. The report from the zones verbally has shown that crime in the zone has caused devastating effects on livelihood, food security and rural development in the zone

Against this background, this study seeks to identify the effects of crime in the zone in order to proffer solution to the problem. On that note the the general objective was to examine the effect of crime on rural family livelihood in ogbomoso agricultural zone oyo-state

The specific objectives were to:

1. examine the socio-economic characteristics of the rural family in the study area;
2. determine frequency of occurrence of various crime in the study area;
3. investigate the effects of crime on rural family livelihoods in the study area.

The hypothesis tested for the study is as follows;

Ho: There is no significant relationship between frequency of occurrence of crimes and effects of crimes on rural family livelihoods.

METHODOLOGY

The study was carried out in Ogbomoso Agricultural Zone of Oyo State.

Ogbomoso Agricultural Zone is made up of five Local Government Areas (LGAs), namely Ogbomoso North Local Government Area (LGA), Ogbomoso South LGA, Ogo-Oluwa LGA, Oriire LGA and Surulere LGA respectively.

Multi Stage Sampling technique was used to select 90 respondents which involves purposive selection of three Local Government Areas (Oriire, Surulere and Ogo-Oluwa) rural in nature.

Random selection of 3 wards out of 14 wards from each of the selected Local Government Areas. Thirty (30) rural families each from the selected wards were randomly chosen. This give us a total sample size of 90 respondents.

Data collection from the respondents was mainly through structured questionnaire. Information contained in the structured questionnaire were based on the objectives of the study. Data were analyzed using both descriptive (frequency count, percentage and mean) and inferential (Pearson Product Moment Correlation) statistics using SPSS version 22.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows that the mean age of all the respondents was approximately 50years which implies that majority of these respondents are still in their active years and productive age. The education distribution of the respondents shows that 15.6% of the respondents had no formal educational while only 1.1% had non-formal education, 42.2% of the respondents had primary school education, 31.1% had secondary education while 10.0% had tertiary education. This shows that respondents in the study are not illiterate, the high education level can increase the productivity of the respondents because it has been shown that farmers with high education level will be able to adopt new technologies in production.

Table 1: Distribution of respondents by socioeconomic characteristics (n = 90)

Socioeconomic characteristics	Frequency	Percentage	Mean
Age			
≤ 30	2	2.2	
31 – 40	9	10.0	
41 – 50	39	43.3	50.10
Above 50	40	44.5	
Marital status			
Single	4	4.4	
Married	81	90.1	
Separated	1	1.1	
Widowed	4	4.4	
Household size			
1 – 2	2	2.2	
3 – 4	4	4.4	**6.02**
5 – 6	51	56.7	
Above 6	33	36.7	
Level of education			
No formal education	14	15.6	
Primary school education	38	42.2	
Secondary school education	28	31.1	
Tertiary education	9	10.0	
Non-formal education	1	1.1	
Primary occupation			
Farming	63	70.0	
Herding	6	6.7	
Trading	11	12.2	
Civil services	6	6.7	

Socioeconomic characteristics	Frequency	Percentage	Mean
Artisan activities	4	4.4	
Years of participating in farming			
≤ 10	3	3.3	
11 – 20	36	40.0	**23.16**
21 – 30	49	54.4	
Above 30	2	2.2	
Farm size			
1.0 – 2.0	64	71.1	
2.1 – 3.0	21	23.3	**2.0816**
3.1 – 4.0	2	2.2	
Above 4.0	3	3.3	

Author survey 2020

Various types of crimes and frequency of occurrence in the study area

Based on the result in the Table 2, the frequency of occurrence of various types of crimes/criminality identified in the study area in their rank order include stealing/theft of all forms (WMS = 2.14), invasion of farm by herdsmen (WMS = 1.93), barn breaking (WMS = 1.69), illegal hunting (WMS = 1.69), arson/bush burning (WMS = 1.60), drug abuse (WMS = 1.34), poisoning of livestock (WMS = 0.63), vandalism (WMS = 0.50), assault (WMS = 0.49), Grievous Harm or Wounding (GHW) (WMS = 0.46), cultism (WMS = 0.27), homicide (killing) (WMS = 0.18), raping (WMS = 0.17) and kidnapping (WMS = 0.12). It was therefore revealed that stealing/theft of all forms was the major type of crime identified in the study area.

Table 2: Distribution of respondents by frequency of occurrence of various types of crimes (n = 90)

Type of crimes/criminality	Frequency of occurrence					
	Very often	Often	Rarely	Not at all	WMS	Rank
Grievous Harm or Wounding (GHW)	0(0.0)	12(13.3)	17(18.9)	61(67.8)	0.46	10th
Invasion of farm by herdsmen	14(15.6)	58(64.4)	16(17.8)	2(2.2)	1.93	2nd
Assault	0(0.0)	12(13.3)	20(22.2)	58(64.4)	0.49	9th
Vandalism	3(3.3)	13(14.4)	10(11.1)	64(71.1)	0.50	8th
Arson/Bush burning	10(11.1)	51(56.7)	12(13.3)	17(18.9)	1.60	5th
Stealing/theft of all forms	15(15.6)	73(81.1)	2(2.2)	0(0.0)	2.14	1st
Barn Breaking	7(7.8)	52(57.8)	27(30.0)	4(4.4)	1.69	3rd
Poisoning of livestock	1(1.1)	12(13.3)	30(33.3)	47(52.2)	0.63	7th
Raping	0(0.0)	5(5.6)	5(5.6)	80(88.9)	0.17	13th
Illegal hunting	4(4.4)	63(70.0)	14(15.6)	9(10.0)	1.69	3rd
Homicide (killing)	0(0.0)	6(6.7)	4(4.4)	80(88.9)	0.18	12th
Drug abuse	10(11.1)	27(30.0)	30(33.3)	23(25.6)	1.34	6th
Cultism	2(2.2)	8(8.9)	2(2.2)	78(86.7)	0.27	11th
Kidnapping	0(0.0)	0(0.0)	11(12.2)	79(87.8)	0.12	14th

Effects of crime on rural family livelihoods in the study area

Based on the result in the Table 3, the perceived effects of various types of crimes/criminality on rural family livelihoods identified in the study area in their rank order include loss of soil fertility (WMS = 4.97), loss of yield of crop (WMS = 4.91), increased in migration patterns of youth (WMS = 4.87), crop destruction (WMS = 4.81), loss of work time (WMS = 4.73), financial and personal losses for farmer (WMS = 4.69), increased prices of goods/agricultural products (WMS = 4.60), reduction in food quality\quantity (WMS = 4.46), displacement/migration of labour (WMS = 4.44) and increased incidence of deforestation through illegal felling of timber (4.44) and others.

Table 3: Distribution of respondents by perceived effects of the crime (n = 90)
SA = Strongly Disagree; A = Agree; U = Undecided; D = Disagree; SD = Strongly Disagree

Perceived effects of the crime/criminality	SA	A	U	D	SD	WMS	Rank
Loss of household resources	78(86.7)	12(13.3)	0(0.0)	0(0.0)	0(0.0)	4.37	15th
Increased in migration patterns of youth	33(36.7)	57(63.3)	0(0.0)	0(0.0)	0(0.0)	4.87	3rd
Displacement/migration of labour	40(44.4)	50(55.6)	0(0.0)	0(0.0)	0(0.0)	4.44	10th
Increased prices of goods/agricultural products	54(60.0)	36(40.0)	0(0.0)	0(0.0)	0(0.0)	4.60	8th
Loss of stored products	74(82.2)	16(17.8)	0(0.0)	0(0.0)	0(0.0)	4.82	4th
Loss of yield of crop	82(91.1)	8(8.9)	0(0.0)	0(0.0)	0(0.0)	4.91	2nd
Loss of soil fertility	87(96.7)	3(3.3)	0(0.0)	0(0.0)	0(0.0)	4.97	1st
Loss of land	20(22.2)	55(61.1)	0(0.0)	0(0.0)	0(0.0)	3.90	18th
Destruction of houses, property and farm stead	2(2.2)	30(33.3)	0(0.0)	0(0.0)	0(0.0)	2.09	20th
Loss of self-esteem	41(45.6)	48(53.3)	0(0.0)	0(0.0)	0(0.0)	4.42	12th
Job dissatisfaction/unwillingness to invest in agriculture beyond subsistence level	35(38.9)	55(61.1)	0(0.0)	0(0.0)	0(0.0)	4.39	14th
Reduction in food quality\quantity	41(45.6)	49(54.4)	0(0.0)	0(0.0)	0(0.0)	4.46	9th
Emotional exhaustion/ Psychological stresses e.g. fear of shock	38(42.2)	17(18.9)	0(0.0)	0(0.0)	0(0.0)	4.42	12th
Crop destruction	73(81.1)	28(31.1)	0(0.0)	0(0.0)	0(0.0)	4.81	5th
Financial and personal losses for farmer	62(68.9)	24(26.7)	0(0.0)	0(0.0)	0(0.0)	4.69	7th
Loss of work time	66(73.3)	60(66.7)	0(0.0)	0(0.0)	0(0.0)	4.73	6th
Loss of future breeding herbs and blood lines	30(44.4)	50(55.6)	0(0.0)	0(0.0)	0(0.0)	4.33	16th
Increased incidence of deforestation through illegal felling of timber	40(44.4)	57(63.3)	0(0.0)	0(0.0)	0(0.0)	4.44	10th
Losses of animals	30(33.3)	9(10.0)	0(0.0)	1(1.1)	2(2.2)	4.24	17th
Loss of life	11(12.2)	41(45.6)	1(1.1)	5(5.6)	64(74.1)	1.87	21th
Relocation/migration of affected farmers	16(17.8)	41(45.6)	1(1.1)	7(7.8)	25(27.8)	3.18	19th

The hypothesis testing result of the Pearson's Products Moment Correlation (PPMC) analysis indicated that the frequency of occurrence of various crime was positive and significantly related to the perceived effects of crimes on rural family livelihoods (r=0.31***; p= 0.002). Therefore, we reject Ho.

CONCLUSION

The research concludes that most frequent crime in the zone was stealing of any form, invasion of farm by herdsmen, breaking of barn and bush burning. The most perceived effect of crime in the study area were loss of soil fertility, yield losses, youth's migration and financial losses.

All these have negative effects (food insecurity and poverty) on livelihood of farmers in the zone.

RECOMMENDATIONS

Based on the findings, the following recommendations are necessary:

1. There is need for all security outfits to give priority to crime reduction rather than enforcement, particularly by using indicators that measure crime trends such as victimization surveys.
2. There is also adequate need for all security outfits to use planning and strategy at the command level, set targets in terms of crime reduction, and use tactics focused on repeat offender, victim and location considerations.
3. Planning must select targets that are amenable to enforcement and collabourate with other agencies able to tackle the underlying causes.

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ASSESSMENT OF FARMERS' KNOWLEDGE ON POST-HARVEST MANAGEMENT OF TOMATOES IN KOGI AND NIGER STATES, NIGERIA

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ABSTRACT
This study Assessed Farmers Knowledge on Post-Harvest Management of Tomatoes in Kogi and Niger States, Nigeria. Multi-stage sampling technique was used in the selection of 340 respondents for the study. Data were collected from primary source using structured questionnaire complemented with interview schedule. Both descriptive statistic and knowledge test were used to achieve the objectives. The results of the analysis obtained shows 79.4% and 77.9% of the the respondents practiced manual sorting and manual grading for tomatoes while (84.1%) used traditional basket for packing tomatoes. Also, it could be concluded that 40.9% of respondents had medium knowledge on post-harvest management of tomatoes, while 34.7% had high knowledge on post-harvest management. It is recommeded that credit and fund should be made available so that farmers could purchase post-harvest tools that are needed to enhance longevity of farmers' produce. Also, farmers should also be trained and sensitized on every aspects of post-harvest management of tomatoes in order to boost knowledge.
Keyword: Assessment, Farmers'-knowledge, Post-harvest, Management, Tomatoes

INTRODUCTION
Tomatoes (*Lycorpesicon esculentum*) plays important role in supplying human with vitamins and minerals needed for growth and development. The production of tomatoess in Nigeria is mostly carried out on large scale in Nothern Nigeria due to suitable agro-climatic condition that favoured it in large quantities. Tomatoes are either used fresh or processed into paste. Unfortunately, they are not only seasonal but highly perishable and deteriorate due to lack of proper knowledge on post-harvest practices that would have prolonged it longevity. Mohammed *et al.* (2012) estimated that more than 50% of tomatoes produced in Nigeria waste away due to inadequate post-harvest management this scenario most times forced farmers to sell their produce immediately after harvesting, only for them to buy it back at an exorbitant price few months after harvesting. Post-harvest management played significant roles in value addition to tomatoes in Nigeria, post-harvest management enhance tomatoes production by reducinge post-harvest losses to the bearest minimum, improves nutrition, adds value by opening new marketing opportunities, generating new jobs and enhance other related economic sectors for viable growth (Pelemo *et al*., 2018). Agricultural products mostly vegetables and fruits require proper post-harvest management at all time but this has not been actualized due to inadequate knowledge of farmers on post-harvest management (Abeleira *et al.,* 2008). The aim of this study is assessment of farmers' knowledge on post-harvest management of tomatoes in Kogi and Niger States, the specific objectives are to; determine the types of post-harvest management used in tomatoes and assess farmer's knowledge level on post-harvest management of tomatoes.

METHODOLOGY
Kogi State is one of the State where this research was carried out. The State consists of 21 Local Government Areas (LGAs). The State is located between latitude 6^0 33^1 and 8^0 44^1 N and longitude 5^0 22^1 and 7^0 49^1E. Kogi State has a total population of 3,278,487 and with growth rate of 3.2%, the State has estimated population of 4,636,071 in 2017. The State has land area of about 30,354.74 square kilometers (Kogi State Ministry of Information working document, 2016). Niger State is the other State where this reserach was conducted. It covers a total land area of 74,224km^2 thus accounting for about eight percent of Nigeria's land area. About 85% of its land area is good for arable crop production (Niger State Ministry of Information, 2012). It is located within longitude 3° 30' and 7° 20' East and latitude 8° 20' and 11° 30' North, with a population of about 3,950,249 and with a growth rate of 3.2%, the State has an estimated population of 5,586,000 in 2017 (Niger State Geographical Information System, 2015). The

major vegetables grow in the study areas include; tomatoes, spinach, pepper and igwu. Multi-stage sampling technique was used for this study in both States. The first stage involved random selection of three (3) Agricultural zones in both States. The second stage involved the selection of one (1) Local Government Areas from each of the zones making a total number of six (6) LGAs from both States. The third stage involved random selection of four (4) communities each from the selected LGAs making a total of twenty-four (24) villages. The fourth stage involved the use of proportional sampling to select 10% of the respondents from the sampling frame which gave a total of 340 respondents.

Primary data was used for this study was collected by researchers assisted by trained enumerators using structure questionnaire and interview schedules. Descriptive statistics such frequency distribution, percentage and mean were used to analyze data. Knowledge test was used to carry of farmers on post-harvest managements of tomatoes. The knowledge test was based on the post-harvest management used for crops produce by the respondents. Knowledge scores was recorded for each respondent and this serve as the dependent's variable for this research. Each of the statements carried a full weight of one (1). Respondents were asked to choose one response against alternative reponses as right, wrong or I dont know. For each each right response, a farmer recieves a full weight of 1, for each wrong or I don't know, a farmer recieve 0. Thus, the knowledge scores range from 0 to 100, where ≤25= low knowledge, 26-50= medium knowledge, 51-75= Slight high Knowledge, while ≥76= high knowledge.

RESULTS AND DISCUSSION

Types of post-harvest management in tomatoes used by farmers

Table 1 indicated the distribution of respondents according to post-harvest technlogies in tomatoes. The distribution of respondents according to sorting method in tomatoes revealed that majority (77.5%) and (81.1%) of respondents in Kogi and Niger States used manual sorting. The pooled results according to Table 4.6 showed that 79.4% of the respondents used manual sorting for tomatoes. This implies that manual sorting was often used in the sorting of tomatoes in both States. This was not contradicting the findings by Muhammed *et al.* (2012) who stressed that manual sorting of tomatoes is common among farmers in Kano State, Nigeria. Also, the distribution of respondents according to grading methods showed that majority (78.9%) and (77.9%) of respondents in Niger and Kogi States used manual grading in tomatoes, while pooled results revealed that 77.9% of the respondents used manual grading for tomatoes. This finding agreed with Muhammed *et al.* (2012) who is of the opinion that manual grading of tomatoes is a common practice among vegetable farmers in Kano State, Nigeria. More so, 88.8% used traditional basket in packing of tomatoes in Kogi State while 80.0% used traditional basket in Niger State. The pooled results indicated that (84.1%) used traditional basket, this reveals that traditional basket was used by majority of the respondents in both States. This finding agreed with Muhammed *et al.* (2012) who stated that traditional basket was mostly used in packing of tomatoes among farmers in Kano State, Nigeria.

Table 2 indicated 47.8% and 38.1% of respondents in Niger and Kogi States used motorcycle in tranporting of tomatoes while that for pooled was (43.2%). This shows that motorcycle is mostly used in transporting tomatoes in the study area. The pooled results according to Table 2 showed that 53.2% used sun drying in the preservation of tomatoes. These findings revealed sundrying is the most method used to presserve tomatoes in the study area. This is in agreement with Muhammed *et al.* (2012), who reported that sun drying is a major method of preservation of tomatoes in Nigeria.

Table 2: Distribution of respondents according to types of post-harvest management in tomatoes used by farmers

Variables	Kogi State (n=160) Freq (%)	Niger State (n=180) Freq (%)	Pooled (n=340 Freq (%)
Sorting			
Manual	124 (77.5)	146 (81.1)	270 (79.4.2)
Grading			
Manual	123 (76.9)	142 (78.9)	265 (77.9)
Packing materials			
Polythene bag	1 (0.6)	10 (5.6)	11 (3.2)
Nylon sacks	2 (1.2)	9 (5.0)	11 (3.2)
Traditional basket	142 (88.8)	144 (80.0)	286 (84.1)
Bags	18 (11.2)	35 (19.4)	53 (15.6)
Storage materials			
Bare flood/ground	90 (56.2)	81 (45.0)	171 (50.3)
Under trees	56 (35.0)	31 (17.2)	87 (25.6)
Transportation methods			
Public transport	6 (3.8)	20 (11.1)	26 (7.6)
Motorcycle	61 (38.1)	86 (47.8)	147 (43.2)
Preservation methods			
Sundrying	99 (61.9)	82 (45.6)	181 (53.2)
Open air dry	68 (42.5)	44 (24.4)	112 (32.9)
Refrigerator	21 (13.1)	16 (8.9)	37 (10.9)
Processing methods			
Grinding to pastes	120 (75.0)	141 (78.3)	261 (76.8)

Sources: Field survey, 2018

***Multiple responses**

Farmers' knowledge on post-harvest management of tomatoes

Table 2 indicated that (50.0%) of respondents in Niger State had medium knowledge on post-harvest management of tomatoes while 35.0% had high knowledge. The pooled results showed that 40.9% of respondents had medium knowledge on post-harvest management of tomatoes, while 34.7% had high knowledge on post-harvest management. However, the pooled results and that from both states revealed that farmers had high on post-harvest management of tomatoes. This might due to the fact that tomatoes are mostly produced by majority of the farming populace in both States, not neccesarily for sales but for consumption. However, high knowledge on post-harvest management of tomatoes is a strong incentive for combating post-harvest lossess. However, proper and good knowledge on sorting, grading, diseases and pest control and others are expected to boost farmers output and eliminate post-harvest farm losses while low knowledge could serve as hinderance to farmers from adopting post-harvest management. This finding was contrary to Mande *et al.* (2017), who stated that majority of Women farmers had low knowledge on post-harvest management.

Table 2: Knowledge of farmers on post-harvest management of tomatoes

Variables	Kogi State (n=160) Freq (%)	Niger State (n=180) Freq (%)	Pooled (n=340) Freq (%)
Very low knowledge	-	17 (9.4)	17 (5.0)
Low knowledge	8 (5.0)	10 (5.6)	18 (5.3)
Medium knowledge	76 (47.5)	90 (50.0)	166 (40.9)
High knowledge	76 (47.5)	63 (35.0)	139 (34.7)

Sources Field survey, (2018)

CONCLUSION AND RECOMMENDATIONS

From the findings it could be concluded that majority of the repondents used manual sorting and manual grading for tomatoes. Majority of tomatoes farmer used traditional basket for packing tomatoes. Also, it could be concluded that less than half of respondents had medium and high knowledg on post-harvest management of tomatoes. It is recommended that tomato **f**armers should be trained and sensitized on every aspect of post-harvesr management of tomatoes by extension agents in order to boost knowledge level; government should subsidize the cost of post-harvest materials and tools so that farmers can access them at affordable price.

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ASSESSMENT OF CLIMATE CHANGE ON SELECTED FRUIT VEGETABLE FARMING IN ETCHE LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

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ABSTRACT

The study assessed climate change on fruit vegetable farming in Etche local Government Area of Rivers state, Nigeria. Interview schedule was used to elicit information from 100 vegetables farmers using the purposive sampling procedure. Collected data were analysed using descriptive and inferential statistics. Findings showed that majority (70%) of the respondents were females, 42% are of the age bracket of 41-50years and 55% are married. Majority (80%) of the respondents are awareness of climate change. The dominant fruit vegetable activities carried out were planting (75%) and trading (75%). Major cause of climate change was deforestation (3.30). Effects of climate change on fruit vegetables are poor /low harvest productivity (3.54) and reduction in size of fruit (3.40). The adaptive strategies used to control problems of climate change was change in planting season (3.70) and use of larger mounds and ridges (3.57). It was recommended that deforestation should be stopped in the study area.

Keywords: Climate change, Selected, Fruit vegetable, Farming

INTRODUCTION

Climate plays a very important role in formation of natural ecosystems; therefore, climate change is a very important phenomenon that needs to be tackled globally (Ezeano and Albert, 2012). Farmers and farming activities are being affected by the global climate change experienced in the past years. In the past decades, the overwhelming complains on increase in the atmospheric temperature on plants, animals and human at large cannot be over emphasized (Eze, 2010). Recent cases of flooding were observed across most of the southern region of Nigeria, which affected some communities in Rivers State. Etche was one of such communities affected by the flood. Also planting activities have in recent times been delayed due to change in climate. Many rural farmers are being influenced by natural disasters (Albert and Isife, 2013). Climate change impact on agricultural development, destruct rural farms, particularly in the Etche farming communities of Rivers State.

Its consequence is, contaminated water source and arisen diseases. Trend of natural disasters by climate change have worsened since storms and rainfall, landslides, floods, spread epidemic diseases like malaria, nausea which increase in terms of frequency, amplitude and intensity. Flood as a result of climate change affect millions of hectares of farmland due to high rising sea levels. Climate change significantly affects fruit vegetable farming in Rivers State and Nigeria at large. Thus, this study, to investigate how climate change has affected farming particularly, fruit vegetable farming.

The specific objectives of the study were to:

i. describe the socioeconomic characteristics of fruit vegetable farmers affected by climate change in the study area,
ii. identify the activities of fruit vegetable farmers in the study area,
iii. identify causes of climate change among fruit vegetable farmers in the study area; and
iv. determine the adaptive strategies of climate change on fruit vegetables production.

METHODOLOGY

The study area was Etche local Government Area of Rivers state. Etche (Echie) is an ethnic group in Rivers state, southern Nigeria. Their communities include Akwu/Obuor, Chokocho, Chokota, Egwi, Afara, Mba, Ikwerengwo, Okehi, Okomoko, Ulakwo, Umuakonu, Umuebulu, Umuechem, Egbeke and Igbodo, which are grouped under five (5) clans namely Igbo, Ozuzu, Mba, Okehi, and Ulakwo/Umuselem clans. The research design for this study was the survey design. The population of the study consists of all the fruit vegetable farmers in Etche local Government area. Multistage sampling procedure was employed. Firstly, from the clans, random sampling was used to select ten (10) communities with predominant farming activities. Secondly, purposive sampling was used

to select one hundred (100) respondents from the selected communities. A total of one hundred (100) respondents was the sample size and used for the study. Primary data sources were used through structured questionnaire.

RESULTS AND DISCUSSION

From Table 1, 30% of the respondents are males while 70% are females indicating that females dominated the frit vegetable farming. Less than half (42%) are of the age bracket of 41-50years, 55% are married, 40% of the respondents are holders of first school leaving certificate, 64% of the respondents had a household size of 5-19 persons, 40% of the respondents earn between 25000-34000 monthly and 63% of the respondents have over 11 years farming experience with a mean value of nine years. Majority (80.0%) of the respondents had a high level of awareness of climate change and mostly cultivated fruit vegetables like garden eggs (34.0%) and okra (30.0%).

Table 1: Socioeconomic characteristics of fruit vegetable farmers in study Area

Characteristics	Frequency (n=100)	Percentage (%)	Mean
Sex			
Male	30	30.0	
Female	70	70.0	
Age (years)			
21-30	18	18.0	
31-40	30	30.0	
41-50	42	42.0	40.3 years
51-60	5	5.0	
61 and above	5	5.0	
Marital status			
Single	20	20..0	
Married	55	55.0	
Divorced/separated	12	12.0	
Widow/widower	13	13..0	
Educational Level			
Non formal education	33	33	
Primary education (FSLC)	40	40	
Secondary education (SSCE)	20	20	
Tertiary education	7	7	
Household size			
1-4	36	36.0	
5-10	64	64..0	7 persons
11 and above	10	10	
Monthly Income (₦)			
15000-24000	36	36.0	
25000-34000	40	40.0	
35000-44000	21	21.0	₦197.42
50000 and above	3	3..0	
Years of Farming Experience			
1-5	7	7.0	
6-10	21	21.0	
11 and above	63	63.0	8.6 years
Level of Awareness on climate change			
Yes	80	80.0	
No	20	20.0	
Types of fruit vegetables cultivated			
Cucumber	15	15.0	

Characteristics	Frequency (n=100)	Percentage (%)	Mean
Okra	30	30.0	
Garden egg	34	34.0	
Tomato	5	5.0	
Pepper	10	10.0	
Chile	6	6.0	

Source: Field Survey, 2019

Table 2 shows that planting (75%) and trading (75%) were the dominant activities carried out by vegetable farmers in the study area as they ranked fist position and weeding (60%) was second. This implies that the major activities carried out by vegetable farmers were planting, weeding and harvesting agreeing with the findings of Albert and Emah (2013) who observed planting and weeding to be the main activities in arable crop farming.

Table 2: Kinds of fruit vegetable farming activities

Kinds of farming activities	Frequency	Percentage	Ranking
Weeding	60	60.0	2nd
Ridging	20	20.0	6th
Planting	75	75.0	Lst
Ploughing	3	3.0	8th
Staking	5	5.0	7th
Fertiliser application	10	30.0	5th
Harvesting	20	57.0	3rd
Bush Clearing	33	33..0	4th
Trading	75	75	Lst

Source: Field Survey, 2019
Multiple responses

The causes of climate change according to respondents view in table 2 were deforestation (3.30), bush burning (3.50), burning of fossil fuel (3.24), changes of sun energy output (3.13), The findings agreed with IPCC (2012) who observed that removing trees by burning, a common practice in developing countries, releases CO_2 into the atmosphere and prevents forests from sequestering carbon in the future.

