



CONTEMPORARY SOCIOLOGICAL CONTEXTS OF THE NIGERIAN FOOD SYSTEM

PROCEEDINGS

of the

32nd ANNUAL NATIONAL
Congress

of the

RURAL SOCIOLOGICAL ASSOCIATION OF NIGERIA (RuSAN)

held at

USMANU DANFODIYO UNIVERSITY, SOKOTO (UDUS)

Between 30th October and 3rd November 2023



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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 30th Annual National Congress held at the Federal University of Agriculture, Abeokuta between 4th and 8th October 2021. 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.

Year	Theme	Editor-in-Chief	Venue/Location
2023	Contemporary sociological contexts of the Nigerian food system	Prof John Oladeji	Usmanu Danfodiyo University, Sokoto
2022	Poverty, governance, and social values in rural context	Prof John Oladeji	Federal University, Oye-Ekiti
2021	Transforming rural environment: The sociological perspective	Prof John Oladeji	Ogun State
2020	Emancipation of the Rural Family in Contemporary Nigeria	Prof. Kolawole Adebayo	Landmark University, Omu Aran, Kwara State
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

Year	Theme	Editor-in-Chief	Venue/Location
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
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

SN	Title	Authors	Pages
1	Preliminary pages		1 – 4
2	Table of content		5 – 6
	<i>Invited papers</i>		
3	Contemporary sociological contexts of the Nigerian food system	Prof Halima SARKINFADA	7 – 16
	<i>Presented papers</i>		
4	Determinants of dietary diversity of rural households in southern region of Kebbi State, Nigeria	Sanchi, I. D., Alhassan, Y. J., Manga, T. A., Sabo, A. Y. and Elisha, E.	17 – 20
5	Effect of farmer-herder conflicts on income generation among farmers in Oyo state, Nigeria	Akinbile, L. A., Aminu, O. O., and Adeyemi, B. M.	21 – 24
6	Influence of artisanal fisheries on income generation of the fishing communities along Shiroro dam, Nigeria	Alhassan, Y. J., Sanchi, I. D., Manga, A. T. and Sabo, A. Y. Ayeni, M. D.	25 – 28
7	Assessment of integrated soil management practices among cassava farmers in Osun state, Nigeria	Wahab, M. J. and Olatinwo, L. K.	29 – 33
8	Indigenous practices used by maize farmers for climate change adaptation in Emohua local government area, Rivers state, Nigeria	Briggs, S., Ifeanyi-Obi, C. C. and Uchendu, K. O.	34 – 37
9	Poor access to food and food insecurity in Nigeria	Abdulkareem, S. B., Sunday, O., Ekpe, H. A., Khadelor, M. O.	38 – 41
10	Determinants of certified seeds accessibility among farming households in Imo state, Nigeria	Izuogu, C. U., Atasie, C. N., Njoku, L. C., Azuamairo, G. C., Ibrahim-Olesin, O. and Onyeneke, C. J.	42 – 45
11	Determinants of rural -urban migration in Ebonyi state, Nigeria	Izuogu, C. U., Atasie, C. N., Njoku, L. C., Azuamairo, G. C., Agou, G. D., and Onyeneke, C. J.	46 – 49
12	Effects of Covid-19 on livelihood activities of rural households in Oyo state, Nigeria	Oyelere, G. O., Sadiq, M. M. and Ojo, O. A.	50 – 52
13	Perceived indigenous treatment of Covid-19 manifestations among rural households in Oyo state, Nigeria	Olagoke, O. O., Oyelakin, A. O., and Omotoso, A. B.	53 – 55
14	Determination of soil organic carbon of Usmanu Danfodiyo University main campus, Sokoto state	Ibrahim, M., Muhammad, U. M., and Sauwa, M. M.	56 – 58
15	Willingness to participate in platform cooperatives among members of abundant farmers' cooperative society, Ikorodu, Lagos state	Ogunyemi, O. I.	59 – 61
16	Effects of ICT infrastructure on food crisis: evidence from Nigeria	Yusuf, O. J., Sulaimon, T. T., Olanrewaju, K. O., and Ambali, Y. O.	62 – 64
17	Nature of technology used for artisanal fisheries among fishing communities along Shiroro and Kainji dams, Nigeria	Muhammad, A. M., Alhassan, Y. J. and Isah, A.	65 – 71
18	Acceptability of immunization programme among rural women of reproductive age in Oyo state, Nigeria	Badiru, I. O., Adeyanju, B. O. and Aina, A. S.	72 – 75
19	Attitude of farmers towards agricultural radio programmes in Ogbomosho agricultural zone of Oyo state	Adesina, S. A., Nwokocha, J. C. & Oyesola, O. B.	76 – 78
20	Impact of west African Soy Limited (WASIL) on maize farmers food security in North-West, Nigeria	Ebenehi, O., Muntakka, M, Musab, I.	79 – 81
21	Level of usage of information communication technology facilities among yam producers in Kwara state	Ayanda, I. F., Abdulrahman, O. L., Ukpi, M. S. and Ibitoye, A. O.	82 – 85
22	Assessment of social media usage by extension agents for disseminating agricultural information in Ondo state	Olatunji, O. C., Fanu, A. T. and Fasina, O. O.	86 – 89
23	Effects of socioeconomic variables on food security status among rural farming households in Yagba east local government area of Kogi state, Nigeria	Pelemo, J. J., Yakubu, S., Abwa, Y. S., Adzenga, J. I., Shaibu, S. O., David, M. J., Abubakar, U. A. and Beida, A. S.	90 – 92
24	Effects of petroleum subsidy removal on sustainable poultry value chain in southwest Nigeria	Kolawole, A. O., Adegun, M. K. and Adebo, G. M.	93 – 96



SN	Title	Authors	Pages
25	Effects of Covid-19 lockdown among rural farmers in Fika local government area, Yobe state Nigeria	Ismaila, H. A., Idrissa, M., Owoade, E. O., Galadima, M and Ahmad, M.	97 – 99
26	Analysis of coping strategies to food insecurity among farming households in Yagba east local government of Kogi state, Nigeria	Pelemo, J. J., David, M. J., Yakubu, S., Obafemi, R. A., Shaibu, S. O., Obamero, B. K. and Abwa, Y. S.	100 – 102
27	Effects of conditional cash transfer on rural households' food security status in southwestern Nigeria	Alabi, A. F. and Oyesola, O. B.	103 – 105
28	Cassava processors' training needs on safety practices in Kwara state, Nigeria	Mustapha, A. T., Ogunjimi, S. I., Adewumi, O. T., Akute, O. D.	106 – 109
29	Constraint influencing farmer's adoption of new agricultural technologies in Kebbi state	Muhammad, A. M., Alhassan, Y. J., Sanda, A. Y. and Abubakar, I.	110 – 112
30	Assessment of land use patterns among arable crop farmers in north central states, Nigeria	Yisa, F., Tanko, L., Tsado J. H., Adejoh, S. O., & Oladimeji, Y. U.	113 – 117
31	Farming households' perceived effects of covid-19 pandemic on food security in Kwara state, Nigeria	Yusuf, O. J., Ekanem, J. T., Olanrewaju, K. O., Olatinwo, L. K., Issa, F. O., Samuel, P. S., Adebo, G. M.	118 – 121
32	Information flow of postharvest losses and reduction strategies for food security in Imo state, Nigeria	Kanu, W. N., and Onyekwere, I. A.	122 – 128
33	Forecasting shock-induced food prices in Nigeria using the Arima model	Oyelami, B., Ogunbayo, I., Oyegoke, O., Akano, O., Olutegbe, N., Adediran, M., Olorunkoya, O. and Adekoya, A.	129 – 131
34	Evaluation of gender differentials in the formal educational status of arable crop famers in Oyo state, Nigeria	Adebimpe, A.T., Okunade, E. O., Ajala, O. A., Ojo, K. O., Henshaw, E. E., and Fabunmi O. D.	132 – 135
35	Perceived effect of covid-19 pandemic on gender roles among maize farmers in Ido local government area of Oyo state, Nigeria	Odebode, S. O., Adetunji, T. A. and Adeniyi, R. T.	136 – 139
36	Determinants of migrants' livelihood security in Ogun state, Nigeria	Mustapha, B. I., Adejumo, A. A., Yekinni, O. T., and Taiwo, A. O.	140 – 143
37	Analysis of conflict resolution mechanisms between crop farmers and herders in Katsina state, Nigeria	Muhammad, M. B., Aliyu, A. S., Yakubu, D. H., Umar, A. U., Garba, A., Umar, I. and Mustapha, S. H.	144 – 147
38	Gender access to agricultural land among groundnut farmers in Agwara local government area of Niger state	Yakubu, D. H., Ali, M. B., Mohammed, F. A., Oduehie, T. C., Muhammad, M. B., Usman, Z. A., and Luka, M.	148 – 151
39	The use of extension agronomic practices among rice farmers in Kano state, Nigeria	Tafida, I., Abdullahi, A. and Abdullahi, S. N.	152 – 155
40	Rapid assessment of IFAD – VCDP mainstreaming for empowering gender and youth in Nigeria	Abdullahi, A., Suleiman, M. S., Idris, A. A., Tafida, I. Halliru, M., Yisa, F. Tafida, N.	156 – 158
41	Social, economic and environmental reasons of farming households affected by 2020 flood for living in Sokoto Rima river basin, Nigeria	Tambari, I. W., Umar, S., Jega, A. A. and Ambursa, A. S.	159 – 163
42	Use of smart agricultural technologies among researchers in agricultural research institutes in Oyo state, Nigeria	Oladeji, J. O., Awotula, T. T. and Olaore, O. M.	164 – 168



INVITED PAPERS



**CONTEMPORARY SOCIOLOGICAL CONTEXTS OF THE NIGERIAN FOOD SYSTEM. BEING A
LEAD PAPER PRESENTED AT THE 32ND ANNUAL NATIONAL CONGRESS OF THE RURAL
SOCIOLOGICAL ASSOCIATION OF NIGERIA (RuSAN) IN COLLABORATION WITH USMANU
DANFODIYO UNIVERSITY, SOKOTO, NIGERIA. HELD AT MANAGEMENT SCIENCE BOARD
ROOM, FACULTY OF MANAGEMENT SCIENCES UDUS**

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ABSTRACT

This paper looked at the concept of food system, food security and various challenges facing food system in the Nigerian contexts. Also, the paper outlined various dimensions of food security and strategies that can be used to enhance standard food system programme in Nigeria and food security. Secondary data collected from both print and online publications were used for the paper. The paper established that poor budget allocation, insecurity, global issues and Nigerian monetary policies, infrastructure facilities problem, social media, citizen's communication, rural-urban migration scenario, land resources management policies and technical and technological interventions, climate change and economic challenges are some of the barriers to effective food system programme in Nigeria. Based on these barriers identified, the paper recommended huge investment in the Nigerian food system programme, stable monetary policies, land reform, provision of adequate infrastructure facilities, security and training programme for stakeholders in the food system.

Keyword: Food system, Food security

INTRODUCTION

Food security challenges is a global problem. Today, more than 800 million people across the globe go to bed hungry every night, most of them are subsistence farmers who depend on agriculture to make a living and feed their families (Relief web 2023, World-Bank, 2023, UNICEF, 2023). Despite an explosion in the growth of urban slums over the last decade, nearly 75 percent of poor people in developing countries live in rural areas. In Nigeria, UNICEF observed that Nearly 25 million Nigerians are at risk of facing hunger between June and August 2023 (lean season) if urgent action is not taken, according to the October 2022 Cadre Harmonisé, a government led and UN-supported food and nutrition analysis carried out twice a year. This is a projected increase from the estimated 17 million people currently at risk of food insecurity. Continued conflict, climate change, inflation and rising food prices are key drivers of this alarming trend (UNICEF 2023). Food access has been affected by persistent violence in the north-east states of Borno, Adamawa and Yobe (BAY) and armed banditry and kidnapping in states such as Katsina, Sokoto, Zamfara, Kaduna, Benue and Niger. According to the National Emergency Management Agency, widespread flooding in the 2022 rainy season damaged more than 676,000 hectares of farmlands, which diminished harvests and increased the risk of food insecurity for families across the country.

The flooding is one of the effects of climate change and variability impacting Nigeria. More extreme weather patterns affecting food security are anticipated in the future. of the 17 million people who are currently food insecure, 3 million are in the northeast BAY states. Without immediate action,

this figure is expected to increase to 4.4 million in the lean season. This includes highly vulnerable displaced populations and returnees who are already struggling to survive a large-scale humanitarian crisis in which 8.3 million people need assistance (UNICEF. 2023). "The food security and nutrition situation across Nigeria is deeply concerning," said Mr. Matthias Schmale, the Resident and Humanitarian Coordinator for Nigeria. "I have visited nutrition stabilization centres filled with children who are fighting to stay alive. We must act now to ensure they and others get the lifesaving support they need". In the past and in the present, the Nigerian government in different times has come up with different policies and programmes to address the problem of food insecurity.

For instance, in 2016, the Nigerian government formulated a policies titled national policy on food and nutrition in Nigeria. The policy reads as following; to achieve the goal of attaining an optimal nutritional status by the year 2025, a number of objectives and targets are articulated as follows:

1. To improve food security at the national, community and household levels;
2. To reduce under nutrition among infants and children, adolescents and women of reproductive age;
3. To significantly reduce micro nutrient deficiency disorders, especially among the vulnerable group;
4. To increase the knowledge of nutrition among the populace and nutrition education into formal and informal training;
5. To promote optimum nutrition for people in especially difficult circumstances, including PLWHA;

6. To prevent and control chronic nutrition-related non communicable diseases;
7. To incorporate food and nutrition considerations into the Federal, State and Local Government sectoral development plans;
8. To promote and strengthen Research, Monitoring and Evaluation of food and nutrition programme;
9. To strengthen systems for providing early warning information on the food and nutrition situation; and
10. To ensure universal access to nutrition-sensitive social protection (FRN 2016).

From here I will like to draw our minds to some fundamental issues I will be discussing in this presentation. I will look at the concepts of food system, food security, food security dimensions, Challenges facing food security in Nigeria and ways forwards.

General food systems concept

Food system have been defined by different scholars to mean different things According to International food research policy (2023), food systems are the sum of actors and interactions along the food value chain—from input supply and production of crops, livestock, fish, and other agricultural commodities to transportation, processing, retailing, wholesaling, and preparation of foods to consumption and disposal. Food systems also include the enabling policy environments and cultural norms around food. Ideal food systems would be nutrition-, health-, and safety-driven, productive and efficient (and thus able to deliver affordable food), environmentally sustainable and climate-smart, and inclusive. To realize this vision, continued investments must be made in agricultural research and development and technological innovations, paving the way for programs and policies that are based on sound evidence. Peter (2019) defined food system as all policies and programme designed down to ensure adequate production of food, processing and distribution.

USDA's National Agricultural Library defines them simply as “*everything* from farm to table.” USDA describes Local and regional food system as “place-specific clusters of agricultural producers of all kinds—farmers, ranchers, fishers—along with consumers and institutions engaged in producing, processing, distributing, and selling foods. The concept of a “food system” represents a contrast to notions of agriculture and food production and consumption as a simple, linear chain from farm to table. Food systems are instead, complex networks that include all the inputs and outputs associated with agricultural and food production and consumption. Food systems can vary substantially from place to place and over time, depending on location specific conditions. The food systems concept provides a comprehensive framing

through which to assess the social, economic, and environmental dimensions of sustainability (Global Food Nutrition Security, 2021).

What is food security? Based on the 1996 World Food Summit, food security is defined as when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. USAID (2022) also, defined food security as means of having, at all times, both physical and economic access to sufficient food to meet dietary needs for a productive and healthy life. A family is food secure when its members do not live in hunger or fear of hunger.

The four main dimensions of food security:

1. *Physical availability of food:* Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.
2. *Economic and physical access to food:* An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
3. *Food utilization:* Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals are the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
4. *Stability* of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status (Committee on World Food Security CFS; USAID 2022).

Challenges of food security in Nigeria

There are many problems facing food security in Nigeria. some of these problems includes; insecurity, global issues, Nigerian monetary policy, Nigerian ICT infrastructure facilities, social media, Rural migration, Land resources management and technical and Technological interventions,

Insecurity

Insecurity according to Musa (2018) and Ogunode, Godwin and Unoaku (2021) is the state of restless and fear. It is the state of intimidation and

lack of protection from arms. Insecurity has been described as one of the factors that can cause food insecurity nationally by Ogunode, Ahaotu and Obi (2021) and Ogunode and Kolo (2021) Nigeria as a country is faced with different forms of insecurity and these forms of insecurity has implications on national food security. Musa (2022) noted that conflicts and worsening insecurity in certain regions of the country, especially in the northeast, northwest and north-central have equally disrupted agricultural activities and displaced farmers. This has hindered food production and distribution, as many farmers are unable to visit their farmlands for fear of attacks by bandits or herdsmen in the last decade. According to Ibirogb (2022) prominent grain-producing states are currently being plundered by armed bandits, terrorists and marauding herders, preventing farmers from accessing their farms. Niger, Ebonyi, Nasarawa, Bauchi and Kaduna, among other grain-producing states, have been languishing under attacks by bandits, terrorists and Boko Haram insurgents. The number one maize-producing state in the country, Kaduna, and its counterpart, Niger, are enmeshed in activities of terrors and bandits, and intensive farming in the states, to say the least, is practically impossible. Unfortunately, Nigeria is estimated to have a deficit of 10 million metric tonnes of maize, and this could become aggravated as commercial production in the largest producing states is disrupted, while industrial demand soars and its price skyrockets. Studies by Ogunode, Umeora and Olatunde-Aiyedun, (2022); Ogunode and Chijindu (2022); Omorogbe (2016) established that insecurity across Nigeria as affected food production and security.