Table 3: Causes of climate change among fruit vegetable farmers

Causes	Strongly Agreed	Agreed	Strongly Agreed	Disagreed	Total Score	Mean score	Remark
Deforestation	38	35	27	20	331	3.30	AC
Bush burning	61	30	5	4	348	3.50	AC
Burning of fossil fuel	38	35	20	27	324	3.24	AC
Use of agro chemical	13	15	42	40	221	2.21	LC
Changes of sun energy output	40	41	10	9	313	3.13	AC
Biomass burning	12	13	43	42	215	2.15	LC
Spiritual inclination	10	20	62	8	232	2.32	LC

Source: Field survey, 2019 ≥ 2.50-AC (A cause); <2.50-LC (Less cause)

Effects of climate change on fruit vegetable as shown in Table 3 revealed that the respondents strongly agreed with poor /low harvest productivity (3.54), scarcity of fruit vegetables (3.45), reduction in size of fruit (3.40), erosion (3.36), flooding (3.06), increase incidence of pest

and diseases (3.22) and spoilage of food vegetables (3.18). This study agrees with the findings of Albert and Okidim (2014) that some of the effects of climate change on agricultural produce were food spoilage, erosion, flooding and low/poor harvest.

Table 3: Effects of climate change on fruit vegetable

Mitigating Effects	Strongly Agreed	Agreed	Strongly Disagreed	Disagreed	Total Score	Mean score	Remark
Poor/low harvest productivity	55	35	40	9	354	3.54	VE
Scarcity of fruit vegetables	60	30	5	5	345	3.45	VE
Spoilage of food vegetables	48	32	10	10	318	3.18	VE
Increase incidence of pest and diseases	44	38	14	4	322	3.22	VE
Flooding	43	30	17	10	306	3.06	VE
Erosion	46	38	12	14	336	3.36	VE
Reduction in size of fruit	55	35	5	5	340	3.40	VE

Source: Field survey, 2019 ≥ 2.50- VE (Very Effective)

Table 4 revealed that adaptive strategies used by fruit vegetable farmers to control problems of climate change revealed that change in planting season (3.70), larger mounds and ridges (3.57), change in harvesting time (3.27), prompt weeding (2.51), change in planting area (3.77) and preplanning against climate change (3.75). The finding confirms Albert et al (2014) who observed change in planting season, larger mounds and ridges and prompt weeding among arable crop farmers.

Table 4: Adaptative strategies to cope with climate change effects on fruit vegetables

Adaptive strategies	Strongly Agreed	Agreed	Strongly Disagreed	Disagreed	Total Score	Mean score	Remark
Farm irrigation	5	7	48	40	177	1.77	NAS
Change in planting season	73	10	17	10	370	3.70	AS
Tree planting	20	12	41	37	235	2.35	NAS
Larger mounds and ridges	64	30	5	1	357	3.57	AS
Change in harvesting time	30	35	15	20	275	2.75	AS
Prompt weeding	23	15	42	30	251	2.51	AS
Change in planting area	77	13	10	10	377	3.77	AS
Preplanning against climate change	78	20	1	1	375	3.75	AS

Source: Field survey, 2019 ≥ 2.50- VE (Adaptative strategies)

CONCLUSION AND RECOMMENDATION

Fruit vegetable farmers in the study are aware of climate change. They believe that climate change was caused by changes of sun energy output and spiritual inclination. The effects of climate change are poor /low harvest productivity, scarcity of fruit vegetables and reduction in size of fruit. To that effect, adaptative strategies such as building of larger mounds and ridges, and prompt weeding were used to cope with the effects of climate change. The study recommended that fruit vegetable farmers should be more cautious of climate change conditions before the commencement of the planting season.

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WOMEN PARTICIPATION IN FRUIT VEGETABLE PRODUCTION IN OYIGBO LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

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ABSTRACT
This study focused on women participation in fruit vegetable production in Oyigbo local government area of Rivers State, Nigeria. Specifically, it described the socio-economic characteristics of the women, identified types of fruit vegetables produced, examined the level of women participation, and determined the benefits of women participation in fruit vegetable production in the study area. Structured questionnaires were used to elicit information from 114 respondents using simple randomly procedure from three (3) zones namely Asa, Ndoki and Oyigbo. Data collected were analyzed using descriptive statistics. The results show that a higher number (35.6%) of the respondents were in the age bracket of 40-49 years, married (77.8%), stopped at secondary school level (42.2%) and cultivated okra (62.2%). The women participated in fruit vegetable production activities such as land preparation ($\bar{x}$ = 3.12) and planting ($\bar{x}$ = 2.91). The benefits of women participating in fruit vegetable production were; increased income ($\bar{x}$ = 3.33) and source of employment ($\bar{x}$ = 3.04). The study recommended that women should be allowed access to land either from their fathers or husbands.
Keywords: Women participation, Fruit vegetable, Production, Oyigbo Local Government Area

INTRODUCTION

Fruit vegetables like the name imply are a list of vegetables that are technically fruits. These are edible plants in which the leaves, stems, flowers, or roots are edible. This list does not include edible plants that are funguses or seeds treated as fruits. Many edible fruits are nonetheless also regarded as vegetables which ordinarily are not supposed to be, for example tomatoes, okra and their likes. Some fruit vegetables are occasionally used to also make sweet dishes, such as carrots, rhubarb, and even avocados. While some of the fruit vegetables on this list may be eaten raw, more often than not, fruit vegetables are cooked. Examples of fruit vegetables include avocado, chili peppers, cucumber, courgette, momordica charantia, egg plants, peppers, pod, okra, tomato, tomatillo, tinda, sweet corn, squashes, pumpkin, winter melon, west indian gherkin, among others (Hennigan, 2018).

Fruit vegetables are mostly cultivated by women today in African countries including Nigeria and production varies from cultivating few plants at the backyard for home consumption to a large-scale production for domestic and export markets (Dlova, Fraser, and Belete, 2004). Fruit vegetable production therefore ensures food security, employment and income generation in rural areas, thereby reinforcing the overall development and poverty reduction goals in most countries (Heinemann, 2012). Initially not many women were into its commercial production but with the so much emphasis on its importance in recent times and with the attractive proceeds made from it since demand currently is more than supply; more women are now attracted to this area of livelihood. It is this participation of women in fruit vegetable production that this study aspires to investigate.

The specific objectives included to:

i. describe the socio-economic characteristics of the women who participated in fruit vegetable production,
ii. identify types of fruit vegetables produced and the type of cropping practiced in the area,
iii. examine the level of participation of the women in fruit vegetable production,
iv. determine the benefits that accrued to the women as they participate in fruit vegetable production and
v. identify the challenges faced by the women engaged in fruit vegetable production and the extent to which they were affected.

METHODOLOGY

The study area was Oyigbo Local Government Area. The LGA has 18 major communities. These communities or villages are divided into two districts. The first is Oyigbo district, it has 4 villages and they include: Izuoma,

Komkom, Obeama, Oyigbo towns. The other district, Ndoki district has 15 villages and they include: Mirinwayi, Okoloma, Ayama, Egberu, Obunku, Umuosi, Obeakpu, Mgborji, Afam-Uku, Afam-Nta, Umuagbai, Azuogu, Omarihu, Okpontu, and Obete. They are predominantly farmers who are involved in the cultivation of staple foods such as yams, cassava, plantain, oil palm, maize, vegetables and fruits. The population of this study consists of all the women farmers participating in fruit vegetable production in the study area. There are 120 women that are into full commercial production of fruit vegetables in the LGA (Oyigbo Divisional Agricultural office, Rivers State Ministry of Agriculture 2018).

Multistage sampling procedure was used to select the fruit vegetable farmers. A proportionate simple random sampling was used to select females into fruit vegetable production in the entire local government area. Six (6) farmers per community were purposively selected to make up the sample size of one hundred and fourteen (114) farmers. Data were collected from primary sources through structured questionnaires. The study adopted both the descriptive and inferential methods to analyze the data obtained from the field. The descriptive tools include percentages, frequency and mean values.

RESULTS AND DISCUSSION

The result in Table 1 shows that a higher number (35.6%) of the respondents were in the age bracket of 40-49 years, 77.8% were married, 90% were education, 46.7% had household size between 1-4 persons, 40% have been farming for 6-10 years, and 25.6% of the respondents earn a monthly income between 10,000-20000. This substantiates Ayanwale and Amusan (2014) which states that the family size of this magnitude may influence preference for farming activities given that family members and land are available for farming operations.

Table 1: Socioeconomic characteristics of the respondents, n=90

Characteristics	Frequency	Percentage	Mean
Age (Years)			
20-29	18	20.0	
30-39	21	23.3	
40-49	32	35.6	41 years
50-59	14	15.6	
60 and above	5	5.54	
Marital Status			
Single	11	12.2	
Married	70	77.8	
Widowed	6	6.7	
Separated	1	1.1	
Divorced	2	2.2	
Educational Level			
No formal education	9	10.0	
Primary education	7	7.8	
Secondary education	38	42.2	
OND/NCE	13	14.4	
HND/B.Sc.	23	25.6	
Household Size (Persons)			
1-4	42	46.7	
5-8	32	35.6	7 persons
9-12	11	12.2	
13 and above	5	5.5	
Years of Experience (Yrs.')			
1-5	23	25.66	
6-10	36	40.0	
11-15	18	20.0	10 years

Characteristics	Frequency	Percentage	Mean
16-20	6	6.6	
21 and above	7	7.8	
Monthly Income (₦)			
10,000- 20,000	18	20.0	
21,000- 30,000	27	30.0	
31,000-40,000	12	13.3	
41,000-50,000	10	11.1	
51,000-60,000	6	6.7	₦38,622.22
61,000-70,000	6	6.7	
71,000-80,000	5	5.5	
81,000-90,000	4	4.4	
91,000 and above	2	2.2	
Size of Farm (Hectares)			
0.1-0.5	27	30.0	
0.6-1.0	38	42.2	
1.1-1.5	18	20.0	0.83ha
1.6-2.0	6	6.7	
2.1 and above	1	1.1	

Source: Field survey, 2018

Entries in Table 2 showed that okra is the dominant fruit vegetable cultivated by all the fruit vegetable farmers studied in the three zones namely; Asa zone, Ndoki zone and Oyigbo zone as it ranked first followed by garden egg and pepper that ranked second and third respectively. Other fruit vegetables cultivated were cucumber (4th), tomatoes (5th) and chili pepper (6th). This confirms the study of Babatunde *et al.,* (2007) that Okra apart from being one of the most important fruit vegetable crops in Nigeria and it ranks first before other fruit vegetable crops.

Table 2: Types of fruit vegetables produced in the study area according to zones

S/N	Types of fruits vegetables cultivated	Asa Zone (n=30) Freq.	%	Ndoki Zone (n=30) Freq.	%	Oyigbo Zone (n=30) Freq.	%	Pooled (n=90)	%	Ranking
1	Okra	20	66.7	21	70.0	15	50.0	56	(62.2)	1st
2	Pepper	15	50.0	13	43.3	12	40.0	40	(44.4)	3rd
3	Tomatoes	9	30.0	6	20.0	5	16.7	20	(22.2)	5th
4	Cucumber	10	33.3	7	23.3	8	26.7	25	(27.8)	4th
5	Garden egg	20	66.7	21	70.0	13	43.3	54	(60.0)	2nd
6	Chili pepper	5	16.7	3	10.0	2	6.7	10	(11.1)	6th

Source: Field survey, 2018 Multiple Responses

The result in Table 3 shows that the women in the study area participated in fruit vegetable production activities such as in land preparation ($\bar{x}$ = 3.12), sourcing for planting materials ($\bar{x}$ = 2.98), planting ($\bar{x}$ = 2.91), weeding ($\bar{x}$ = 2.50), harvesting ($\bar{x}$ = 2.68), sorting yield ($\bar{x}$ = 2.60), and sales ($\bar{x}$ = 2.92) as they all had a mean score of 2.50 and above. The area the women did not participate actively was in storage as it had score ($\bar{x}$ = 2.19). Mantunhu (2011) in their study on participation of rural women in vegetable production observed that women were involved in operations such as cleaning of land, sowing of seed etc.

Table 3: Level of women participation in fruit vegetable production activities

S/N	Extent of Women participation	VGE **4**	GE **3**	LE **2**	VLE **1**	TOTAL **Mean**	MEAN ($\bar{x}$)
1)	Land preparation	30(120)	43(129)	15)30)	2(2)	281	3.12
2)	Sourcing for planting materials	20(80)	51(153)	16(32)	3(3)	268	2.98
3)	Planting	22(88)	38(114)	16(32)	14(28)	262	2.91
4)	Weeding	19(76)	23(69)	28(56)	20(20)	221	2.50
5)	Harvesting	18(72)	37(111)	23(46)	12(12)	241	2.68
6)	Sorting Yield	12(48)	38(114)	32(64)	8(8)	234	2.60
7)	Storage	8(32)	28(84)	27(54)	27(27)	197	2.19
8)	Sales	28(112)	37(111)	15(30)	10(10)	263	2.92

Source: Field survey, 2018 ≥2.50= Great Extent; <2.50= Very little Extent

From Table 4, the result shows that the benefits of women participating in fruit vegetable production are serving as source of Income ($\bar{x}$ = 3.04), better business ($\bar{x}$ = 3.19), more income ($\bar{x}$ = 3.33), improved standard of living ($\bar{x}$ = 3.18), bigger farm ($\bar{x}$ = 3.16), education for family members ($\bar{x}$ = 3.02), good nutrition ($\bar{x}$ = 3.22), better health ($\bar{x}$ = 3.20), purchase bicycle ($\bar{x}$ = 2.63), contribution to the sustenance of the family ($\bar{x}$ = 3.56) and being able to make contributions in the community ($\bar{x}$ = 2.60). A study by Ladele (1994) reported that farmers participated in WIA programme because it helped them to acquire more skills on agriculture in addition to providing support services.

Table 4: Benefits accrued to Women participation in fruit vegetable production activities

Benefits	**Strongly Agreed (4)**	**Agreed (3)**	**Disagreed (2)**	**Strongly Disagree (1)**	**Total Mean**	**Mean** ($\bar{x}$)
Source of Income	20(80)	36(168)	12(24)	2(2)	274	3.04
Better Business	34(136)	40(120)	15(30)	1(1)	287	3.19
More Income	44(176)	36(108)	6(12)	4(4)	300	3.33
Improved Standard of Living	40(160)	30(90)	16(32)	4(4)	286	3.18
Bigger Farm	34(136)	36(108)	20(40)	------	284	3.16
Education for Family Members	30(120)	40(120)	12(24)	8(8)	272	3.02
Good Nutrition	44(176)	28(84)	12(24)	6(6)	290	3.22
Better Health	36(144)	40(120)	10(20)	4(4)	288	3.20
Purchase Phones	10(40)	40(120)	23(46)	17(17)	223	2.48
Purchase Bicycle	10(40)	38(114)	31(62)	21(21)	237	2.63
Contribution to the Sustenance of the Family	60(240)	22(66)	6(12)	2(2)	320	3.56
Being able to make Contributions in the Community	18(72)	40(120)	10(20)	22(22)	234	2.60

CONCLUSION AND RECOMMENDATIONS

The activities performed by these women includes, land preparation, sourcing for planting materials, planting, harvesting, sorting yield, sales. The fruit vegetables cultivated in order of demand were basically okra, garden eggs, pepper, cucumber, tomatoes and chili pepper, respectively. Participating in fruit vegetable production was not without benefits. It yielded in the area as source of income, better business, more income, improved

standard of living, bigger farm, education for family members, good nutrition, better health, contribution to the sustenance of the family, being able to make contributions in the community, among others. Women should be considered and allowed to inherit land from their fathers and their husbands as it will solve the problem of unavailability of land for farming.

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ANALYSIS OF PROFITABILITY OF CASSAVA ENTERPRISES IN RURAL AREAS OF OYO STATE

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ABSTRACT
This study analyzed profitability of cassava enterprises in rural areas of Oyo state, Nigeria. Multistage sampling procedure was used to select 160 respondents for the study. This study assessed the respondents' enterprise characteristics, sources of information, constraints and profitability of cassava enterprise. Data collected with interviewed schedule were analyzed using descriptive and inferential statistics (PPMC and ANOVA) at p=0.05. Results show that most respondents belong to cassava farmers association (50.6%) and source information through co-entrepreneurs (69.4%). Most producers (49.4%), processors (51.4%) and marketers (92.1%) had between 6 and 9 hectares of land, large processing units and were retailers respectively. The entrepreneurs were constrained by inadequate credit facilities (WS=176.9) and cassava glut (WS=174.3); and was high for 55% of the respondents. Cassava processing was the most profitable enterprise. Farm size (r=0.568), Number of processing units (r=0.532) and Marketing type (r=-0.509) and constraints were significantly related to profitability. Cassava entrepreneurs should pull their resources together for found availability while the producer should endeavor to scale up using value addition strategies for the optimum profitability status.
Keywords: Cassava entrepreneurs, Value addition strategies, marketing type, Cassava glut, and Cassava farmers

INTRODUCTION

Cassava has been plating significant roles in Nigeria's Agricultural sector. It has been used to diversify and boost the country's economy. Cassava comparative production advantage over the other staples encourages its production most especially by rural people. Cassava is a crop that has high ability to increase people's economic, reduces their poverty level and at the same time contributes significantly to Gross Domestic Product (GDP) of the country despite its low improved varieties and input in terms of production **(**Osun, Ogundijo and Bolarinwa, 2014). This has also led the Federal Government of Nigeria, state government and NGO's to introduce different programmes in order to boost the country's economy, increase production, reduce poverty, provides food security and profitability of those in the value-chain.

A vast expanse of research and literature exist on the profitability of each of the cassava enterprises, for example Okpeke and Onyeagocha (2015) analyzed the profitability of processing cassava tubers into *Garri.* However, the studies tended to concentrate on profitability level of individual or two enterprise(s) without affirming the profit difference among cassava production, cassava processing and Garri marketing.

Therefore, this study ascertained the profitability differences across the three enterprises in order to ascertain the enterprise that is most profitable among cassava production, processing and Garri marketing in terms of input and output ratio.

METHODOLOGY

The study was carried out in rural areas of Oyo state, Nigeria. Multistage sampling technique was used to select 160 respondents for the study. Data were collected using structured questionnaire. Data were analyzed using both descriptive (frequencies, percentages, mean and weighted score) and inferential statistics (PPMC and ANOVA at p=0.05).

RESULTS AND DISCUSSION

Enterprises characteristics of cassava entrepreneurs

The result in Table 1 shows that 49.4% of cassava producers had between 6 and 9 hectares of land, 51.4% of the processors had large processing units and almost all (92.1%) of the marketers were retailers.

Table 1: Distribution of cassava entrepreneurs by their enterprise's characteristics

Variable	Frequency	Percentage
Area of farm size		
2-5	10	11.8
6-9	42	49.4
10-13	30	35.2
≥14	2	2.4
Total	84	
Number of processing units		
Small	18	48.6
Large	19	51.4
Total	37	
Marketing type		
Whole seller	3	7.9
Retailer	35	92.1
Total	38	

Source: Field survey (2019)

Sources of information

Results in Table 2 shows that co-entrepreneurs (69.4%) were the major source of information for cassava entrepreneurs. This can be as a result of the social interaction that occurs among the entrepreneurs during their association meeting.

Table 2: Sources of enterprise information (n=160)

Source of information	Frequency	Percentage
Co-entrepreneurs	111	69.4
Ministry of agriculture	17	10.6
Extension agents	21	13.1
Customers	11	6.9

Source: Field survey (2019)

Constraints faced by cassava entrepreneurs

Table 3 shows that inadequate credit facilities (ws=176.9) ranked first of the constraints faced by the entrepreneurs, this was followed by cassava glut (ws=174.3).

Table 3: Distribution of cassava entrepreneurs based on the ranking of the constraints to their enterprises production

Constraints	Major constraint	Minor constraint	Not a constraint	Weighted score
Inadequate credit facilities	82.5	11.9	5.6	176.9
Cassava glut	80.6	13.1	6.3	174.3
Inadequate extension services	53.8	19.3	26.9	126.9

Source: Field survey (2019)

Table 4 reveals that the profit in cassava production, processing and *Garri* marketing were ₦628,234.12; ₦1,101,162.2 and ₦607,860.00 respectively with *Garri* processing having the highest profitable enterprise.

Table 4: Distribution of cassava enterprises (₦) according to their Profitability

Variable items	Mean	Minimum	Maximum	Standard deviation
Processing profit	1,101,162.2	283,920.00	8,880,000.00	1419193.7131
Production profit	628,234.12	1,850,000.00	1,850,000.00	528112.07985
Marketing profit	607,860.00	42,240.00	2,745,600.00	758082.18576

Source: Field survey (2019)

Test of relationship between some enterprise characteristics and their enterprises profitability

Result of PPMC in Table 5 reveals that entrepreneurs' farm size (r=0.568, p=0.000) Number of processing unit (r=0.532, p=0.001) and Marketing type (r=-0.509, p=0.001) were significantly related to profitability

Table 5: PPMC for test of relationship between enterprise characteristics and their profitability.

Variable	N	r-value	p-value	Decision
Area of farm size per hectare	85	0.568	0.000	Significant
Number of processing units	37	0.532	0.001	Significant
Marketing type	38	-0.509	0.001	Significant

Source: Field survey (2019)

Result of PPMC in Table 6 reveals that there was significant relationship between constraints to cassava enterprise (r=0.163, p=0.040) and profitability.

Table 6: PPMC for test of relationship between constraints and enterprises profitability (n=160)

Variable	r-value	p-value	Decision
Constraints to enterprises vs. Profitability	0.163	0.040	Significant

Source: Field survey (2019)

Test of profitability difference among the cassava enterprises

The result in Table 7 shows that there was significant difference in the profitability of cassava enterprises (F=4.383, p=0.014). Further analysis on LSD post-hoc test also shows that there was a statistically significant difference among the enterprise's profitability.

Table 7: ANOVA analysis: profitability difference among cassava enterprises.

	Sum of squares	Df	Mean square	F-value	p-value
Between Groups	6.543E+012	2	3271563575556	4.383	0.014
Within Groups	1.172E+014	157	746492139064.2		
Total	1.237E+014	159			

Source: Field survey (2019)

CONCLUSIONS AND RECOMMENDATIONS

Cassava producers practiced on small areas of land, *Garri* processors had large processing units and most of the *Garri* marketers were retailers. The entrepreneurs sought information from co-entrepreneurs, major constraint was inadequate credit facilities. Cassava (*Garri)* processing was the most profitable enterprise. Significant relationship existed between respondents' farm size, Number of processing unit, marketing type, constraints and profitability. Cassava entrepreneurs should pull their resources together for found availability while the producer should endeavor to scale up using value addition strategies for the optimum profitability status.

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ANALYSIS OF THE EFFECTS OF FARMER-HERDER CONFLICTS ON RURAL FAMILY FOOD SECURITY IN GOMBE STATE, NIGERIA

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ABSTRACT

The study examined the effects of farmer-herder conflicts on rural family food security in Gombe State, Nigeria. Primary data were collected using structured questionnaire and focus group discussion among 118 farmers and 112 herders. Percentage, Tobit and logit regression models were used in analysing the data. The result showed that, household size and education, farm size and cattle route encroachment were the major causes of the conflict. In addition, killing of stray cattle, population growth, rape and sexual harassment were all responsible to farmer-herder conflict with different marginal effects. There is need to create a platform that will bring all stakeholders together on a quarterly basis in order to have an interaction and to employ extension agents to serve as an intermediary between farmers and herders. There is need for the law makers to revisit the existing 1964 grazing reserves act and 1978 land tenure act so as to give room to accommodate land ownership, usage and control for the competing parties. This may help in reducing the intensity of the conflict.

Keywords: Farmer-herder conflicts, rural family, food security status.

INTRODUCTION

Agricultural production provides the means of livelihood and economic sustenance for the majority of Nigerians population. Farmers and herders make significant contributions in meeting the nutritional needs of the country and thus contributing to food security of households (Onuoha, and Ezirim, 2015). Food security at the individual, household, national, regional and global levels is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for active and healthy life. Food insecurity exists when people do not have adequate physical and economic access to food, (Food and Agricultural Organisation (FAO), 2015). The World Bank identified four pillars underpinning food security, as food availability, food accessibility, food utilisation and food stability (FAO, 2015). In recent years, Nigeria have witnessed series of violent communal clashes arising from the activities of the herders who move about on a daily basis with their cattle in search of water and green pastures (Suleiman, 2015). Consequently, many farmers and herders have lost their lives, while others have experienced declining production in their crops and herds (Suleiman, 2015).

Conflict has been one of the stumbling blocks and a major threat to world peace today. Conflict is perceived as a serious disagreement or argument about something important that leads to the outbreak of law and order (Collins, 2016). Conflict is a struggle or contest between people with opposing needs, ideas, values and goals (Dietz and Albert, 2016). According to Oyetade (2017), access to water and grazing land has become more competitive and has led to farmers and herders into arguments on a regular basis. This is a worrisome trend because both have coexisted inter-dependently for centuries, sharing the same fields for farming and grazing with a manageable level of tolerance and accommodation. Conflicts disrupts and threatens the peaceful coexistence of different ethnic groups and sustainability of agricultural production in Nigeria (Moritz, 2016).

This had led to damage of crops, attacks on cattle, destruction of properties, killings of live and cattle rustling in Gombe State. It is reported that climatic change, population growth, environmental degradation, government policies and insurgency activities are some of the major trigger of conflicts and violence between farmers and herders (Suleiman, 2015). However, little or inadequate information have been documented, in respect to effects of farmer-herder conflicts on food security of rural households especially in Gombe State. As a result of the increasing trend of the conflicts in the State, its pose a key challenge and call for an in-depth analysis of its effects on food security among rural households. It has not been

sufficiently documented on the specific or inter-play of factors influencing farmer-herder conflicts in the study area. Furthermore, it is not well known about the mitigation strategies employed in the management of farmer-herder conflicts in the study area, neither of the effectiveness or constraints of such management strategies. Given these backgrounds, this study addresses the following research objectives:

The broad objective of the study was to examine the effects of farmer-herder conflicts on rural households' food security in Gombe State, Nigeria. The specific objectives of the study were to:

i. determine the socio-economic characteristics, institutional and environmental factors influencing farmer-herder conflicts;
ii. examine the effects of farmer-herder conflicts on food security of rural households and
iii. identify the mitigation strategies associated with the management of the farmer-herder conflicts.

METHODOLOGY

The study was carried out in Gombe State, located at the centre of the north eastern part of Nigeria between latitude 9º 30 and 12º 30º N, longitude 8º 5 and 11º 45 E. The State is made up of 11 Local Government Areas (LGAs). It has a total land area of 20,265 Square kilometers with an estimated population size of (2,857,042) in 2006 National Population Commission [NPC], (2006) and a projected population of (4,195,662) in 2019. The target population for the study were farmers and herders. A multi-stage sampling procedure was used to select respondents for the study. The first stage involved the purposive selection of three local government areas, one each from the three agricultural zone. (Billiri in the South, Dukku in the North and Yamaltu Deba in the Central Zones). The selection was based on the frequent occurrence of farmer-herder conflicts in the study area. The LGAs selected had recorded frequent clashes between farmers and herders. The second stage involved stratified random sampling of 3 villages, from each of the 3 selected LGAs giving a total of 9 villages, (Wade, Kuri, Dadin Kowa from Y/Deba LGA, Maltawo, Jamari, Maru from Dukku LGA and Tudu, Ayaba, Laushidadi from Billiri LGA). A total number of 276 farmers were selected, while 267 herders were equally selected, to give a total sample frame of 543 respondents for both the farmers and herders. A sample size of 230 respondents were used, 118 farmers and 112 herders respectively. Primary data were obtained using semi-structured questionnaire, interview schedule and focus group discussion (FGD). Both descriptive and inferential statistics were used to analyse the data collected.

RESULTS AND DISCUSSION

Factors influencing farmer-herder conflicts

The coefficient of household size was positive sign and statistically significant of probability. It's an evident from the study that large households are more prone to farmer-herder conflicts than those with fewer household. While the coefficient of education had an inverse relationship with conflict and statistically significant, thus suggesting that the higher the educational level of the household, the more they avert/avoid conflict compare to non-educated people. Educated person may be more open to dialogue during conflicts. The coefficient of farm size also had an inverse relationship with conflict and statistically significant at 1 percent level. This may be due to high pressure on land resulted from increase in population vis-à-vis the traditional land tenure of inheritance. Farming on the cattle routes was positive sign and statistically significant. This implies that as farmers continue farming on the cattle routes this may cause farmer-herder conflicts. The positive relationship indicates that the more the cattle routes are encroached the more the probability to engage in conflict between farmers and the herders. This agrees with the assertion by Yahaya (2018) that land encroachment is among the causes of farmer-h.