Inflation

Inflation according to Ogunode and Ukozor (2023) refer to continuous rising in the general prices of goods and services in a country, state or communities. Premium time (2023) reported that Nigeria's annual inflation rate rose to 24.08 per cent in July from 22.79 per cent in the previous month, the National Bureau of Statistics (NBS) said Tuesday. The statistics office asserted that the July 2023 inflation rate showed an increase of 1.29 per cent points when compared to June 2023 headline inflation rate. The food inflation rate in July 2023 was 26.98 per cent on a year-on-year basis, which was 4.97 per cent points higher compared to the rate recorded in July 2022 (22.02 per cent). The bureau observed that the rise in food inflation on a year-on-year basis was caused by increases in prices of oil and fat, bread and cereals, fish, potatoes, yam and other tubers, fruits, meat, vegetables, milk, cheese, and eggs. Although the prices of food have been on the rise across Nigeria in recent years. But the situation deteriorated due to the impact of government policies such as the removal of subsidy on petrol, among others. Premium time maintained

that On 29 May, during his inauguration, President Tinubu announced the removal of subsidy on petrol.

This development has caused hardship for many Nigerians with its attendant increase in the prices of goods and services. Apart from the removal of subsidy, the Central Bank of Nigeria (CBN) also announced the unification of all segments of the foreign exchange (FX) market as part of efforts to engender transparency in the markets and boost investors' confidence. Inflation as impact on food consumption of Nigerians. Inflation as led to increases in prices of farm inputs. For instance, prices of fertilizer, herbicides, rice seeds and pesticides (Premium time 2023a). Also, Ibirogb (2022) cited Mr Ayooade Popoola in Premium (2022) who noted that expensive inputs have contributed to the reduction of hectares under cultivation in the absence of affordable loans to farmers. Popoola said one kg of quality rice seeds had increased from N300 to N700 in less than two years. And, land preparation, particularly ploughing of one acre of farmland, had increased from N8,000 in 2022 to N30,000 in 2023. The increase in prices of the critical inputs in agriculture had incapacitated farmers and drastically reduced the total number of hectares under cultivation. Some farmers, he added, have abandoned commercial farming altogether. Ola (2021) discovered that inflation in Nigeria is one of the major factors responsible for food insecurity. Relief web (2022) noted that inflation in West and Central Africa is responsible for soaring food prices that poses a significant threat to food security by reducing the purchasing power of millions of people, especially vulnerable groups. This is mainly due to the dominant share of food weight in the consumer price index (CPI) basket. The average share of food expenditure of households in West Africa is 43.1% of the total, with households in Mali, The Gambia, Nigeria, Senegal, Sierra Leone and Burkina Faso spending more than 50%

Influence of Global Issues

International issues on wars and financial crises sometimes has impact on international and national security. Balana, Andam, Amare, Adeyanju, and Laborde (2022) noted that the current rise in global market prices for major food commodities almost mirrors that of the 2008 food crisis, presenting a worldwide threat to food security. The situation is particularly severe in Africa, where the COVID-19 pandemic and now the Russia-Ukraine crisis have exposed the vulnerability of food systems to major shocks, particularly in countries like Nigeria that rely heavily on imports of major staple foods such as rice and wheat. With global food prices spiking, and supplies of wheat, oils and other items disrupted due to the Russia-Ukraine war, Nigeria faces a number of threats to its already precarious food security. Since over 50% of the foods consumed by Nigerian households come

from purchased sources, food price inflation threatens to place many people in a worsening food insecurity situation. In particular, Nigeria's dependence on wheat imports may lead to high prices, and supply problems.

Nigerian monetary (Cashless) policy and Small-scale agro-allied business

One of the problems that has affected food security in Nigeria is unstable monetary policies and unreliable agricultural policies. Recently, the Central Bank of Nigeria (CBN) embarked on a cashless economy policy. The central bank governor's maintained that the main objectives of its redesign were to make monetary policy decisions more effective, deepen financial inclusion in the country, curb terror financing and banditry, and discourage vote-buying by politicians and money laundering. The CBN intended to operate a cashless economy in Nigeria as obtained in developed countries, where as a result, issues of money laundering are promptly tackled (Ibirogbu F. 2022; Relief web 2023; Agrifoodnetwork. 2023).

The agriculture sector, which contributes significantly to the economy, suffered from depressed spending, affecting farmers' ability to pay for labour and resulting in reduced production". The cashless economy policy was implemented and this has affected small-scale agro-allied business across the country (Ezeamalu, 2023). Recently a study was carried by SBM with a titled 'Strapped: Impact of the Cash Scarcity on Individuals and Businesses' and it was released on 16 May, 2023. The study discovered that the cashless policy caused "lasting damage" to individuals and businesses across Nigeria. Its findings showed that transportation and feeding became more difficult and transport workers had to use POS machines to ease payment for passengers. According to the study, 100% of the interviewees in north-central Nigeria said they were affected by cash scarcity. When the CBN started easing the policy between January and March, petty traders in the region could not access their old notes from the banks, and customers could not pay. For instance, as the scarcity began to ease in mid-March, the Poultry Association of Nigeria asserted they had been unable to sell 15 million crates of eggs over six weeks. The poultry farmers said they could not buy feed for their birds due to the paucity of Naira notes (SBMINTEL, 2022). Bailey (2023), also report tat in the first quarter of 2023, Nigerians struggled to get cash due to the Naira redesign policy of the Central Bank of Nigeria (CBN). The scarcity of the Naira notes disrupted economic activities and the livelihoods of many people. Data from the CBN revealed that the currency in circulation dropped to the lowest level in 14 years and five months to N982.1 billion in February from N1.39 trillion in the previous month. The monetary policy of Nigerian

government as affected food security and food production.

Infrastructure Facilities

Infrastructure facilities is another major determinant of food security in Nigeria. Infrastructure facility means any publicly or privately owned facility providing or distributing services for the benefit of the public, such as water, sewage, energy, fuel or communications (Sarkinfaada, 2013; Ogunode 2020). Lawinsider (2020) viewed infrastructure facilities to mean any works, structures or improvements to land or waters other than Ancillary Project Area Infrastructure which directly or indirectly provide a service or any other benefit to:- (a) the general public; or (b) the Island community, including – (c) offices, depots and staff housing by or for the benefit of the Commonwealth of Australia, the State, any local government, statutory authority or government owned corporation,(d) any electricity generation, distribution or transmission facility; (e) public education facilities; (f) public health facilities; (g) police facilities; (h) emergency facilities; (i) transport facilities (including pedestrian paths, cycle ways, transfer facilities, freight storage and logistic areas, bus stops and layovers, ferry stops, taxi stops); (j) sewage pump stations and sewerage treatments facilities; (k) solid waste transfer and treatment facilities; (l) water supply pump stations, raw water storage, clear water storage, dams, weirs, bore field infrastructure; (m) the things listed in section 24KA(2) of the Native Title Act to the extent that they are not Ancillary Project Area Infrastructure; and (n) any IBIS Store; but not including (o) Social Housing.

The roles of infrastructure facilities in national and local food security cannot be underestimated. Infrastructure facilities boost production, aids transportation of agricultural products, support preservation and storage of products. The deficit of infrastructure facilities in Nigeria is affecting national food security. Nigeria's infrastructure deficit, amounting to 30% of its gross domestic product (GDP), falls short of the international benchmark of 70% set by the World Bank, the International Trade Office of the US Department of Commerce noted. With Nigeria's population growing at a rate of over 2.5% per year and an expected population of 400 million people by 2050, the US agency worries that the current infrastructure in the country is likely to be overwhelmed and may affect food production and security. The World Bank projected that Nigeria will need to invest \$3 trillion to reduce its infrastructure deficit. In 2019, Global Competitive Index Report ranked Nigeria 130th out of 141 economies surveyed for quality infrastructure facilities. With a score of 48.33 out of 100 total

points, the country still has over 50% infrastructure deficit.

Also, Nigeria was ranked 24th out of 54 African countries in the Africa Infrastructure Development Index (AIDI), 2020. With a total score of 23.26, Nigeria lags behind Egypt at 2nd place with 88.3 points, and Libya at 3rd with 82.9 points. The implication of its infrastructure facilities is that food production, distribution, storage and preservation will be affected (Babatunde, 2022). Specifically in the area of informational communication technology, Muammed (2020) and Jude (2023) opined that over the past few decades, ICT played an important role in Nigeria's agricultural development process. However, in incorporating ICT to a sector like agriculture, which contributes immensely to the economic development in Africa and in developed economies. Scholars in time past and in present have attempted to assess or evaluate how ICT can be adopted in order to ensure food security in in Nigeria and other Africa countries due to economic large-scale advantages.

For example, Chavula Chavula (2014) conducted a study and concluded that the role of ICT in agricultural production in Africa from 2000 to 2011 using panel data for 34 African countries. The study found that the ICT plays a significant role in enhancing agricultural production. The significant challenges that the agricultural sector is experiencing in Nigeria are weak infrastructure, the high rate of insecurity and low ICT adoption. These challenges account for why agricultural efficiency is lower than that of what obtains in Kenya. Titus (2020) and Tijjani, Alhassan, Saddik, Muhammad, Lawal and Maje (2013) observed inadequate infrastructure facilities such as bad roads, inefficient transportation systems, and lack of effective storage facilities, among others across farm settlements in Nigeria. This often leads to massive spoilage and wastage, amid poor investment in preservation infrastructure that could help improve the shelf lives of food items before getting to the consumers. The high level of post-harvest losses being recorded worsens food availability due to Nigeria's growing population, making it difficult to meet the increasing demand for food.

Poor budgetary allocation

Poor funding of agricultural sectors as contributed to food insecurity in Nigeria. Mojeed, (2023) noted that despite being a signatory to the 2003 Maputo Declaration on Agriculture and Food Security in Africa, which among other things requires parties to allocate 10 per cent of their national budgets for the development of agriculture across the continent, Nigeria is yet to comply with the pact. Within the last decade, allocation to the sector has been extremely poor, even amid wastage and corruption. Before the immediate past president,

Muhammadu Buhari, assumed power in 2015, only 1.43 per cent (N67 billion) of Nigeria's 4.7 trillion national budget was allocated to the sector. In 2015, agriculture drew a paltry budgetary allocation, with only 0.9 per cent of the N4.49 trillion budget. In 2016, 2017 and 2018, allocation to the sector increased to 1.3 per cent, 1.82 per cent and 2.01 per cent of the N6.10, N7.44 and N8.61 trillion total federal budgets, respectively.

The rate fell to 1.56 per cent in 2019, and 1.34 per cent in 2020, before recording a slight increase of 1.37 per cent in 2021 and just 1.8 per cent in 2022 — the highest recorded in four years. In percentage terms, the highest allocation to agriculture in the past two decades by any government to date was in 2008 and 2009 respectively. In 2008, Mr Yar'Adua's government budgeted N2.92 billion for agriculture, which was 5.41 per cent of the total budget, and in 2009, it budgeted N3.101 billion, which was 5.38 per cent of the total budget. Clausen (2012); Popoola, (2018); Ezeamalu, (2023) and Muammed (2020) maintained that poor funding of agricultural sector is a major factor contribution to food insecurity in Nigeria.

Ineffective agricultural policies

Ineffective Agricultural policies is another factor that as affected food security in Nigeria. Mojeed, (2023) submitted that in the last five decades, Nigeria has introduced a number of agricultural policies to boost production and improve food security but the impacts of these policies have been poor. In the early years of Nigeria's independence, agriculture served as the nation's mainstay with the country being one of the biggest producers of palm oil, groundnut, cotton and cocoa. The sector alone employed over 70 per cent of the labour force and accounted for as much as 62.3 per cent of the nation's foreign exchange earnings. But things changed for the worse after the nation discovered crude oil and productivity declined in the sector. Since then, Nigeria has struggled to reposition its agricultural sector, with the numerous policies introduced by different administrations. Under Mr Buhari alone, notable agricultural policies launched in an effort to revamp the country's agricultural sector are Agriculture Promotion Policy (APP), Nigeria-Africa Trade and Investment Promotion Programme (NATIPP), Anchor Borrowers Programme, Presidential Fertiliser Initiative, Presidential Economic Diversification Initiative (PEDI), Zero Reject Initiative, Economic and Export Promotion Incentives, National Agricultural Technology and Innovation Policy (NATIP) and the Food security council among others. Despite these policy interventions, there have been no significant changes in the country's state of food availability, affordability and accessibility, prompting Mr Tinubu to declare a state of emergency in the sector.



Climate Change

Climate change as affected Nigeria's food system. Climate change as affected effective farming system. It has affected food production, processing and distribution. Akpata (2021) observed that Nigeria is listed among the top 10 countries vulnerable to climate change, impacted by higher temperatures, flooding, landslides, gully erosion and drought. Over 3.2 million people have been impacted by extensive flooding in Nigeria since July, and over 600 people have died as a result. In 34 of the 36 states, there are more than 1.4 million displaced individuals. Floods have destroyed or damaged almost 569,000 hectares of cropland, further exacerbating the already grave food insecurity. Access to water is also a challenge as irrigation systems are proving inadequate to plug water supply gaps in increasingly arid regions especially in the North West and East. Pest migrations due to weather changes have also been on the increase with devastating consequences for farmlands especially in North Central region. Meanwhile, the high levels of post-harvest losses and waste are significantly impacting the country's efforts to reduce greenhouse gas emissions and are contributing to growing landfills. As climate induced desertification renders swathes of livestock pasture barren there has been increased migration of pastoralist livestock farmers (herdsmen) southwards. These pastoralists are increasingly coming into conflict with crop farmers, further increasing tensions and violence. Nearly 2,000 persons are reported to have died due to these herdsmen-farmer conflicts in 2018 alone. This number has multiplied as the conflicts intensify.

Social media, citizen's communication, rural-urban migration scenario, land resources management policies and technical and technological interventions.

Another problem affecting food security in Nigeria is the problem of social media, rural migration, land management policies and level of technical and technological interventions from international organization and the government. Let us look at how the media is been used to cause food insecurity in the country. People use social media to spread fake news. They spread news that is capable of distracting farmers from going to farmers. They used social media to send fake pictures of price hike. Rural-urban migration as a result of internal conflicts, flood and social development as also affected food production and sustainability. Every day thousands of rural farmers are migrating from their farmland due to internal crisis and floods. Many farmers due to poor land management policies across the country cannot access land for farming and those with farmlands are been disturbed by the bandits and Fulani's. The level of technical and

technological interventions from international organization and the government has a lot to do with food security. A country has plan for national food security must ensure farmers get their right training and training on innovation to boost crop productions. Here in Nigeria, many farmers do not access training, extension services are not effective and efficient. Farm inputs and aids to support and boost production are not coming. This affects food production.

Rural sociologist perceive Food Security Strategy in Agriculture and food systems as the a whole unit made up of interrelated components of people, behaviors, relationships, and material goods that interact to solve human social problems in the production, processing, packaging, transporting, trade, marketing, consumption, and use of food, feed, and fiber through aquaculture, farming, wild fisheries, forestry, and pastoralism. The food and agriculture system operates within and is influenced by social phenomenon in which, political, economic, and environmental social, cultural, economic, and political factors influence agricultural practices, technologies, and systems, as well as how agriculture and rural life shape social and economic relations of the members of the society, prominent theories in sociology observed that the social; system as a social entity that is able to assimilate all that is within in order to carry out scientific and social investigation to solve human social problems that are inherent in society. Examples of studies in agriculture where sociology might contribute include problem the farming areas, occupational mobility, regional or rural community development, agricultural extension and adoption of innovations, consumer behaviour and co-operation.

CONCLUSION AND SUGGESTIONS

In conclusion, I will like to say kudos to the present president of Nigeria who in order to ensure Nigerian food security and in the context of a food security situation compounded by recent increases of 192% [initially] and 217% [subsequently] in the price of fuel, that on the 14th of July, 2023, the federal government declared a state of emergency on the food security situation in the country. The Nigerian governments unveiled a comprehensive intervention plan on food security, affordability, and sustainability, taking decisive action to tackle food inflation. The intervention plan stated 12 key action points:

- a. Immediate release of fertilizers and grains to farmers and households.
- b. Synergy between the Ministry of Agriculture and Water Resources for irrigation and all-year-round farming.
- c. Creation of a National Commodity Board for price assessment and maintenance of strategic food reserves.



- d. Increased security measures for farms and farmers.
- e. Central Bank's role in funding the agricultural value chain to be enhanced.
- f. Activation of 500,000 hectares of land for farming and river basins for continuous farming.
- g. Deployment of concessionary capital/funding to the agricultural sector.
- h. Improvement of transportation and storage facilities for agricultural products.
- i. Increase of revenue from food and agricultural exports.
- j. Improved facilitation of trade by working with Nigerian Customs.
- k. Massive boost in employment and job creation in the agricultural sector.
- l. Commitment to ensuring every Nigerian has access to affordable food.
- vii. Government should increase and support investments in research and development that enable increasing the micronutrient content of foods and raw materials
- viii. Formulate policies to make land available for farmers and regulatory reforms to improve the efficiency and integration of domestic food markets and reduce barriers to food trade
- ix. Government should work with the private sector, non-governmental organizations, international donors and scientists, and others to strengthen capacities of farmers and provide farmer wit techniques assistance.
- x. Government should direct Banks to provide long and short-term loans for farmers in rural and urban areas.

There however are concerns that are being expressed in various quarters about the government's ability and [political] will to deliver on these commitments in a timely manner. This is because any potential failure could compound the current situation for many, and push many vulnerable communities, including women, girls and small-scale farmers, further into poverty, as well as into food insecurity and malnutrition. Based on the above discussion, I hereby suggest the following:

- i. Government should provide safety nets to ensure that vulnerable families have access to food and water—and money in their pockets to make vital purchases
- ii. Government should fix the security problems by addressing social problems like unemployment and injustices. Delivering expedited emergency support by fast-tracking financing assistance to farmers through existing financial institutions
- iii. Engaging with state government and local government to address food security challenges. Instruments include rapid country diagnostics and data-based monitoring instruments and partnerships.
- iv. Promoting farming systems that use climate smart techniques and produce a more diverse mix of foods, to improve food systems' resilience, increase farm incomes and enable greater availability and affordability of nutrient-dense foods
- v. Government should provide necessary infrastructure facilities to improving supply chains to reduce post-harvest food losses, improve hygiene in food distribution channels, and better link production and consumption centers
- vi. Government should put down measures that will help farmers adopts an integrated "One Health" approach to managing risks associated with animal, human and environmental health

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PRESENTED PAPERS



DETERMINANTS OF DIETARY DIVERSITY OF RURAL HOUSEHOLDS IN SOUTHERN REGION OF KEBBI STATE, NIGERIA

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ABSTRACT

The paper examined the determinants of dietary diversity of rural household in southern region of Kebbi state, Nigeria. Multi-stage sampling procedure was employed to select 160 respondents for the study. Inferential statistics (Poisson model and logit regression) were used for data analysis. The study results on pattern of household dietary diversity indicated that about 97.50% of the respondent households consumed cereals closely followed by 91.82% of the respondents who consumed oil and fats, also 82.50% of the household consumed vegetables, 80.63% respondents. The dietary diversity score (DDS) of the individual household ranged from 3 to 11 were categorized into four (3) groups, the households with low dietary diversity ranged 0 to 4 were 36.25% and households with medium dietary diversity which ranged 5 to 8 were 56.88%. Logistic regression estimates of factors influencing the decision to participate in market shows that household size has a negative coefficient - 0.538 with a (p-value 0.002) but was statistically significant at 10% probability level, access to information with a coefficient 1.921 and a p-value 0,013 was significant at 5% level of significance. It is concluded that household's dietary diversity allows households to access a more diverse set of foods thereby helping to improve household livelihood conditions. Policy which improves rural farm household income should be put in place as well as activities that can help increase farm household income should be encouraged.

Keywords: Determinants, dietary diversity, rural households, southern Kebbi

INTRODUCTION

Variation in an individual's diet is associated with the intake of adequate energy and essential nutrients; increasing variety in one's diet is recommended in most dietary guidelines globally (IFAD, 2009). Dietary diversity can be measured at either the household or the individual level and higher scores represent a more diverse diet. For households, a higher score is an indicator of increased economic access to a varied diet for household members. Household dietary diversity has been shown to be associated with caloric and protein adequacy and household income (Ahmadu, 2018). Dietary diversity is the number of food groups or items consumed over a reference period. It can be measured at a household or individual level through the use of a questionnaire. Lack of dietary diversity is a serious problem among the poor populations of developing countries, where diets are based predominantly on starchy staples which lack essential micronutrients and contribute to the burden of malnutrition and micronutrient deficiencies [Ahmadu, 2018].

Dietary diversity is very crucial in promoting good health among the populace. There are many researches on dietary diversity in southern region of Kebbi state but researches on the determinants of dietary diversity among rural households have not been properly and/or empirically documented. Most researches on dietary diversity were health related and focuses mainly on dietary diversity among children and the aged in urban centres. It is therefore against this back drop that the researchers embarked on the study to assess

the determinants of dietary diversity among rural households in the region.

The broad objective of this research is to determine the dietary diversity of rural households in southern region of Kebbi state, Nigeria.

However, the specific objectives are to:

1. describe the socio-economic characteristics of the respondents in the study area
2. determine the dietary diversity of the rural households in the study area
3. identify the factors influencing dietary diversity in the study area

METHODOLOGY

Southern Kebbi State (Zuru Emirate), Nigeria is one of the four Emirates in Kebbi state which comprises of four Local Government Areas (LGAs) namely; Danko-Wasagu, Fakai, Sakaba and Zuru. The Emirate is located at latitudes 11° and 12° N and longitudes 4° and 5° E of the equator and in the extreme south-eastern part of the state on a 9,000 square kilometers landmass. Southern Kebbi is hilly and bounded to the north by Gummi Local Government Area of Zamfara State, North-west by Koko Local Government Area, South-west by Yauri Local Government Area, North-east by Bukkuyum Local Government Area of Zamfara State, south by Rijau Local Government Area of Niger state and a population of 582, 106 people (NPC, 2006; Yahaya, 2015). The climate is marked by both wet and dry seasons of which wet season dominates between April to October and dry season between November to February.

Convenience sampling was used to select two LGAs (Zuru and Fakai LGAs) for the study. Simple

random sampling technique was then employed to select (160) respondents from 16 villages, 8 villages from each of the 2 LGAs. Similarly, 10 households were randomly selected from each of the selected villages thereby giving a total number of (160) households used as sample size for the study.

Data were sourced from structured questionnaires designed in line with the study objectives. In the same vein, structured interview schedule was also conducted on rural households who were not able to read and write and their responses were recorded on the questionnaires.

Both descriptive and inferential statistics were used for data analysis. Descriptive statistics such as mean, frequency and percentage were used to analyse objective 1. Similarly, household dietary diversity score (HDDS) was utilised to achieve objective 2. Binary logistic regression model was used to analyse objective 3.

Model specification

Poisson model for the determination of Dietary Diversity

Poisson model for determination of Dietary Diversity was used to determine Household Dietary Diversity Score (HDDS). It was used to achieve objective 2. The poisson model for determination of dietary diversity is given as follows:

Poisson model for determination of Dietary Diversity

$$F(y_i|x_i) = \frac{e^{-\lambda(x)} \lambda^{i(x)} (y_i)^{i(x)}}{\Gamma(1+y)}$$

Where;

$\lambda_i = \exp(\alpha + x'\beta)$ and $y_i = 0, 1 \dots i$ is the number/count food eaten by the household

X = a vector of predictor variables following the findings of (Animashaun, 2012). The expected number of the events, y_i

$$E(y_i/x_i) = \text{var}[y_i/x_i] = \lambda = \exp(\alpha + X'\beta)$$

For $i = 1, 2, \dots, M$

Binary Logistic Regression Model

Logit regression model was used to achieve objective 3. Logit model is dichotomous in nature. It is used to determine probabilities between two (2) classes.

The generalized logit regression model is given as:

$$\text{Logit}(P) = \log\left(\frac{p}{1-p}\right) = \ln\frac{p}{1-p}$$

$$\text{Logit}(P(x)) = \log\left(\frac{p(x)}{1-p(x)}\right) = a_0 + b_1x_1 + b_2x_2 + b_3x_3 \dots b_nx_n + U$$

Where Y is binary dependent variable valued as 1 when household diversify dietary consumption and 0 when otherwise.

Independent variables

X_1 = Age of the respondent (years)

X_2 = Gender of the respondent

X_3 = Household size of the respondent

X_4 = Educational level of respondent (non-formal, primary, secondary, tertiary)

X_5 = Primary occupation of the respondent

X_6 = Farm income of the respondent

X_7 = Farming experience

X_8 = Access to information

X_9 = Market participation

RESULTS AND DISCUSSION

Table 1: Proportion of household's dietary diversity score of rural households in the study area

Items	Frequency	Percentage
Cereals	156	97.50
Fish and seafood	129	80.63
Root and Tubers	86	53.75
Pulses/Legumes/Nuts	113	70.63
Vegetables	132	82.50
Milk and Milk products	62	38.75
Fruits	54	33.75
Oil/Fats	146	91.82
Meat and Poultry offal	81	50.63
Sugar / Honey	74	46.25
Eggs	44	27.50
Mean of HDDs	6.43	
Standard deviation	1.86	
Minimum	3	
Maximum	11	
Category of Dietary Diversity		
Low HDDs (0-4)	58	36.25
Medium HDDs (5-8)	91	56.88
High HDDs (9-12)	11	6.88

Source: Field survey, 2023

Table 2: Logistic regression estimates of the determinants of Dietary Diversity

Variables	Coefficient	Std. Err	z – value	p> z
Age	0.039	0.044	0.88	0.377
Gender	0.477	0.772	0.62	0.537
Household size	-0.538	0.174	-3.10	0.002***
Education level	-0.500	0.435	-1.15	0.251
Primary occupation	-0.008	0.285	-0.03	0.977
Farm income	0.000	4.47e	5.30	0.000***
Farming experience	-0.035	0.055	-0.64	0.520
Access to information	1.921	0.773	2.48	0.013**
Market participation	-0.083	0.0342	-2.43	0.015**
Constant	1.367	3.086	0.44	0.658

Source: Field Survey, 2023 *** significant at 10% ** significant at 5% * significant at 1%

DISCUSSION

The result in Table 1 shows the proportion of the households in percentage consuming the different food groups. It reveals the pattern of household dietary diversity of the rural households within the study area. About 97.50% of the respondents' household consumed cereal within 24 hours recall period, 80.63% consumed fish and seafood, root and tubers were consumed by 53.75% of the household, pulses, legumes and nuts were consumed by 70.63% of the household, also 82.50% of the household consumed vegetables, milk and milk products were consumed by 38.75% of the household, fruits were consumed by 33.75% of the household, 91.82% of the respondents consumed oil and fats. Meat and poultry offal were consumed by 50.63% of the respondents, 46.25% of the respondent's household consumed sugar and honey, 27.50% consumed eggs and 98.13% ate other food items. The minimum and maximum numbers of food groups consumed by the respondents' household were 3 and 11 food groups respectively. On average, approximately 7 food groups were consumed by the respondents. The dietary diversity score (DDS) of the individual household ranged from 3 to 11 were categorized into four (3) groups, the household with low dietary diversity ranged 0 to 4 were 36.25%, household with medium dietary diversity which ranged 5 to 8 were 56.88%, and household with high level of dietary diversity ranged 9 to 12 were 6.88%.

Table 2 reveals the logistic regression estimates of the effects of dietary diversity of rural households using variables as age, household size, farm income, access to information and market participation. The coefficient of age was found to be positive and significant at 5% implying that dietary diversity increases with increase in age. The positive and significant effects of the age of household increase the probability of households having dietary diversity. This contradicts findings of (Agboola, 2004) who reported that increase in age decreases dietary diversity. The coefficient of household size was found to be negative and significant at 1%, level of significance. This implies that increase in household size decreases the dietary

diversity of rural households and food security status. The coefficient of farm income was found to be positive and significant at 5% consistent with a priori expectation that the greater the income of household heads, the higher the probability of a household having dietary diversity.

CONCLUSION AND RECOMMENDATIONS

It is concluded that dietary diversity allows households to access a more diverse set of foods for improved living conditions. Most of the households investigated have medium dietary diversity score in the study area. Logistic model results reveal that increase in household's income, access to information and market participation improve the dietary diversity of respondents in the study area.

Based on the findings of this study, the following recommendations were made:

1. Interventions should be provided and should focus on improving balanced household dietary diversity in the study area.
2. Consumption of different food should be encouraged within the study area.
3. Policy which improves rural household income should be put in place this will help increase household dietary diversity.

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EFFECT OF FARMER-HERDER CONFLICTS ON INCOME GENERATION AMONG FARMERS IN OYO STATE, NIGERIA

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ABSTRACT

Besides increased terrorism, there is heightened insecurity stemming from conflicts between farmers and herders in Nigeria. This had led to killings, insubordination and food insecurity as farmers do not feel safe to go to their farms again. The study was conducted in Oyo state, Nigeria based on occurrence of conflict between farmers and herders in the area. This study determined the effects of farmer-herder conflict on farmers' income generation. Interview schedule was used to elicit data from 100 crop farmers. Mean, frequency, percentage, t-test and Pearson product moment correlation were used for data analysis at 5%. Reprisal attacks (95.0%), and competition over the use of land/water resources (92.0%) were major reasons for farmers-herders' conflicts. Prominent consequences of conflict include lack of access to farmland (100.0%), a threat to national security (100.0%), destruction of farmland by herdsmen (97.0%) and reduction in output (97.0%). Major methods of conflict resolution were reportage to law enforcement agencies (100.0%) and tolerance (79.0%). A significant difference existed between the annual income of farmers before ($\bar{x}=7,554,375.00$) and after ($\bar{x}=2,269,522.73$) conflicts ($t=7.558$). Age ($\beta=0.389$) and farm size ($\beta=0.339$) significantly determined farmers' income after conflict. Hence, farmer-herder conflicts negatively affect crop production. The need to enlighten farmers on peaceful coexistence and their importance to national food security attainment was recommended.

Keywords: Farmer-herder conflicts, Income generation, Consequences of conflicts, Conflict resolution

INTRODUCTION

The conflicts between herders and rural communities' members dominated by crop farmers in Nigeria had become a topical issue of utmost importance and required solution. This is because currently, Nigeria is still battling with economic recession and heightened food insecurity of its teeming population. The menace of farmer-herder conflicts compounds crop farmers' situation and impairs their ability to produce maximally in a safe environment. Farmer-herder conflicts greatly contribute to the agricultural sector inability to provide sufficiently to meet the nation food demands. Encroachment of herds into farmlands had led to clashes between farmers and herders overtime because of crop destruction which consequently reduces farmers' income. Besides crop destruction, there had been instances of abductions, assault, robbery, loss of properties and loss of lives owing to attacks by herders in different states in Nigeria. For instance, there had been great unrest in Oke-Ogun area of Oyo State owing to abductions, robbery and killings connected with suspected armed herders (Owolabi, 2021). According to Sahara Reporters New York (2021), herders attacked three men with machetes in Saki, Oke Ogun area of Oyo State. In the same vein, suspected Fulani herdsmen tied a farmer to tree and killed him with cutlass in Saki West Local Government (Olaniyi, 2021). From the foregoing, it is obvious that farmers cannot farm in an insecure environment and this has consequential effect on their livelihood. Hence, this study determines the effect of farmer-herder conflicts on crop farmers' income Oke Ogun area of Oyo State, Nigeria.

METHODOLOGY

The study was conducted in Oke-Ogun Area of Oyo state, Nigeria. The population of the study consist of arable crop farmers in Oke-Ogun Area. Oke-Ogun Area of Oyo state was purposively selected because of heightened conflicts between farmers and herders. These conflicts led to assault, abductions and loss of lives which were reported in the Nigerian dailies in 2021 (Owolabi, 2021). The conflicts disrupt farming activities in Oke-Ogun Area of Oyo state. Saki West and Saki East LGAs were purposively selected because of the prominent issues of conflict in the LGAs. Two communities were randomly selected from each LGA. Adeduntan and Ogunlere communities were selected from Saki East, while Ekokan and Okerete communities were selected from Saki West. Twenty-five arable crop farmers were randomly selected from each community to make a total of 100 crop farmers sampled for the study. Interview schedule was used to elicit data from crop farmers. The income of crop farmers was determined before and after conflict focusing on four major crops grown in the area, namely cassava, maize, rice and yam. Recall method was used to collect information on crop farmers' income before conflict (in the last 5 years before the prominence of conflict in 2021). Mean, frequency, percentage, t-test and Pearson product moment correlation were used for data analysis.

RESULTS AND DISCUSSION

Causes for farmer-herder conflicts -

According to the results in Table 1, the major causes of conflicts include reprisal attacks (95.0%), competition over the use of land/water resources (92.0%), destruction of crops by animals (91.0), non-recognition of the rights of indigenes (89.0%),

grazing right disputes (88.0%), illegal immigration (88%), violation of tenancy agreement (85.0%) and government negligence (79.0%). The results

evidenced the prominence of conflicts in the study area.