Table 1: Factors influencing farmer-herder conflicts

Variables	Coefficient	Std. Err.	T
Age	0.001101	0.00153	0.72
Sex	-0.02968	0.044071	-0.67
Marital status	-0.00025	0.025776	-0.01
Household size	0.006957	0.003349	2.08**
Education	-0.02762	0.012347	-2.24**
Farm size	-0.01709	0.006787	-2.52***
Farming experience	-0.00122	0.001516	-0.8
Cooperative membership	-0.00178	0.001526	-1.17
Extension contact	-0.01065	0.012233	-0.87
Herd size	-0.00025	0.000178	-1.39
Decline in grassland	-0.10091	0.074595	-1.35
Misuse of water bodies in the area	-0.00135	0.045183	-0.03
Farming on the grazing reserves	0.064896	0.050494	1.29
Farming on the cattle routes	0.135748	0.046381	2.93***
Low rainfall in the region	-0.05155	0.060611	-0.85
High incidence of desertification	-0.03506	0.042125	-0.83
Cons	0.195921	0.395053	0.5
Sigma	0.1635471	0.0081739	20.00
No of observation, 230; LR chi^2 (16), 75.56; Prob > chi^2, 0.0000; Log likelihood.51.046			

*** P < 0.01, ** P < 0.05, * P < 0.10, Std Err. = Standard Error, Coef = Coefficient

CONCLUSION AND RECOMMENDATIONS

Farmer-herder conflicts have drastically reduced the availability of food supply as well as the income of rural family. Three key factors are responsible for farmer-herder conflicts in the study areas, these are; killing of stray cattle, increase in population, raping and sexual harassment by the parties. Therefore, there is need for village extension agents to be employ who can serve as an intermediary between the farmers and herders. The need to create a platform that will bring all stakeholders together on a quarterly basis. The study recommends the need for the law makers to revisits the existing 1964 grazing reserves act and 1978 land tenure act so as to give room to accommodate land ownership, usage and control to farmers and herders. The research also revealed the needs to adopt some mitigating strategies such as alternative dispute resolutions, arrest and prosecution of offenders, this will help in managing the intensity of the conflicts.

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ACCESS TO FARM RESOURCES AMONG FARMERS AND ADOPTION OF SAWAH TECHNOLOGY IN NIGERIA

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ABSTRACT

Access to necessary farm resources plays a vital role in the adoption of any agricultural technology. This study examined the effect of access to farm resource on the adoption of sawah technology in Ogun, Ondo, Niger, Ebonyi and Kaduna States and Abuja, the federal capital of Nigeria. Using interview guide, data were collected from selected 124 sawah farmers. The respondents were predominantly male, married and had Quranic education, with mean age of 42.3 years. The mean household size was 14, farm size ranged from 0.03 to10 hectares (Average= 0.5 ha). Sawah technology package was fully adopted by 56.3% of farmers, partially adopted by 30.6% and discontinued by 13.2%. The farmers had access to land but the access varied from full to partial. Farmers had little to no access to equipment and tools, of which the main concern was the power tiller. The majority of farmers had access to required labour. Farmers had no adequate access to improved seed, credit and loans, information and extension services.). This study has brought to fore the roles of access to resources in adoption and dissemination of sawah technology. For further dissemination and adoption of sawah technology, policy-makers must bear the major findings of this study in mind.

Keywords: sawah, farm resource, adoption, farmer, Nigeria

INTRODUCTION

Access to farm resources played a vital role in adoption of any agricultural technology. The constraints related to the tenure system, such as unequal access to land, lack of a mechanism to transfer rights and consolidate plots, have resulted in under-developed agriculture, food insecurity, and degraded natural resource. Infrastructure such as roads and irrigation play a key role in facilitating technology adoption. Improved transportation is also associated with diffusion of technology, better use of inputs and better prices for farmers (ATAI, 2011).

Sawah as a tool for achieving a self sufficiency in rice production in Africa particularly Nigeria relies more on the availability of needed farm resources. Adoption of sawah technology can only be effective in providing the most desired increase in rice production in Nigeria based on the availability and efficient use of farm resources. Sawah refers to levelled rice field surrounded by banks with inlet and outlet for irrigation and drainage. The basic elements of sawah system include improved irrigated rice basins, seedbed preparation, transplanting and spacing of seedlings, fertiliser application and most importantly, appropriate water management. Sawah development involves the construction of structures such as bunds, canals, and dykes, which require land with secure tenure (either permanent or for a reasonable number of years) for the farmers to break even on the investment (Alarima, *et al*., 2011).

According to FAO (2001) land tenure and barriers related to land availability are major constraints to agricultural intensification. Input such as seeds, fertilisers, irrigation facilities and farm implements are also critical for adoption of any agricultural technology. The non-provision and non availability of these inputs has greatly limited agricultural development in developing countries. Information is a critical resource in the operation and management of the agricultural enterprise.

METHODOLOGY

This study was carried out in five states and the FCT where sawah is being practiced. The states are Niger, Kaduna, Ondo, Kwara, Ebonyin and Abuja (i.e., the FCT). Data used in this study were collected in all the sawah sites in Nigeria namely: Bida, Zaria, Ilorin, Abakaliki, Abuja and Akure. A well-structured interview guide was used to elicit information from the farmers.

RESULTS AND DISCUSSION

The study as shown in Table 1 reveals that the adoption score range between 9 and 26 with a mean of 19.39 (SD = 4.24). Majority of the respondents had score above the mean score indicating a high level of adoption. In general, sawah technology package was fully adopted by 56.3% of farmers, partially adopted by 30.6% and discontinued by 13.2%. The high level of adoption is due to the inherent benefits in sawah which include high yield, improvement in the rate of tillering of the rice, efficiency of fertiliser usage and effective weeds control (Fashola *et al.,* 2006).

Table 1. Description of the variables of the study

Description	Measurement	Min	Max	Mean	SD
Adoption level	3-point likert scale of full adoption (3), partial adoption (2) and discontinued/not adopted (1)	9	26	19.39	4.24
Personal factors					
Sex	Ordinally as Male (1) Female (2)		Mostly Male (99%)		
Age	Measured in years	25	80	42.3	13.58
Marital Status	Ordinally as Married (1) Single (2)		Mostly Married (98%)		
Educational Level	Quranic (1) No formal education (2), Primary education (3), secondary education (4, and Tertiary education (5).		Mostly Quranic (64%)		
Household size	Number of persons in the household	1	40	14	
Farm Size	Measured in hectares	0.03	10	0.53	1.03
Years of experience	Measured in years	7	65	31.91	16.33
Yield of Sawah rice	Measured in kg	80	36000	2462.26	5056.08
Income	Measured in Naira	10000	500000	151110	83351.61
Years of experience in Sawah	Measured in years	1	11	6.34	3.31

Access to required resources among farmers

Tables 2 show the access to required resources profile of the farmers in the study area. Farmers have access to land but the access varies from full to partial. Full access occurs in the case of the landowners that have enough land and did not migrate to other communities. Partial access occurs among the tenants and those with limited hectares of land in their communities but migrate to other communities to get land for production. Control over the land rests solely with the landowners. They decide the size of the land to be cultivated by tenants and may prevent tenants from expanding the size of their sawah farms. Farmers have little to no access to equipment and tools, of which the main concern is the power tiller. Majority of the farmers have access to required labour. This is because; farmers make use of their family members as main source of their labour. The large size of the family (11-20) is an added advantage for the farmers. As clearly shown, farmers have no access to improved seed, credit and loans, information and extension services. These will definitely have a negative effect on the adoption of sawah technology. The demand for use of these resources is high and is limiting the expansion of the adoption of sawah technology in Nigeria

Table 2: Access to farm resources among the respondents

Access to farm resources		Full (%)	Partial (%)	No (%)
Access to land	3-point likert scale of full (3), partial (2) and no (1)	46.20	53.80	0.00
Access to equipment/tools	3-point likert scale of full (3), partial (2) and no (1)	19.30	43.70	37.00
Access to required labour	3-point likert scale of full (3), partial (2) and no (1)	80.70	18.50	0.80
Access to cash/credit	3-point likert scale of full (3), partial (2) and no (1)	2.50	26.90	70.60
Access to information	3-point likert scale of full (3), partial (2) and no (1)	4.20	25.20	70.60
Access to extension services	3-point likert scale of full (3), partial (2) and no (1)	0.80	22.70	76.50
Access to improved Seed	3-point likert scale of full (3), partial (2) and no (1)	1.70	28.60	69.70

CONCLUSION

Ensuring high levels of tenure security, adequate access to tools especially power tiller, sustained access to labour, adequate credit facilities and effective and efficient information and extension services is important for sustainable adoption of sawah technology**.** Further dissemination and adoption of sawah technology to other parts of Nigeria in other to attain self sufficiency in rice production must therefore bear in mind the findings of this study.

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ESTIMATING MANGO POSTHARVEST LOSSES AND ITS IMPLICATION FOR FRUIT FARMING: LESSONS FROM FAMILY-OPERATED ORCHARDS IN OYO STATE, NIGERIA

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ABSTRACT

This study was designed to assess mango postharvest loss criticalites and reduction strategies. A three-stage sampling procedure was used to select one hundred and thirty-five respondents for the study. The data collected using structured interview schedule were presented and analysed using frequency counts, percentage, mean and standard deviation for the descriptive statistics and multiple regression to test the hypothesis. Findings of the study revealed that the mean age of the respondents was 57.5 years, mostly males and were married with an average household size of 7 persons and 25.4 years of farming experience. Skin break/crack contributed highest to mango postharvest loss criticality. On-farm wholesaling was the most (92.6%) important strategy used by the farmers to mitigate postharvest losses. Regression analysis revealed that latex removal and checking for bruises has significant contribution to reduction of loss criticality at 0.05 level of significance. The study concluded that estimating loss criticality directs farmers on the right strategy to mitigate postharvest loss and increase income accruable to their families.

Keywords: Family-Operated Orchards, Fruit Farming, Postharvest Losses

INTRODUCTION

Fruit crops sub-sector of contributes significantly to agricultural sector as it serves as a booster to the local economy of rural households. It creates a means of livelihoods for the farmers and has the potential of generating foreign exchange earnings.

Among various commercial dry land fruit crops, mango stands out in Nigeria as it thrives well on wide range of soils, low rainfall and favorable temperature. Mango fruit is well known due to its wide range of adaptability, high nutritive value, richness in variety, taste and excellent flavor. The fruit is very popular and regarded as king of fruits in most part of the world. In spite of its natural endowment, mango is highly perishable. Several environmental conditions, higher moisture content, soft textures of the fruit and susceptibility to various pathogenic infections are the limiting factors to its shelf-life (Yahaya and Mardiyya, 2019).

A clear pathway to ensure the availability of mango is to minimize postharvest losses. For farmers to understand and practice postharvest loss reduction managements, knowledge of how to estimate postharvest losses must be brought to bear. As this will enable them to focus more on the major causes of the loss. It is based on this background that this study was designed to analyze mango postharvest losses and its implication for fruit farming. Specifically, the study aimed at identifying the roles played by members of the households in the mango orchard management; determine the level of mango postharvest losses; and examine the postharvest handling practice of mango for loss reduction.

METHODOLOGY

The study was conducted in Oyo State located in the south-west of Nigeria. A three-stage sampling technique was adopted for this study. First was the purposive sampling of Ogbomosho and Oyo Agricultural Zones, noted as the major mango producing zones in the state. In the second stage, all the nine Local Government Areas in the zones were purposively selected due to the huge presence of mango growers. Lastly, fifteen mango growers were selected from each LGAs using snow ball method. Structured interview schedule was used to collect data for the study. The level of postharvest losses was determined using an adapted Rapid Loss Assessment Tool developed by Sector Project Sustainable Agriculture (2015) which expresses loss in term of its criticality using a perceived response on Relevance and Importance of effect of postharvest practices on mango fruit. The postharvest handling practice of mango for loss reduction was assessed by asking the farmers to state the postharvest practices they employ in their orchards using yes (2) or no (1) responses. Data from the study were analyzed using descriptive statistics such as frequencies,

percentages, means and standard deviation and multiple regression analysis for testing the hypothesis at 0.05 level of significance.

RESULT AND DISCUSSION

Socioeconomic characteristics of the respondents

Data in Table 1 reveals that majority (79.3%) of the respondents were males while about (20.7%) were females. This is in line with the position of National Bureau of Statistics (2019) that male headed households usually out-number female headed households in most Nigerian communities. The mean age of the respondents was 57.5 years. Most of them (66.7%) were married with majority (59.3%) having non-formal education. Olabanji and Olabanji (2020) reported that the more educated farmers are, the better they become in handling production challenges. The average household size and years of experience was 7 persons and 25.4 years respectively. The average population of trees per orchards was about 24 trees.

Table 1: Distribution of respondents according to their socio-economic characteristics

Variables	Frequency (N)	Percentage (%)	Mean
Sex			
Male	107	79.3	
Female	28	20.7	
Age of Respondents			
<20	0	0.0	
20-40	23	17.1	57.5 years
41-60	103	76.3	
>60	9	6.6	
Marital Status			
Single	44	32.6	
Married	90	66.7	
Divorced	1	0.7	
Educational Level			
Non-formal education	80	59.3	
Primary	38	28.1	
Secondary	11	8.1	
Tertiary	06	4.4	
Household Size			
1-5	45	33.3	7 Persons
6-10	77	57.0	
11-15	13	9.6	
Years of Farming Experience			
<10	0	0.0	
10-20	36	26.7	
21-30	49	36.3	25.4 years
>30	50	37.0	
Numbers of mango trees planted			
<20	41	48.8	
21-40	31	37.6	24 trees
41-60	28	11.2	
>60	35	2.4	

Source: Field survey, 2018

Level of mango postharvest losses

Data on Table 3 shows that loss criticality was most prominent in skin break/crack ranking first with a mean score of 3.51. This was followed by fruit pest attacks ranking second with a mean score of 1.47 and Bruises ranked third (MS =1.07), these accounts for the major areas where farmers experience loss annually.

Table 2: Loss criticality measurement

Variables	Critical loss	Less critical loss	No loss	Total Loss	Mean Score	Contribution to loss criticality Ranking
Bruises	47 (34.8)	51 (37.8)	37 (27.4)	145	1.07	3rd
Skin break/crack	84 (62.2)	36 (26.7)	15 (11.1)	204	3.51	1st
Pest attacks	79 (58.5)	40 (29.6)	16 (11.9)	198	1.47	2nd
Sun burn	0 (0)	0(0)	135 (100)	000	0.00	NR
Over ripe	11 (8.1)	10 (7.4)	114 (84.4)	32	0.24	6th
Lenticel spot	15 (11.1)	40 (29.6)	80 (59.3)	70	0.52	5th
Rusetting	14 (10.4)	2 (1.5)	119 (88.1)	29	0.22	7th
Anthracnose decay	0 (0)	135 (100)	0 (0)	135	1.00	4th
Shrinking shoulder	2(1.5)	1 (0.7)	132 (97.8)	5	0.04	8th

Computed from field data, 2018 NR =No Rank

The postharvest handling practice of mango for loss reduction

Table 4 shows the fruit handling practices adopted by the mango growers. Most of them (92.6%) adopted on-farm wholesaling to prevent fruit loss and damage on their farms. Also, 89.6% of the farmers do a quick sale of the fruit before the fruit ripen to deterrable state and chemical application to prevent pests and diseases infestation (58.8%). In order to deliver and maintain good quality fruit, Musyoka, Isaboke, and Ndirangu, (2020) posited that proper handling and management culture must be maintained among small-scale mango farmers.

Table 3: Distribution of the respondents based on adopted handling practices of mangoes

Handling Practices	Yes	No
Chemical application	79 (58.5)	56 (41.5)
Selective harvesting	34 (25.2)	101 (74.8)
On farm Wholesaling	125 (92.6)	10(7.4)
Latex removal	16 (11.9)	119 (88.1)
Sorting and grading	44 (32.4)	91 (67.4)
Weed control	54 (40.0)	81 (60)
Special storage of fruits	2 (1.5)	133 (98.5)
Forced-ripening of fruits	11 (8.1)	124 (91.9)
Checking for bruises	52 (38.5)	83 (61.5)
Washing with cold water	8 (5.9)	127 (94.1)
Quick sales	121 (89.6)	14 (10.4)

Source: Field Survey, 2018

Table 5 shows the regression analysis of the growers' loss criticality values and adopted loss reduction practices. It was revealed that latex removal and checking for bruises shows a significant contribution to reducing loss criticality ($p<0.05$). The R^2 of 0.733 suggests that about 73% of the adopted practice accounted for the loss criticality. This finding implies that latex removal and checking for bruises does not reduce loss criticality.

Table 4: Regression result of the of loss criticality of farmers and adopted loss reduction practices

Variables	β	t-value	Sig-value
Constant	25.5**	11.863	0.000
Chemical application	0.051	0.216	0.829
On farm Wholesaling	0.055	0.126	0.900
Latex removal	0.880**	2.451	0.016
Sorting and grading	-0.360	-1.418	0.159
Checking for bruises	0.671**	2.685	0.008
Washing with cold water	-0.210	-4.22	0.674
Quick sales	-2.14	-0.542	0.589
R^2	0.733		

Data Computation, 2018 **Significant@ 5%

CONCLUSION AND RECOMMENDATION

This paper concluded that pest attacks was the hot spot for loss criticality and recommends that fruit farmer should be exposed to Rapid Loss Assessment Tools to help them plan and prevent losses thereby increasing fruit availability in a sustainable manner.

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EFFECT OF SHIRORO DAM IRRIGATION FARMING TO LIVELIHOOD SHOCKS AMONG RURAL HOUSEHOLDS IN NIGER STATE, NIGERIA

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ABSTRACT
Dry season farming in Shiroro dam (SD) project serves as a resilience to avert climate change, environmental, socio-economic and production shocks among rural households in Nigeria. The study assessed the effect of SD dry season farming to livelihood shocks among rural households in Niger state, Nigeria. Primary data were collected with the aid of structured questionnaires. A multistage sampling procedure was used to select 165 farming households from 291 Shiroro dam villages. Descriptive statistics and regression models were used to analyze the data. Results indicate that majority of SD farming household heads are male (90.9%), with mean age and farming experience of 49 and 19 years respectively. The result of the coefficients of irrigation income (0.634), rain-fed income (0.006), fishery income (0.129), and agricultural wage labour (-0.050) were statistically significant factors influencing earning accrued to farming households. Result also revealed that socio-economic and institutional variables were major determinants in extent to cope with shocks. Farmers should strengthen their cooperative and collabourate with extension agents to harness agricultural information, and other critical resources that will enable them preventing and coping with production shocks, climate change and other environmental challenges.
Keywords: Information, irrigation, Shiroro dam, shocks, Nigeria

INTRODUCTION
Nigeria food supply and demand is made up of local production dominated by smallholder farmers and partial imports from other countries. However, as a developing country with a high dependence on importation of staple food, effort to break the jinx and improve self-sufficiency in food production and reduce demand-supply gaps has always been met with a number of problems. One of such predicaments is agricultural shocks comprising production and marketing shocks. Shocks in agriculture include external short-term deviations from long term trends that have substantial negative effects on farmer's current state of well-being, level of assets, livelihoods and safety. These include climate change effects, extreme adverse natural events such as droughts, flood, and erosion and market-related events including fuel hike, input and output price fluctuations, uncertainty in biological processes related to weather, diseases, pests, and infertility (FAO, 2016, Oladimeji *et al.,* 2019). While the impacts of shocks on poverty and coping strategies have been widely studied in developing countries (Ngenoh *et al.,* 2018), the extent of factors influencing shocks in agricultural production and irrigation nexus are rare in literature and has not been thoroughly analysed. Hence, the broad objective of this study was to assess the effect of Shiroro dam irrigation farming to agricultural and livelihood shocks among rural households in Niger state, Nigeria.

METHODOLOGY
This study was conducted in Niger State, North central Nigeria. Shiroro hydropower reservoir is storage based hydroelectric facility located in Niger State at the Shiroro Gorge. The climate, edaphic features and hydrology of the State permit the cultivation of most of Nigeria's staple crops and allow sufficient opportunities for livestock rearing and artisanal fisheries production. Primary data were collected in 2019 farming season, with the aid of a structured questionnaire. A multistage sampling was used to select two LGAs purposively: Shiroro and Muya out of the 25 LGAs in the State because of location of the dam. Twenty-one villages adjacent to the dam were listed and 13 villages were purposefully selected due to intensity of households' involvement in Shiroro dam farming. The list of farming households in each village was compiled and 165 farmers out of 291 were randomly selected.

Descriptive statistics, multiple and Tobit regression models were used to analyze the data. Multiple regression models were used to determine

factors influencing profit of SDF. The Cobb-douglas function is explicitly specified as follows:

$$\ln Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 \quad (1)$$

Where: Y is the SDF profit per ha. X_1 *to* X_7 were specified in the result, βo = constant; β_1 –β_7 are parameters to be estimated. The determinants of intensity to cope with production shocks were accomplished by Tobit regression model. Socio-economic and institutional factors determining farmers' intensity to cope with production shocks was achieved using Tobit regression model. Thus:

$$Y_i = \beta_0 + \beta_1 X_1 + \ldots + \beta_{12} X_{12} + u \quad \ldots (2)$$

Where: Y_i is shocks index measured by dividing irrigation income by the total livelihood income from all sources; β_0 = constant term, β_i –β_{10} are coefficients to be estimated, u_i = error term with zero mean and constant variance. The independent variables fitted in the model were operationalized in subsequent results.

RESULTS AND DISCUSSION

Socioeconomic status of SDF indicate that the mean age and farm experience of the farmers were estimated to 49 and 19 years respectively which indicate farmers are likely to be in active age capable of high productivity and are likely to utilise new technologies. The mean household size was estimated to 8 persons per farmer, an indication that there is a likelihood of reduced cost of labour, as adequate family labour will be available for farming operations *ceteris paribus*. The coefficients of variation of farm size (94.23%) and extension contact (88.4%) were high indicating there is high variability and deviation in these parameters. The mean years of cooperative association was 6.7 with coefficient of variation of 32.8%.

Figure 1 depicts types and magnitude of shocks and level of crop impaired among SDF. Results show that flooding is most prevalent shock experienced by majority of farmers (94.5%) with average value of crop loss of 64.5%. Although crop shocks are transitory and are a plausibly exogenous source of variation at the household level (Beegle *et al.,* 2006), however, if persistent and recurrent in the same families over time, might pick up unobserved household characteristics rather than identifying an exogenous source of variation.

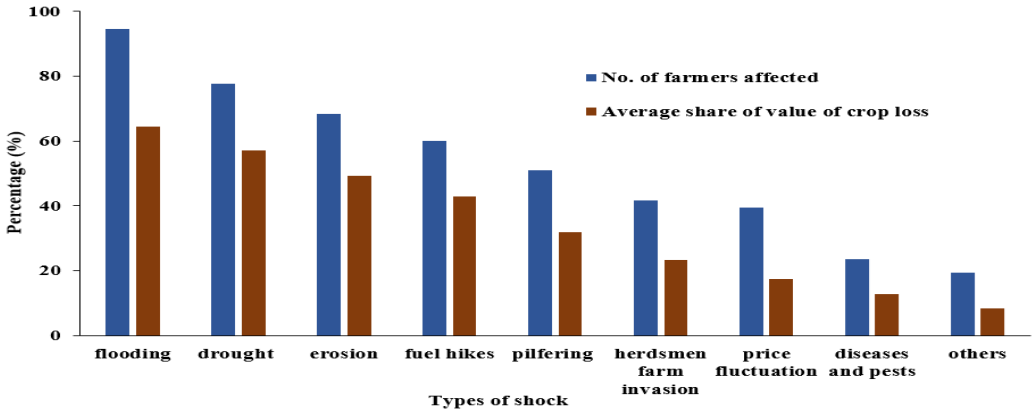

Figure 1: Types and magnitude of shocks and level of crop impaired, ** Multiple Responses

The shares of income from different livelihood activities are summarized by sectors in Figure 2. Although all activities were important sources of income for the SDF sampled, farming activities were the most important source of income cumulated to 79.30% comprising of the share of income from Shiroro dam irrigation and rainfed farming amount to 57.4% and 45.52% of farm income and total income respectively. This shows that dry season irrigation play a significant role to alleviate shocks emanating from flooding or drought during the raining season. In addition, irrigation acts as succor to farming household during the off-farm season. This is comparable to the study of Eneyew *et al.* (2014) that irrigation use has a positive impact on households earning from crop in rural area of Ethiopia.

Results in Table 1 showed that the postulated explanatory variables explained about 72.1% in the variations of factors influencing

income accrued to SDF. The F-test revealed that the model was statistically significant at 1% hence the model has a good fit. The significant and positive coefficients on irrigation, fishery and rainfed incomes implies that a unit increase in any of the variable whose coefficient is positive implies an increase in income by corresponding units. However, the negative coefficient of livestock and agricultural wage labour implies that unit increase in these variables will lead to a decrease in income earned.

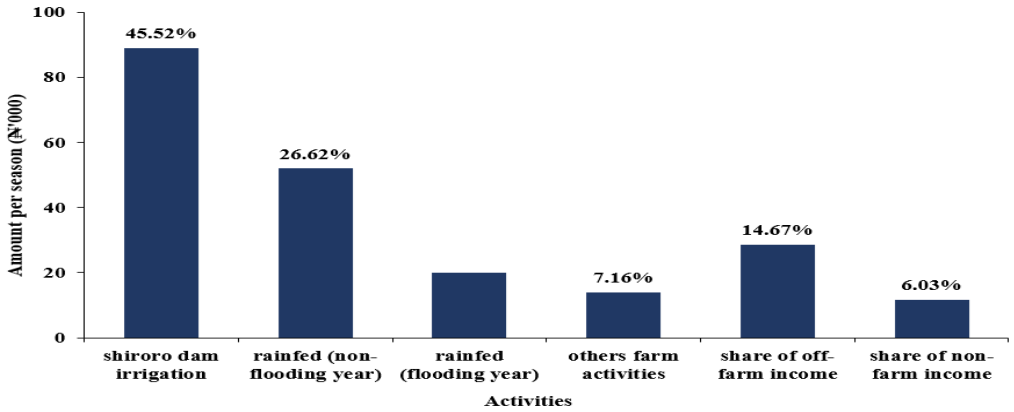

Figure 2: Summary of livelihood activities and income earnings by SDF per season

The MLE estimates of the extent or intensity of coping with agricultural shocks was achieved with the Tobit regression model are also presented in Table 2. Irrigation income, credit accessed for irrigation and extension contact was positive and statistically significant. This implies that access to these institutional variables significantly increased the probability of coping with production shocks in line with study of Ngenoh *et al.* (2018).