Table 1: Causes for farmer-herder conflicts

No	Items	Yes
1	Revenge or reprisal attack	95.0
2	Destruction of crops by animals	91.0
3	Competition over the use of land and water resources with the herdsman	92.0
4	Non-recognition of the rights of indigenes	89.0
5	Grazing right disputes	88.0
6	Illegal immigration	88.0
7	Language barrier	87.0
8	Violation of tenancy agreement	85.0
9	Government negligence	79.0
10	Personal disagreement	72.0

Consequences of conflict between farmers and herdsman - Table 2 shows that prominent consequences of conflict include lack of access to farmland (100.0%), a threat to national security (100.0%), destruction of farmland by herdsman

(97.0%) and reduction in output (97.0%). The inability of farmers to continue farming and destruction crops planted implies loss of income for farmers and waste of energy and resources.

Table 2: Consequences of conflict between farmers and herdsman

S/N	Items	Yes
1	Lack of access to farmland	100.0
2	Threat to national security	100.0
3	Constraint in mobility	98.0
4	Kidnapping of farmers	97.0
5	Migration of labour	97.0
6	Destruction of properties	97.0
7	Reduction in output	97.0
8	Destruction of farmland by herdsman	97.0
9	Killing of the victims by the herdsman	96.0
10	Hunger	93.0

Methods of conflict resolution - Table 3 reveals the different measures that crop farmers had taken to ensure peace reign in the study area. Major methods of conflict resolution were reportage to law enforcement agencies (100.0%), tolerance (79.0%)

and compromising (83.0%). Some of the crop farmers indicated employing intervention of local heads such as *Oba, Baale* etc (42.0%), court verdicts (37.0%) and peaceful negotiation (24%).

Table 3: Methods of conflict resolution

S/N	Items	Yes
1	Peaceful negotiation	24.0
2	Reporting to law enforcement agencies	100.0
3	Intervention of local heads (<i>Oba, Baale</i> etc)	42.0
4	Tolerance	79.0
5	Compromising	83.0
6	Payment of compensation to victims	45.0
7	Establishment of grazing points	12.0
8	Enlightenment of farmers and herdsman	24.0
9	Court verdicts	37.0

Annual output of crop farmers after conflict - From the result in Table 4, the average annual output of crop farmers after conflict was 22±14 tonnes for

cassava, 34±31 tonnes for maize, 202±105 bags for rice and 12±8 tonnes for yam.

Table 4: Annual output of crop farmers after conflict



Annual Output	F	%	Mean	SD	Annual Output	F	%	Mean	SD
Cassava (tonnes)					Maize (tonnes)				
<23	66	66.0	22	14	<36	61	61.0	34	31
23-44	2	2.0			36-69	9	9.0		
45-66	6	6.0			70-103	7	7.0		
>66	6	6.0			>103	3	3.0		
Rice (bags)					Yam (tonnes)				
≤ 203	76	76.0	202	105	0.5-30	73	73.0	12	8
>203	3	3.0							

Annual income of crop farmers before and after conflict - The result on the annual income of crop farmers before and after conflict is presented in Table 5. It was found that the average income from cassava dropped from 1,702,835±1,250,002 before conflict to 591,956±450,455 after conflict. Similarly, the average income from maize decreases from 3,183,500±2,500,784 before conflict to 493,928±353,114 after conflict. Likewise, there was

a reduction in the income of rice from 1,550,151±1,001,765 before conflict to 338,276±300,000 after conflict. In the same vein, the average income realized from yam decreases from 719,230±650,091 before conflict to 338,276±300,000 after conflict. The results are indicative of the fact that farmer-herder conflicts greatly reduce farmers' income.

Table 5: Crop farmers annual income before and after conflict

Crops	Income before conflict (N)	Freq.	%	Mean	SD
Cassava	1,000,000 – 1,350,000	26	26.0	1,702,835	1,250,002
	1,350,001 – 2,600,000	20	20.0		
	2,600,001 – 3,850,000	18	18.0		
	>3,850,000	3	3.0		
Maize	≤ 2,530,000	29	29.0	3,183,500	2,500,784
	2,530,001 – 5,030,000	27	27.0		
	5,030,001 – 7,560,000	11	11.0		
	>7,560,000	3	3.0		
Rice	≤ 6,150,000	59	59.0		
	6,150,001 – 12,150,000	8	8.0		
	>12,150,000	1	1.0		
Yam	≤ 655,000	38	38.0		
	655,001 – 1,305,000	19	19.0		
	1,305,001 – 1,955,000	6	6.0		
	>1,955,000	2	2.0		
	Income after conflict (N)				
Cassava	15,000 – 465,000	24	24.0	591,956	450,455
	465,001 – 915,000	26	26.0		
	915,001 – 1,365,000	16	16.0		
	>1,365,000	3	3.0		
Maize	≤ 710,000	60	60.0	493,928	353,114
	710,001 – 1,410,000	5	5.0		
	1,410,001 – 2,110,000	3	3.0		
	>2,110,000	2	2.0		
Rice	≤ 1,070,000	22	22.0	1,550,151	1,001,765
	1,070,001 - 2,070,000	22	22.0		
	2,070,001 - 3,070,000	17	17.0		
	>3,070,000	5	5.0		
Yam	≤ 304,000	38	38.0	338,276	300,000
	304,001 – 604,000	21	21.0		
	>604,000	6	6.0		

Contribution of selected socioeconomic characteristics to the income of farmers - Regression analysis was used to ascertain the contribution of selected socioeconomic characteristics to the income of crop farmers. Table 6 reveals that the R² value of 0.288 indicates that

28.8% of the income of crop farmers can be explained by the socioeconomic characteristics in the regression model. Significant socioeconomic characteristics predicting crop farmers' income were their age ($\beta=0.389$) and farm size ($\beta=0.339$). Age contributed 38.9% to farmers' income and the

increase in crop farmers' income can be explained by 33.9% of their farm size.

Table 6: Contribution of socioeconomic characteristics to the income of farmers

Variable	β	t-value	p-value
Constant		-0.764	0.447
Age	0.389	2.195	0.004*
Sex	0.048	0.446	0.657
Type of crops grown	-0.183	-1.816	0.073
Household size	-0.136	-1.246	0.216
Hired labour	0.179	1.837	0.070
Farm size	0.339	2.938	0.004*

R=0.537, R²=0.288, Adjusted R square = 0.216, Std. Error=180.82

Result showing difference in the income of farmers before and after conflict - Table 7 shows that a significant difference existed between the annual income of farmers before (\bar{x} =7,554,375.00) and after (\bar{x} =2,269,522.73) conflicts (t=7.558). The

drastic drop in the income of respondents after the conflicts is evidence of reduced access to farmland, destruction of crops and a threat to food security.

Table 7: t-test result showing difference in the income of farmers before and after conflict

	Mean	SD	F	p-value	Decision
Before conflict	7,554,375.00	7,843,699.42	7.558	0.000	Significant
After conflict	2,269,522.73	1,872,330.47			

CONCLUSION

The study concluded that farmer-herder conflicts had negative effect on arable crop production which is the mainstay of the economy. The drastic drop in the income of crop farmers after the conflicts is evidence of reduced access to farmland, reduced farming activities and a threat to national food security. The need to enlighten farmers and herders on the need for peaceful coexistence and their importance to national food security attainment was recommended. The establishment of grazing routes for herders is also paramount to reduction in farmers-herders conflict.

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INFLUENCE OF ARTISANAL FISHERIES ON INCOME GENERATION OF THE FISHING COMMUNITIES ALONG SHIRORO DAM, NIGERIA

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ABSTRACT

This study examined the influence of artisanal fisheries on income generation of the fishing communities along Shiroro dam, Nigeria. Questionnaire was used to collect data from the respondents. Multi-stage sampling procedure was used in selecting the 460 respondents for this study. Inferential statistics (Gini coefficient and Logit regression) were used for data analysis. A Gini coefficient value of 0.51 was obtained indicating that there is apparently a high disparity in income distribution among the fishers. The Logit regression estimates of the effect of artisanal fisheries on income of fishers shows that household size has a t-value 3.42, access to credit with a t-value 2.57 and age of the fishers 4.24, were statistically significant at 1% level of significance while access to extension services with a t-value 2.17, was significant at 5% level of probability. In conclusion, the study showed that, artisanal fisheries activities is an important livelihood activity in the lives of the fishers along the dam as it enhances food security and improved livelihood conditions. The study therefore recommended that government should give financial assistance to the fishers to enable them to seamlessly undertake their fishing activities. Government should provide improved fishing and processing inputs to fishers at subsidized rate.

Keywords: Influence, Artisanal Fisheries Activities, Income, Fishing Communities

INTRODUCTION

The relevance of the fisheries sub-sector to the Nigerian economy and benefits derived by Nigerians from fish and other fish products led to the high consumption and hence the increased demand for fisheries products. In order to meet up with increasing demand for fisheries products. Fisheries production in Nigeria especially from marine is important for the socio-economic development of Nigerians and it contributes to the nation's economic growth through the Gross Domestic Product (GDP) (Dasuki *et al.*, 2014) posits that Nigeria is blessed with enough marine fisheries resources that could enhance increased fish supply/production. Yet, fish supply from domestic production is far below the fish demand of her citizens. Developing countries play a major role in the fishery industry. Food and Agriculture Organization (FAO, 2005) estimates that in 2018, 79 per cent of fishery production took place in developing countries, and accounted for 49 per cent of world exports of fish and fish products in value terms and 59 per cent in terms of quantity. In Nigeria, the gap between supply and demand of fish and fish products is widening; this is directly the result of increase in population, rapid urbanization and growing income. Nigeria therefore spend huge sums of money to import fish into the country to supplement fish catch from open water bodies and fish production from aquaculture. There are a lot of studies on artisanal fisheries in Nigeria, yet there is near absence or limited information or studies on the effect of Artisanal Fisheries on Livelihood of the Fishing Communities along Shiroro and Kainji Dams. A lot of artisanal fisheries activities are carried out along Shiroro and Kainji dams Niger State of Nigeria, but empirical evidence related to

the effect of these activities on the livelihood of the fishing communities are not documented.

The broad objective of the study is to assess artisanal fisheries activities and its influence on income distribution among the fishing communities along Shiroro dam, Nigeria.

The specific objectives are to:

- i. determine the income distribution of the fishers along Shiroro dam
- ii. analyse the influence of artisanal fisheries on income of fishers

METHODOLOGY

The study was carried out along Shiroro dam. The population of Shiroro is projected in 2020 to be 322,918 people using 3.2% growth rate. The climate, edaphic features and hydrology of the state allows sufficient opportunities for harvesting fresh water fish such as *Tilapia* spp, *Bagrus* spp, *Clarias* spp, *Gymnarchus niloticus*, *Heterotis* spp, *Labeo* spp, *Mormyrus* spp, *Latesniloticus*, and permit the cultivation of most of Nigeria's staple crops such as maize, yam, rice, millet and sorghum. The dam lies approximately between Latitude 9° 57' 25N and Longitude 6° 49' 55E. It is located approximately 90 km southwest of Kaduna on River Dinya.

The study employed multi-stage and proportionate sampling techniques in selecting the sample size for the study. Firstly, Shiroro dam located in North central region of Nigeria where artisanal fisheries activities are widely practiced was purposively selected. Secondly, 20 Villages were randomly drawn along the dam. Thirdly, proportionate sampling technique was then employed to select 10% of the fishing population from each of the

selected villages, thus making 460 fishers used as sample size for the study.

Primary data were used for the study obtained using structured questionnaires designed in line with the study objectives. The copies of which were administered to the respondents selected for the study.

Data collected were analysed using Gini coefficient and logit regression. Gini coefficient was used to achieve objective i while Logit regression was employed to achieve objective ii.

Gini Coefficient was used to achieve objective 2. Gini coefficient was used to estimate the degree of income inequality among artisanal fishers in the study area. Gini coefficient is a value between 0 and 1. A higher number indicates a greater degree of income inequality. A value of 1 indicates the highest degree of income inequality where a single individual earns the entire income. A value of 0 indicates that all individuals have the same income. Thus, a value of 0 indicate perfect income equality. The Gini coefficient model is specified as follows:

$$G_i = 1 - \sum_{k=0}^n (\times - \times) (Y_k - Y_k) \dots \dots \dots (1)$$

The equation one reduced to:

$$G_i = 1 - \sum XY$$

Where; G_i = Gini coefficient

X = Proportion of the Population of Fishers

Y = Cumulated Proportion of the Income of Fishers

Logit Regression Analysis

Logit Regression Analysis (LRA) was employed to analyze objective 3. The Logit model is an inferential statistical regression model that describes

the relationship between a censored continuous dependent variable y_i and a vector of independent variables x_i . Y_i is the dependent variable and $X_1 - X_{11}$ are the independent variables

The general Logit regression model is mathematically expressed as:

$$Y = \alpha + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_{11} X_{11} + U \dots \dots \dots (2)$$

Where Y = Livelihood (Implying a binary dependent variable valued as 1= when household has sustainable livelihood and 0= when otherwise.

X_1 = Period of fishing (1 for rainy season, 0 otherwise)

X_2 = Household size (Number)

X_3 = Membership of association (1 for member, 0 otherwise)

X_4 = Access to extension services (1 for access, 0 otherwise)

X_5 = Access to credit (1 for access, 0 otherwise)

X_6 = Fishing technology (1 for local, 0 otherwise)

X_7 = Processing method (1 for local, 0 otherwise)

X_8 = Age of the fishers (1 for member, 0 otherwise)

X_9 = Fishing experience (Years)

X_{10} = Livelihood diversification (1 for diversified livelihood, 0 otherwise)

X_{11} = Income from fishing (N)

U = Error term

B_i = Constant term

$\beta_i - \beta_{11}$ = Regression coefficient estimated (Amamiya, 1998).

RESULTS AND DISCUSSION

Table 1: Distribution of income of fishers by annual sales in the study area

Range of Income of Fishers (₦)	Income (₦)	Frequency of Fishers (F)	% of Fishers (X)	Cumulative % of fishers	% of Income	cumulative % of Income (Y)	XY
<200,000	2,575,000	28	6.0	6.0	00.95	0.95	0.000578261
200,000-400,000	41,246,000	131	28.5	34.5	15.27	15.27	0.046205803
401,000-600,000	45,168,000	84	18.3	52.8	16.74	32.96	0.060173839
601,000-800,000	104,910,000	139	30.2	83.0	38.85	71.81	0.216974294
801,000-1,000,000	60,725,000	67	14.6	97.5	22.49	94.3	0.137340073
>1,000,000	15,400,000	11	2.4	100	5.70	100	0.023912178
TOTAL	270,024,000	460	100		100		0.49

Source: Field Survey, 2023

The Gini index therefore is $GI = 1 - \sum XY = 1 - 0.49 = 0.51$

**Table 2: Logistic regression estimates of the influence of artisanal fisheries on
Income of fishers (n = 460)**

Variables	Parameters	Coefficient	Standard Error	t-Value
Period of fishing	X ₁	0.041	0.161	0.26
Household Size	X ₂	-0.063***	0.018	3.42
Membership of Association	X ₃	0.179	0.255	0.70
Access to Extension	X ₄	0.713**	0.328	2.17
Access to Credit	X ₅	1.647***	0.461	3.57
Fishing Technology	X ₆	-0.139	0.205	-0.68
Processing Method	X ₇	0.062	0.399	0.15
Age of the Fishers	X ₈	0.0009***	0.000	4.24
Fishing Experience	X ₉	0.060***	0.022	2.77
Livelihood diversification	X ₁₀	1.848***	0.449	4.12
Income from fishing	X ₁₁	0.655***	0.297	2.21
Lr Chi ²			268.19	
Prob > Chi ²			0.00	
Pseudo R ²			0.85	
Log Likelihood Value			-23.06	
Number of Observations			460	

Source: Field Survey, 2023 *significant at 10% level, **significant at 5% level, ***significant at 1% level

Income distribution of the fishers

Table 1 shows the distribution of income of fishers by annual sales in the study area. The Gini coefficient was used to determine the pattern of income distribution among the fishers across Shiroro and Kainji dams. The Gini coefficient is a measure of inequality among values of a frequency distribution, for example, levels of income, wealth etc. It has values ranging from 0 to 1. A Gini coefficient of zero (0) expresses perfect equality where all values are the same i.e. everyone has exactly equal income, while a Gini coefficient of one (1) 100 on the percentiles scale) expresses maximal inequality among values, for example where only one person has all the income. Table 1 revealed the Gini coefficient value of 0.51 for the fishers in the study area. This value indicates income inequality among the fishers implying that the income was not evenly distributed. The disparity could be as a result of type of fishing gears used for fishing, experience in fishing, number of crew used for fishing and possibly household size of the fishers.

Estimates of the effect of artisanal fisheries on livelihood sustainability of fishers

Table 2 shows the logit regression estimates of the effect of artisanal fisheries activities on income of fishers along Shiroro. Six of the eleven factors in the model (Household size, Access to credit, Age, Fishing experience, Quantity of fish caught, Income from fishing) were found to be significant at 1% level of significance and one other variable (Access to extension) was significant at 5% level in explaining the variation of income of fishers in the study area. Household size of the fishers has a negative coefficient but statistically significant (t = -3.42, p0.01). A unit increase in the size of the household will result in a 0.06 reduction in the

likelihood that income of fishers will be sustainable. This outcome was anticipated because more homes mean more people are consuming the same resources.

The results indicates that for every unit increase in the years of fishing experience of the fishers, there is a 0.06 increase in the log odds of income, holding all other independent variables constant. These findings therefore suggest that as years of fishing experience increases, so doe's income of fishers. The results show that holding all other independent variables constant, for every unit increase in the number of livelihood activities, there is 1.84 increase in the log odds of income of the fishers. Primary livelihood activity was also found important and significant (p<0.05) in determining income distribution of the fishers in the study area. Access to extension contact has a positive coefficient (t = 2.17, p 0.05) that is significant at 5% level. The results showed that holding all other independent variables constant, for every unit increase in credit accessibility, there is a 1.67 increase in the log odds of livelihood sustainability of the fishers. The coefficient of age of household has been found to have a significant (t<4.24) and negative influence on the probability of livelihood. This implied that the income of the fishers increased by 4% as the fishers age increased by one year. Asaku (2017) revealed that the coefficient of age is positively significant at both 1% and 5% probability levels. The coefficient of monthly income correlated positively with livelihood activity with a t-value of 2.21 which was significant at 0.01 probability level.

CONCLUSION AND RECOMMENDATIONS

Conclusively, findings of the study showed that, artisanal fisheries activities enhances food security, income generation, sustainable



employment provision and improved livelihood conditions. There was disparity in income distribution among the fishers because their income was not evenly distributed and that many of them are poor. Findings further indicated that artisanal fishing had an effect on the livelihood of the fishers. The following recommendations are made. Government of Nigeria should give financial assistance to the fishers to enable them to seamlessly undertake their fishing, processing and trading activities to improve their livelihood conditions and financial institutions should grant credit facilities to practicing fishers and banks should relax their collateral requirements. Fishers should join membership cooperative associations to enable them secure credits, be trained on new fishing technologies and learn new skills of fishing towards improving fish catch. NGOs should liaise with the fishers to provide fishing equipment and at subsidized rate so as to encourage fishers to expand their fishing enterprises

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ASSESSMENT OF INTEGRATED SOIL MANAGEMENT PRACTICES AMONG CASSAVA FARMERS IN OSUN STATE, NIGERIA

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ABSTRACT

The study examined the assessment of integrated soil management practices among Cassava farmers in Osun, State, Nigeria. Primary data were used for the study and was collected with the aid of structured questionnaire. Multi-stage random sampling procedure was employed to select 120 cassava farmers for this study. The data collected were analyzed using descriptive and Pearson moment correlation analysis.. The result of the study revealed that majority (81%) of the cassava farmers were males, 38% of the cassava farmers have secondary school education while 43% of the cassava farmers adopted the use of inorganic fertilizer and other methods which were either of shifting cultivation, crop rotation or bush fallowing, while (4%) of the respondents adopted all the soil management practices in the study area. There was a negative relationship between integrated soil management practices and output from cassava production. The constraints of inadequate access to credit, weather variability, and poor access to market were encountered by cassava farmers in the study area. The study recommended that incentives be given specifically for women and youths to participate more in cassava production in the study area. Government should set better land policies to promote a domestic cassava production policy that favours farmers on land utilization and management.

Keywords: Integrated, soil management, cassava, and production.

INTRODUCTION

Every nation attempts to address prevalent issue of food security. Agriculture provides food for the teeming population in Nigeria and contributes about 33% to the gross domestic product (GDP) of the nation (Bureau of African Affairs, 2010). The sector employs about one third of the total labor force and provide a livelihood for the bulk of the rural populace (FMARD, 2006). Land use in Africa nation predominantly Nigeria has been characterized by significant amount of land degradation which is caused by human activities through various soil management practices. Many poor African pastoralists and farming households responds to declining land productivity by abandoning existing pasture and crop land, and moving to a new land for grazing and crop production. Most farmers in developing countries, who are low income earners cannot afford to buy land, hence manage their soils and cropping systems to obtain better crop yields through proper use of soil conservation practices.

Cassava (*Manihotesculenta*) is cultivated mainly in the tropic and sub-tropic regions of the world, over a wide range of environmental and soil conditions. It is very tolerant of drought and heat stress and produces well on marginal soils. Nigeria was the largest producer of the crop with 45,721,000, 43,410,000, and 44,582,000 million in 2006, 2007 and 2008 respectively. About 90% of this is however, consumed as food (Awoyinka, 2009). Nigeria is yet to fully harness the socio-economic potentials of Cassava that would translate to higher ranking of Cassava next to petroleum as major contributor to the Gross Domestic Product (GDP). For this to be achieved Cassava farmers production efficiency and profit margins needs to be

established in Nigeria. Cassava crop is one of the most important carbohydrate sources (Awoyinka, 2009). The large population of Nigeria depended on Cassava daily as their main dish such as *gari* and *fufu*, the leaves are consumed as vegetable, and it serves as raw material to industries as well as been a means of alleviating poverty (James *et al.*, 2011).

The two important aspect of soil management are soil conservation and soil fertility management; thus soil conservation entails anything to prevent the soil from damages, which can be through erosion, soil acidification, and distortion of bio diversity (FAO, 2009). Soil fertility management involves the ability of the farmers to supply nutrients for optimum crop growth. Based on the poverty among rural farmers, these had led to the unimpressive performance of agricultural sector, thus resources must be used more efficiently, thereby eliminating waste, also leading to increase in farmers income (Simonyan *et al.* 2010). One of the most severe threats to the sustainability of agricultural crops production in Nigeria is declining productivity as a result of the loss of soil fertility. Simonyan *et al.* (2010) stated that Nigerians are poor and hungry despite efforts made by various governments in improving agricultural productivity and efficiency of the rural farmers who are the major stakeholders of agricultural production. The performance of small holder farmers in Nigeria is observed to be unsatisfactory. The agricultural sector of Nigeria has failed to keep pace with the demand of households and industries for farm produce as food or raw materials (Nwaiwu *et al.*, 2010). Despite the involvement of many rural farmers in the agricultural production, several odds however still work against their efforts to produce abundant food for the nation and live a better life.

One of the odds is attributed to the fluctuation in market prices as a result of the demand factors (Mohammed and Achem, 2010), thereby, resulting to food insecurity. It was revealed that 80% of Nigerians in the rural areas eat a cassava meal at least once a day; hence it plays a major role in the country's food security. It is therefore important to study the small holder farmers who contribute to high bulk of production of this staple crop. The main objective of this study was to assess the integrated soil management practices among Cassava farmers in Osun State. The specific objectives are to describe socio-economic characteristic cassava farmers in the study area, identify soil management practices among cassava farmers in the study area, examine the relationship between soil management practices and output of cassava farmers in the study area, and identify the constraints faced by cassava farmers under integrated soil management practices in the study area.

METHODOLOGY

The study was conducted in Osun state. The state is located in southwest Nigeria, it lies between latitudes 7.05° N and 8.10° N and longitudes 4.05° E and 5.15° E. It covers a total area of approximately 14,875km² while the land area is about 9,251km². Agricultural sector forms the overall thrust within the state with human population of about 3,416,959(NPC, 2006). The people in the state are mostly farmers producing food crops such as yam, maize, cassava, cowpea, cocoyam, okra, pepper, garden egg, groundnut and a number of cash crops such as cocoa, coffee, kola, cashew, and oil palm (NPAFS, 2009). There are two distinct climate seasons which are rainy season which exists from March to October and dry season from November to early march. Annual rainfall average is 1570mm while temperature ranges from to 27.5°C. Rainfall ranges between 900 and 1600mm annually and humidity between 85 and 95% (Mathew et al, 2015).Data used in this study were obtained from primary sources. Information was collected with the aid of structured interview schedule.

The sampling technique used for this study was multi-stage sampling procedure. The first stage involves purposive selection of three (3) Agricultural Development Programme (ADP) zones of the state, due to administrative block arrangement. The second stage involves purposive selection of three (3) wards from each of the ADP zones due to high concentration of cassava farmers. The third stage involved random selection of (15) cassava farmers each from the selected wards, finally to make a total of 135 respondents, out of the 135 respondents, 15 were invalid making a total of sample size of 120 for this study. The ADP zones are Iwo, Osogbo, and Ife-Ijesha. The selected wards were Iwo,Masifa and Ejigbo from Iwo ADP zones, Obokun, Otan-ile, and Imesi-ile, were selected from

Osogbo ADP zones, while Oyan, Igbaye and Okuku were selected in Ife-ijesha zone of the state.

Data for this study were analysed using descriptive and inferential statistics. Descriptive statistics were used to analyse socio-economic characteristics and integrated soil management practice in the study area, while Person's moment correlation analysis was used to analyse the relationship between output and integrated soil management practices in the study area.

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics

Table 1 shows that majority of the cassava farmers in study area (80.83%) were male, while (19.17%) of the cassava farmers were female, this shows that most males were into cassava production than their female counterparts. Majority of the cassava farmers (31.67%) are within the age bracket of 47-57 years. About (25.0%) of the cassava farmers are within the range of 25-35years.About (20.83%) of cassava farmers are within the range of 36-46years.About (12.50%) of the cassava farmers are within 58-68 years and (10.0%) of cassava farmers are between the ranges of 68-78years. The mean age is 41years. Table 1 shows that majority of the cassava farmers (76.67%) are married. About(8.33%) of cassava farmers are single. About (15.0%) of cassava farmers are either separated or divorced. Table 1 below shows that majority of cassava farmers (51.67%) are involved in trading. About (29.17%) of cassava farmers are farmers .About (15.83%) of cassava farmers are artisans. About (8.33%) of cassava farmers are farmers. About (3.33%) of cassava farmers have no secondary occupation. Table 1 shows that majority of the cassava farmers in the study area(37.50%) have secondary education. About (28.33%) of the cassava farmers have primary education. About (25.0%) have tertiary education. About (9.17%) of the cassava farmers have no formal education. Table 1 also shows that majority of cassava farmers (54.17%) belong to cooperative society or farmers association, while (45.83%) of the cassava farmers did not belong to cooperative or farmers association. Table 1 shows that majority of the cassava farmers (32.50%) have farming experience between 11-20years.About (26.67%) of cassava farmers have farming experience between 21-30years.About (25.00%) of the cassava farmers have farming experience between 1-10years. About (15.83%) of cassava farmers have farming experience between 31-40years.The mean farming experience is 19 years,which implies most of the farmers have enough farming experience in the study area. Table 1 shows that majority of cassava farmers (55.83%) have a household size between 6-10.About (40%) of cassava farmers have a household size between 1-5.About (4.17%) of cassava farmers have a house hold size between 11-15.thus the mean household

size is 6 persons, which implies cassava farmers with large household size can make use of family labour to reduce the cost spent on labour during production in the study area. The findings from this study agrees with Awoyinka (2009) and James *et al.* (2011) that cassava production was mostly dominated by male farmers, with mean age above 40 years.

Soil management

The results in table 2 shows the integrated soil management practices adopted by cassava farmer in the study area. Majority (42.5%) of the respondents adopted the use of inorganic fertilizer and other methods such as shifting cultivation, crop rotation, and bush fallowing. About (15.83%) adopted the use of organic and inorganic fertilizer, about (9.17%) adopted the use of organic manure and cover cropping. About (5.83%) adopted the use of inorganic, organic and intercropping with legumes such as soybean and cowpea. About (6.67%) adopted the use of inorganic and cover cropping system. About (5.0%) adopted the use of organic and intercropping with legumes. About (4.17%) adopted the use of all the soil management practices. About (2.5%) adopted the use of inorganic fertilizer and intercropping with legumes. The result from this study disagrees with Nwaiwu *et al.* (2010) that discovered that the use of inorganic was the common soil management practice by cassava farmers in Imo state.

Relationship between soil management and output from cassava production

Table 3 shows that there is a negative relationship between soil management practices and the output of cassava, thus it implies that the soil management practices adopted do not determine the output of cassava in the study area. The result from this study is similar to that of James *et al.* (2011), who discovered that the output from cassava production does not really depends on the type of

production practice adopted by farmers in the study area.

Constraints faced by cassava farmers under integrated soil management practices in the study area

The figure 1 shows the constraints faced by cassava farmers under integrated soil management practices in the study area. These constraints, ranked in percentages from the highest to the lowest were: inadequate access to credit, weather variability, poor access to market, poor transportation network, high cost of input, and pest and disease infestation. The most prominent constraint was limited access to credit as attested by 27.50% of the cassava farmers. This issue may be associated with limited access to credit facilities by the farmers in the area due to their inability to provide the required collateral by lending institutions. Farmers are then forced to depend on their meager personal savings to finance cassava farming. The issue of weather variability was also a major constraint with 21.67%, which implied the cassava farmers faced issues of low rainfall and high temperature which have serious impact on their cassava output. The poor access to market was another major constraint with 17.50%, which implied that the cassava farmers do not have access to favourable market linkage to sell their cassava produce after harvest. The least problem in the study area was the issue of pest and disease infestation with 8.3% which implied that the cassava stems mostly cultivated in the study area are disease resistance with fewer incidences of pest's attacks. One of the reasons why this issue was minimal was due to the nature of integrated management practice adopted by farmers in the study area. The findings from this study were in line with Sowunmi, Orungbemi, and Adedeji (2021) where they discovered that poor transportation, weather condition, and market were major problems faced by cassava farmers in Oyo state, Nigeria.

Table 1: Socio-economic Characteristics of Cassava Farmers in the study area

Variables	Frequency	Percentage	Mean
Sex			
Male	97	80.83	
Female	23	19.17	
Age			
25-35	30	25.00	41.00
36-46	25	20.83	
47-57	38	31.67	
58-68	15	12.50	
69-79	12	10.00	
Marital status			
Single	10	8.33	
Married	92	76.67	
Others	18	15.00	

Level of Education			
None	11	9.17	
Primary	34	28.33	
Secondary	45	37.50	
Tertiary	30	25.00	
Farming Experience			
1-10	20	16.67	
11-20	14	11.67	19.00
21-30	28	23.33	
31-40	58	48.33	
Household size			
1-5	48	40.00	
6-10	67	55.83	6.00
11-15	5	4.17	
Total	120	100	

Source: *Field survey, 2016*

Table 2: Distribution of respondents according to their integrated soil management practices.

Soil management practices.	Frequency.	Percentage (%)
Inorganic, organic	19	15.83
Organic, inorganic, cover cropping	10	8.33
Inorganic, organic, intercropping	7	5.83
Inorganic fertilizer, others	51	42.5
Inorganic, cover cropping	8	6.67
Organic, cover cropping	11	9.17
Organic, intercropping	6	5.0
Inorganic, intercropping	3	2.5
Inorganic, organic, intercropping, cover cropping, others	5	4.17
Total	120	100

Source: *Field survey, 2016*

Table 3: Results of Pearson moment correlation analysis

Variable	Coefficient	p-value
Output of cassava	-0.1165	0.2052

Source: *Field survey, 2016*

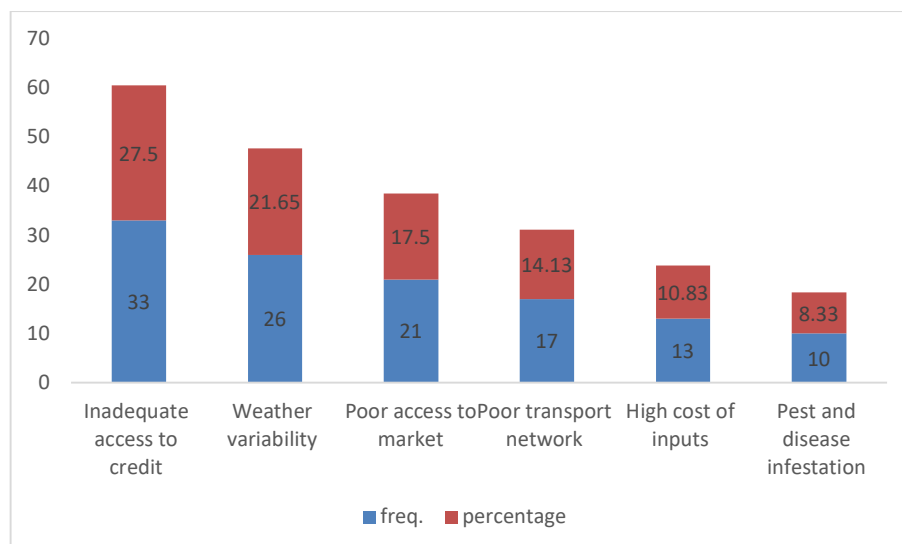


Figure 1: Constraints faced by Cassava farmers in the study area

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that cassava was male dominated, there was a negative relationship between soil management practices and output from cassava production in the study area, and it implies the type of soil management practice adopted does not determine the level of output from cassava production. Cassava farmers adopted the use of inorganic fertilizer and multiple methods such as shifting cultivation, crop rotation than any other soil management practices in the study area. Government should set better land policies to promote a domestic cassava production policy that favours farmers on land utilization and management. Extension agents should try to educate the women and young individuals on the potentials of the use of integrated soil management in cassava production, because it can be observed in the study that females are less involve in cassava production under integrated soil management practices.