Table 1: Multiple Regression analysis of factors influencing income accrued to SDF

Variable (₦)	Coefficient	Standard error	t-value	P > //Z//
Constant	0.338***	0.093	3.63	0.0012
Irrigation income	0.634***	0.192	3.3	0.0026
Remittance and gifts	4.00E-07	3.90E-07	1.03	0.6731
Livestock worth	-0.231**	0.104	-2.22	0.0372
Non-farm income	0.001	0.0012	0.83	0.8218
Fishery income	0.129**	0.053	2.43	0.0205
Rain fed income	0.006***	0.002	3	0.0029
Agric. wage labour	-0.050*	0.027	-1.85	0.0832

*Note: statistically significant at 1***, 5** and 10* % probability level respectively. R^2 = 0.721, F-value = 18.06.*

Table 2: MLE Tobit regression model of the extent of coping with agricultural shocks

Variable	**Coefficient**	**Standard error**	**t-value**	**P > //Z//**
Age (years)	0.328***	0.094	3.49	0.000
Marital status (married =1, no =0)	-0.111	0.862	-0.13	0.421
Level of education (years)	1.00E-08	2.00E-08	0.50	0.106
Household size (number of persons)	-0.401***	0.155	2.59	0.002
Farm size (hectare)	0.299	0.189	1.58	0.108
Cooperative membership (years)	-1.00E-05	1.50E-05	-0.67	0.176
Distance to market (kilometer)	0.267***	0.064	4.17	0.000
Irrigation income (Naira)	0.502***	0.172	2.92	0.001

Variable	Coefficient	Standard error	t-value	P > //Z//
Inform on shocks (yes=1, no=0)	-0.512***	0.201	2.55	0.002
Non-farm income (Naira)	-3.00E-09	2.90E-09	-1.03	0.125
Credit accessed (Naira)	0.2e-6**	9.00E-08	2.22	0.025
Extension contacts (number)	0.009***	0.003	3.00	0.000
Constant	0.213**	0.097	2.20	0.021

LR Chi^2 (12) =77.09, log likelihood = -112.03

Figure 3 depicts strategies adapted in mitigating shocks by SDF. The results show that majority of the coping strategies used by SDF were informal. Only 3% of sampled farmers insured their farm.

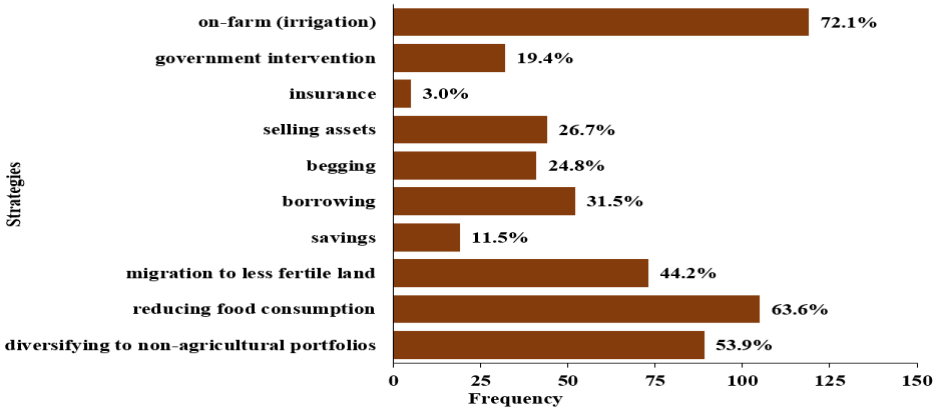

Figure 3: Strategies adopted to mitigate agricultural shocks Note: Multiple Responses allowed

CONCLUSION AND RECOMMENDATIONS

Shiroro dam irrigation was ranked as the most important livelihood source of SDF. Variables such as age, household size, market, irrigation income, information on shocks, extension contact and credit accessed were the major determinants in the decision to cope and the extent of coping strategies by SDF. Farmers should strengthen their cooperative organisation to harness credit facilities, insurance scheme, extension services, market information and government intervention in natural disaster. Farmers should also prioritize dry season irrigation to minimize shocks associated with flooding, drought and other natural disaster.

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THE PROFITABILITY OF STRIGA TOLERANT MAIZE VARIETY WITH LOCAL VARIETY IN TUDUN SAIBU, SOBA LOCAL GOVERNMENT AREA, KADUNA STATE

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ABSTRACT

On- farm demonstration was conducted at Tudun Saibu in Soba LGA Kaduna State, Nigeria during the 2017wet season to create awareness and compare the profitability of improved Striga-maize tolerant variety Acr. 97 TZL Comp. 1-W strip cropped with soybeans (TGX 1448-2E) as a trap crop and farmers' variety planted sole to control or manage striga. A group of fifty-seven farmers were purposively selected as maize farmers group.The demonstrations were conducted on two farmers' plots infested with Striga. The two plots were planted side by side (experimental and control plots) for farmers themselves to compare. Simple descriptive statistics and Gross margin were employed. The results indicated that improved maize Striga- tolerant variety, strip- cropped with soybeans significantly produced higher yield of 18.90kg and high profit, the farmer's variety was 7.52kg. Based on this study it was concluded that strip cropping of soybean with Striga- tolerant maize variety assisted in managing and controllingstriga which resulted in increase in yield, and profit. The study recommended the use of soybean as a trap crop for control of Striga, the use of Striga- tolerant maize variety, Acr. 97 TZL Comp. 1-W for control of *Striga.*

Key Words: Demonstration, Create awareness, and Striga tolerant

INTRODUCTION

Maize *(Zea mays* L) is a cereal of the grass sub-family *Pannicoideae,* and family *Poaceae. which*is an important grain crop of the world used as an animal feed supplement for silage making, human consumption while the straw for bedding. It has values such as provision of a high dry matter, starch and fibre in the diet (Acquaah, 2005). Maize (*Zea mays* L.) is the world's highest supplier of calorie with caloric supply of about 19.5%. It provides more calorie than rice (16.5%) and wheat (15.0%). Maize is one of the most important staple foods in the world today; maize, rice and wheat combine to supply more than 50% of global caloric intake (World Atlas, 2017). Maize is the most important staple food in Nigeria and it has grown to be local 'cash crop' most especially in the southwestern part of Nigeria where at least 30% of the crop land has been devoted to small-scale maize production under various cropping systems. It is the third most important cereal after sorghum and millet (Juma, 2010). It has been recognized to be one of the longest ever cultivated food crops. Maize is also grown in several regions of the world and is referred to as the world best adapted crop (IITA, 2008). In Nigeria, the demand for maize is increasing at a faster rate daily (Sadiq*et al.,* 2013).

The availability of high yielding maize varieties has further attracted more producers and increased production of the crop in the country. Maize production in Nigeria stood at 10.7 million metric tons in 2015 (FAO, 2017) and 10.5 million metric tons in 2017 (Mundi Index, 2018). Unfortunately, increased production has been constrained by factors such as drought, Downey mildew, Maize Streak Virus and most of all is Striga spp. infestation which hinders maize production and decreases its yield. *Hermonthica* reduces the yield of maize by 80 - 100% up when infection occurs at an early growth stage (Kim *et* a/., 1988; Lagoke *et al.,* 1994).

This study is expected to provide valuable information and training on improved *Striga* management practice.

The broad objective of this study was to examine the profitability of Striga maize tolerant variety with local variety. The specific objectives were to:

i. create awareness on the improved Striga tolerant maize variety strip- cropped with soybeans controlling Striga.
ii. compare the profitability of improved maize Striga tolerant variety with local variety.

METHODOLOGY

The maize variety, ACR 97TZL Comp. 1-W, is an improved open pollinated and *Striga*-tolerant variety which has been released by the Institute for Agricultural Research, Ahmadu Bello University Zaria (IAR/ABU). It is moderately tall

in height and late maturing variety. The demonstrations were conducted on two farm lands infested with *Striga* and were established in June 2014. A Simple Paired Plot Design (SPPD) were placed side by side with normal agronomic practices in the same field as a way for farmers themselves to compare. Each plot measures 50m length and 25m width i.e., 25x50m. Treatment include a strip cropped of Soybeans TGX- 1448-2E identified as a potential trap crop with maize *Striga*tolerant variety, ACR 97TZL Comp. 1 -W, compare with farmers local maize variety planted sole. The land was ploughed, harrowed and ridged 75cm apart. Maize was sown at an inter row spacing of 25cm between stands, which occupies two ridges, and Soybeans was drilled to one ridge i.e. in strip, maize occupied two (2) ridges and Soybeans one (1) ridge spread all over the first plot. All the agronomic practices were carried out at the same time the same method. The two plots were hoe-weeded at three weeks after sowing (3 WAS) and five weeks after sowing (5 WAS) and earthed up at *8* weeks after sowing (8 WAS) followed with hand pulling of other weeds except *Striga.* Fertiliser was applied to the maize at the recommended rate of 120KgN/ha and $60KgP_20_5$ and $60KgK_20$ using 20:10:10 compound fertiliser and Urea. The nitrogen was split applied at six weeks after sowing. The strip cropped Soybeans received a basal $50KgP_20_5$ using single superphosphate (SSP 18% P_20_5). Primary data were collected from the field observations of *Striga*parameter which include *Striga*shoot, stand count at harvest, and yield components of maize and Soybeans. Simple descriptive statistics was used for objective one while gross margin was employed for objective two respectively.

RESULTS AND DISCUSSION

Table 1 shows that before the creation of awareness among farmers in the area none of the farmers has any knowledge about improved Striga maize tolerant variety. Demonstration plots were established to create farmers awareness in the study area. The rate of awareness of improved maize Striga tolerant variety (Acr. 97TZL Comp. 1-W) among the farmers was 100%.

Table 1: Distribution of participants according to Awareness

Participants	Frequency	Percentage
Number aware	0	0.0
Number not aware	57	100
Total	57	100

Costs and benefit return analysis

Table 2 shows the costs incurred for the production of both improved maize variety plus soyabeans and the local maize variety. Although there is little difference in the total cost of expenditure of the two varieties which is N2,400, but still there is wider gap in terms of the yield obtained and the total income generated. The income generated from the improved variety plus soyabeans is (19,600) while the local variety gave a negative return of N3,750.

Table 2: Estimates of costs and returns of improved maize variety and local maize variety

Variables Inputs	Costs incurred Production of improved Maize + Soybeans Value (N)	Cost incurred on Local Variety Value(N)
Seed	1,200.00	700
Fertilisers	6,500.00	2,000.00
Harrowing	2,000.00	1,200.00
Ridging	1,200.00	1,200.00
Planting	1,500.00	1,500.00
Fertiliser application	1,200.00	1,200.00
Weeding	3,000.00	3,000.00
Earthen –up	1,200.00	1,200.00
Harvesting	1,000.00	1,000.00
Threshing	900	900
Transportation	450	450

TVC	20,150.00	17,750
Average yield of maize	**1,050kg**	**400kg**

Unit price of maize/100kg = N3,500
Unit price of soyabean/100kg = N5,000
G.1 for Improved Variety = 39,750 at 0.13ha 25 x 50m
G.1 for Local Variety = N14,000 at 0.13ha 25 x 50m\
T.V.C for Improved Variety = N20,150 at 0.13ha 25 x 50m
T.V.C for local variety = N17,750 at 0.13ha 25 x 50m
:. GM = G1 – T.V.C.
For I.V = 39,750-20,150 = N19,600.00
For LV = 14,00-17,750 = -N3,750
Where: GM = Gross Margin
TVC = Total Variable Cost
GI = Gross Income
IV = Improved Variety
LV = Local Variety

CONCLUSION

This study reveals that strip cropping of soybeans with Striga tolerant maize variety assisted in controlling Strigahermonthica, which resulted in increase in yield and profit, and it could lead to improvement in standard of living of the farmers.

RECOMMENDATIONS

Based on the findings of the study the following recommendations are therefore suggested. The use of soyabean as a trap crop for control of Striga.The use of Striga tolerant maize variety, Acr.97 TZL Comp. 1-W for control of *Striga.* The extension staff at all level should be trained to educate the farmers on this technology.

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FACTORS INFLUENCING CONSUMERS' PREFERENCE AND CONSUMPTION PATTERN OF FISH IN LAGOS STATE, NIGERIA

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ABSTRACT

Fish is one of the preferred and cheapest source of animal protein consumed by man. The study assessed factors influencing consumers' preference and consumption of fish in Lagos State. Multistage sampling procedure was used to select 112 respondents for the study. Data were collected on respondents' personal characteristics, types of fishes preferred and the factors influencing their consumption pattern using a structured questionnaire. Frequency counts, mean, percentages and Chi-square were used to analyse the data. Majority (72.3%) of the respondent had tertiary education, 56.3% were single,36.6% were civil servants with mean age and household size of 26.43years and 7persons respectively. The most preferred frozen, fresh and processed fish were Mackerel ($\bar{x}$=1.46), Clarias *spp* ($\bar{x}$ =0.85) and fried fish ($\bar{x}$=1.38) respectively, while the least preferred frozen, fresh and processed were tuna ($\bar{x}$=0.64), Tilapia ($\bar{x}$=0.46) and boiled fish ($\bar{x}$=0.98) respectively. Major factors influencing fish consumption were nutritional value (57.1%), oil level (53.6%), availability of fish species (51.8%) and palatability (50.9%). Chi-square result showed a significant ($p<0.05$) association between marital status and consumer preference (χ^2= 14.941; df= 6). The study concluded that the respondents preferred frozen fish more and nutritional value was major factor considered in consumers' preference of fish. Therefore, more investment should be made in the fish sector for better nutrition and household food security.

Keywords: Fish, factors, consumers' preference, consumption

INTRODUCTION

Agriculture is the bedrock in the economic development of Africa and fish production's contribution to the Nigerian economy is significant in-terms of animal protein supply and nutrient requirements, income, generate employment, rural development and exchange earning potentials (The fish Site, 2007). It is one of the preferred and cheapest source of animal protein containing balanced level of amino acids, vitamin B12, low cholesterol, high poly unsaturated fats, essential minerals and elements (Sarpong *et.al.,* 2005).

Production of fish is approximately 154 million tons per year worldwide and their consumption is 18.5 per capita per year, It contributes 36.6gm per day of net protein utilisation and is still below the recommended requirement by the World Health Organisation (FAO, 2013). World per capita fish consumption revealed a steady increase, from an average of 9.9 kg in the 1960s to 11.5 kg in the 1970s, 12.5 kg in the 1980s, 14.4 kg in the 1990s and reaching 16.4 kg in 2005 (FAO 2008). Fish preferences and consumption are affected by consumers' geographical, social, sensory and non-sensory factors (Pieniak *et al*., 2011; Honkanen *et al*., 2005). In Africa, fish consumption rate remains low with average per capita consumption rate of 9.9kg, while in Nigeria, average production of fish was 800,000 metric tons, while 2.7 metric tons was consumed (Oyinbo and Rewkot, 2013)

Malnutrition is a serious problem in the developing countries and it can be examined in terms of consumption of macro and micronutrients (Abdulai and Aubert, 2004). Insufficient intake of these nutrients hinders healthy development, affects the capacity of the person to perform productive activities and decreases the use of other nutrients (Aromolaran, 2004). Some factors influencing consumption of different types of fish are cost of fish, types of fish preferred, consumers' income, availability and quality of fish, technological equipments used for processing, market structure and environment. The aforementioned challenges lead to assessing factors influencing consumers' preference and consumption pattern of fish in Lagos State, Nigeria. The specific objectives are: 1) identify the personal characteristics of fish consumers, 2) determine the types of fish they prefer to consume, and 3) identify factors influencing the consumption pattern of fish in the study area. The study hypothesized that: 1) there is no significant relationship between selected personal

characteristics of fish consumers and their preference of fish and 2) there is no significant difference between the consumer preferences in urban and rural areas.

METHODOLOGY

Lagos State location is in the low-lying coastal zone of South Western Nigeria. It lies approximately between longitudes 20º 42′E and 30º 42′E and latitudes 60º 22′N and 60º 52′N of the equator. The southern boundary of the state is formed by the 180 km long Atlantic coastline, while its northern and eastern boundaries are shared with Ogun State and the western boundary by Republic of Benin. Lagos state population size is about 6.2% of the national population of 120 million (National Population Commission- NPC, 2006) and it has a widespread set of connections of marine, freshwater, lagoon, rivers, creeks, swamp and estuaries which are 22% out of the total landmass and this gives fishing and related activities an advantage (Lagos Bureau of Statistics, 2013).

A multistage sampling procedure was used for selection of respondents in the study area. Two local government areas were purposively selected based on the predominance of fishing activities in these areas and they were stratified into urban and rural areas (Lagos State Agricultural Development Authority, 2012). Four towns were purposively selected from each selected local Government areas based on their high predominance fishing production and activities. Seven respondents were randomly selected from each town. A total of 112 respondents were randomly sampled from sixteen (16) towns in the local government areas selected.

Table 1: Selected local Government Area and Towns

Local Government Area Selected	Towns Selected
Rural Areas	
Ibeju-Lekki	Iberikodo, Eleko, Ibeju and Osoroko
Epe	Eredo, Ilara, Agbowa and Epe town
Urban Areas	
Ikeja	Ojodu, Seriki-Aro, Ogba and Ikeja town
Eti-Osa	Obalende Sangotedo, Ilado and Ilase

Primary data were used for this study and collected using a well structured and pre-tested questionnaire and interview schedule which were content validated. Household heads were interviewed, however in the absence of household heads, decision makers in-charge of household cooking were interviewed. The data collected for this study were analyzed using descriptive (frequency counts, percentages, mean, standard deviation) and inferential (Chi-square) statistics through IBM SPSS Statistics**.**

RESULTS AND DISCUSSION

Personal characteristics

The mean age and household size of the respondents were 26 years and 7 persons respectively and 56.3% are single. Some of the respondents were single parent, separated couples and some married household heads might have migrated to another location due to the nature of their jobs or physical challenges. This signifies that most of the respondents were youth that are in their active and productive age. Biological, adopted and relative individuals that lived under the same roof for more than ten (10) years can be regarded as household size. Their large house hold size implies that more quantity of fish might be consumed by larger family members. This agreed with Eyo (2002) that fish meal is most ideal for the aged and the growing youth because of the ease of digestibility of its soft tissue. Majority (76.0%) of the respondents were Christians, and 72.3% had tertiary education. High level of education among the respondents will assist them to acquire better knowledge and understand better the nutritional value of fish, thereby leading to increased fish consumption. This support Amao *et al*., (2006) who posited that people who have nutritional knowledge about fish will consume it more than people who are not knowledgeable on the nutritional benefits of consuming fish.

Table 2: Distribution of respondents by personal characteristics

Variables	Frequency	Percentage (%)	Mean
Age			
21 – 30	66	58.9	
31 – 40	23	20.5	**26.43**
41 – 50	11	9.8	
>50years	12	10.8	
Total	**112**	**100**	
Education			
No formal Education	2	1.8	
Primary	5	4.5	
Secondary	24	21.4	
Tertiary	81	72.3	
Total	**112**	**100**	
Gender			
Male	56	50	
Female	56	50	
Total	**112**	**100.0**	
Marital Status			
Single	63	56.3	
Married	44	39.3	
Divorced	2	1.8	
Widow	3	2.7	
Total	**112**	**100.0**	
Religion			
Christian	75	76.0	
Muslim	35	31.2	
Traditional	2	1.8	
Total	**112**	**100.0**	
Main Occupation			
Civil Services	41	36.6`	
Teaching	23	20.5	
Farming	14	12.5	
Trading	24	21.4	
Student	5	4.5	
Banking	2	1.8	
Total	**112**	**100.0**	
Household size			
1-3	3	2.7	
4-6	101	90.2	**6.54**
>6	8	7.2	
Total	**112**	**100.0**	

Source: Field Survey

Types of Fish Preferred by the Consumers

Types of fish were categorized into frozen, fresh and processed. Mackerel ($\bar{x}$=1.46), Croaker ($\bar{x}$=1.06) and Express ($\bar{x}$=1.01) were the most preferred frozen fishes by the respondents, while tuna ($\bar{x}$=0.64) was the least preferred (Table 3). This may be due to availability and palatability. The finding correlates with Mvodo *et al*., (2018) that most people will prefer frozen mackerel more than any frozen fish. For processed fish, fried ($\bar{x}$=1.38) and dried ($\bar{x}$=1.22) were mostly preferred while boiled fish ($\bar{x}$=0.98) was least preferred. Fried fish is readily available, affordable and more delicious than smoked and boiled fish. It is also

generally believed that it is more palatable, retains more nutrients and improves shelf-life from spoilage. This agrees with the finding of Erkan *et al*., (2010) who posited that high mineral and vitamins were mostly found in fried fish. Clarias *spp* ($\bar{x}$=0.85) and *Ghana obscura* ($\bar{x}$=0.74) were the mostly preferred fresh fish by the consumers while Tilapia ($\bar{x}$=0.46) was the least preferred. Clarias species promotes enrichment in the regular diet and its production generates employment among the people. This agreed with Rosa Rui *et al.,* (2007) and Olaoye *et al.*, (2007) who reported that Clarias *spp* are more easily digestible with high protein, high concentration of iron and beneficial lipids as well as being highly medicinal. This agree with Olaoye *et al.*, (2007) that many people consume Clarias spp more than any fresh fish in Nigeria and this may be due to its tolerant and possess better market value and attain good market size within a short time (Olaoye *et al*.,2007).

Table 3: Distribution of respondents by types of fish preferred

Types of fish	Preferred (Percentage)	Less preferred (Percentage)	Not preferred (Percentage)	Mean	Rank
Frozen					
Mackerel (Titus)	76.8	6.3	17	1.46	1st
Horse Mackerel (Kote)	60.7	13.4	25.9	0.98	4th
Croaker	42.9	12.5	44.7	1.06	2nd
Hake	43.0	20.5	35.8	0.90	5th
Express	43.8	29.5	26.8	1.01	3rd
Sardine	33.0	25.0	42.0	0.71	7th
Heering (Shawa)	35.7	24.1	40.2	0.80	6th
Tuna	22.3	29.5	48.3	0.64	8th
Fresh Fish					
Clarias spp	66.0%	6.3	27.7	0.85	1st
Gymnarchus niloticus	69.6	6.3	24.1	0.72	3rd
Tilapia	67.0	6.3	26.8	0.46	5th
Ghana obscura	67.9	7.1	25.0	0.74	2nd
Heterotis niloticus	37.5	35.7	26.8	0.55	4th
Processed fish					
Dried fish	66.1	13.4	20.6	1.22	2nd
Smoked fish	34.8	37.5	27.7	1.14	3rd
Fried fish	64.3	18.8	17.0	1.38	1st
Boiled fish	22.3	25.0	52.6	0.98	4th

Source: Field Survey

Factors influencing the consumption pattern of fish

The respondents indicated that nutritional value (57.1%), presence of cholesterol (53.6%), and availability of fish species (51.8%) were the common factors influencing the consumption pattern of fish (Table 4). This implies that respondents consume fish because of their high protein contents/nutrients and unique nutritional health benefits. Nutritional value plays an important role in fish consumption, especially among those with higher levels of education. This finding support Brunso *et al*., (2004) who reported that four general motives for fish consumption are nutrition, convenience, taste and process characteristics.

Table 4: Distribution of Factors Influencing Consumption Pattern of Fish

Factors	Frequency	Percentage
Cost	56	50.0
Types of fish species	56	50.0
Consumer income	56	50.0
Nutritional value	64	57.1
Availability of fish species	58	51.8
Palatability	57	50.9
Presence of cholesterol	60	53.6
Time to process and prepare the fish	24	21.4
Fish quality	53	47.3
Hygiene	53	47.3

** Multiple responses. **Source: Field Survey**

The result reveals a significant ($p \leq 0.05$) association between consumers' marital status and consumer preferences ($\chi^2 = 14.941$, df=6), therefore, the null hypothesis is rejected. Marital status is the only variable that is significant, this implies that marital status has high contribution toward consumer preference of fish. This study revealed that preference levels of single individuals have a positive contribution toward fish preference in the future and is essential for having healthier generations. This agrees with the finding of Akegbejo -Samoson (2005) and Onurlubas (2013) who posited that preference for food is influenced by marital status.

Table 5: Relationship between Respondents Personal Characteristics and Preference of Fish

Variables	χ^2	Df	p-value	Decision
Education	6.322	6	0.388	Not significant
Gender	0.176	2	0.916	Not significant
Marital status	14.941	6	0.021	Significant***
Religion	2.964	4	0.564	Not significant
Occupation	10.038	10	0.437	Not significant

Source: Field Survey

χ^2= Chi-square, Df= Degree of freedom, p= Significance level ($p \leq 0.05$)

A significant ($p<0.05$) relationship between fish quality ($\beta=0.321$), types of fish ($\beta= 0.279$) and fish preference, therefore the null hypothesis is rejected (Table 6). The quality of the fish in terms of freshness, taste, preservation and size is highly important to prevent fish deterioration, spoilage and enhance its preference. This agreed with FAO (2010) that fish is highly perishable, which requires good storage facilities to preserve desirable quality, good taste and nutritional value.

Table 6: Relationship between factors and consumer preference

Factors	β	p-value
Cost	0.162	0.147
Type	0.279	0.011*
Income	-0.167	0.144
Nutritional value	-0.047	0.637
Availability of fish Species	-0.194	0.121
Time to process and prepare the fish	-0.052	0.616
Fish quality	0.321	0.009*
Packing	-0.047	0.712

Source: Field survey. *Significant at 0.05

CONCLUSION AND RECOMMENDATIONS

The study concluded that the nutritional value of fish was a major factor influencing consumers' consumption of fish. Fish quality and types of fish are significant factors influencing consumer preference of fish. It was therefore recommended that fish producers should ensure to produce quality fish in order to meet consumer preference.

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CONSTRAINTS ON FISH PREFERENCE AND CONSUMPTION PATTERN IN LAGOS STATE, NIGERIA

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ABSTRACT
Fish is one of the main key ingredients on global menu consumed by rich and poor people. This study examined constraints associated with fish preference and consumption pattern in Lagos State, Nigeria. Multistage sampling procedure was used to select 112 respondents for the study. Data were collected on types of fish preferred, respondents' income, constraints and forms of fish consumed using a structured questionnaire. Frequency counts, percentage, mean and Pearson Product Moment Correlation (PPMC) were used to analyse the data. Result revealed that the most preferred frozen, fresh and processed fish were Mackerel ($\bar{x}$=1.46), Clarias *spp* ($\bar{x}$ =0.85) and fried fish ($\bar{x}$=1.38) respectively. Most of respondents' income (30.4%) fell between #10,001 and #20,000. Inadequate power supply ($\bar{x}$ =1.69), high cost of fish ($\bar{x}$=1.58), and poor income ($\bar{x}$=1.56) were some of the constraints that affected fish consumption in the study area. The most consumed frozen processed and fresh fish were Mackerel (94.5%), fried fish (74.9%) and *Gymnarchus niloticus* (37.8%) respectively. Result of PPMC showed that relationship exists between consumers' income level (χ^2 = 0.008, r=0.398, p≤ 0.05) and consumption of fish. Also, there exists a difference (p≤ 0.05) in the consumption pattern of fish between rural and urban consumers (t= -2.109, df= 109, P= 0.037). The study concluded that consumers' income level and access to power supply posed great challenge to consumption and preference for fish in the study area. Government should intensify effort in providing stable power supply.
Keywords: Fish, constraints, preference, consumption

INTRODUCTION
Nigeria is the largest producer of fish in Sub-Saharan Africa and contributes to alleviating poverty, improving food and nutrition security, gives livelihood opportunities for women, youth, adults in fish production value chain, relatively cheaper and readily available (World fish, 2018; Akinbode and Dipeolu,2012). Consumption of fish has increased worldwide in the last decade which promotes better economic growth in many parts of the developing world (*Herrero et al.* 2013).

Nigeria has per capita consumption rates well below world averages and those rates are declining, Nigeria consumed 5 to 8 kilograms per capita per year. However, per capita fish consumption between 2003 and 2004 was 7.3% per kg per year as compared to the recommended rate of 12.0% per kg per year (Ann *et al.,* 2013; Adeogun*et al.,* 2008). Despite the nutritional and health benefits, fish consumption is low in some states in Nigeria, compared to beef due to some constraints identified as non-availability of fish, distribution difficulty, poor quality of fish, high price, poor processing and storage methods among others (Tsado*et al.,*2012). Most urban low income house-holds in Nigeria are also plagued with inadequate animal protein intake due to lack of financial resources, low profit and high price of fish (Obayelu *et al.,* 2009).

The general objective of the study is to access constraints on fish preference and consumption in Lagos State. The specific objectives are to: (i) ascertain the income level of the consumers**,** (ii) identify the pattern of fish consumption (iii) identify constraints faced by fish consumers.