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INDIGENOUS PRACTICES USED BY MAIZE FARMERS FOR CLIMATE CHANGE ADAPTATION IN EMOHUA LOCAL GOVERNMENT AREA, RIVERS STATE, NIGERIA

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ABSTRACT

The study investigated the indigenous practices used by maize farmers for climate change adaptation in Emohua Local Government Area, Rivers State. Specifically, the study described the respondents' socio-economic characteristics, ascertain the respondents' level of awareness of climate change, identify the respondents' source of information on climate change and assess the indigenous practices used for climate change adaptation by the respondents. A hundred respondents were selected from the population of all registered maize farmers in the study area through multistage sampling procedure. Data were obtained primarily with the aid of structured questionnaires and analyzed using frequency count, mean and percentage. The result revealed that respondents have notice change in climate at a point (100.0%). Their sources of information were radio (86.0%) and Extension agent (84.0%). The indigenous practices used by the respondents for climate change adaptation were change of planting and harvesting date (\bar{x} =3.4) as well as increased mulching (\bar{x} =2.8). Maize farmers in Emohua LGA, Rivers State have noticed climate change for the past 40 years and are highly aware of the difference in the amount of radiation from the sun. The farmers get information on climate change from radio, television, etc. Preservation of maize seedlings with local herbicides, changing maize planting date, etc. were indigenous practices used by the farmers for climate change adaptation. Community organizations and institutions should encourage maize farmers to access more indigenous practices in their production.

Keywords: Indigenous practices, climate change, Adaptation.

INTRODUCTION

Maize (*Zea mays*) is an important monoecious herbaceous annual crop cultivated for food, industrial and other economic purposes. In Nigeria, maize is cultivated throughout the country in different environmental conditions and is consumed in almost all household in different forms. However, with respect to maize farming, other forms of agriculture and land use, climate change will likely stimulate a significant change both in terms of the quantum of products as well as the location or area of production (Campbell, Thornton, Zougmore, Van Asten & Lipper, 2018). According to Agwu and Irohabe (2013), climate change has altered the composition of the earth atmospheric variables which have manifested in different dimensions including temperature ranges, vapour pressure, sea level, volcanic activity and melting glacier ice which have adversely affected food production and as such have become a global concern lately. The changes in climate affects the ability of rural communities to satisfy those needs that are inherent in their environment thereby exposing the rural dwellers to difference forms and degrees of vulnerability. One important step in reducing the vulnerability of climatic hazard among rural farming population is the development and practice of adaptation strategies using indigenous knowledge (Alhassan, Osei-Asare, & Kuwornu, 2019). According to Intergovernmental Panel on Climate Change (IPCC) which remains a key influence on government policymaking, as cited by Agwu and Irohabe (2013a), traditional ecological knowledge must also be used in climate assessments. However, incorporating indigenous

knowledge into climate change concerns should not be done at the expense of modern/western scientific knowledge (IPCC, 2019).

Indigenous knowledge which has been defined as institutionalized local knowledge that has been built upon and passed on from one generation to the other by word of mouth is the basis for local-level decision-making in many rural communities and integrating this knowledge into climate change policies can lead to the development of effective adaptation strategies that are cost-effective, participatory and sustainable (Nwakwasi, 2013). Climate change adaptation strategies are those approaches that enable the community to cope with or adjust to the impacts of climate change in the local areas. In Nigeria, adaptation strategies perceived by maize farmers as appropriate include crop diversification using different crop varieties, varying the planting and harvesting dates, increasing the use of irrigation, increasing the use of water and soil conservation techniques, shading and shelter, shortening the length of the growing season and diversifying from farming to non-farming activities (Verchot, 2007). However, despite the importance of local knowledge in addressing local challenges (Nwakwasi, 2013), limited significance is placed on Indigenous Knowledge Systems (IKS) and farming in Emohua Local Government Area, Rivers State.

METHODOLOGY

The study was conducted in Emohua Local Government Area (L.G.A). Emohua is one of the 23 LGAs in River State, with its headquarters situated in Emohua community which is in the tropical rainforest agro-ecological zone of Nigeria and

allows for diverse agricultural production activities in the area. Hence, farming and fishing are the major occupation of people in the area. A multistage sampling procedure was used to select 100 respondents from the population of all registered maize farmers in the study area. Data collected through the use of structured questionnaires were analyzed using descriptive statistics such as mean, frequency count and percentage.

RESULTS AND DISCUSSION

Maize farmer's awareness of climate change in the study area

Table 2 shows Maize farmer's awareness of climate change. The table revealed that all (100%) of the respondents have noticed change in climate at one point or the other, 46%, have noticed the changes in climate for about 6 to 10 years, while 30% and 24% have observed changes in climate for less than 6 years and over 10 years respectively. This is in line with the report of Igbokwe and Enwere (2001) who noted that rural people are knowledgeable of their environment and needs especially the farming systems and can detect changes within their society.

Table 2: Respondents Awareness of Climate Change

Variables	Frequency	Percentage
Have you noticed any change in climate	100	
How long have you noticed the change (years)		
Below 6	30	30.0
6-10	46	46.0
Above 10	24	24.0

Source: Field survey data, 2022

Respondents' sources of information on climate change

Table 3 showed that the respondents' major source of information on climate change was from Radio (86%), extension agents (84%), fellow farmers (91%), television (55%), mobile phones (80%) and personal experience (89%). Information sources are vital components of the social system

which enable farmers make informed production decisions. In line with this, Omagbemi, et. al, (2018) expressed that access to information could stimulate changes and creates conducive learning environment and make learning more meaningful and responsive to the localized and specific needs of learners which could aid decision on climate change adaptation process.

Table 3: Respondents' source of information on climate change

Sources of information	Frequency	Percentage (%)
Radio	86	86.0*
Extension agent	84	84.0*
Fellow farmers	91	91.0*
Television	55	55.0*
Mobile phone	80	80.0*
News paper	50	50.0*
Personal experience	89	89.0*

Source: Field Survey, 2023 *Multiple responses

Indigenous practices used in climate change adaptation among maize farmers in the area of the study

Table 4 shows that the indigenous practices used for climate change adaptation by the respondents are use of local herbicides to preserve maize seedling (\bar{x} =3.25), dumping farm waste to decay instead of burning (\bar{x} =3.17), allowing farmland to recuperate through fallowing (\bar{x} =2.89), change of planting and harvesting dates (\bar{x} =3.42), weeding more frequently (\bar{x} =3.42), increased mulching (\bar{x} =2.84), planting traditional groomed maize variety that have shown appreciable

resistance to climactic variations (\bar{x} =3.16), use of locally made organic manure (\bar{x} =3.13), use of local water, harvesting and storage system (\bar{x} =2.82), accessing information from extension agent planting (\bar{x} =3.43), planting of cover crops (\bar{x} =2.63), use of traditional produced herbicide and pesticide (\bar{x} =3.16), use of minimum tillage system (\bar{x} =2.95), employing climate knowledge gained from other farmers (\bar{x} =3.54), planting under trees (\bar{x} =2.65), Use of known pest and disease resistance crop varieties (\bar{x} =3.13) and avoiding cutting down trees (\bar{x} =2.55). Indigenous knowledge and practices have been helpful in coping with the problems accompanied by

climate variability. This is because much of the world's biological diversity is in the custody of the farmers who follow age-long farming and land use

practices for withstanding the effects that comes with climate change (Nwakwasi, 2013).

Table 4.4: Indigenous practices use for climate change adaptation among maize farmers

Variables	Strongly agree	Agree	disagree	Strongly disagree	Mean
I preserve maize seedling with local herbicides	34 (34.0)	57 (57.0)	9 (9.0)	-	3.25**
I dump farm waste to decay instead of burning	40 (40.0)	37 (37.0)	23 (23.0)	-	3.17**
I allow my farmland to recuperate through fallowing	29 (29.0)	31 (31.0)	40 (40.0)	-	2.89**
I weed more frequently	60 (60.0)	24 (24.0)	16 (16.0)	-	3.44**
Increased mulching	25 (25.0)	34 (34.0)	41 (41.0)	-	2.84**
I plant traditional groomed maize variety that have shown appreciable resistance	31 (31.0)	54 (54.0)	15 (15.0)	-	3.16**
I use organic manure	27 (27.0)	59 (59.0)	14 (14.0)	-	3.13**
use of local water harvesting and storage system	30 (30.0)	23 (23.0)	46 (46.0)	1 (1.0)	2.82**
I access information from extension agent	58 (58.0)	28 (28.0)	13 (13.0)	1 (1.0)	3.43**
Planting of cover crops	22 (22.0)	19 (19.0)	59 (59.0)	-	2.63**
I employ climate knowledge gained from other farmers	66 (66.0)	22 (22.0)	12 (12.0)	-	3.54**
Planting under trees	24 (24.0)	17 (17.0)	59 (59.0)	-	2.65**
I avoid cutting down trees in my farm land	21 (21.0)	13 (13.0)	66 (66.0)	-	2.55**

Source: Field Survey, 2023; **Agree, *disagree

Conclusion:

The maize farmers in the study area are aware of changes in climate. They got information on climate change from Sources of information radio, extension agent, fellow farmers, television, mobile phone, newspaper and personal experience. However, the indigenous practices used by the farmers for climate change adaptation are use of local herbicides to preserve maize seedling, dumping farm waste to decay instead of burning, change of planting and harvesting dates, weeding more frequently, increased mulching, use of local water harvesting and storage system; accessing information from extension agents, employing climate knowledge gained from other farmers, planting under trees and avoiding cutting down trees. Community organizations and institutions should encourage maize farmers to access more indigenous practices in their production.

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POOR ACCESS TO FOOD AND FOOD INSECURITY IN NIGERIA¹Abdulkareem, S. B., ¹Sunday, O., ²Ekpe, H. A., ¹Akhadelor, M. O.¹Federal College of Forestry Mechanization, Afaka-Kaduna²Federal University Gusau**ABSTRACT**

Viable agricultural programmes and activities can sustain the food supply and reserves needed for the welfare of the citizens. In Nigeria, food insecurity is a major problem. Food security is an indispensable prerequisite for the survival of mankind and economic activities including food production. Food is different from other commodities because of its inevitability for survival and existence. Food is different from other commodities because everybody needs it for survival, and it is an indispensable factor in nation's quest for economic growth and development. Unfortunately, most of the food need in Nigeria is produced by peasant farmers who lack capital, skills, energy, and other viable ingredients to produce on large quantity that will meet the requirement of the growing population. This paper assessed access to food and food insecurity in Nigeria. Methodologically, the authors made use of secondary sources of data where relevant empirical literatures were reviewed to assess access to food and food insecurity in Nigeria. The study found that among factors that cause food insecurity are: policy inconsistencies, violent conflicts, insufficient production among others. The paper therefore concludes that to have access to food and combat food insecurity in Nigeria, the government must stand on her toes to fight insecurity in the country to the end. The study recommends that public policy makers must see food as a component of welfarism and as such develop political will to achieve all to enable food security.

Keywords: Food insecurity, Economic development, Access to Food

INTRODUCTION

Food security is a basic human need and fighting hunger is one of the greatest challenges of this century. (Ojo and Adebayo, 2012). Although the number of people living in hunger has declined for many years, in 2015 it has started to increase again (FAO et al. 2019). Today, two billion people are still living in moderate or severe food insecurity, because they do not have regular access to food, not a necessary variety of nutritional value, or there is not enough food for the whole population available. 820 Million of these two billion facing food insecurity are living in hunger (FAO et al., 2019). Particularly in developing countries, people cannot meet their nutritional needs (Oyinloye et al., 2018).

Food security is an elementary and basic requirement for national development and as such, has been used by different people to convey different thoughts. In the last decades the annual population of Nigeria has grown rapidly, and has particularly seen food insecurity spiraling to become the norm in many homes, a trend which has furthered the intensity of poverty and lack of access to food. Interaction of population growth, bad policies of government, lack of infrastructural development, rural-urban drift, lack of incentives, poverty of peasants as well as under-capitalization has fuel the fangs of food insecurity in Nigeria.

Clashes between farmers and herdsmen in the North Central places like Benue, Taraba, Nasarawa and Plateau, and North West zone places like Zamfara and Kaduna, have caused heavy losses of lives and property. These losses of lives have seriously affected farming activities and other related businesses in the regions affected. Due to this clashes and banditry, there has been a drastic reduction in farm outputs, this development, has heightened the fear of hunger. Most farmers in the

affected states have already abandoned farms for fear of being attacked by the herdsmen. Farming is no longer business as usual for the predominantly farming communities of Benue and border communities of Nasarawa and Taraba states. Many farmers have been dispossessed and displaced of their farms by armed men believed to be Fulani herdsmen.

Theoretical framework

The achievement of food security in a society falls under the purview of the state. The state is majorly able to engender policies that favour agricultural production, expansion and sustenance through deregulation, privatization and disengagement with areas of social provision. It is the duty of the state to set up a proper environment for effective trade relations and hands-off market forces. As a result, this research work adopts Neoliberalism as its theoretical underpinning. This is so because neoliberalism favors private and economic markets rather than the public ones and authority of the state. Also, because neoliberalism advocates reduction in deficit spending, open markets to trade, abolishment of fixed exchange rates, and permission for private property as well as permission for privatized businesses run by the state. Significantly, neoliberalism for ensuring food security refers to a freeing of the economy by eliminating regulations and barriers that restrict what actors can do.

Concept of Food Insecurity

Food insecurity is the absence of food security; food insecurity means lack of access to enough food and can either be temporary or chronic. Akinyetun, (2018) opine that chronic food insecurity arises due to lack of resources to acquire and produce food thereby leading to persistent inadequate diet. FAO (2010) also refers to food

insecurity as the consequences of inadequate consumption of nutritious food bearing in mind that the physiological use of food is within the domain of nutrition and health.

When individuals cannot provide enough food for their families, it results to hunger and poor health. Poor health reduces one's ability to work and live a productive healthy life. Poor human development destabilizes a country's potential for economic development for generations to come (Otaha, 2013). Food insecurity is the opposite of food security, it is the lack of access to sufficient quality and quantity of save nutrition food for an active and healthy life; the inability of households or individuals to meet the required consumption level in the face of fluctuating production, price, and income (Akinyetun, 2018). Inability of households to have reliable access to food in sufficient quantity and quality to enjoy active and healthy life is called food insecurity.

Causes of Food Insecurity

Policy inconsistencies and corruption

There has been serious setback on food production and distribution due to prevalent policy changes and poor performance of agencies appointed to execute food and agriculture policies. New governments in power always abandon the previous government policies and programmes on agriculture and new ones are put in place, and the new ones put in place are not better than the old ones. All these are in a bid to create opportunities for graft. This creates no room for stability and progress in food production. Similarly, the dismal performances of some of the past programs like Green Revolution, Lower River Basin Development Authorities, Operation Feed the Nation, as well as agencies like National Agricultural and Land Development Authority (NALDA) and the Directorate of Foods, Roads and Rural Infrastructure (DFRRI) have contributed to low agricultural and food productivity in Nigeria.

Conflicts

Both ethnic and religious conflicts have devastating effects on the economic activities of a country especially food production in the areas that these conflicts take place. Conflicts do not necessarily mean physical fighting of wars. It could be a disarticulated society that is experiencing structural violence without official declaration of war such as oppression of the poor by the rich, pervasive poverty, police brutality, and intimidation of ordinary people by those in power, oppression of women and children and monopolization of resources and power by some sections of the society. It will be absolutely wrong to say there is peace in such a country like Nigeria where Boko Haram and banditry are threatening the unity of the country. Therefore, it is quite possible not to have peace even when there is no war (Akinyetun, 2018).

Insufficient production

Nigeria's major challenge to food security is its underdeveloped agricultural sector that is perpetually characterized by over reliance on primary agriculture, low fertility soils in some areas, minimal use of external farm inputs, environmental degradation, significant food crop loss both pre and post-harvest, and inadequate food storage and preservation that result in significant commodity price fluctuation (Ilaboya, Atikpo, Omofuma, Asekhame, Umokoro, 2012). Almost ninety-five percent of food in Sub Sahara Africa is grown under rain fed agriculture. Hence food production is vulnerable to adverse weather condition (Ilaboya et al., 2012).

Economic Development as a Driver of Food Insecurity

Economy situation of a country influences food security. One of the biggest variables to measure economy growth is the economy and it can be closely connected to food security. Many scholars proof that the better the economic growth, the more people are likely to be food secure (Warr, 2014 in Kralovec, 2020). Therefore, a weak economy or an economic crisis can lead to food insecurity in a country (Musemwa, 2015; FAO et al, 2019 in Kralovec, 2020). Researches has been conducted in developing countries in Africa because they have thriving economic growth, and at the same time are vulnerable to an economic crisis, because they are often low-income countries, always in conflict and are hit most by climate change. All this increases the vulnerability of a population (FAO, 2019: 59 in Kralovec, 2020).