Hypotheses of the study are;

H_o1: There is no significant relationship between consumers' income level and consumption of fish and

H_o2: There is no significant difference in consumption pattern of fish between rural and urban dwellers.

METHODOLOGY
The study was conducted in Lagos State located in the low-lying coastal zone of South Western and lies approximately between longitudes 20º 42′E and 30º 42′E and latitudes 60º 22′N and 60º 52′N of the equator. The southern boundary of the state is formed by the 180 km long Atlantic coastline, while its northern and eastern boundaries

are shared with Ogun State, western boundary by Republic of Benin. This inhabit size is about 6.2% of the national population of 120 million (National Population Commission- NPC, 2006). Lagoon and waterways occupy 2.17% of the 357,700 hectares area and small and large-scale fisheries are common in many coastal areas of the state including Ibeju-Lekki and Epe (Oluwatayo and Adedeji 2019).

A multistage sampling procedure was used for the selection of the respondents from four (Ikeja, Eti-osa, Ibeju-Lekki and Epe) purposively selected Local Government Areas due to their high predominance of fishing activities and stratified into urban and rural areas (Lagos State Agricultural Development Authority, 2012). Four communities were purposively selected from each selected local Government areas based on their predominance fishing production and activities. A total of 112 respondents were randomly sampled from sixteen (16) communities in the local government areas selected. A structured questionnaire was used to elicit information from the respondents after it was content and faced validated. Data were analyzed using frequency counts, percentages, mean, standard deviation, chi-square and t- test through IBM SPSS statistics.

Monthly income was measured at ordinal level, consumer constraints were measured at nominal level and fish consumption pattern was measured at ordinal level

RESULTS AND DISCUSSION

Respondents' monthly income

Half (50.9%) of the respondents earned between ₦10,001 and ₦30,000 per month while 24.1% earned below ₦10,000.00 monthly (Table 1). This implies that most of the respondents are low income earners. However, they can still afford to purchase fish because it is available and can still be affordable to purchase than other animal protein sources. Ultimately increasing fish consumption. This study agreed with Adeyemi (2005) that fish consumption is a function of income.

Table 1: Distribution of respondents' monthly income (n= 112)

Income per month (₦)	Frequency	Percentage (%)
Below 10,000	27	24.1
10,001 – 20,000	34	30.4
20,001 – 30,000	23	20.5
30,001 – 40,000	11	9.8
40,001 – 50,000	9	8.0
50,001 – 60,000	5	4.5
Above 60,000	3	2.7

Source: Field survey

Constraints affecting consumers' preference and consumption of fish

Inadequate power supply (68.8%) and high cost of fish (67.9%) were the major constraints identified by the respondents as influencing their preference and consumption of fish (Table 2). This implies that stable power supply would reduce deterioration of fresh and frozen fish. Cost of fish determine the quantity of fish that can be bought, if the price of fish is low, then more fishes can be purchased leading to more consumption of fish. This result corroborates with the finding of Sunil *et al.*, (2008) that the major problems in fish consumption were irregular supply, high cost of fish and consumers poor income.

Table 2: Distribution of respondents by constraints affecting consumers' preference and consumption of fish (n= 112)

Constraints	Frequency	Percentage	Mode	Rank
Poor income	62	55.4	1.56	4th
High cost of fish	76	67.9	1.58	2nd
Limited choice of fish desired	66	58.9	1.32	3rd
Spoilage of fish due to inadequate of power supply	77	68.8	1.69	1st
Long time required to process and prepare for consumption	44	39.3	1.39	7th
Poor hygiene	57	50.9	1.51	5th
Inadequate level of nutritional value of fish	48	42.9	1.43	6th

***Multiple responses. Source: Field survey

Consumption pattern of fish

Majority (94.5%) of the respondents consumed frozen fish (Mackerel), 56.7% consumed processed fish (fried fish) and 50.4% consumed fresh fish (*Claria spp)* thrice in a day (Table 3). Mackerel fish is more palatable, highly nutritious and contain essential mineral for healthy growth. Sarpong *et al. (*2005) agreed that fish is the cheapest animal protein source containing balanced level of amino acids, vitamin B12, low cholesterol, high poly unsaturated fats, essential minerals and elements. Fried fish is a good preserved fish that prevents spoilage, elongates the shelf life and retain the nutritional value, which is good for both the young and old. This result corroborates Adel *et al.,* 2019 that fried fish is very digestible and aid health benefits of fish consumers. *Clarias* species are more cultured, available and consumed more than any other fresh fish species. This finding agreed with Olaoye *et al.* (2007) that *Clarias sp.* have higher consumption pattern among fresh fish.

Table 3: Consumption pattern of fish

Fish Categories	Never	Once per week	Twice per week	Thrice per week	Four times per week	Five times per week	Six times per week	Once per day	Twice per day	Thrice per day
Mackerel										
Frequency	10	32	8	10	10	7	12	12	6	5
Rate (%)	8.9	28.6	7.1	8.9	8.9	6.3	10.7	10.7	5.4	4.5
Total (%)	8.9	28.6	`14.2	26.7	35.6	31.5	64.2	74.9	75.6	94.5
Heering										
Frequency	43	23	17	7	4	3	6	5	2	2
Rate (%)	38.4	20.5	15.2	6.3	3.6	2.7	5.4	4.5	1.8	1.8
Total (%)	38.4	20.5	34.4	18.9	14.4	12.5	32.4	31.5	25.2	37.8
Horse Mackerel										
Frequency	39	26	16	12	5	6	4	1	3	0
Rate (%)	34.8	23.2	14.3	10.7	4.5	5.4	3.6	0.9	2.7	0.0
Total (%)	34.8	23.2	28.6	32.1	13.5	27.0	21.6	6.3	37.8	0.0
Express										
Frequency	34	26	17	11	3	3	5	0	0	1
Rate (%)	30.4	23.2	15.2	9.8	3.6	2.7	4.5	0.0	0.0	0.9
Total (%)	30.4	23.2	30.4	29.4	14.4	13.5	27.0	0.0	0.0	18.9
Sardine										
Frequency	48	31	6	5	7	4	5	4	1	1
Rate (%)	42.9	27.7	5.4	4.5	6.3	3.6	4.5	3.6	0.9	0.9
Total (%)	42.9	27.7	10.8	13.5	25.2	18.0	27.0	25.2	12.6	18.9

Fish Categories	Never	Once per week	Twice per week	Thrice per week	Four times per week	Five times per week	Six times per week	Once per day	Twice per day	Thrice per day
Tuna										
Frequency	50	31	10	7	6	1	2	2	0	3
Rate (%)	44.6	27.7	8.9	6.3	5.4	0.9	1.8	1.8	0.0	2.7
Total (%)	44.6	27.7	17.8	18.9	21.6	4.5	10.8	12.6	0.0	56.7
Hake										
Frequency	32	37	16	5	8	7	3	1	1	2
Rate (%)	28.6	33.0	14.3	4.5	7.1	6.3	2.7	0.9	0.9	1.8
Total (%)	28.6	33.0	28.6	13.5	28.4	31.5	16.2	6.3	12.6	37.8
Croaker										
Frequency	31	31	15	14	5	5	8	1	1	1
Rate (%)	27.7	27.7	13.4	12.5	4.5	4.5	7.1	0.9	0.9	0.9
Total (%)	27.7	27.7	26.8	37.5	18.0	22.5	42.6	6.3	12.6	18.9
Claria spp										
Frequency	42	36	14	3	6	2	5	0	3	1
Rate (%)	37.5	32.1	12.5	2.7	5.4	1.8	4.5	0.0	2.7	0.9
Total (%)	37.5	32.1	25.0	8.1	21.6	9.0	27.0	0.0	37.8	18.9
Tilapia										
Frequency	48	36	8	3	7	3	2	4	0	1
Rate (%)	42.9	32.1	7.1	2.7	6.3	2.7	1.8	3.6	0.0	0.9
Total (%)	42.9	32.1	14.2	8.1	25.2	13.5	10.8	25.2	0.0	18.9
Gymnarchs nilotics										
Frequency	50	34	10	2	6	3	2	1	2	2
Rate (%)	44.6	30.4	8.9	1.8	5.4	2.7	1.8	0.9	1.8	1.8
Total (%)	44.6	30.4	17.8	5.4	31.6	13.5	10.8	6.3	25.2	37.8
Heterotis niloticus										
Frequency	59	22	10	7	2	4	4	6	1	1
Rate (%)	52.7	19.6	8.9	6.3	1.8	3.6	3.6	5.4	0.9	0.9
Total (%)	52.7	19.6	17.8	18.9	7.2	18.0	18.0	37.8	12.6	18.9
Ghana Obscura										
Frequency	68	24	7	3	7	1	0	1	1	0
Rate (%)	60.7	21.4	6.3	2.7	6.3	0.9	0.0	0.9	0.9	0.0
Total (%)	60.7	21.4	12.6	8.1	25.2	4.5	0.0	6.3	12.6	0.0
Processed fish										
Dried fish										
Frequency	8	44	18	10	9	4	11	4	3	1
Rate (%)	7.1	3.9	16.1	8.9	8.0	3.6	9.8	3.6	2.7	0.9
Total (%)	7.7	39.3	32.2	26.7	32.0	18.0	58.8	25.2	37.8	18.9
Smoked fish										
Frequency	8	40	17	13	10	6+	10	4	2	2
Rate (%)	7.1	35.7	15.2	11.6	8.9	5.4	8.9	3.6	1.8	1.8
Total (%)	7.1	35.7	30.4	34.8	35.6	27.0	53.4	25.2	25.2	37.8
Boiled Fish										
Frequency	24	38	10	10	8	7	6	8	1	0

Fish Categories	Never	Once per week	Twice per week	Thrice per week	Four times per week	Five times per week	Six times per week	Once per day	Twice per day	Thrice per day
Rate (%)	21.4	33.9	8.9	8.9	7.1	6.3	5.4	7.1	0.9	0.0
Total (%)	21.4	33.9	17.8	26.7	28.4	31.5	32.4	49.7	12.6	0.0
Fried fish										
Frequency	7	37	20	6	8	10	6	12	3	3
Rate (%)	6.3	33.0	17.9	5.4	7.1	8.9	5.4	10.7	2.7	2.7
Total (%)	6.3	33.0	35.8	16.2	28.4	44.5	32.4	74.9	37.8	56.7

Source: Field Survey

Hypotheses testing

Hypothesis I: There is no significant relationship between consumers' income level and their consumption**.** A significant ($p<0.05$) relationship exists between consumers' income and consumption of fish ($r = 0.398$); therefore, the null hypothesis is rejected (Table 4). Consumers' income can afford to buy fish which is a good and cheap source of animal protein source among the people. This finding agreed with Adeniyi (2012), who reported that consumer's income is the major function of consumption.

Table 4: Relationship between consumers' income level and their fish consumption

Variables	Value	Df	p-value	Decision
Consumption of fish	18.020	10	0.045*	Significant

Source: Field survey
*Significant at 0.05

Hypothesis Two: There is no significant difference in consumption pattern of fish between rural and urban area. There was a significant ($p<0.05$) difference between the rural and urban areas in their pattern of fish consumption ($t=-2.109$); therefore, the null hypothesis is rejected (Table 5). This could be as a result of usage of alternative power supply like industrial generator, solar and inverter to supply power to preserve or retain fish quality and freshness. Urban dwellers earned higher income and presence of modern and technological methods of fish processing and cold rooms in urban areas are more than the rural areas. This study corroborates the study of Sari (2018) that fish consumption behaviour of the urban family is significantly influenced by household size, marital status, income, infrastructure facilities and presence of modern equipment in the urban areas.

Table 5: T-test Analysis Result showing the Difference between Consumption Patterns of Fish between Rural and Urban Areas

Variables	Number of respondents	Mean	Standard deviation	t-value	Df	p-value	Remark
Rural	56	29.2364	15.17699	-2.109	109	0.037*	Significant
Urban	56	37.1250	23.31372				

Source: Field survey
*Significant at 0.05

CONCLUSION AND RECOMMENDATIONS

The study concluded that consumers' income level and access to power supply posed greatchallenge to consumption and preference for fish in the study area. Government should intensify effort in providing stable power supply by partnering with the private sector.

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FARM LEVEL POVERTY ANALYSIS: IMPACT OF MARKET PARTICIPATION ON MAIZE FARMERS IN KADUNA STATE, NIGERIA

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ABSTRACT

Farmers in the northern geo-political zones of Nigeria have higher incidence of poverty than their southern counterparts. Using data collected from 600 randomly selected maize farmers, and the FGT model, Logit regression and PSM. This paper examined the impact of market participation on poverty status of maize farmers in Kaduna State. Results of FGT decomposition revealed that poverty incidence for the whole sample farmers, market and non-market participants gave a poverty headcount ratio of 0.564, 0.590 and 0.459 respectively. Poverty depth and severity were 40.03% and 26.78% for the pooled maize farmers, 42.12% and 22.18% for maize market participants and 33.61% and 16.89% for the non-market participants. The outcome of the Logit regression analysis established that maize farming years of experience, farm size, non-farm income, farm income per head, amount of credit and market participation at significant levels of 1%, 5%, 1%, 1%, 1% and 10% respectively were the variables affecting maize farmers poverty. The PSM showed that market participation has a positive and robust effect on crop farmers' income by about N3041.08. It is probable that the ability to be a net-seller is what really matters to a farmer succeeding to grow out of poverty since they are susceptible to the seasonality problem of production. Extension officers should encourage farmers to add value to their produce to obtain higher price. The farmers can also organise themselves into groups for aggregation of grains for inventory credit (warrantage). Any government policy aimed at capacity building and improving the standard of living of the rural farmer is of paramount importance.

Keywords: market participants, head count, income.

INTRODUCTION

The proportion of Nigerians living in poverty was about 46% in 2018 (World Poverty Clock, 2018) and 40.1% in 2019 (National Bureau of Statistics (NBS), 2019). Soludo (2012) while making presentation at the stakeholders meeting on the Nigerian economy stated that "Very high levels of poverty is essentially a northern phenomenon". Most of the poor are located in the North-East with a poverty incidence of 71.86%, followed closely by the North-West (poverty incidence of 64.85%) and then the North-Central (poverty incidence of 42.72%) (NBS, 2019). Correspondingly, Ogwumike and Akinnibosun (2013) reported that farmers in the Northern geo-political zones have higher incidence of poverty than their southern counterparts.

Hence, rural poverty will not be substantially reduced by exclusive emphasis on subsistence food crop production; rather, more market-oriented production systems are needed. It is then important to identify and address underlying factors leading to subsistence farming and perpetuation of poverty and vulnerability of rural poor in Kaduna State. It is against this background that the following objectives were formulated to; determine the poverty status of maize farmers, maize market participants and non-participants; determine the factors affecting the poverty status of maize farmers; analyse the impact of market participation on the poverty status of maize farmers.

METHODOLOGY

Primary data were collected in 2016/2017 production season through the administration of structured questionnaires sampled maize farmers in Kaduna State. The State lies between latitudes 90ºN and 12ºN of the equator and between longitudes 6ºE and 9ºE of the prime meridian, occupying 7% of Nigeria's land mass (Kaduna State Government, 2016). Eight (8) Local Government Areas (LGAs), 2 from each agricultural zones of Kaduna State were selected, based on the number of maize farmers in the LGA using Kaduna State Agricultural Development Project (KADP) village listings, 2016. The respondents were proportionally and randomly selected from a registered maize farmers' cooperative society in each of the LGAs resulting in a total of 600 respondents. It is sufficient to note

that 10% of sample frame from each cooperative was randomly selected.

The standard of living of farmers in the study area was measured using the Foster, Greer and Thorbecke (FGT) model a class of additively decomposable poverty measures. This was used to achieve objectives (i). It is given as;

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{a}\left[\left(z - \frac{y}{z}\right)\right]^\alpha \quad . \quad . \quad . \quad .1$$

Where, α = the FGT index and takes the values 0, 1 or 2, n = total number of farmers, q = number of farmers below the poverty line, Z = poverty line, y = annual per capita income (N)

Logit regression model

The Logit regression model measures the effect of changes in the explanatory variables on the probability of being poor. The model is expressed as

$$t_i = t_i^* = X_i\beta + u_i. \quad . \quad . \quad .2$$

$$(t_i = 0 \; if \; t_i^* \leq 0, t_i = 1 \; if \; t_i^* > 0)$$

Where, t_i= observable but censored variable measuring both the probability of being poor or not, t_i^*= latent variable indicating that poverty may or may not be directly observable. Poverty is observed if $t_i^* > 0$ and unobserved if $t_i^* \leq 0$, X_i = set of explanatory variables.

Propensity score matching

The propensity score matching-based nearest neighbour matching is specified as;

$$ATE_1 = \frac{1}{n_T}[\sum_{i\in T} y_{1i} - \sum_{i\in u}\omega_i y_{0i}] \quad . \quad . \quad .3$$

Where, ATE_1=impact of market participation in maize market, NT=number of farmers within the ith maize market, y_{1i}=per capita income of treated farmers(N), y_{0i} = per capita income of untreated farmers(N), ω_i= weight, i = ith farmer.

RESULTS AND DISCUSSION

Poverty status of maize farmers, market participants and non-participants

The poverty line value computed for this study translates to a daily income of ₦315.93, equivalent to $1.90 a day (June 16, 2017) of the IPL set by the World Bank in 2015. In Table 1, the result showed that the mean household income/head/day of maize market participants was ₦2335.12, whereas the non-market participants had a mean income of ₦448.62.

Table 1: Descriptive statistics of income status of the respondents

	Pooled	Non-Participants	Participants
Total	600	122	478
Mean	1951.53	448.62	2335.12
Minimum	0.00	20.11	0.00
Maximum	833571.43	5714.29	833571.43
Std. Deviation	34111.57	723.92	38214.52

In Table 2, the proportion of the market participants and non-participants whose per capita income fell below the poverty line was 59% and 45.9% correspondingly, while about 56% of the pooled maize farmers fall below the poverty line. Conversely, more than half (about 56%) of the maize farmers and the maize market participants (59%) were poor in terms of functioning and basic capability. These findings are in agreement with the findings of Amao *et al.* (2011).

Table 2: Distribution of the poverty status of the respondents

Poverty Class	Non-Participants		Participants		Pooled	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Core poor	49	40.2	240	50.2	289	48.2
Poor	7	5.7	42	8.8	49	8.2
Non-poor	24	19.7	60	12.6	84	14.0
Wealth Class	42	34.4	136	28.5	178	29.7
Total	122	100.0	478	100.0	600	100.0

In Table 3, about 56% of the total sample maize farmers spend less than what they will need to meet the minimum living standard requirements. The result is not in line with the findings of Oyinbo

and Olaleye (2016). Poverty gap (depth) indicates that the farmers need about 37% of the poverty line to break away from the poverty group while Poverty severity was 0.243.

Table 3: Poverty measures of maize farmers, market participants and non-market participants

Variable	P_0	P_1	P_2	N
Maize farmers	0.564^{NS}	0.372	0.243	600
Market participants	0.589^{NS}	0.392	0.259	478
Non-market participants	0.459***	0.299	0.195	122

P_0 is the headcount index, P_1 is the poverty gap index, P_2 is the squared poverty gap; *** significant at 1%, ^{NS} not significant

About 59.0% of the market participant live below the stated poverty line (Table 4). Poverty gap and the degree of inequality of maize market participants were 0.392 and 0.259 respectively. Thus, the poverty inequality among the market participants is an indication of how farmers participate in markets either as sellers or buyers. Further, the poverty incidences (P_0) for the non-market participants was significantly different from the whole group at 1%. In Table 5, poverty rate, poverty index and the severity of poverty were significantly different from those that participated in the market and those that did not. The differences were significant at 5% level of probability.

Table 5: Difference in poverty profile of maize farmers

Characteristics	Market participants	Non-market participants	Test of difference
Poverty incidence	0.589	0.459	-2.246**
Poverty gap	0.459	0.299	2.290**
Poverty severity	0.259	0.195	2.222**

Determinants of poverty of maize farmers

The result presented in Table 6 shows that Chi-square statistic is significant at 1% level of probability, which means that the model is a good fit. Maize farming years of experience (0.0098), non-farm income (1.43E-07), farm income per head (0.0004), amount of credit were statistically significant at 1% with a positive relationship with the probability of being poor. While farm size and market participation were statistically significant at 1% and 5% and negatively related with the probability of being poor. This shows that those that participate in market have a higher chance of getting out of poverty than those who did not participate. This is line with the reports of (Persson, 2009).

Table 6: Maximum likelihood estimates of Logit model for factors determining the poverty status of the respondents

Variables	Parameter	Coefficient	Standard error	t-value
Constant	β_0	0.2986	0.18999	1.57
Age (years)	β_1	0.0003	0.00317	0.1
Level of education (years)	β_2	0.0042	0.00594	0.7
Maize farming exp.(years)	β_3	0.0098	0.00283	3.45***
Maize farming members(number)	β_4	-0.0005	0.00484	-0.1
Farm size (ha)	β_5	-0.0261	0.01260	-2.07**
Land tenurial system (dummy)	β_6	-0.0505	0.03786	-1.33
Non-farm income (₦)	β_7	1.43E-07	3.71E-08	3.85***
Farm income per head (₦)	β_8	0.0004	6.92E-05	5.87***
Distance to market (km)	β_9	-0.0052	0.00447	-1.17
Transaction costs (₦)	β_{10}	4.46E-06	3.25E-06	1.37
Amount of credit (₦)	β_{11}	8.21E-07	2.69E-07	3.05***
Market participation (dummy)	β_{12}	-0.1359	0.07431	-1.83*
Chi-square	109.18			

Log Likelihood Function	-555.53

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

Impact of maize market participation on poverty level

Accordingly, in Table 7, the propensity scores matching results indicated that market participation has a positive and robust effect on crop farmers' income and a way out of poverty more than the non-participants by about N3041.08.

Table 7: Average treatment effect (ATE) of participation in maize market on poverty level of maize farmers

Matching algorithm	Number of treated	Number of controls	ATT	Std.Error	t-value
NNM	443	157	3041.084	180.039	16.891*

CONCLUSION AND RECOMMENDATION

More than half of the maize farmers and market participants lived below the poverty line (poor). It is probable that the ability to be a net-seller is what really matters to a farmer succeeding to grow out of poverty since they are susceptible to the seasonality problem of production. Extension officers should encourage farmers to add value to their produce to obtain higher price. The farmers can also organise themselves into groups for aggregation of grains for inventory credit (warrantage). The maize farmers are further advised to combine maize farming with other non-farm activities especially during off-season. This suggests also that any policy aimed at capacity building and improving the standard of living of the rural farmer is of paramount importance.

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ADOPTION OF CLIMATE SMART TECHNOLOGY AMONG MAIZE FARMERS IN KWARA STATE, NIGERIA: THE ROLE OF KNOWLEDGE EXCHANGE

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ABSTRACT

This study was designed to understand how farmers' knowledge exchange influenced the adoption of Climate Smart Agricultural (CSA) practices among maize farmers in Kwara State, Nigeria. A three-stage sampling procedure was used to select three hundred and ninety-one respondents for the study. Data were collected through interview schedule and analyzed using both descriptive and inferential statistics such as Frequency, Percentage, Mean, Standard Deviation and Pearson Product Moment Correlation. Findings of the study revealed that the mean age of the respondents was 47.2 years, they were mostly males and married with an average household size of 9 persons and 20.6 years of farming experience. Plot neighbors were indicated as the major communication network influencing knowledge exchange among the farmers (62.4%). A reasonable proportion (79.9%) of the respondents had effective knowledge exchange of the technology and majority of them (62.7%) adopted it. Knowledge exchange had positive correlation with adoption of the technology ($r=0.535$, $p=0.001$) at 0.05 level of significance. The study concluded that the farmers have good knowledge exchange and high adoption of CSA technology. The study recommended the need to strengthen farmer-to-farmer extension since it could bridge the gaps in technology transfer and promote adoption of agricultural technologies.

Keywords: Adoption, Climate Smart Technology, Maize Farmers, Knowledge Exchange

INTRODUCTION

In Nigeria, maize can be considered as a major food security crop due to the high level of its consumption and the role it plays in the livestock sectors. As a crop, maize is particularly prone to drought caused by climate change. In order to provide succor to farmers cultivating in drought prone areas, efforts are being made by scientist to provide farmers with adaptation technologies. One of such efforts yielded the development and dissemination of some improved varieties of maize and recommended climate smart practices for optimum performance of the varieties.

For farmers to benefit from and adopt any new technology, and put them to use, they must have adequate knowledge of the innovations. Accessibility of knowledge sources, its affordability and the trust worthiness does not only contribute to the flow of agricultural knowledge but also promote adoption of innovations (Olabanji and Ogunlade, 2020). Adoption research over the years has mainly considered the individual farmer as the basis of analysis, whereas the effect of communication networks on farmer's decision-making has received inadequate attention. Since some adoption of agricultural technologies is through social learning (Foster and Rosenzweig, 2010), it is important to understand the role of knowledge exchange in farmers' use of innovations. Hence, the study sought to analyse farmers' knowledge exchange and adoption of climate smart practices among maize farmers in Kwara State. The objectives of the study were to; examine the quality of knowledge exchange on climate smart practices in maize production among the farmers; identify the major communication network influencing the knowledge exchange; and assess the level of adoption of the innovation.

METHODOLOGY

The study was carried out in Kwara State, Nigeria where Drought Tolerant Maize (DTMA) technologies were being promoted by various research organisations especially the International Institute for Tropical Agriculture (IITA). A three-stage sampling technique was used to select respondents for the study. In the first stage, two ADP zones (C and D) were purposively selected from the four (4) zones in the state due to the presence of communities where DTMA on-farm trials were conducted. The second stage involved the random selection of 16 communities within the selected zones. Lastly, a probability proportionate sample to size method was used to select twenty percent of the plot managers in each household from a list of farming households compiled through the assistance of the community representatives. Thus, the sample size comprised 391 respondents. Three hundred and ninety-one interview schedules were administered on the field but only 387 were

fit for analysis after data cleaning was carried out. A validated Knowledge Exchange Assessment Scale was used to measure knowledge exchange among the farmers. Individual knowledge exchange score was computed categorized into: Very Effective, Effective, Less Effective and Not Effective knowledge exchange based on scores ranging from 70-100%; 60-69%; 50-59%; and less than 50% respectively. Descriptive statistics was used in to analyse the data collected. Pearson Product Moment Correlation (PPMC) was used to test the hypothesis at 0.05 level of significance.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows that more than two-third of the respondents (78%) were male while 85 (22%) were female revealing the dominance of male gender in farming activities in the study area. This could be attributed to the tediousness attached to farming. Averagely, the respondents were aged 47.6 years. Most of the respondents (85.3%) were married and 81.9% had between primary to tertiary education. According to Esturk and Oren (2014), the more the education of a farmer, the easier it is to process new knowledge. The mean years of farming experience and household size was 20.9 years and 9 persons respectively. The average farm size was 3.8 hectares. Implying that majority of the farmers were small-scale farmers. More than half of the farmers (63.7%) were members of a social organisation. Membership of an association is assumed to assist farmers to have more access to information.

Table 1: Distribution of the respondents based on their socioeconomic characteristics

Variables	Frequency (N=387)	Percentages (%)	Mean
Sex			
Male	302	78.0	
Female	85	22.0	
Age			
Less than 30	62	16.0	
41-60	271	70.0	47.6 years
61 and above	54	14.0	
Marital Status			
Single	36	9.3	
Married	339	87.7	
Widowed	12	3.1	
Educational attainment			
No formal education	70	18.1	
Primary School Education	266	68.7	
Secondary School education	45	11.6	
Above Secondary School	06	1.6	
Years of Farming Experience			
Less than 10	57	14.7	
10-19	134	34.6	
20-29	121	31.3	
30 and above	75	19.4	
Size of Household			
Less than 5	21	5.4	
5-10	199	51.4	9 persons
11 and above	167	43.2	
Size of Farmland			
1-5ha	174	45.0	
6-10ha	201	51.9	3.8 ha
Above 10ha	12	3.1	
Group Membership			
Yes	334	86.3	

Variables	Frequency (N=387)	Percentages (%)	Mean
No	53	13.7	

Source: Field survey, 2019

Knowledge exchange among farmers

The result on Table 2 indicated that only 20.1% of the respondents had non effective knowledge exchange on the climate smart practices in maize production. This implied that the farmers have good to excellent interpersonal communication skills. Pratiwi and Suzuki (2017) reported that farmers easily share their experiences with each other hence improving their production.

Table 2: Distribution of the farmers based on the quality of Knowledge exchange on DTMA

Quality of knowledge Exchange on DTMA	Frequency	Percentages (%)
Very Effective knowledge exchange (70-100%)	91	28.1
Effective knowledge exchange (60-69%)	117	36.1
Less Effective knowledge exchange (50-59%)	51	15.7
Not Effective knowledge exchange (0-49%)	65	20.1

Source: Computed from field data, 2019

Major knowledge exchange channels existing among the farmers

Data on table 3 indicated that plot neighbour was the channel through which most of the farmers had exchange of knowledge. This may be because DTMA is an innovation that requires on the field assessments. The more farmers see the innovation on fellow farmers' farm, the more the tendencies of making enquiry.

Table 3: Percentage distribution of the farmers based on their channels of knowledge exchange

Knowledge Channels	Frequency	Percentages (%)
Residential Neighbour	45	13.9
Plot Neighbour	114	35.2
Extension Agents/Researchers	53	16.4
Group Contact	28	8.6
Agro-input Dealers	57	17.6
Family and Friends	27	8.3

Source: field survey, 2019

Level of adoption of the technology

The results on Table 4 revealed that most of the farmers (62.7%) adopted the use of improved maize variety (DTMA) and the associated practices. This implied that the technology is gaining popularity among the farmers. Adoption of improved practices by a farmer is necessarily based on his capacity knowledge into practice.

Table 4: Categorisation of the respondents based on their level of adoption of the practices

Level of knowledge on Agriculture	Frequency	Percentages (%)
Low adopters (up to 33%)	51	15.7
Moderate adopters (34-66%)	70	21.6
High adopters (67-100%)	203	62.7

Source: Computed from field data, 2019

Correlation analysis for knowledge exchange and adoption of climate smart practices in maize farming revealed that knowledge exchange on the technology have a significant relationship with its adoption. This is indicated from the correlation value of 0.535 and p value of 0.000 (<0.05). From this finding, it can be concluded that in order for farmers to adopt the

technology, all factors related to knowledge exchange are very crucial.

Table 5: Correlation between Knowledge Exchange and Adoption of maize climate smart practices

		Knowledge Exchange	Adoption
Knowledge Exchange	Pearson Correlation	1	0.535**
	Sig. (2-tailed)		0.000
	N	324	324
Adoption	Pearson Correlation	0.535**	1
	Sig. (2-tailed)	0.000	
	N	324	324

Source: Field Survey, 2019

**Correlation is significant at the 0.05 level of significance (2-tailed)

CONCLUSION AND RECOMMENDATION

Effective agricultural knowledge exchange is important for increased access to agricultural knowledge and adoption. It was recommended that extension service providers should explore more of farmers-to-farmers extension in dissemination of technologies for wider coverage.

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ROLE OF SOCIAL MEDIA IN DISSEMINATION OF AGRICULTURAL INFORMATION AMONG FARMERS IN OYO CENTRAL SENATORIAL DISTRICTS OF OYO STATE, NIGERIA

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ABSTRACT
Social media plays an important role in transiting information to large number of audiences simultaneously. As Agriculture system become more complex, farmers' access to reliable, timely and relevant information sources become more critical to their competitiveness. This study therefore examined the role of social media in dissemination of Agricultural information among farmers in Oyo state. Multi-stage sampling procedure was used to select 120 respondents. Primary data was used for the study using multistage sampling procedure to select 120 respondents out of which only 111 questionnaires were retrieved. The analytical tools employed were descriptive statistics such as mean, charts, and frequency counts. The findings of the study revealed that the mean age of respondents and farm size of the respondents were 27.7years and 17.6 hectares. WhatsApp (68.5%) and mobile text messages (61.2%) were the most preferred tools for dissemination of agricultural information. Provision of solution to agricultural problems (278.4) and increased production quantity and quality (254.6) were identified by the respondents as the major contributions of social media tools in the dissemination of agricultural information. The study recommends the establishment of information centres, where farmers could access online agricultural information that can complement extension services most especially in areas where there are geographically dispersed groups and where extension officers cannot effectively reach all farmers due to various factors.
Keywords: Social Media, Dissemination, Agricultural Information

INTRODUCTION

Agricultural sector has been described as the most important sector of the Nigerian economy which holds a lot of potentials for the future economic development of the nation as it had done in the past. However, the Nigerian agricultural sector is recently characterized by inefficiencies. Repositioning the collapsing Nigerian agricultural sector therefore requires the application of viable innovations especially in the dissemination of available agricultural technologies (Izuchukwu, 2015). The introduction of the internet and online services has introduced new methods of carrying out many activities which can be described as "e-computing" (Adeyemo, 2013). The basic information needs of farmers are information on crops, production techniques, production equipment and agricultural inputs, market information and weather forecast among others (Milovanović, 2014). Social media tools include social networking sites (Facebook, LinkedIn *etc*.), video and photo sharing websites (YouTube, Pinterest, *etc*.), blogs and microblogs (Twitter, Instagram, *etc*.), video and podcasts (Skype, *etc*.), socially integrated mobile text messaging (Line, WhatsApp, Viber, *etc*.) and many more.

The introduction of social media has opened up a platform that agricultural extension officer's, farmers, agricultural institutions and non-governmental institutions utilise to disseminate and exchange agricultural information. Access to internet-capable cell phones enables people to employ social media tools to connect with others who share their interests, experiences, and circumstances (Kipkurgat, Onyiego Chemwaina, 2016).

The agriculture sector in developing countries is becoming increasingly knowledge intensive and researchers at the global, regional, and national levels continue to generate new information but due to various factors, extension services are not readily available to all farmers. However not all institutions have fully embraced social media as a tool for disseminating information or sharing research outputs and the relevance of using social media as an information source for professional application has been overlooked. This is primarily due to lack of experience and hesitation on the part of extension educators, which has resulted in a low acceptance of social media use in agricultural extension by administration, peers, and clients (Newbury, Humphrey and Fuess, 2014). It is against this backdrop that this study assessed the role of social media dissemination of agricultural information among farmers in Oyo state.

The objectives below guided the study:

1. to examine respondents' preferred social media for information dissemination
2. to find out respondents' information needs sought from the internet with the use of social media
3. to ascertain the extent at which respondents derived benefits from the use of social media in utilising agricultural information
4. to examine respondents' perceived constraints in accessing agricultural information from social media

METHODOLOGY

This study was carried out in Oyo state. Multi-stage random sampling procedure was employed to select respondents for the study. The first stage involved a random selection of 40% of the local government in Oyo Central senatorial district to give a total of four local governments, namely: Oyo East, Oyo West, Atiba and Afijio local Government respectively. The second stage involved a random sampling of two villages from each local government to give a total of eight villages. Thereafter, fifteen farmers with handsets were purposively selected from each of the selected villages to give a total of 120 respondents for the study. However, 111 questionnaires were retrieved and used for analysis of this study.

Data were obtained using interview schedule based on the objectives of the study (farmers preferred social media, information needs sought for with the use of social media, respondents' benefits derived and constraints faced to the use of social media in utilising agricultural information). A list of 9 social media sources were provided with dichotomous response option of "yes" and "no". "Yes" option was assigned 1 score, while "No" was assigned a score of 0. Likewise, a list of 9 perceived information needs of farmers were provided with response option of "preferred" and "and not preferred", with scores of 1 and 0 assigned respectively. Respondents were asked to state the extent to which they derive benefits from social media via the following options; to a large extent; to a lesser extent; not at all, with scores of 3, 2, 1 and 0 assigned respectively. Constraints to the use of social media to utilise agricultural information was measured by providing respondents with seven factors that could hinder respondents from accessing agricultural information on social media via the following options; to a large extent; to a lesser extent; not at all, with scores of 3, 2, 1 and 0 assigned respectively. Finally, respondents' socioeconomic characteristics were measured at intervals, nominal and ordinal level of measurement as the case may be.

RESULTS AND DISCUSSION

Farmers' preferred social media for information dissemination

The result in Table 3 shows that WhatsApp (68.5%) was ranked highest as the most preferred social media tool to access agricultural information, followed by mobile text messages (61.2%) and Facebook (58.6%). As such, it can be deduced that WhatsApp was the most preferred social media platform among farmers in the study area. This result is in line with the findings of Mbugua, Matofari and Ngigi (2010) who state that farmer's preference in information dissemination pathways and media is important in determining adoption of technologies and productivity.

Table 3 Distribution of respondents according to their preferred channels for information dissemination

Channels	Preferred	Not Preferred	Rank
Facebook	58.6	41.4	3rd
WhatsApp	61.3	38.7	1st
Instagram	35.1	64.9	5th
Twitter	23.4	76.6	9th
Hangout	24.3	76.6	8th
Telegram	27.9	72.1	7th
LinkedIn	33.3	66.7	6th
YouTube	41.4	58.6	4th
Mobile text messages	68.5	31.5	2nd

Agricultural information needs sought by farmers on social media

Table 4 shows that 99.1% of farmers engaged social media in accessing agricultural information on seed variety, 97.2% sought for available credit facility source and 90.0% sought market trend, price and stock. The result is in tandem with the findings of Babu *et al*., (2012) who reported that increases in the productivity of smallholder agriculture crucially depend on information related to production, processing and markets, identifying farmers' sources of information and search behavior becomes important.

Table 4 Distribution of respondents according to agricultural information needs sought on social media

Information needs	Percentage	Rank
Technological information	63.1	7th
Educational and training information	67.6	5th
Business and trade information	72.1	4th
Government agricultural policies and plans	61.3	8th
Weather condition and Environmental information	63.1	7th
Variety of improved seeds	99.1	1st
Agrochemicals	64.9	6th
Credit facilities, source, terms and conditions	97.2	2nd
Market trend, price, and stock available	90.0	3rd

Respondent's benefits derived from the use of social media for the information dissemination

Table 5 indicates that among other benefits derived from the use of social media for the information dissemination, farmers ranked provides solution to agricultural problems first, with weighted mean score of 278.4, followed by increase production quantity and quality (254.6), clarifies doubts among farmers (245.8) and networking, recognition and motivation in agriculture (244.9). The implication of this result shows that social media has proved immensely useful to farmers in seeking solutions to their day-to-day agricultural problems pertaining to both crop and livestock production. This is in support of the findings of Yousaf, Jha and Vittalamurthy (2017) which asserted that relevant solutions through WhatsApp helped farmers to reduce livestock and crop losses.

Table 5 Distribution of respondents according to benefits derived from the use of social media

Benefits	To a large extent	To a lesser extent	Rarely	Not at all	Weighted score	Rank
Provides answers to agricultural problems.	78.4	21.6	0.0	0.0	278.4	1st
Easy to receive and seek information.	73.9	0.0	0.0	26.1	221.7	5th
clarifies doubts among farmers	67.6	13.5	16.0	2.9	245.8	3rd
Opportunity of continuous learning and connected to scientific information.	54.1	9.0	36.9	0.0	217.2	6th
Diverse information received in multiple forms (texts, pictures, photos etc.)	63.1	0.0	9.2	9.0	202.2	7th
It helps in networking, recognition and motivation in agriculture.	81.1	0.8	0.0	18.1	244.9	4th
Helps to increase production quantity and quality	81.8	0.0	9.2	9.0	254.6	2nd

Respondents' perceived constraints against the use of social media

Table 7 shows that irrelevant posts, inadequate or erratic power supply, lack of credit to purchase data regularly and poor internet connectivity were ranked as the most important challenges that farmers faced in fully benefitting from social media sources with weighted mean

scores of 245.6, 235.2, 234.3 and 169.2 respectively. The implication of the result is that farmers would have benefited more but for the above listed factors that constrained them. A study by Dini *et al.* (2016) reported poor internet connection, limited capability, security issues, unsupportive regulation and distraction of focus as constraints to the use of social media in Indonesia.

Table 7 Distribution of respondents according to constraints they perceived against effective utilisation of social media

Constraints	To a large extent	To a lesser extent	Rarely	Not at all	Weighted score	Rank
Irrelevant posts	18.9	48.6	15.3	17,1	169.2	4th
Slow internet connectivity	78.4	0.0	0.0	21.6	235.2	2nd
Problems of phone storage	8.1	0.0	61.3	30.6	85.6	7th
Difficulty in understanding and proper utilisation of information	22.5	22.5	11.7	43.2	107.1	5th
Illiteracy	9.9	38.7	0.0	51.40	124.2	6th
High cost of data	72.1	0.0	0.2	18.0	234.3	3rd
Inadequate/ erratic power supply.	81.8	0.0	0.2	18.0	245.6	1st

CONCLUSIONS AND RECOMMENDATIONS

Social media has provided farmers generally with great potentials to maximize in order to improve in agricultural productivity thereby contributing to development. It is evident from the study majority that famers have a positive attitude towards the use of social media in seeking agricultural information, hence social media is largely beneficial as a source of agricultural information. However, there are substantial constraints which discouraged some farmers from accessing agricultural information through the use of social media.

Information centres should be established and internet-based information service should be extended to the rural farmers as this will help in contributing significantly to agricultural development at the rural level. It is imperative that internet–based tools should be utilised by various stakeholders in agriculture to ensure that information needs of rural farmers are satisfied optimally.

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PERCEIVED EFFECT OF UNDER-UTILISED SPECIES ON RURAL LIVELIHOOD: A CASE STUDY OF EDIBLE MUSHROOM AMONG FARM FAMILIES IN OSUN STATE, NIGERIA

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ABSTRACT

The study examined the perceived effect of edible mushroom on the livelihood of farm families in Osun State. A multistage sampling technique was used to select 102 farm families. Data were collected with the aid of a structured questionnaire. The data were analyzed using descriptive statistics and correlation analysis. Results of the study showed that the mean age of the household heads was 45.7 years as majority (69.4%) of the household heads had below secondary education. This revealed that majority of the farming household heads in the study area were in their active age. The reasons for consuming mushroom by the farm families includes cheap substitute for meat, good source of vitamins and minerals, palatability, medicinal value and availability. Effect of mushroom economic activities on livelihood, shows that the gathering and sales of mushroom significantly had positive relationship with the income of farm families. Despite the nutritional and income benefits from mushroom, farm families face challenges in gathering mushroom for sale which include high perishability, seasonality in the availability of mushroom, difficulty in differentiating between edible and poisonous ones, scarcity of some types of mushroom in the study area. The study therefore, recommends that there should be increase in the awareness of the nutritional, medicinal and income generating potential of mushroom as this will improve food security and livelihood of rural communities.

Keywords: Food security, perishability, households and gathering

INTRODUCTION

The importance of underutilised species in the livelihood of the poor cannot be overemphasized (Naylor et al. 2004). Underutilised species are useful species which are marginalized, to which little attention is paid or even overlooked by researchers, breeders and policy makers (Padulosi et al. 2013). Underutilised species supplies important macronutrients (carbohydrates, proteins and fats), micronutrients (vitamins and minerals), as well as bioactive non-nutrients that contribute to dietary health (Bioversity International, 2017). Some of this species are cultivated while majority are gathered in the wild of which mushroom is part, as some of them have been identified to be edible.

Over 2,000 species of mushrooms exist in nature, but about 25 are widely accepted as food and few are commercially cultivated. Mushrooms are considered as a delicacy with high nutritional and functional value, and are also accepted as nutraceutical foods (Chang and Miles, 2008). They have great nutritional value as they are quite rich in protein, with an important content of essential amino acids and fiber, poor fat but with excellent important fatty acids content. Moreover, edible mushrooms provide a nutritionally significant content of vitamins (B1, B2, B12, C, D, and E) (Heleno et al, 2010). In Nigeria many species of mushrooms are popular and acceptable to the people, which are collected from the wild; either from the forest floor or on decayed wood in rainy season. Edible mushrooms are of considerable interest because of their nutritional value, medicinal properties, and economic importance (Chang and Miles, 2008) as it is gaining attention in most local communities as a cheap source of protein since the conventionary ones are expensive and also providing a means of livelihood to rural households as they gather, process and sell them.

Therefore, the study examines the effect of edible mushroom on the livelihood of farm families in Osun State, Nigeria. The specific objectives are to describe the socio-economic characteristics of rural household heads; identify the reasons for consuming edible mushroom by the farm families; examine the effect of mushroom economic activities on livelihood of farm families and to identify constraints facing farm families in gathering mushroom for sale.

METHODOLOGY

The study was carried out in Osun state which is an inland state in south-western Nigeria. Its capital is Osogbo, comprising of thirty (30) Local Government Areas and divided into three Agricultural zones. It has a tropical climate with prominent wet (between April and October) and dry (between November and March) seasons with fertile soil which encourages the production of crops and livestock (Osun State Ministry of Agriculture, 2014).

Data and Sampling Techniques: A multistage sampling technique was used for the study. The first stage was the random selection of two agricultural development zones, the second stage was the random selection of six (6) villages from the zones and the last stage was the selection of nine (9) farm families who pick and sell mushroom using snow balling techniques from each of the villages. A total of 108 farm families were sampled. But only 102 questionnaires were used for the analysis.

The data collected were analyzed with Descriptive Statistics and Correlation Analysis. Descriptive Statistics such as frequency, percentage and tabulation, use of central tendency and dispersion (mean, mode, median and standard deviation) was used to describe the socio-economic characteristics of the farm families' head; identify the reasons for consuming edible mushroom by the farm families; and to identify constraints facing farm families in gathering mushroom for sale.

Correlation Analysis: this was used to examine the effect of mushroom economic activities on livelihood of farm families.

Correlation Coefficient Formula

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2]\ [n\Sigma y^2 - (\Sigma y)^2]}}$$

X = sales of mushroom; Y = Household income; N = Number of respondents

RESULTS AND DISCUSSION

Table 1 shows that 79.41% of the household heads were male which means households in the study area are majorly headed by males. This is similar to the results of the study carried out by (Adebisi et al. 2019) where majority of the households were headed by male. The mean age was 47.01 years. This revealed that majority of the household heads in the study area are middle aged and still active. Majority (94%) of the household heads in the study area had less than secondary education. The average household size was 5.06; majority (57%) of the household heads practice farming as their primary source of livelihood. The average monthly income for households in the study area was 23,430.50 naira.

Table 1: Socioeconomic Characteristics of the House Heads (n=102)

Characteristics		Frequency	Percentage
Gender	Male	81	79.41
	Female	21	20.59
Age	<30	07	06.83
	30-39	29	28.43
	40-49	49	48.04
	50-59	17	16.00
	>60	00	00.00
Educational Level	No formal Education	45	44.12
	Primary	52	50.98
	Secondary	05	04.90
	Tertiary	00	00.00
Household Size	<5	56	54.90
	6-10	46	50.90
	>10	00	00.00
Place of Farming	Primary	59	57.84
	Secondary	43	42.16
Monthly Income	<20,000	62	60.78
	20,000-40,000	42	31.37
	40,001-60,000	8	7.84
	>60,000	0	0.00

Source: Field Survey, 2020

The reasons for consuming Edible mushrooms by the farm families include: being a cheap substitute for meat as many of respondents indicated that edible mushroom has a similar taste to meat. It is also consumed because it is seen to be a good source of vitamins and minerals. It is also consumed because it is palatable while the remaining (18.56 percent) consume it because of the availability

Table 2: Reasons for Consuming Mushroom

Reasons for consuming mushroom*	Frequency	Percentage
Cheap substitute for meat	102	22.27
Good source of vitamins and minerals	96	20.96
Palatability	88	19.21
Medicinal value	87	19.00
Availability	85	18.56
Total	458	100.00

Source: Field Survey, 2020
*Multiple responses

Table 3 shows the effect of the sales of edible mushrooms on livelihood of farm families. The result revealed a weak positive correlation as shown by (r = 0.385) between the sales of edible mushroom and household income as this was also significant. .

Table 3: Effect of Edible mushroom Economic Activities on Livelihood of Farm Families

		Sales of Edible Mushroom	Household Income
Sales of Edible Mushroom	Pearson correlation	1	0.385***
	Sig (2-tailed)		0.000
	N	102	102
Household Income	Pearson correlation	0.385***	1
	Sig (2-tailed)	0.000	
	N	102	102

Source: Field survey, 2020
*** Significant at P<0.01

Table 4 shows that constraints to the harvesting of edible mushrooms for sales include High Perishability, Seasonality of Edible Mushroom availability, Technicality of differentiating between edible from the poisonous mushroom ones and Scarcity of some types of mushroom demanded in the study area.

Table 4: Constraints to Gathering of Edible Mushroom

Constraints	Very Serious	Serious	Moderately Serious	Not Serious	Not a Problem	MS	Rank
High Perishability	53(51.9)	31(30.39)	9(8.82)	6(5.88)	3(2.94)	4.16	1st
Seasonality of Edible Mushroom availability	46(45.10)	30(29.41)	18(17.64)	6(5.88)	2(1.96)	4.09	2nd
Technicality of differentiating between edible and poisonous mushroom	21(20.59)	15(14.71)	36(35.29)	18(17.65)	12(11.77)	3.0	3rd
Scarcity of some types of mushroom demanded in the study area	10(9.80)	10(9.80)	22(21.57)	28(27.45)	32(31.37)	2.40	4th

Source: Field survey, 2020

CONCLUSION AND RECOMMENDATION

Edible mushroom has positive and significant effect on the livelihood of rural households. It is therefore recommended, that there should be increase in the awareness of the nutritional, medicinal and income generating potential of edible mushroom as this will improve food security and livelihood of rural communities.

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EVALUATION OF THE CONSTRAINTS AND BENEFITS OF USAGE OF E-AGRICULTURE BY CEREAL CROP FARMING IN BORNO AND KEBBI STATE, NIGERIA

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ABSRACT
This study was aimed at evaluating the constraints and benefits of the cereal crop farmers in the use of e-agriculture information sources in Borno and Kebbi state, Nigeria. The specific objectives of the study are to ascertain the benefits derived by the cereal crop farmers from the use of e- agriculture and to examine the severity of the constraints faced by the cereal crop farmers in the use of e-agriculture information sources. Three (3) stage sampling procedure was used for the sampling. The total sample size for farmers in Borno is 203, and the total sample size for kebbi is 197. The sample size was obtained from the sample frame using the Yamane Formula at 0.07 level of error tolerance. Structured questionnaires, along with interview schedule were used for collection of primary data. Likert scale of measurement was used to summarize the data collected and to present the result of this findings. The result on constraints revealed that, inadequate training and policy inconsistency which were ranked 1st and 2nd were the very severe constraints the cereal crop farmers faced, while the result on benefits unveiled that, increase in yields of crop with the mean score of 2.44 which is ranked 1st is the very high benefits the cereal crop farmers get in the use of e-agriculture. The study concludes that, adequate training be giving to the cereal crop farmers in the field of e-agriculture to enhance their adoption and usage of the packages.
Keywords: Constraints, Benefits, Cereal Crop, Farmers, Borno, Kebbi, Nigeria

INTRODUCTION

E-agriculture is an emerging field focusing on the enhancement of agriculture and rural development through improved information and communication processes. E-agriculture involves application of innovative ways to use Information and Communication Technology (ICTs) in the rural domain with the primary focus on agriculture (Chauhan, 2018). E-agriculture cover all aspects including research, planning, monitoring and evaluation, engineering and science of production, processing, extension service among others. It is a global initiative to enhance sustainable agricultural development and food security by improving the use of information, communication and associated technologies in the agricultural sector (E-agriculture Community, 2017). Cereal farming is the growing of cereal crops for human food, livestock feed as well as for other uses, including industrial starch and biofuel (Ismaila *et al.,* 2010).

Swanson (2010) said that, obstacles to access to E-agriculture information in the rural areas of Nigeria include cost of the technology, lack of infrastructure, and lack of technical support in repair and maintenance, and language barriers. Mittal (2012), pointed out the following as the major benefits of E-agriculture; Increased productivity due to growth and penetration of mobile E-agriculture in rural areas, Innovations in agriculture through electronic media that supports education and training, Creation of new opportunities increasing the development of human and social capital, Achieving improved process control, transparency in market information, Reduction of transaction costs in tracking of consumer needs, Enhanced food security and support rural livelihoods, Poverty alleviation through modern agriculture, and so on.

Fulfilling the vision 2020 on agriculture in Nigeria starts with a solution that ensures effective information dissemination at all levels from the grass root to the policy development. In line with this vision, Sidmach Technologies have developed an electronic information bank on everything agriculture in Nigeria known as E-agriculture portal (FMARD and NITDA, 2016). In view of the above initiative, the research evaluated the constraints and benefits of the usage of E-agriculture by cereal crop farmers in Borno and Kebbi state.

METHODOLOGY

The study was carried out in Borno and Kebbi states, Nigeria. Three (3) stage sampling procedure were used for the sampling. The data for this study were collected from primary sources, (structured questionnaires) that contains both open and close ended questions and interview was conducted for farmers who cannot read nor write with the help of well-trained enumerators. The analytical technique that was used in this study was simple descriptive statistics, which involved the use of likert scale to present the results on objectives i and ii.

RESULTS AND DISCUSSION

Perception of the severity of the constraints faced by the cereal crop farmers

Table 1 shows that, in-adequate training and participation by farmers in e-agriculture related activities revealed to have very severe constraints with the highest mean score value of 2.43, ranked 1st, which implies that majority of the respondents do not have access to training on e-agriculture related activities. Meanwhile policy inconsistency by the government ranked 2nd as very severe constraint with the mean score value of 2.35. This implies that, changes in policies usually tends to affect adoption of new agricultural practices, especially the use of e-agriculture. This finding agrees with that of Arokoyo (2011), who reported that, policy inconsistencies have kept agricultural development at bay. Inadequate skill has the mean score value of 2.20 ranked 3th as a very severe constraint faced by the cereal crop farmers. This finding is in line with that of Bouis *et al*. (2011), who in their findings reported that, illiterates and older farmers often have less developed digital skills and so they are usually less likely to adopt e-agriculture. Geographical location is also one of the constraints identified limiting the cereal crop farmers access to the use of e-agriculture tools and information, this has the mean score value of 1.91 ranked 7th as not severe constraints. This implies that, in reaching out to rural farmers about new practices, geographical location is very paramount, as locations affects the penetration of this new initiatives especially e-agriculture information tools and sources. This finding agrees with that of Hassan (2009), who in his findings reported that, location of an e-agriculture centres should be socially convenient for all users, including women and older people.

Table 1: Respondents' perceived constraints faced in the usage of e-agriculture

Constraints	Very Severe	Severe	Not Severe	Weighted Sum	Weighted Mean	Rank	Decision
Inadequate training	657	272	45	974	2.43	1st	Severe
Policy inconsistency	621	256	65	942	2.35	2nd	Severe
Inadequate skills	522	270	91	883	2.20	3th	Severe
Incompatibility of the technology with the existing culture	459	260	117	836	2. 09	4th	Severe
Inadequate power supply	405	332	99	836	2.09	4th	Severe
High rural poverty	360	374	93	827	2.06	6th	Severe
Geographical location	336	282	147	765	1.91	7th	Not Severe
Issue of gender and diversity	285	232	189	706	1.76	8th	Not Severe
High level of illiteracy	216	262	197	675	1.68	9th	Not Severe
Inadequate time	168	266	211	645	1.61	10th	Not Severe

Source: Field Survey Data, 2019

Benefits of the usage of e-agriculture by the respondents

The result on Table 2 showed that, increase in yields of crop with the mean score value of 2.44 ranked 1st and was high among the benefits derived by the cereal crop farmers in the usage of e-agriculture information. This implies that, the cereal crop farmers yields were enhanced by their usage of e-agriculture information. Thus, as farmers yield increases as a result of their usage of e-agriculture information, income also increases resulting in better livelihood. This finding agrees with that of Moshe (2017), who reported that, the adoption of e-agriculture increases crop yield per land and water unit by 20% to 100% and improved produce quality.