The economic situation of the individual is significant for the food security status of a household. Unemployment is one of the factors leading to food insecurity. It is one of the most explored factors in the field of economic development and food security. Being unemployed puts people into poverty and poor people usually depend on the market to obtain food. They spend a higher percentage of their income on food and consequently suffer more likely from food insecurity (Metu, Okeyika, Maduka, 2016).

Conflict-affected countries have on average higher rates of food insecure people than countries not affected by conflict (FAO 2017). As violent conflicts can have short-term effects on people's nutritional status, it can also have long-lasting impacts on their livelihoods. Violent conflict can affect food security in several ways. However, the effect conflict has on food security depends on what kind of conflict it is, considering that 'measuring and categorizing conflict is not straightforward' (Martin-Shields and Stojetz, 2019). Studies show that the outcome depends on the type of conflict.

CONCLUSION AND RECOMMENDATIONS

Nigerian state in this nascent democratic era must pursue food security as urgent as possible. Any country that cannot effectively formulate and implement agricultural and food policies may find it very difficult to use the citizens as catalyst for sustainable democracy. The survival of the state is mostly linked to the ability of its economy to meet the material demands of both people and government. Welfare according to Daniel Wit (1953:9 in Kralovec, 2020) “constitutes a third objective of modern government”. Any government whether democratic or dictatorial that makes her citizens go hungry will definitely run into trouble. That welfare is an objective of all modern nation states is a fact comparable to their common pursuit of national economic health. Welfare activity is engaged in, because people the world over, demand it of their governments. In essence, food is an essential component of welfarism. This paper therefore recommends that public policy makers must as a matter of urgency see food as component of welfarism and as such develop sufficient political will to achieve (i) increased food production; (ii) evolve food policy and (iii) eventually attain food security for all.

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**DETERMINANTS OF CERTIFIED SEEDS ACCESSIBILITY AMONG FARMING HOUSEHOLDS IN
IMO STATE, NIGERIA**

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ABSTRACT

The study determined factors affecting accessibility of certified seeds among farming households in Imo State. One hundred and eighty respondents were selected for the study through a multistage sampling procedure. The study ascertained the availability, sources and access to certified seeds as well as certified seeds preference criteria. Data were collected using structured questionnaire and analysed with frequency count, percentages and regression. Results show that 57.4% of the respondents agreed that certified seeds were available to them, 79.4% sourced their seeds from local markets the challenges of accessing certified seeds include high cost of seeds (87.8%), lack of availability (48.3%), lack of reliability of certified seed (76.3%) and distance to source of certified seed (44.4%). Determinants of certified seeds accessibility include household size ($P \leq 0.082$), age ($P \leq 0.032$) and ownership of mobile phone ($P \leq 0.066$). The study concluded that farmers did not source their seeds from certified seed agencies, hence lacked access to certified seeds. Certified seeds companies should facilitate farming households' access to certified seeds at subsidized rates.

Keywords: Certified seeds, farming households, seed companies

INTRODUCTION

The agricultural sector is a major contributor to the livelihoods of many rural Africans. It accounts for over 2.3% of the country's GDP, 40% of export earnings, and 4.6% of employment in the country. Over 70% of people in rural areas depend on agriculture, and it plays a crucial role in job creation, food security, and poverty alleviation (Hlatshwayo *et al.*, 2021) with about 50% of the agricultural households in Africa practicing agriculture as the primary source of food, while 37.5% list agriculture as a source of extra food (Mwadalu and Mwangi, 2015).

Certified seed is among the key inputs for improving crop production and productivity. Increasing the quality of certified seeds can increase the yield potential of the crop by significant folds and thus, is one of the most economical and efficient inputs to agricultural development. Certified seeds are official improved variety seeds generated from governmental and non-governmental agricultural agencies and incubation centre. Ever since certified seed was considered an important vehicle to extend intensified production techniques in developing countries, the supply system has received considerable attention (Kusse and Kasso, 2021).

A sustainable certified seed supply and utilization system will ensure that high-quality seeds of a wide range of varieties and crops are produced and fully available in time and affordable to farmers and other stakeholders. However, like in many states of the country, farmers in Imo State have not gotten seed on time and with expected quality due to a combination of factors, including inefficient seed production, distribution and quality assurance systems, as well as bottlenecks caused by a lack of good seed policy on key issues such as access to credit for inputs. The study ascertained the

availability of certified seed, sources of certified seeds and the challenges affecting access to certified seeds.

The hypothesis for the study tested for significant relationship between determinants of access to certified seed and access to certified seed.

METHODOLOGY

This study was carried out in Imo State. Imo state has an estimated population of 5,408,756, a total land area of 5,530 km², population density of 978 persons per square kilometre which is predominantly rural (National Bureau for Statistics, 2022). The population for this study comprised of all rural farm households in Imo State. The sampling frame comprised of rural farm households in some selected rural communities within the three agricultural zones of the state. A multistage sampling procedure was used for the study. Two zones namely Okigwe and Owerri purposively selected out of the three zones in the state due to the security challenges in the third zone during the period of data collection. At the second stage, two Agricultural Development Programme (ADP) extension blocks were selected from the list of ADP blocks to give a total of six blocks. In the third stage, two ADP circles were selected from each of the six blocks to give a total of twelve circles. In the final stage, 20% of sample of farmers were selected from each of the circles to give a total of 115 respondents.

To ascertain the determinants of access to certified seed and access to certified seed the study utilized multiple regression analysis.

$$\text{Certified Seed access} = \beta_0 + \sum_{i=1}^n \beta_i \chi_i + \mu$$

β_0 , Coefficients to be estimated; β_i , Parameters to be estimated; χ_i , Value of the determination; μ , Stochastic error term

RESULTS AND DISCUSSION

Availability of certified seed

Entries in Table 1 show that majority of the respondents (57.4%), agreed that certified seeds are available for farmers in the state. This finding is in agreement with Izuogu, et al. (2023) and Raheem et al. (2023) who reported that farmers in Nigeria consented to the availability of certified seeds in

their various study areas. Availability of improved seeds are at the centre of the innovative packages that are necessary for increasing agricultural production, nutrition and improvement in the living standard of rural households. According to McEwan et al. (2020) increase in the availability of certified seed will lead to an increase in its accessibility.

Table 1: Availability of certified seed (n=115)

Response	Frequency	Percentage
Yes	66	57.4
Undecided	9	7.8
No	40	34.78

Source: Field survey, 2023

Sources of certified seed

Table 2 shows that 79.40% of the farmers purchased their seed from the local markets and 44.34 % sourced their seeds from fellow farmers. Other sources of seed were seed dealers (40.86%), Research institutes (33.91%) and farmers' cooperatives. This result is in line with the findings of Thijssen (2022) who highlighted that notwithstanding the 50 years of investments in crop

variety improvement and development of the seed sector in Africa, more than 90 percent of farmers in Sub-Saharan Africa (SSA) obtain their seeds from fellow farmers and other informal sources. According to Ilangathilaka et al. (2021), farmers resort to neighbour's seed due to their perception that regular use of their own seeds reduces productivity.

Table 2: Sources of seed

Source	Frequency	Percentage
Research institutes	39	33.91
Extension services	16	13.91
Seed dealers	47	40.86
Farmers' cooperatives	32	27.82
Fellow farmers	51	44.34
Local market	91	79.40

Source: Field survey, 2023

Challenges of accessing certified seed

The findings in Table 3 indicates that majority of the respondents (87.8%) identified high cost of seed as a challenge to accessing certified seeds. Other challenges of accessing certified seeds included non-reliability (76.3%), risk of cultivating certified seed (56.4%), bad notions of certified seeds by peers (51.6%) and non-availability of certified seeds. Ilangathilaka et al. (2021) and Simtowe et al. (2019)

disclosed that majority of farmers who use informal seeds do so as a result of non-availability of certified seed and that even when these seeds are available, some are of low quality and unreliable. Part of the mandate of the National Agricultural Seed Council (NASC) is to ensure the production and circulation of adequate quantities of high-quality seeds of improved varieties of every crop that is of importance to the Nigerian farmers (NASC, 2019).

Table 3: Challenges of accessing certified seed

Challenges	Frequency	Percentage
High cost of seeds	101	87.8
Non availability	56	48.3
Non reliability of certified seeds	88	76.3
Distance to source of certified seeds	51	44.4
Unavailability of certified seeds	34	39.1
Risk of cultivating certified seeds	49	56.4
Bad notions of certified seeds by peers	45	51.6

Source: Field survey, 2023

Determinants of certified seed accessibility

The result of the probit regression model estimates in Table 4 shows that respondent's age had a significant positive effect on access to certified seed among respondents. This implies that as a farmer grows older, there will be an increase in his ability to access certified seeds. Invariably, young farmers are expected to have lesser access to certified seeds.

There is a positive significant relation between the number of years spent in school and access to certified seed. This may be given to the fact that the more educated a farmer is, the more the likelihood of having better information that will arouse interest for certified seeds. Hence, education has not just increased farmers' access to certified seed but has also elevated their ability to evaluate certified seeds.

Household size had a significant positive influence on access to certified seed. The means that as the members of the farm family increased, their access to certified seed increased.

From Table 4, there is a significant positive relationship between ownership of mobile phone and access to certified seeds. Information is very essential in creating awareness and consolidating farmer's decision to acquire certified seed. This agrees with Abbas and Jiang (2018) who opined that there is need for up-to-date communications with farmers as it relates to new technologies, improved varieties, prices and innovative agronomic practices.

Access to certified seed also increased as farmers had more contacts with extension agents as revealed by the significant relationship in Table 4.

Table 4: Determinants of certified seed accessibility among respondents

Variable	Coefficient	P > z	z-value
Age (year)	0.02838**	0.032	0.18
Years spent schooling	0.03732*	0.082	1.58
Household size	0.03542**	0.032	1.93
Farming Experience (year)	0.00934	0.082	-1.900
Farm size	0.00145	0.822	0.11
Ownership of mobile phone	0.95708***	0.066	4.82
Distance to farm (km)	0.01303	0.424	0.68
Access to credit	0.07639	0.680	0.30
Contact with extension	0.24148***	0.002	2.63
Constant	-1.25102**	0.025	-2.19
LR χ^2 (11) = 56.81			
Prob > χ^2 = 0.0000			
Pseudo R ² = 0.3132			
Log likelihood = -125.22673			

*, P < 0.1; **, P < 0.05; ***, P < 0.01

CONCLUSION AND RECOMMENDATION

High cost, non-reliability and the risk of cultivating certified seed are among the major challenges of farmers in accessing certified seed. Certified seed access is influenced by household size, ownership of mobile phone and contact with extension. Government should subsidize the price of certified seed and engage more extension agents to create awareness on certified seed. Effort should be made by the NASC to ensure that poor quality certified seed are eradicated.

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DETERMINANTS OF RURAL -URBAN MIGRATION IN EBONYI STATE, NIGERIA

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ABSTRACT

This study investigated the determinants of rural-to-urban migration in Ebonyi State. It described the socioeconomic characteristics of respondents, identified the causes and consequences of rural-urban migration on agricultural production, and identified the perceived challenges faced by migrants in the urban area. Multistage sampling procedure was used in selecting 140 respondents for the study while data were collected using structured questionnaire and analysed using frequency count, percentages as well as regression analysis. Respondents identified inadequate employment opportunities in rural areas (83.6%), inadequate infrastructure and (55.7) lack of interest in farming (24.3%) as causes of rural-urban migration. The consequences of migration on agricultural production include low agricultural productivity (86.7%), reduction in the agricultural labour force (64.8%) and increase in financial returns to the rural areas (54.3%). Inability to secure employment (66.8%), inadequate social services and amenities (47.8%) and high cost of transportation (40.5%) were among the perceived challenges faced by migrants on arrival in the urban areas. Age ($P \leq 0.007$), willingness to migrate ($P \leq 0.043$) and farming as major occupation ($P \leq 0.023$) were the socio-economic characteristics that influenced rural-urban migration. The study concludes that rural-urban migration threatens agricultural production and recommends that employment opportunities and social services should be improved to reduce rural-urban migration.

Keywords: Rural-urban migration, Agricultural labour force, Inability to secure employment

INTRODUCTION

Migration is a demographic process involving the permanent and temporary movement of individuals from one environmental area to another. On a spatial scale, migration occurs in a number of patterns, including urban-urban, urban-rural, rural-rural, and rural-urban. Rural-urban migration is the outcome of a search for perceived or actual potentials as a result of wealth disparities between rural and urban areas. It is the movement of people from rural to urban in quest of better opportunities due to wealth disparities between rural and urban areas and the higher quality of life found in urban areas.

Rural-urban migration is the movement of people from rural villages, towns, and farms to urban centers in search of jobs. The rapid growth of rural-urban labor force migration has been a common feature of developing countries which occurs in response to natural and human-induced factors (Alemu et al., 2022). In the field of migration studies, rural-urban migration has both negative and positive socioeconomic effects on the areas from which migrants come. As far as the negative effects are concerned, it is recognized that rural-urban migration intensifies poverty, as it takes away the productive echelon and depletes the ranks of most-needed farm labor from rural areas. Nigeria's rural areas are rich in both human and material resources, but these assets have yet to be fully realized and utilized for agricultural and rural development (Yohanna, 2014). The influence of migration from rural to urban areas upon agriculture and rural development cannot be overstated. Migration of labour out of agriculture is seen as a subsistence strategy which is not new at all because

it occurred in the history of developed countries and it is still very evident in developing countries. The effect of rural-urban migration and agriculture could be negative or positive depending on the rural market functionality.

METHODOLOGY

The study was carried out in Ebonyi state. The State lies at latitude 6°31'N and longitude 8°15'E (Eze, 2016). Abakiliki, the state capital has over the years been a center of attraction for migrants from the rural communities. Other attractive cities in the South -East include Enugu, Aba, Owerri, Onitsha etc. Ebonyi state has good motorable route which makes it easy for people to move from one location to another. The state also has in airport which was recently commissioned. Stratified random sampling techniques was adopted for the study in the selection of 140 respondents for study. This was proportionate to size of households in the selected communities. Structured questionnaires were used to gather primary data from respondents All statistical analysis was done using the Statistical Package for Social Science (SPSS) batch system.

RESULTS AND DISCUSSION**Causes of migration**

Entries in Table 1 shows that inadequate employment opportunities in rural areas (83.6%), inadequate infrastructure (55.7%), and lack of interest in farming (24.3%) were the major causes of rural-urban migration. This suggests that rural communities' lack of job prospects is a significant factor driving migration. The economic challenges and limited financial resources in rural areas drive

young people to seek better economic conditions elsewhere. All these factors highlight the influence of personal connections, skill development opportunities, and the desire for higher incomes in driving rural-urban migration. Danejo, Abubakar, Haruna, Usman and Bawuro (2015) also reported

that youth migrated from rural areas to urban areas due to lack of social amenities and employment in their original place of residence, for educational pursuance and to engaged themselves in one form of business or the other that generated income.

Table 1 Causes of rural-urban migration (n=140)

Causes	F *	%
Inadequate employment opportunities in rural areas	117	83.6
Inadequate infrastructure	78	55.7
Lack of interest in farming	34	24.3
Displacement as a result of communal crises	23	16.4
Escape from punishment as a result of a crime committed	9	6.4
Extreme poverty	14	10
Apprenticeship programmes	7	5.0
Better opportunities in the urban centres	21	15
The desire for more political or religious power	8	5.7
Improved wages in the urban	7	5.0
Joining relatives in the city	7	5.0

Source: Field Survey, 2023. * Multiple Responses Recorded

Effects of rural-urban migration on agricultural production

Rural -urban migration has both positive and negative effects on agricultural production as shown on Table 2. Among the negative effect are reduction in the agricultural labour force (64.80%), low agricultural productivity (86.60%) while increase in financial returns to the rural areas (54.30%) and decrease in the dependency ratio in rural areas (36.42%) were the major positive effects. This result agrees with the findings of Alarima

(2018) who reported that rural-urban migration has adversely affected agricultural production in the rural area through reduction in agricultural labour force. The increase in financial returns also agrees with the findings of Ehirim, Onyeneke, Chidiebere-Mark and Nnabuihe (2012). However, these remittances may not be able to compensate for low production on a sustainable base. Odey (2018) also reported that rural-urban migration gave rise to reduction in the agricultural labour force.

Table 2 Effects of rural-urban migration on agricultural production (n=140)

Effects	F	%
Reduction in the agricultural labour force	91	64.80
Low agricultural productivity	121	86.60
Decreases the dependency ratio in rural areas	51	36.42
Reduces the formation of groups and cooperative societies among youths	75	53.57
Farm work becomes tedious	36	25.72
Food insecurity in households	45	32.14
High cost of labour	48	34.28
Increase in financial returns to the rural areas	76	54.30
This leads to diversification into non-farm occupation	78	55.71
Increase in child labour	45	32.14

Source: Field Survey, 2023

Perceived challenges faced on arrival

From Table 3, inability to secure the anticipated job or employment (66.80%), inadequate social services and amenities (47.80%) and high cost of transport (40.50%) were the major challenges that

respondents perceived for rural-urban migrants. Nkoko (2012) identified lack of anticipated jobs as one of the challenges faced by migrants on arrival at the destination.