More so, increased income with the mean score value of 2.41 and also ranked 2nd was high among the benefits derived by the cereal crop farmers. This implies that, the use of e-agriculture information sources in their cereal crop farming have provided them with adequate information to ensure better livelihood. Food security, with the mean score value of 2.40 and ranked 3rd was also among high benefits derived. This finding implies that, the usage of e-agriculture was highly beneficial to the cereal crop farmers in the study area, as it aims to enhance agricultural productivity in order to achieve greater food security in the study area. This finding corroborates with that of Mittal (2012), who reported that, using e-agriculture information sources will help enhance food security, support rural livelihoods, also help to alleviate poverty. The respondents also indicated low benefits of e-agriculture on access to natural resources in agriculture with the mean score value of 1.94 ranked 8th. Rural poor depend on agriculture and related activities for their livelihoods, but majority had limited access to land and other natural resources needed to boost their agricultural productivity.

Table 2: Distribution of the respondents benefits of e-agriculture information usage

Benefits	VH (3)	H (2)	L (1)	(WS)	(WM)	Rank	Decision
Increased yields	636	310	32	978	2.44	1st	High
Increased income	663	248	55	966	2.41	2nd	High
Provides food Security	642	270	49	961	2.40	3rd	High
Alleviate poverty	528	342	42	912	2.28	4th	High
Uplifting farmers livelihoods	564	256	84	904	2.26	5th	High
Access to edu and train	450	364	68	882	2.20	6th	High
Policies related to Agric.	279	398	108	785	1.96	7th	Low
Provides better access to natural resources	255	416	107	778	1.94	8th	Low

Source: Field Survey Data, 2019

Note: VH = Very High, H = High, L = Low, WS = Weighted Sum, WM = Weighted Mean

CONCLUSION

Base on the result of this findings, the study concludes that, training in the use of E-agriculture packages to farmers especially the cereal crop farmers is necessary, this should be made a priority by the extension agents and other stakeholders in agriculture in view to educate the farmers on the packages endowed in E-agriculture and provide them with the needed information that is required to boost their cereal crop productivity. Also the farmers are thereby encouraged to acquire necessary skills that will enable them perform well in the use of E-agriculture information.

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SMALLHOLDER FARMERS' OBSERVABLE EFFECTS OF CLIMATE VARIATIONS ON TOMATO YIELD AND ADAPTATION STRATEGIES IN IMEKO AFON, LOCAL GOVERNMENT, OGUN STATE NIGERIA

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ABSTRACT
Climate variability is one of the most serious environmental threats facing mankind worldwide. It affects agriculture in several ways, including its direct impact on food production such as production of tomato. This study assessed smallholder farmers' observable effects of climate variations on tomato yield and adaptation strategies in Imeko Afon. Purposive sampling technique was used to select 294 tomato farmers from 12 rural communities. The study area was chosen due to highest number of tomato farmers. Well-structured questionnaire and interview Schedule were used to obtain data on the observable effects of climate variations on tomato yield, various adaptation strategies used by the farmers and also socio-economic characteristics of tomato farmers. Data were analysed using descriptive statistics and Pearson's Chi-square test. The findings revealed that 88.4%, 77.1%, and 68.0% of the respondents strongly agreed that unstable planting season, unpredictable timing of harvest and reduced yield of tomato respectively were common observable effects of climate variation on tomato production. Chi-square test reveals that, that there is significant ($p \leq 0.05$) relationship between socio-economic characteristics and adaptation strategies used. Therefore, climate variations negatively affect tomato production leading to poor yield and high financial lost in the study area. Using of irrigation system and improved varieties were recommended.
Keywords: Climate variation, small holder farmers, tomato production, adaptation strategies

INTRODUCTION

One of the biggest environmental challenges bedeviling mankind in this 21st century is the changing climate across the globe (Datta, 2013). According to the United Nations Framework Convention on Climate Change (UNFCCC, 2007), the climate is said to have changed when there is a direct or indirect alteration of the composition of the global atmosphere, which is in addition to natural climate variability observed over comparable time periods. Climate variability looks at changes that occur within smaller timeframes, such as a month, a season or a year.

According to Federal Office of Statistics (1999), small scale farmers are farmers whose production capacity falls between 0.1 and 4.99 hectares holding.

Tomato (*Lycopersicon esculentum)* belongs to the family Lycopersicon. Tomato will grow anywhere in Nigeria; provided there is regular supply of water, however the crop does well in the savanna zone than the forest zone because diseases and pests are less prevalent (Kelley and Boyhan, 2010).

The Intergovernmental Panel on Climate Change (IPCC, 2007) defines climate adaptation as initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Adaptation can therefore be regarded as the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. Operationally, climate adaptation as used in this work refers to the various strategies adopted to respond to harsh climatic conditions. The papers therefore, determines the farmers' observable effects of climate variations on tomato yield and also determine the level of significant relationship between adaptation strategies and socio-economic characteristics of tomato farmers.

METHODOLOGY

The study was carried out in Imeko Afon Local government area of Ogun State, South West of Nigeria. Imeko Afon local government area was purposively chosen because the Local Government is the highest producer of Tomato.

Purposive sampling technique was used to select 294 tomato farmers from 12 rural communities. Data were collected with well-structured questionnaires and interview schedule from tomato farmers. Data were analyzed with descriptive statistics and Pearson's Chi-square test.

RESULTS AND DISCUSSSION

Farmers' observable effect of climate variations on tomato yield

Table 1 shows the observable effect of climate variations on tomato yield. It was revealed that, averagely 47% of the farmers strongly agreed that climate variation has increased harmful effect on weeds while 53% of the farmers agreed that climate variation has increased harmful effect of weeds while none of the respondents disagree. This shows that climate variation has increased harmful effect of weeds on tomato yield because the variation in climate favours the weeds to grow very well to the detriment of the tomato plant. Table 1 explained other observable effect of climate variations on tomato yield.

Table 1: Farmers observable effect of Climate variation on tomato yield

Observable effects	SA	A	U	SD	D
Increased harmful effect of weeds	9.9	90.1	0	0	0
Reduced the yield of tomato	68.0	32	0	0	0
Caused more diseases harmful to tomato crop	14.6	85.4	0	0	0
Caused more insect pest harmful to tomato crop	14.6	85.4	0	0	0
Caused dehydration in tomato crop	52.0	48.0	0	0	0
Reduced the total farmland cultivated with tomato	33.3	66.7	0	0	0
Made timing of harvest unpredictable	71.7	28.3	0	0	0
Negatively affected planting season	88.4	11.6	0	0	0
Made tomato farming enterprise unprofitable	70.1	29.9	0	0	0
Mean	47	53	0	0	0

***SA-Strongly Agreed, A-Agreed, U- Undecided, SD-Strongly Disagreed, D- Disagreed**

Source: Field survey, 2019

*Multiple responses

Relationship between adaptation strategies and socioeconomic characteristics of the tomato farmers

The socio-economic characteristics of tomato farmers that were selected for these studies are; age, sex, household sizes, occupation, educational background and years of experience on operation. The adaptation strategies that were used by tomato farmers are; altering planting date, switching to tomato variety, application of irrigation, planting early or late maturing tomato variety, planting tomato crops on fadama lands, planting pest and disease resistance, altering of tillage methods, application of green or organic manure. Details are presented in Table 2. Chi-square results shows that, significant relationship existed between altering planting date, period and extension visits ($X^2 = 12.092$; $p = 0.01$). Switching to tomato variety more adaptable was statistically related to education levels ($X^2 = 12.092$; $p = 0.01$), farming experience ($X^2 = 2.85$; $p = 0.04$) and extension visits ($X^2 = 15.013$; $p = 0.001$). Application of irrigation was significantly related to levels of education ($X^2 = 14.489$; $p = 0.002$), farming experience ($X^2 = 28.981$; $p = 0.000$) and extension visits ($X^2 = 10.165$; $p = 0.001$). Planting early or late maturing tomato variety had significant relationship with age ($X^2 = 9.963$; $p = 0.041$), education ($X^2 = 21.696$; $p = 0.000$), household size ($X^2 = 14.940$; $p = 0.02$) and farming experience ($X^2 = 15.545$; $p = 0.04$). Planting pest and disease resistance variety was significantly related to education ($X^2 = 10.850$; $p = 0.013$) and farming experience ($X^2 = 10.034$; $p = 0.040$). Altering of tillage method had significantly relationship with education ($X^2 = 18.877$; $p = 0.004$), farming experience ($X^2 = 31.663$; $p = 0.000$) and extension visits ($X^2 = 11.733$; $p = 0.003$).

The results conclude that, there is a significant relationship between adaptation strategies and some socio-economic characteristics

such as age, household size, farming experience and training from extension agents at 5% significant level.

Table 2: Results of Chi-Square analysis showing relationship between adaptation strategies and socioeconomic characteristics of the tomato farmers

Variables	APDT		STV		APIRR		PELMT		PTCFL		PPDR		ATM		AGOM	
	X^2	P – value	X^2	P - value	X^2	P – value	X^2	P – value	X^2	P - value	X^2	P-value	X^2	P-value	X^2	P-value
Age	7.234	0.124	4.346	0.825	2.978	0.562	9.963	0.041*	0.618	0.961	7.730	1.02	12.170	0.144	1.417	0.841
Sex	1.174	0.279	0.282	0.868	0.863	0.353	1.547	0.214	1.018	0.313	0.102	0.749	0.498	0.780	0.860	0.354
Marital Status	0.394	0.821	1.859	0.762	1.062	0.588	4.080	0.130	0.616	0.735	1.562	0.458	6.063	0.195	0.423	0.809
Education	10.618	0.14	21.311	0.002*	14.482	0.002*	21.696	0.000*	0.113	0.990	10.850	0.013*	18.877	0.004*	1.941	0.585
Household Size	5.303	0.15	3.941	0.685	1.366	0.714	14.940	0.02*	0.864	0.834	6.811	0.078	10.471	0.106	1.403	0.705
Farming Experience	13.188	0.10	22.857	0.04*	28.981	0.000*	15.545	0.04*	3.334	0.504	10.034	0.040*	31.663	0.000*	4.624	0.328
Extension Visits	12.09	0.01*	15.013	0.001*	10.165	0.001*	1.292	0.256	0.933	0.334	0.219	0.640	11.733	0.003*	0.243	0.622

Note: APDT = Altering planting Date; STV = Switching to Tomato Variety; APIRR = Application of Irrigation; PELMT = Planting Early or Late Maturing Tomato Variety; PTCFL = Planting Tomato Crops on Fadama Lands; PPDR = Planting Pest and Disease Resistance; ATM = Altering of Tillage Methods; AGOM = Application of Green or organic Manure.

* represent significant level (p-value) at 5%

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATION

Indeed, climate variations in Imeko Afon local government area really have harmful effect on tomato farmers in the study area. There were poor yield and discouragement of expanding their hectarage of land due to lose of financial gains and cannot meet their house hold needs. Therefore, Nigerian Meteorological Agency (NIMET) should make use of Extension Agents to keep the tomato farmers informed about predictions of climate variations from time to time and also government should encourage the farmers to use irrigation system by giving funds to the farmers in order to use it.

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GINGER FARMERS' MANAGEMENT PRACTICES UNDER PREVAILING CLIMATE CHANGE IN JABA LOCALGOVERNMENT AREA OF KADUNA STATE

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ABSTRACT
This study was designed to investigate management practices adopted by ginger farmers to cope with the prevailing climate change. Structured questionnaire was used for the collection of primary data from 210 randomly selected ginger farmers from seven wards of Jaba local government area of Kaduna State. The data was subjected to descriptive statistical analyses. The findings revealed that the average age of farmers was 37 years, with 15 average years' experience in ginger farming on average farm sizes of 1.9ha. The major climate change experienced by the farmers was late establishment of rains. About 41% of the farmers reduced their farm sizes while 35.7% did not change the intended farm sizes but used improved agricultural practices. It was therefore concluded that climate change was responsible for the annual fluctuation in quantities of ginger produced. It is recommended that the farmers should be encouraged to form cooperative groups to cope with the climate change rather than reducing production.
Keywords: Ginger, Coping management, Climate change

INTRODUCTION
Climate change is one of the biggest societal challenges of our generation and the search for ways to mitigate and adapt to this phenomenon are being sought for. Poor people living in agricultural communities in developing countries are said to be the most affected by these climatic changes (Maskrey et al., 2007). Agriculture is a major source of livelihood for a large proportion of rural communities across Nigeria. The world has responded to climate change phenomenon through two broad response mechanisms: Mitigation and adaptation strategies aimed at, moderating the adverse effects of climate change and/or to exploit any arising beneficial opportunities. Adaptation Strategies have been classified into four namely: Technological Developments; Government programs and insurance; Farm practices and Farm financial management (Daulagala *et al.,* (2012). Technological Developments involves Crop development, Weather and climate, Information systems, Resource management innovations, Farming practices etc. Government Programs and Insurance deals with agricultural subsidy and support programs, private insurance, resource management programs etc. Farm practices focuses on farm production, land use, land topography, irrigation, timing of operations, and Farm financial management is achieved through crop insurance, crop shares and futures, income stabilization programs, household income, etc. Ginger production is a major source of livelihood to most farmers in Jaba Local Government area of Kaduna State. Ginger output has been fluctuating mainly due to climate change as a leading influencing factor. This poses a serious threat to the farmers' annual income that needs to be addressed. The objectives of this study were to, examine how do the farmers perceive as Climate Change; determine how the climate change has influenced ginger production; examine how ginger farmers are coping with Climate Change

METHODOLOGY
This study was carried out in Jaba Local Government Area, of Kaduna State. It is within Southern Guinea Savannah with a rainfall ranging from 75cm to 125cm and temperatures ranges 20^0C and 30^0C. The area experiences distinct dry and rainy seasons and has a predominantly clay loam soil. Ginger is produced mainly as commercial. A randomly selected sample size of 210 farmers comprising of thirty (30) famers each from seven wards were used for this study. Primary data were collected using structured questionnaire and interviews to solicit information on socio-economic characteristics and ginger production practices.

Descriptive statistics was used to analysis the data collected.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of respondents

The socioeconomic characteristic of the farmers (Table.1) showed that majority of the respondents (92.9%) were males as against 96% (Nmadu and Marcus, 2013) and 66.4% (Atiyong *et al.,* (2018) and 80%, 82.5% and 63.9% of them were married (Nmadu and Marcus, (2013), and Atiyong *et al.,* (2018)) respectively. The average age of the respondents was 37years with 15years ginger farming experience. These suggest that most of the respondents got involved in ginger farming when they were at about twenty years old. The study also found that 44.3% and 18.57% had secondary and tertiary education respectively. This finding is a plus on the farmers, in view of the fact that educated farmers are likely to be more aware of the modern coping/adaptation strategies to climatic changes which can facilitate increase ginger yield in the area. This is also in line with the assumption that an educated person is more able to process information and use it to make informed decisions and also enabling the individual to perform tasks more efficiently. Lower educations tend to constrain the ability to understand vital warning information and access to recovery information (Cutter et al, 2003). More so, an educated farmer has more opportunities to connect with the new farming technology to open up their minds regarding foul practices. The average farm size was found to be 1.9ha with an average yield of about 5.9tonnes per hectare. Farm size has been linked to production efficiency due to labour constraints (Nmaadu and Marcus, 2013). In Nigeria, the average yield on a hectare of farmland is about 13–27 metric tonnes. If the best agronomy practices are followed, ginger yields 16 tons to 20 tons per hectare (anonymous, 2019).

Table: 1 Socioeconomic characteristics of Ginger farmers

Variables	Frequency	Percentage	Average	Nmadu & Marcus (2013)	Atiyong et al., (2018)
Marital Status					
Married	168	80		82.5	63.9
Single	42	20		13.0	20.4
Gender					
Male	195	92.9		96	66.4
Female	15	7.1		4	33.6
Age distributions			37yrs	42yrs	40yrs
Educational level					
No formal educ.	9	4.3		2	15
Primary education	55	26.2		21	47.1
Adult education	12	5.7		5	
Secondary educ.	95	44.3		46	28.2
Tertiary education	39	18.6		21	9.1
Years of experience			15yrs	27yrs	NA
Occupation					
Farming	111	52.9		NA	55.1
Trading	50	23.8		NA	8.4
Civil servant	42	19.5		NA	27.1
Others	7	5.6		NA	NA
Full/Part time					
Full time	135	64.3			
Part time	75	35.7			
Average farm size			1.9ha	3.09ha	NA
Average Yield/ha			5.9t/ha	NA	< 4t/ha

Total	210	100

NA= Not Available

Perceived climate change trends

Farmers were asked to comment on observed weather changing trends in their locality over a period of five to ten years. The results (Table: 2) showed farmers observed increases in variation of rainfall onset and its distribution (74.1%), desertification (61.8%) drought (55%) and high sun intensity (54.2%). This is reflected in the fluctuation in yield which supports Atiyong *et al's., (2018),* report of strong positive relationship (r= 0.606) between ginger yield and rainfall. It is noteworthy also that increase in heat wave reported by 40% farmers may be attributed to the high sun intensity which also affects yields (Atiyong *et al., (2018)*. This supports the scientific agreement that climate change is happening and will continue well into the future regardless of the effectiveness of mitigation measures (Christensen and others 2007).

Table: 2. Perceptions of climate change parameters by respondents

Weather elements changes	Same	Declined	Increased
Thunderstorms	54	26.5	19.5
Heavy winds	43.0	27.5	29.5
Incidence of dust covering the atmosphere	49.5	16.2	34.3
Variability in rainfall	23.2	2.7	74.1
Flooding	14.2	36.1	49.7
Drought	33.5	11.5	55
High Sun intensity	34.1	11.7	54.2
Erosion	47.9	19.6	32.5
Heat Waves	29.0	30.1	40.9
Desertification or loss of forest resources	27.0	11.3	61.8

Ginger farmers' adaptation approaches to climate change

Table 3 show possible impacts of climate change and their adaptive responses. Improved management practices as one of the most important (27.1%) copping strategy. Improved management practices adopted by farmer include: the use of appropriate amounts of organic and inorganic fertilisers together with well-adapted and good agronomic practices. Ginger farmer have also learnt the art of intercropping high maize population on ginger farms. This intercropping has proven to be effective in addressing increasing temperatures which affect ginger production and also improve farm incomes and reduce vulnerability to climate change. Reduction of farm size was ranked second strategies farmers usually employed in order to cope with late establishment of rain. This is based on the fact that there is always low tendency to higher risks when farm sizes are reduced that might invariably lead to lower loss. There were about 14.3% of the farmers who still cultivated their normal farm sizes in spite of late rains. These were the risk takers who may stand a chance to gain more income due low output supply that will attract higher prices for their products. A group of 5.1% farmers do not cultivate ginger at all when rains delay. This practice could reduce the quantity of ginger in a supplied to the market. However, it was noted that farmers who reduced farm sizes and those that still cultivated intended farm sizes took measures to improve the soil fertility through soil and land management interventions focus on enhancing soil health. Indigenous knowledge provides the backbone of successful climate change adaptation in farming. These strategies adopted by ginger farmers have proved the assertion that farmers possess valuable indigenous adaptation strategies that include early warning systems (Ajibade and Shokemi 2003; Nyong *et al.,* 2007).

Table 3: Coping with late rain establishment

Variables	Frequency	%
Do not grow at all	12	5.7
Improved management practices	57	27.1
Increase land area	9	4.3
Still cultivate intended size	30	14.3
Use of plant protection chemicals	27	12.9
Reduce farm size	39	18.6
Intercrop with maize to provide shade	25	11.9
Use more mulching materials	11	5.2
Total	210	100

CONCLUSION AND RECOMMENDATIONS

Strong narratives on climate exist in Jaba Local Government area and adaptive measures directly linked to climate parameters were found to be used to cope with the changes.

Extension education campaign should be intensified to increase the farmers' knowledge about climate change; government should collabourate with meteorologist in forecasting about climate change and also in bringing about measures to control the adverse effects of climate change. Group's formations should be encouraged for bulk supply of inputs and for dissemination of information on current climate changes and measures.

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EFFECTIVENESS OF COMMUNITY-BASED ORGANISATIONS IN SUPPORTING RURAL FARMERS IN IREPODUN LOCAL GOVERNMENT AREA, KWARA STATE, NIGERIA

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ABSTRACT

The paper assessed the effectiveness of Community-based organisations (CBOs) in supporting rural farmers in Irepodun Local Government Area, Kwara State, Nigeria. A structured interview schedule was used to elicit information from ninety-two (92) randomly sampled farmers in the study area. The findings showed that majority of the rural farmers were middle aged (76.3%), married (85.9%), had an average farming experience of about 21 years and about one-third (30.4%) indicated that they held leadership positions in the CBO they belong to. Most (54.4%) of the CBOs in the study area had a membership size of 20 persons and above, generated income through membership dues (55.4%) and allowed all members to be involved in decision making process (100%). Furthermore, the support services rendered by the CBOs that were prominently perceived to be effective were in the areas of conflict mediation, facilitation of access to labour, unionism and improvement of access to market. The severe constraints faced by the CBOs in the area were inadequate financial capital, insufficient government assistance and unfavourable government policies. The study recommends that Government and other NGOs should pay more attention to CBOs by providing them with the needed support in terms of favourable policies and financial backups so that they can be more effective in supporting rural farmers in coping with the various socio-economic challenges they face in the study area.

Keywords: Community-based Organisations, effectiveness, rural farmers, support

INTRODUCTION

The Phenomenon of extreme poverty is dominant in Africa with its prevalence and severity found specifically among farm families in rural communities (Ogundipe et al, 2019). In Nigeria, majority of these rural farm families are pressured by various socio-economic and cultural challenges arising from developmental gaps created by the poor performance of government over the years. In a bid to redress this situation, many rural communities have formed Community-based Organisations (CBOs) such as farmers' cooperatives, market associations, women and youth forums in order to mobilize resources to ameliorate the socio-economic challenges around them. These CBOs are formed to support and empower community members, distribute resources more equally, respond to basic needs of farm families, compliment government effort in providing basic amenities and promoting better rural livelihoods in the community. Majority of the rural farmers in these communities are members of one CBO or another and they expect to enjoy certain support services provided by them in order to experience better welfare and livelihood. It is against this background that this study intends to assess the effectiveness of CBOs in supporting rural farmers using Irepodun LGA of Kwara State as a case study. Specifically, the study describes the institutional characteristics of CBOs in the study areas; identify the support services rendered by CBOs to the rural farmers; evaluate the effectiveness of services rendered by CBOs; identify the constraints faced by CBOs in supporting farmers.

METHODOLOGY

The study was conducted in Irepodun Local Government Area, Kwara State, Nigeria. Irepodun is located within the North Central geopolitical zone with its headquarters in Omu-aran. The population of the study was the total number of farmers that were registered members of Community-based Organisations in Irepodun Local Government Area. From the list gotten from ADP/Ministry there are 5 registered CBOs in the area with a total number of 92 farmers. The names of these CBOs are Agbelore Farmers Group, Agbesowapo Multipurpose Cooperative Society, Deo Gratias Farmers Society, Ifesowapo Cashew Farmers, Agbeloba Oke Oko-Ikun Farmers Group. Due to the small population of registered farmers

gotten, data collection was carried out on the entire population. The ninety-two (92) farmers gotten from the five registered CBOs in the LGA were used for this study. A structured questionnaire was used to elicit information from the respondents. Data were collected on the socio-economic characteristics of the farmers, the institutional characteristics of CBOs, the support services rendered by CBOs to the rural farmers, the constraints faced by CBOs in supporting farmers while the dependent variable was the perceived effectiveness of services rendered by CBOs. The data was analyzed using descriptive statistics such as frequency counts, percentage, means and ranks while the inferential statistics used was logistics regression (using the dichotomized effectiveness score as dependent variable for the model).

RESULTS AND DISCUSSION

Socioeconomic characteristics of rural farmers

The findings from Table 1 revealed that the mean age of the rural farmers was 49.8 years. This result is in agreement with the findings of (Matanmi *et al*, 2015) that most farmers are middle aged due to less involvement of youths in farming activities. Majority of the rural farmers were married (85.9%), held membership position in CBOs (69.6%), had an average farming experience of about 21 years and with a mean household size of 7 persons. This finding on household size implies that the rural farmers could draw some level of family labour from their household which will ultimately reduce their labour cost.

Table 1: Distribution of the socioeconomic characteristics of the respondents, n = 92

Variables	Description
Age	Mean = 49.8 years
Gender	Mostly Male (66.3%)
Position held in CBO	Mainly members (69.6%)
Marital Status	Mainly married (85.9%)
Household Size	Mean = 7 persons
Educational Level	Mainly Primary and Secondary Education (46.7%)
Farming Experience	Mean = 21.1 years
Average Annual Income	Mean = 142,065 naira

Source: Field Survey, 2019

Institutional characteristics of community-based organisations

Table 2 showed that more than half (54.4%) of the CBOs in the study area had a membership size of 20 persons and above, with a mean of 22 persons, generated income through membership dues and fines (79.3%) and allowed all members to be involved in decision making process (100%). This implies that the CBOs in the area are well established and functional and are expected to be able to render some level of support services to the farmers in the area.

Table 2: Description of Institutional Characteristics of the CBOs, n=92

Variables	Description
Membership Size	Mean = 22 persons
Constitution	All have constitution (100.0%)
Emergence of Leader	All by election (100.0%)
Leadership Style adopted	All by Democracy (100.0%)
Decision making process	Carried out by all members (100.0%)
Meetings	Mainly weekly and Fortnightly (83.9%)
Source of income	Mainly by membership dues and fines (79.3%)

Source: Field Survey, 2019

Effectiveness of CBOs in rendering support services

The support services rendered by the CBOs that were prominently perceived to be effective were in the areas of conflict mediation ($\bar{X} = 3.48$), facilitation of access to labour ($\bar{X} = 3.38$), unionism ($\bar{X} = 3.32$), and improvement of access to market ($\bar{X} = 3.09$). However support

services such as access to credit, processing facilities and farm input were less effectively rendered by the CBOs in the area. This implies that members finance their farming activities with income and resources gotten outside the farmers groups. This is in accordance with findings of (Olorunfemi *et al*, 2014) that most farmers depend on their personal capital to finance their farming activities. The Inability to provide certain support services may be attributed to inadequate financial supports and insufficient government assistance to carry out those services. This agrees with findings of (Abudu, 2017) that most CBOs do not render some support services due to lack of financial assistance from government.

Table 3: Effectiveness of CBOs in rendering support services

Services Rendered	Mean
Facilitate access to credit	2.58
Access to farm input	2.08
Improve access to market	3.09
Improve access to knowledge	2.93
Conflict mediation	3.48
Access to labour	3.38
Unionism	3.32
Facilitates access to processing facilities	2.42

Source: Field Survey, 2019.

Constraints faced by the community-based organisations

Table 4 revealed that the severe constraints faced by the CBOs in the area were inadequate financial capital, insufficient government assistance and unfavourable government policies. This implies that most of the CBOs will not be able to render some support services to their members due to lack of financial support and assistance from the government. This is in agreement with the findings of (Effiong, 2012) who posit that inadequate financial support hampers the execution of major activities which will help the Community-based Organisations and their members experience growth.

Table 4: Constraints Faced by the Community-based Organisations

Constraints	Mean	Rank
Inadequate financial support	3.50	1st
Insufficient government assistance	3.36	2nd
Inadequate linkage with other Non-profit organisation	2.53	5th
Lack of proper loyalty and support from members	1.80	7th
Lack of proper recognition by government and other organisations	2.55	4th
Leadership problem	1.53	8th
Irregularity of meetings	2.02	6th
Unfavorable government policy	3.13	3rd

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATION

The study concluded that most CBOs have been effective in rendering some support services to their members. However, it is worthy of note that support services such as access to credits, farm inputs and processing facilities were not effectively rendered by majority of the CBOs in the area. Furthermore, the major constraints militating against the CBOs from being able to render effectively some of these important support services to their members were lack of financial supports, inadequate Government assistance, inadequate linkage with other NGOs, unfavorable government policies. The study recommends that Government and other NGOs should pay more attention to CBOs by providing them with the needed support in terms of favourable policies and financial backups so that they can be more effective

in supporting rural farmers in coping with the various socio-economic challenges they face in the study area.

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CONSUMPTION OF LOCAL RICE AND ITS CORRELATES AMONG FARMING HOUSEHOLDS IN AKWA IBOM STATE, NIGERIA

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ABSTRACT

The study investigated incidence of local rice consumption and determined the variables that drive local rice consumption among farming household members in Akwa Ibom State. A multi-stage sampling procedure was used in selecting a total of 10 Local Government Areas, 10 wards as well as 340 households for the study. Data were collected through the use of structured questionnaire and analyzed using both the descriptive and inferential statistics. A composite index analysis on incidence of local rice consumption revealed that 55.0% of respondents were high consumers. Educational status, occupation, consumers' perception and factors affecting perception jointly and significantly contributed to the consumption habit of the respondents (R = 0.735). Results from ANOVA revealed that local rice was significantly consumed by primary school graduates (34.40), followed by fulltime farmers (32.58) and those who added trading to farming (32.78). Therefore, more farmers should be encouraged and assisted with resources they would need to venture more into trading of locally produced rice since more trading leads to more consumption of the rice.

Keywords: Local Rice, Consumption, Correlate, farming households, AKS

INTRODUCTION

The need to promote sustainable consumption of locally produced rice is increasingly becoming expedient considering its potential benefits to the Nigerian economy. Nutritionally, locally produced rice accounts for 27% of nutritional energy, 20% of nutritional protein, 3% nutritional fat and 15kcal/caput/day, (Ajayi and Ajiboye 2020, Opeyemi, et al 2015, Ogundele, et al 2014). Locally produced rice is also an essential food crop that generates income for Nigerian farmers especially small-scale producers who sell greater portion of what they totally produce and consume only a few (Sowunmi, et al 2014).

However, a recent report has shown that only about 57% of the 6.7 million metric tonnes of rice consumed in Nigeria annually is locally produced, leading to a supply deficit of about 3 million metric tonnes, (FMARD, 2016). This deficit seems to be filled by importation. Almost every household; both rich and poor, greatly consume rice in various forms in Akwa Ibom State. The regard of rice as a necessary food item by most households of the state is an indication of increasing consumers' preference for rice.

A clear understanding of the incidence of local rice consumption and variables influencing the dynamics of rice consumption among farming families in the state can constitute a major insight in her policy formulation towards sustainability of local rice consumption.

The study investigated incidence of local rice consumption and made effort to determine the variables that drive local rice consumption among farming household members in Akwa Ibom State. The specific objectives of the study were to identify the socioeconomic characteristics of the respondents, examine the incidence of consumption of local rice and determine the correlates of local rice consumption among farming households in the study area.

The hypothesis of the study is stated thus; there is no significant variation in the incidence of local rice consumption based on selected socio-economic variables.

METHODOLOGY

The study was conducted in Akwa Ibom State which has the objective of ensuring that 80% of rice consumed in the state is produced within the state. The population of the study consisted of rice consumers in the wards that make up the ten (10) Federal Constituencies in Akwa Ibom State. Multiple-stage sampling procedure was used in the selection of respondents for this study. A total of 10 Local Government Areas, 10 wards as well as 340 households were selected for the study. Questionnaire consisting of subsections to reflect the specific objectives of the study was used for primary data collection. Collected data were

analysed using composite index, multiple regression as well as Analysis of Variance (ANOVA).

- **Model Specification**
- The model was implicitly expressed as follows: $Y=f(X_1, X_2, X_3, X_4, X_5, U)$
- Where:
- Y= Computed scores on household members' responses to rice consumption scale
- X_1= Perception of local rice (computed score)
- X_2= Marital status (married=0, widowed=1)
- X_3= Educational level (Years)
- X_4= Occupation (Non farming=0, farming=1)
- X_5= Factors influencing Perception (computed score)
- U=Stochastic term

RESULTS AND DISCUSSION

Incidence of consumption of local rice in the study area

In order to give a clearer picture on the extent of consumption of local rice among the respondents in the study area, composite index was estimated. The index range lies within 0.00 and 1.00, as the respondents estimated index tends towards 1.00, it implies that the respondents' consumption of the locally produced rice was extremely high and vice versa as it tends towards 0.00. However, for ease of analysis, the index of each item was distributed along a categorized status of consumption based on equal interval, such that 0.00 – 0.33 indicates low consumption, 0.34 – 0.66 indicates moderate consumption while 0.67 – 1.00 indicates high consumption. Results in Table 1 reveals that majority (55.0%) of the respondents fell under the high consumption category with only (15.59%) falling under the low consumption category. This implies that most of the respondents highly consumed the local rice of the state.

Table 1: Distribution of respondents by incidence of consumption of locally produced rice (EALPR)

Interval	Interpretations	Frequency	Percentages
0.0 – 0.33	Low consumption	53	15.59
0.34 – 0.66	Moderate consumption	100	29.41
0.67 – 1.00	High consumption	187	55
Total		340	100

Source: computed from field survey, 2020

Correlates of local rice consumption among farming households

Table 2 showed that all the five (5) independent variables taken together had some level of influence on the variance in the incidence of local rice consumption, R = 0.735. From the table also, 54.0% variance in incidence of local rice consumption was accounted for by the five (5) independent variables. The joint influence of these independent variables on incidence of local rice consumption was statistically significant at F = 22.101; P < 0.05.

Table 2: Correlates of local rice consumption among farming households

Variables (Xs)	Coefficients	Standard Error	t-value	Sign value
(Constant)		2.986	.598	.551
Perception of local rice (X_1)	.249	.057	2.947	.004
Marital Status (X_2)	-.053	.757	-.753	.453
Educational Status (X_3)	.166	1.564	2.166	.032
Occupation (X_4)	.236	.882	3.112	.002
Factors influencing Perception (X_5)	.551	.093	6.785	.000
R	.735			
R^2	.540			
Adjusted R^2	.515			
F-value	22.101			
Sig.	.000			

Source: computed from field survey, 2020

Analysis of variation in the incidence of consumption of local rice based on selected socioeconomic variables

Results in Table 3 revealed that the mean index of consumption of the local rice among farmers tend to decrease as the respondents attained higher educational status. Again, those who added trading to farming had the highest (32.78) consumption level of the local rice followed by those who did only farming (32.58). Also, those who consumed rice during festive periods accepted (40.00) local rice more than farmers who ate rice occasionally (36.00), weekly (31.18), daily (30.88), and then monthly (30.60).

Table 3: ANOVA Results on the variation in incidence of consumption of local rice based on selected socio-economic variables

S/n	Variables	N	Mean	F-Value	Sign 2-tailed	P-Value	Remarks
1	**Age**			**1.896**	**1.00**	**0.05**	**NS**
	11-20	90	31.15				
	21-30	147	32.13				
	31-40	60	31.03				
	41-50	23	34.20				
	51-60	14	27.00				
	61 and above	6	27.00				
2	**Marital status**			**0.313**	**0.732**	**0.05**	**NS**
	Single	129	31.25				
	Married	185	32.07				
	Divorced	26	31.00				
3	**Level of Education**			**2.525**	**0.03**	**0.05**	**Significant**
	Not attend school	42	30.75^{ab}				
	Primary	54	34.40^{a}				
	SSCE	72	32.17^{a}				
	OND/NCE	71	30.21^{ab}				
	HND/B.Sc.	81	29.50^{b}				
	MSC and above	20	26.00^{b}				
4	**Occupation**			**3.167**	**0.016**	**0.05**	**Significant**
	Civil Service	50	31.87^{a}				
	Farming	199	32.58^{a}				
	Trading	58	32.78^{a}				
	Self Employed	18	29.96^{b}				
	Others	15	28.61^{b}				
5	**Household Size**			**0.145**	**0.865**	**0.05**	**NS**
	2-5 people	198	31.53				
	5 – 10 people	117	31.46				
	10 and above	25	30.60				
6	**Rice Consumption**			**2.988**	**0.02**	**0.05**	**Significant**
	Daily	63	30.88^{b}				
	Weekly	176	31.18^{b}				
	Monthly	54	30.60^{b}				
	During festive period	40	40.00^{a}				
	Occasionally	7	36.00^{ab}				
7	**Gender**			**df**	**t-value**	**t-critical**	**Remark**
	Male	112	32.50	118	0.094	1.98	**NS**
	Female	228	30.85				

Source: Field survey, 2020

CONCLUSION AND RECOMMENDATIONS

It can therefore be concluded that the local rice in Akwa Ibom State is highly consumed by the respondents in the various communities and that the incidence of consumption is majorly driven by the respondents' perception, factors affecting perception, educational status as well as marital status of the respondents.

Based on the findings of this study, the following recommendations were made;

- More farmers should be encouraged and assisted with resources they would need to venture more into trading of locally produced rice since more trading leads to more consumption of the rice.
- More strategies should be put in place by the rice farmers and government to ensure continuous affordability, availability, sustained taste and improve the quality of the locally produced rice.

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CONSTRAINTS TO FARMERS PARTICIPATION UNDER WEST AFRICA AGRICULTURAL PRODUCTIVITY PROGRAMME IN NORTHERN STATES, NIGERIA

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ABSTRACT

The study assessed the constraints to farmers' participation under West Africa Agricultural Productivity Programme in three Northern States, Nigeria. Data for this study were obtained by the use of structured questionnaire. A total sample size of 221 respondents was selected through multi-stage sampling which represent 45 percent of the sampling frame of 485. Descriptive statistics was employed to achieve the objectives. The results of the study revealed that 56 percent were found within the productive age bracket 31-50 years, 70 percent of the respondents were males, while about 46 percent had Arabic education. The findings further, indicated that 174 (about 79 %) had access to extension contact, then 217 (98 %) were married. The study also revealed that 29 percent of the farmers were faced with inadequate access to improved seed problem, followed by 19 percent complained on high-cost farm equipment as second problem to participation in WAAPP activities, only 5 percent of the respondents interviewed reported that poor cooperative leadership was a problem. Therefore, based on these findings, it is recommended that youth should be sensitized to engage into an intervention programme to become self employed, farmers should adopt the community-based seed production practices to have access to improved seed at reasonable price and adult literacy programme should be organised by the local government, this will increase the literacy level of the farmers.

Keywords: Constraints, farmers, WAAPP

INTRODUCTION

Approximately 1.5 billion people are engaged in small-holder agriculture across the world, they include 75 percent of the world's poorest people whose food, income and livelihood prospects depend on agriculture (Andrea, 2014). Majority of the world's extremely poor people live in the rural areas and have livelihoods which are bound closely to small–holder agriculture usually as farmer, labourers, marketers as well as transporters of farm produce and suppliers of non-agricultural services to households whose income is principally derived from agriculture (Jonathan, 2002). Furthermore, agriculture is the dominant occupation of rural Nigerians and mainly practiced under rain fed condition. It constitutes a significant sector of Nigeria's economy and has contributed immensely to its economic development. It provides food for the growing population, employment for over 60 percent of the population; in addition, it further supplies raw materials and foreign exchange earnings for the development of the industrial sector and generation of the incomes for the farmers (Amaza, 2009).

It is well – known fact that participants to agricultural intervention programme usually gain easier access to inputs, extension and support services from government or non-governmental sources. Unfortunately, many participants engaged in the programme activities in the study have poor level of living despite their effort to participate in the intervention programme. It is against this background that this study examined the constraints to constraints to farmers' participation under West Africa agricultural productivity programme in the study.

Specific objectives of study were to:

i. describe the socio-economic characteristics of the respondents in the study area;
ii. identify and discuss the constraints to farmers participation in the programme

METHODOLOGY

The study was conducted in three selected Northern States of Nigeria. Multi-stage sampling procedure was employed. In the first stage, three States were purposively selected (Kaduna, Katsina and Kano). They were the participating States under the programme intervention. In the second stage six Local Government Areas were purposively selected based on participation in the programme and in the last stage 221 participants were randomly selected from the sample frame of

485 respondents. Descriptive Statistics was used to achieve objective i and ii respectively.

RESULTS AND DISCUSSION

The results in Table 1 revealed that 56 percent of the respondents were within the productive age bracket of 31-50 years. However, the mean age for the respondents was 43 years. The result indicated that the respondents were in their active age, since majority of them were not above 50 years in age.

The findings of the study also showed that 70% of the farmers were malesand 30% were females. This implies that the male respondents dominated the farming activities in the study area.

The finding on these variables shows that 46 percent of the respondents had Arabic education; 23 percent had secondary school education respectively. The implication of this result is that most of the farmers can read and write either in Arabic or in western education which gives them a better opportunity to accept and understand developmental project without little stress. The result further revealed that the mean years in education for the farmers was 11 years.

The result of the study as presented in Table 1 indicated that 217 (98%) were married, while 2 percent were single among the farmers interviewed. This implies that most of the respondents in the study area were married; this could be attributed to the norms and culture of the people in the area, which encourage early marriage.

Table 1: Socio-economic characteristics of respondents (n=221)

Variable	Frequency	Percentage	Mean
Age			
20 – 30	39	18	43
31 - 40	60	27	
41 – 50	63	29	
51 – 60	46	21	
Above 60	13	5	
Sex			
Male	155	70	
Female	66	30	
Education level			
Adult	5	2	
Arabic	102	46	
Primary	38	17	
Secondary	51	23	
Tertiary	25	12	
Access to extension contact			
Yes	174	79	
No	47	21	
Marital status			
Married	217	98	
Single	4	2	

Source: Field Survey, 2018

It has been observed that farmers' participation in the WAAPP activities in the selected study area were constrained by many factors. The major constraints that hindered their participation were presented in figure 1. Inadequate access to improved seed, high cost of farm equipment, inadequate access to credit facilities, poor road network, inadequate storage facilities, limited market information and poor cooperative leadership are some of these inhibitors. Inadequate access to improved seed was ranked first whereby the highest proportion of the participating farmers which is (29 %) reported inadequate access to improved seeds as the major inhibitor to

participation. This may be connected with the high cost of the improved seeds which the farmers needed to improve their yield and level of living.

It is generally known that improved seeds perform better and yield higher than the unimproved one that the farmers recycle from their farms subsequent to being introduced to improved seeds because improved seeds respond very well to fertiliser while at the same time resisting pest and disease infestation. While this finding confirmed the findings of Muhammed *et al.* (2011) who reported that non-availability of improved seeds was a constraint to farmers' participation in an intervention programme.

The high cost of farm equipment was reported as the second challenge limiting farmers' participation at (19 %). The farmers reported that farm equipment such as planters, sprayers and even the heavy equipment like tractors are very expensive for single household to rent or purchase. Most of the participants could not afford to rent tractors to help them clear and till their farms. Using modern farm equipment minimizes cost on farm operations such as land preparation, weeding, harvesting and even in the control of pest and disease infestation. Modern farm equipment save labour and encourage farmers to expand their farm size to produce more agricultural commodities. Inadequate access to credit facilities was among the problems listed by the respondents concerning their participation in the WAAPP activities in the study area. About (15%) of the participating farmers were unable to access credit facilities to carry out their farming activities.

The participating farmers equally complained of poor road network as one of the challenges to their participating in WAAPP activities. The respondents (12 %) stated that poor road is a major challenge during the wet season when farm resources (inputs) are difficult to transport, in fact, most labourers would not accept job offer where the farm is difficult to access. Therefore, transporters would charge higher transportation fare to move farm inputs like organic and inorganic fertilisers, seeds etc. to the farm site. Limited market information and poor cooperative leadership were other challenges the farmers faced to participate in WAAPP activities. Many of these farmers had problem on sourcing market information for the sale of their farm produce. The respondents therefore sold their farm produce quickly in most cases to middle men who then resell the produce at higher prices in the market, when the price appreciate or increase. Usually under such situation farmers operate at lost. Lastly, the farmers also complained of poor leadership in the cooperative societies they belong to. About 5 percent of the farmers stated that the leaders of the cooperative societies were not managing them very well; therefore, some members were not comfortable with the official's attitude. In some cases, the leaders were accused of misinforming members on what to do to benefit from the WAAPP while some divert the programme assets for personal use. Because of all these manipulations; many members became skeptical and increase the conflict among the group members which reduces group cohesion.

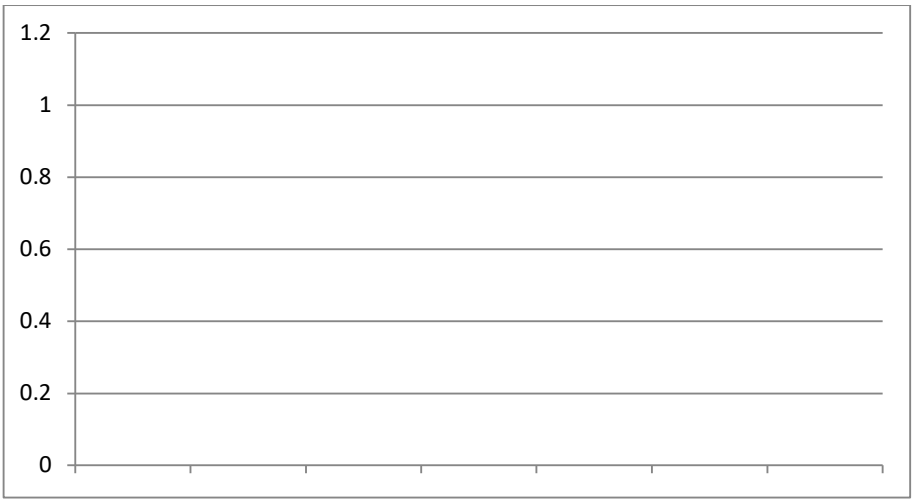

Figure 1: Constraints to farmers' participation in WAAPP

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it is concluded that participants in the WAAPP activities were at productive age, majority of the respondents were married. Furthermore, the participating farmers were mostly males, this indicated that males dominated farming activities in the study area and most of the farmers had Arabic education. However, the farmers were constrained to problems that limited their participation in WAAPP activities, such constraints were inadequate access to improved seeds, high cost of farm equipment, inadequate access to credit facilities etc.

RECOMMENDATIONS

It was found that major of the participants were between 41 – 50 years thus, it is recommended that facilitators should sensitize the youth to engage into intervention programme to become self employed. This will reduce the labour market among our teeming youth in the country.

It is recommended that farmers should adopt the community-based seed production practices. This would enable the farmers to have access to improved seeds at reasonable price. The practice should be supervised by National Seed Council of Nigeria, while the extension staff would serve as facilitator to the farmers for establishing the community-based seed farm.

It is recommended that Adult education programmes should be organised by local government in order to increase the literacy levels of the farmers. This could help the farmers to understand the activities of WAAPP better.

It is also recommended that women should be sensitized and mobilized to participate in the programme activities. It was found that males were the most beneficiaries of the programme more than women. This would increase the women capacity in terms of income generation for family promotion.

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PROMOTING MOTORISED GROUNDNUT OIL EXTRACTOR AMONG RURAL WOMEN IN BUNGUDU LOCAL GOVERNMENT AREA OF ZAMFARA STATE

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ABSTRACT

This study was aimed at promoting and evaluating groundnut oil extractor among women processors in Bungudu Local Government Area of Zamfara, State. Local processing has been associated with problems of drudgery and low productivity. Hence, this study also assessed the profitability as well as the perception of the clientele towards the extractor in comparison to the traditional method. A sample of 78 women was selected from 8 communities using proportionate stratified random sampling. Data collection involved administration of questionnaire and observation. Descriptive statistics and gross margin analysis were used to analyze the data obtained. The study found that using the motorised extractor is far more profitable than the traditional method of extraction, with a profit margin of N4500 and N2800 respectively when 25kg of groundnut was processed. The participants perceived the extractor to be a compatible, complex and relatively advantageous innovation. However, they also found it costly to acquire. Overall, the extractor was deemed beneficial and should be made more affordable to rural women.

Keywords: Groundnut oil extractor, income, rural women, Zamfara

INTRODUCTION

The production of groundnut oil and its by-products, including raw or fried cakes, is an important source of income for women in large areas of Africa. Groundnut oil extraction in most developing nations such as Nigeria is usually processed manually by hand, and like all other manual operations, it is full of drudgery and time-consuming (Ajao *et al.,* 2010). According to United Nations Development Fund for Women (UNIFEM), (1997) a typical process from West Africa, using local implements, is tasking and tedious. Ajao, *et al.* (2010) stressed that the weak points of these processes are the grating or crushing steps.

The women engaged in groundnut oil extraction in the community used traditional processes of groundnut oil extraction which are labour intensive and time-consuming. It is a tedious process involving hand stirring using pestle and mortar. At the household level this whole process could take about 4 to 5 hours to process 9 to 12kg of groundnut. Changes seem apt, at least for any kind of market-oriented production small, medium or large scale. The potential for improvements would best be tapped by a simplified reproducible version of the modern technologies which will maximize groundnut oil quality, quantity and efficient production. In order to assist the small-scale groundnut oil processors in the rural communities, this project introduced improved groundnut oil extractor among women for income generation in Bungudu Local Government Area of Zamfara State. This study was aimed at promoting and evaluating groundnut oil extractor among women processors in Bungudu Local Government Area of Zamfara, State. It also assessed the profitability as well as the perception of the clientele towards the extractor in comparison to the traditional method.

METHODOLOGY

The study was conducted in Bungudu Local Government Area (LGA) of Zamfara State. It is 32 kilometers eastward away from the State capital, Gusau and lies between latitude 12º15ˈN and longitude 6º33ˈE in the Northern Sudan Savannah ecological zone of Nigeria. Bungudu has a population of 366,008 with roughly equal proportion of males and females. Groundnut is one of the major cash crops produced in the area (Garba *et al.,* 2015). This study is based on the principles of action research and utilised the methods of participatory extension in delivering and evaluating the technology of groundnut oil extraction. Action research was initiated to solve the immediate problem of inefficiency of traditional oil extraction methods used by rural women in the target community. Multi stage sampling technique was used. In the first stage, eight villages were purposively selected based on the proportion of women groundnut processors therein. These are:

Gulubba, Zaman Ruwa, Gidan na Rinji, Farar-kasa, Fara-kuwa, Yar-rumfa, Gidan Algo, and Sito. A survey and meeting were held with the women and other stakeholders involved in groundnut processing in all the villages to have the actual number of women who practice groundnut oil processing in each village within the area and the interested women were gathered in each village. Subsequently, a sample of 78 participants was selected using proportionate stratified random sampling technique as shown in Table 1.

Table 1: Number of interested women and the sample selected from each village

Village	No. of processors	Sample
Gulubba	30	15
Zaman-ruwa	22	11
Gidan Narinji	20	10
Farar Kasa	20	10
Fara Kuwa	16	8
Yar Rumfa	14	7
Gidan Algo	22	11
Sito	12	6
Total	156	78

RESULTS AND DISCUSSION

The result in Table 2 showed the cost and return of groundnut oil extraction. Twenty-five kilograms of unshelled groundnut was processed using both the traditional and mechanized methods to demonstrate and compare profitability. Using the traditional (mortar and pestle) method a total N8100 was realized from the investment of N5300 giving a gross margin (profit) of N2800. Higher returns of N9650 were obtained using the mechanized extractor, even with lesser total variable cost of N5150, giving a profit of N4500. This shows that the extractor is far more profitable than the traditional method.

Table 2: Cost and returns of groundnut oil production using traditional and mechanized methods

Items	**Local method**			**Mechanized extractor**		
	Quantity	***Price (N)***	***Total (N)***	***Quantity***	***Price (N)***	***Total (N)***
Groundnut	25kg	160	4000	25kg	160	4000
Frying and shelling			500			500
Milling			300			300
Oil extraction			500			60
Fuel			-	2 litres		290
Total variable cost (TVC)			**5300**			**5150**
Oil	12 litres	550	6600	15 litres	550	8250
Cake	15kg	100	1500	14kg	100	1400
Total income (TI)			**8100**			**9650**
Gross Margin (GM)			**2800**			**4500**

Furthermore, the use of the extractor was found to be time saving. The local method of extracting oil from 25kg of groundnut took 65 minutes while it took only 27 minutes to using groundnut oil extractor. The oil yield increased and the time taken to finish the oil extraction showed how efficient was the oil extractor. The oil extractor was also efficient and cost effective considering the energy and time conservative mode of operation.

At the end of the groundnut oil extraction training and demonstration process, the perception of the trainees was assessed based on some factors of adoption: compatibility, complexity, affordability and accessibility of the groundnut oil extractor. It was found that 60.3% of the

respondents observed the oil extractor was compatible with their lifestyle. Compatibility is important in conservative societies like northern Nigeria especially among the women. However, majority (79.5%) of the processors considered the machine too complex to use. They found it difficult to start and operate the machine. Hence, they recommended modifications to simplify the extractor and its operations. Another, constraint is that the processors considered the machine to be costly. Only (37.2%) said they could afford the extractor. Meanwhile, most (87.2%) of the respondents affirmed that the new motorised extractor has advantage over and above the traditional tools and processes of groundnut processing. This could be attributed to the efficient demonstration and training organised in the community.

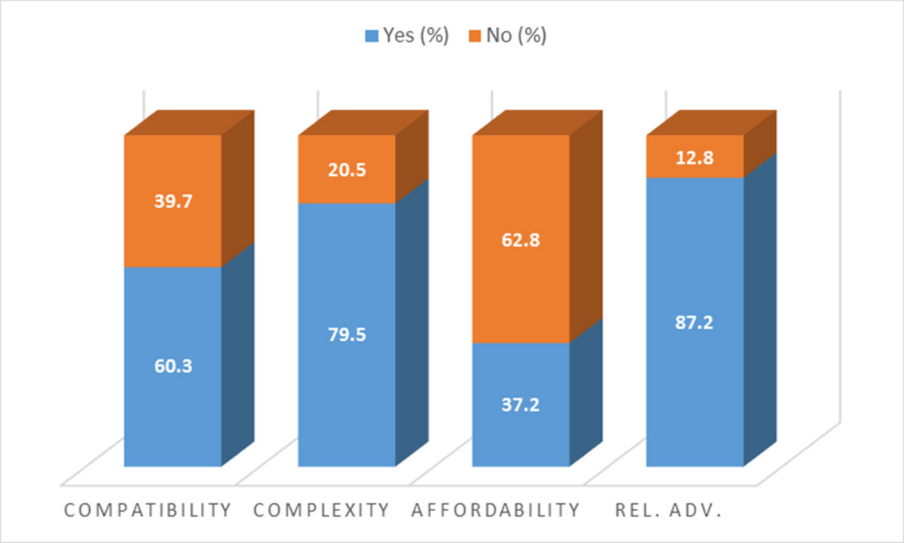

Figure 6: Perception of the motorised extractor among participants

CONCLUSION

The motorised extractor by IAR was designed to reduce drudgery, save time and labour, and enhance profitability in groundnut oil extraction thereby reducing poverty and improving livelihood among women processors in the rural areas. Based on this study, the machine was found to be beneficial in these aspects as it was found to be profitable to use. However, the participants found the machine to be costly to acquire and complex to operate. These attributes could hinder adoption of the innovation among resource-poor women in the rural areas of Zamfara State, and Nigeria in general.

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