Table 3 Perceived challenges faced on arrival

Challenges	Frequency	%
Shelter	69	49.28
Food and related consumer items	63	45.00
Inability to secure job or employment	94	66.80
Cultural difference	48	34.28
Inadequate social services and amenities	67	47.80
High cost of transport	57	40.50
Violence	84	60.00
No difficulties faced	60	42.85

Source: Field Survey, 2023

Regression estimates of relationship rural-urban migration and selected socio-economic characteristics

Willingness to migrate showed a positive relationship with migration which implies that for every increase in the number of times respondents were willing to migrate, there was an increase in migration by 0.16%. Igbole and Adaka, (2017) in a previous study reported that migration reduces as willingness to migrate deteriorates. People who are willing to migrate secure better chances of leaving the rural areas than those who are not. (Odey, 2018).

Age showed a positive significant relationship with migration, which implied that for every unit increase in age, there will be an increase migration. These findings agree with Alarima (2018) who reported an increase in migration as the age of the rural dwellers increased. The possible reason for this is that the older an individual grows, the more the person appreciates the challenges of rural-urban dichotomy.

Table 4: Multiple regression estimates of relationship rural-urban migration and selected socio-economic characteristics

Variable	Linear Estimate
Constant	3.611 (2.916)**
Age	0.007 (2.301)**
Willingness to migrate	0.043 (2.216)**
Sex	-0.327 (-1.178)
Source of income	0.462 (1.878)
Farming as major occupation	0.023 (2.145)**
R	0.577***
R ²	0.342

CONCLUSION AND RECOMMENDATION

The study identified age, willingness to migrate and having farming as a major occupation as the major factors that influence rural-urban migration in Ebonyi State. Also, inadequate infrastructure and absence of adequate employment opportunities were identified as the major causes of rural-urban migration. Government should improve the level of infrastructure in the rural areas to reduce the rate of rural – urban migration. More job opportunities should be created in the rural areas given that most rural dwellers are not gainfully employed and this pushes them to the urban centres.

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EFFECTS OF COVID-19 ON LIVELIHOOD ACTIVITIES OF RURAL HOUSEHOLDS IN OYO STATE, NIGERIA

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ABSTRACT

This study assessed the effects of COVID-19 on livelihood activities of rural households in Oyo State, Nigeria. Multistage sampling procedure was used in selecting 364 respondents, using interview schedule to elicit the needed relevant information. The study revealed that apart from farming (100%), petty trading (53.5%), hand craft (43.1%) were the other forms of livelihood activities to maintain their survival. All the respondents (100%) claimed that COVID-19 reduced work exchange activities. However, 93.0% claimed low patronage as the effects on their livelihood activities. Nonetheless, 83.5% engaged in skipping of meals and 66.5% made recourse to lending/borrowing money as coping strategies applied while COVID-19 lasted. Chi-square analysis established significant relationships between coping strategies such as collection of food from neighbours/friends ($\chi^2 = 57.53$; $pv = 0.003$), skipping of meals ($\chi^2 = 92.76$; $pv = 0.001$) and effects of COVID-19 on livelihoods activities of rural households. Conclusion was that rural households' livelihood activities were at lowest ebbs during COVID-19 pandemic. It was recommended that all government agencies and non-governmental organization should synergize efforts at deploying digital infrastructures accompanied with digital education in rural areas to promote online activities thereby linking rural people with the whole world while reducing physical movement

Keywords: Rural livelihoods, activities, COVID-19, pandemic

INTRODUCTION

Corona virus disease also known as COVID-19 is a disease of which its unprecedented outbreak was initially witnessed in the year 2019 at Wuhan, Hubei Province of China. This was corroborated by Ahmed, *et. al.*, (2020). It manifested in the form of severe acute respiratory syndrome (SARS) in human beings. COVID-19 is highly contagious disease which voraciously ravaged the whole world, threatening the human existence. During which this COVID-19 lasted, it paralyzed almost every human endeavours in all frontiers (Amare, *et.al.* 2021). Attempt to curb the imposed menace made several governments across the world enacted series of restriction in the forms of lockdowns, transportation (land, air and water) restrictions, social/physical distancing, crowd avoidance and use of nose-masks.

In strictly remote rural areas, as movements were restricted, the scourge was much felt because they were primary producers in their crudeness devoid of sophistication. Rural households that mostly engage in farming and for the reasons of lockdown or movement obstructions cannot get labour for work on their farms. Hence, they resulted to surviving on petty trading and other forms of livelihood activities. According to Amare *et.al.* (2021) rural households experienced reduced economic activities during covid-19. Therefore, the general objective was to investigate the effects of COVID-19 on livelihood activities of rural household in Oyo State while the specific objectives were to identify various livelihood activities of the respondents, determine the effects of COVID-19 on rural households' livelihood activities and identify coping strategies employed during COVID-19.

METHODOLOGY

Relying on Oyo State Agricultural Development Programme (OYSADEP) delineation, multistage procedure was used to select respondents for this study. Stage one: purposive sampling of all agricultural zones because of the widespread of COVID-19 cases. Stage two: random selection of 10% of rural Local Government Areas (LGAs) in each zone. That is Ona-Ara local government from Ibadan/Ibarapa with 9 rural LGAs; Afijio local government from Oyo zone with 4 LGAs; Ogo Oluwa local government from Ogbomoso Zone with 5 LGAs and Itesiwaju local government from Saki zone with 10 LGAs culminating in 4 LGAs where this research was carried out. Stage three: based on the village listing template of OYSADEP, 10% of the rural villages in each of the chosen rural local governments were randomly selected. This gave 36 from 3,909 villages, 12 from 1,205 villages, 16 from 1,601 villages and 19 from 1,904 villages from On-Ara, Afijio, Ogo Oluwa and Itesiwaju LGAs, respectively. Finally, stage four involved random selection of 10% of the 36,405 rural household heads from OYSADEP farmers register, which gave 364 respondents for this research.

RESULT AND DISCUSSIONS

Livelihood activities

Data in Table 1 revealed that all (100%) the respondents engaged in farming and 53.5% engaged in petty trading. This implies that apart from farming, rural households engaged in various forms of livelihood activities. This was affirmed by Aderinoye-Abdulwahab *et. al.* (2015) that households engage in diverse livelihood activities to maintain their lives.

Table 1: Distribution of respondents according to their livelihood's activities engagement

Livelihood activities*	Frequency	Percentage
Farming	364	100
Petty trading	195	53.5
Hand craft	158	43.1
Forest product	113	31.0
Work-exchange group	109	29.9
Commercial motorcycling	98	26.9
Daily paid job	81	22.3
Haulage of goods	69	19.0
Daily farm labour	41	11.3

* Multiple responses

Source: Field Survey, 2023

Perceived effects of covid-9

Data in Table 2 revealed that all (100%) respondents claimed that they experienced reduced work exchange activities; reduction in transportation and restricted social life in their areas as the aftermath of covid-19. Majority (93.0%) opined that they experienced low patronage. This implies that

the effect during covid-19 pandemic was felt by rural households in diverse forms which really affected their livelihood activities negatively. This is similar to a study conducted by Krauss *et. al.* (2022) where they established that covid-19 pandemic really affected the rural household livelihood activities.

Table 2: Perceived effects of covid-19 on rural households' livelihood activities

Perceived effects of covid-19*	Frequency	Percentage
Reduced work exchange activities	364	100
Reduction in transportation	364	100
Restricted social life	364	100
Low patronage on their livelihood activities	338	93.0
Reduced marketing activities	305	83.8

*Multiple responses

Source: Field Survey, 2023

Coping strategies during covid-19

Data in Table 3 revealed that 83.5% of the rural households adopted the option of skipping

meals as coping strategy during covid-19 pandemic and 66.7% resulted into borrowing money as coping strategy during covid-19.

Table 3: Distribution of respondents by coping strategies during covid-19

Coping strategies*	Frequency	Percentage
Skipping of meals	304	83.5
Borrowing money	242	66.5
Collection of food from neighbour and friends	231	63.5
Begging for alms (food and money)	206	56.6
Engaging in hard and unworthy jobs	194	53.3

*Multiple responses

Source: Field Survey, 2023

Test of hypothesis

Data in Table 4 has established the relationship between coping strategies employed by the rural households and the effects of covid-19. It was revealed that collection of food from neighbours/friends ($\chi^2 = 57.53$; $pv = 0.003$),

skipping of meals ($\chi^2 = 92.76$; $pv = 0.001$) at 0.5 level were significantly related to the effects of covid-19 during which the pandemic lasted. This implies that rural household applied various forms of coping strategies during the period which covid-19 was ravaging.

Table 4: Relationship between coping strategies and effects of covid-19

Coping strategies	χ^2 -value	pv	Remark
Collection of food from neighbours and friends	57.53	0.003	Significant
Skipping meals	92.76	0.001	Significant
Borrowing money	88.54	0.000	Significant

Source: Field Survey, 2023

CONCLUSION AND RECOMMENDATIONS

It was concluded that rural household suffered gravely during covid-19 pandemic as most of their livelihood activities experienced depression. It is hereby recommended that governments, philanthropists, nongovernmental organizations (NGOs) and community-based organizations (CBOs) should synergize efforts at deploying digital infrastructures accompanied with digital education in rural areas to promote online activities thereby linking rural people with the whole world while reducing physical movement.

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PERCEIVED INDIGENOUS TREATMENT OF COVID-19 MANIFESTATIONS AMONG RURAL HOUSEHOLDS IN OYO STATE, NIGERIA

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ABSTRACT

The outbreak of the pandemic of COVID-19 precipitated abysmal socioeconomic challenges globally, and principally a terrible threat to global food security. It therefore necessitated looking for homegrown solutions to the pandemic of COVID-19. Thus, this study unearthed the perceived indigenous treatment of COVID-19 manifestations among rural households in Oyo State. Specifically determine health seeking behaviour of rural people, determine risk perception of rural people on COVID-19, and identified herbs and other plant derivatives perceived to be efficacious for treating COVID-19. A multistage sampling procedure was used to arrive at 405 respondents for the study. Structured interview guide was used to elicit information from respondents. Data were analyzed using frequency counts, mean and percentages. They mostly (65.4%) perceived that COVID-19 was a foreign disease. Slightly above average (57.0%) preferred herbal medicine to orthodox medicine. Majority (91.9%) had the source of knowledge of traditional medicine from their ancestors. *Azadirachta indica*, *Capsicum frutescens*, and *Citrus limon*, were some of the herbs and plant materials used. It is hereby concluded that rural people often use homegrown therapy for treating ailments, but had a wrong mental image of COVID-19. It is thus recommended that it is high time the health policy makers integrated herbal medicine into conventional medicine to guarantee sustainable health delivery for entire citizenry.

Keywords: Indigenous medicine, COVID-19, Rural household, Treatment

INTRODUCTION

The emergence of COVID-19 subjected the whole world into palpable fear. Millions of lives were lost as a result of the virulent nature of the disease (Erinoso et al, 2021). Diverse of approaches were employed to stem the tide of the disease, in order to ensure that the entire world were not wiped out of the universe. Vaccines were produced by different manufacturing industries, combinations of conventional medicinal approaches were integrated with homegrown medicinal practices in some Asia (Ozili, P.K. and Arun, T.G. 2020). In Nigeria, the Federal Ministry of Health at a point in time, advocated the use of homegrown solutions, this accorded relevance and recognition to the natural healing practices. Herbs and other plant derivatives were believed in some quarters to possess certain active properties capable of preventing the virulent nature of the virus (Vandebroek, Pieroni, Stepp, Hanazaki et al, 2020). Herbal medicines have also helped to mitigate the effects of contagious diseases like SARS-CoV. Evidence reinforces the view that herbal medicine may well be efficacious in managing and reducing the risk of COVID-19 as well (Ogunkola, Adebisi, Imo, Odey, and Lucero-Prisno, 2020). The study was poised to determine health seeking behaviour of rural people, determine risk perception of rural people on COVID-19, and identified herbs and other plant derivatives perceived to be efficacious for treating COVID-19.

METHODOLOGY

In line with the Oyo State Agricultural Development Programme (OYSADEP) delineation, multistage procedure was used to select respondents for this study. Stage one: purposive sampling of all agricultural zones because of the widespread of COVID-19 cases. Stage two: random selection of

10% of rural Local Government Areas (LGAs) in each zone. That is Ona-Ara local government from Ibadan/Ibarapa with 9 rural LGAs; Afijio local government from Oyo zone with 4 LGAs; Ogo Oluwa local government from Ogbomoso Zone with 5 LGAs and Itesiwaju local government from Saki zone with 10 LGAs culminating in 4 LGAs where this research was carried out. Stage three: based on the village listing template of OYSADEP, 10% of the rural villages in each of the chosen rural local governments were randomly selected. This gave 36 from 4,509 villages, 12 from 1,205 villages, 16 from 1,601 villages and 19 from 1,904 villages from On-Ara, Afijio, Ogo Oluwa and Itesiwaju LGAs, respectively. Finally, stage four involved random selection of 10% of the 40,502 rural household heads from OYSADEP farmers register, which gave 405 respondents for this research.

RESULT AND DISCUSSIONS

Health seeking behaviour of rural people in Oyo State

Data in Table 1 presents behaviours that rural people often exhibit when it comes to decision on health-related matters or choices. Those that often believed that some diseases were common or ordinary, were ranked 1st, while the belief in the influence of preternatural forces on illnesses ranked 2nd. Also, consulting oracles, confession and ritual sacrifices were ranked 3rd, while the preference for herbal medicine over orthodox medicine was ranked 5th. Religious influence on health seeking behaviour was ranked 6th. This was corroborated by Lucero-Prisno, Adebisi, and Lin (2020) that the religion of people often influences their health choices and that any medical or health solutions that are contrary to man's faith are rejected. However, some illnesses were classified as "ordinary or common" while

some were classified as “serious or severe” this notion also affect their health choices (Bamiwuye,

Akintunde, Olanrewaju, Kehinde, Shittu, and Adedire, 2021).

Table 1: Health seeking behaviour of rural people in Oyo State

Attitudinal statements	Responses				Rank
	Usually	Rarely	Never	WMS	
Does your religion influence your decision on any health-related matter?	118	215	72	2.11	6 th
Do you believe in the classification of some illnesses as ‘common and ordinary’?	349	45	11	2.83	1 st
Do you believe in the influence of preternatural forces on illnesses?	328	35	42	2.70	2 nd
Does using herbs and other plant derivatives more efficacious and effective in treating illnesses than orthodox drugs and medicines?	211	45	149	2.15	5 th
Your preference for solution to sickness is always traditional medicine except when it might have gone beyond control?	197	83	125	2.18	4 th
Do you believe that divination (consulting the oracles), confession, ritual sacrifices, incantations and potions made from plant and animal parts are essential components of illness management?	285	16	105	2.44	3 rd

Source: Field survey, 2023

Rural people’s risk perception of COVID-19

Data in Table 2 revealed that the respondents held varying opinions and mental images on COVID-19. Ranked 1st was the perception that only aged are prone to be infected by COVID-19; ranked 2nd was that COVID-19 is an imported disease and cannot infect Africans; ranked 3rd was that COVID-19 can spread through public gathering; and ranked 6th was the opinion that the

respondents were paranoid of contacting COVID-19. This implied that respondents believed that the pandemic was hyped and the Africans were not susceptible to it considering our climate. This is in tandem with the outcome of the research carried out by Bamiwuye, Akintunde, Olanrewaju, Kehinde, Shittu, and Adedire (2021) that people held a wrong perception on COVID-19, which influenced their responses to the disease.

Table 3. Rural people’s risk perception of COVID-19

Perceptual statement	Perceptual responses				Mean	Rank
	Very likely	Somewhat likely	Somewhat unlikely	Very unlikely		
COVID-19 is an imported disease and cannot infect Africans	111(27.4)	154(38.0)	72(17.8)	68(16.8)	2.76	2 nd
I am worried or paranoid of contacting COVID-19s	46(11.4)	58(14.3)	76(18.7)	225(55.6)	1.81	6 th
COVID-19 can transmit through physical contact with infected person	18(4.4)	34(8.4)	116(28.6)	237(58.5)	1.59	7 th
Only aged are prone to be infected by COVID-19	129(31.8)	110(27.1)	113(27.9)	53(13.2)	2.78	1 st
COVID-19 can spread through public transport/ gathering	63(15.6)	59(14.6)	126(31.1)	157(38.8)	2.07	3 rd
It can be transmitted through somebody without symptom	74(18.3)	23(5.7)	164(40.5)	144(35.6)	2.07	3 rd
Likelihood of death from COVID-19	54(13.3)	42(10.4)	149(36.8)	160(39.5)	1.97	5 th

Source: Field survey 2023

Some medicinal plants recorded for treating COVID-19 manifestations

Data in Table 3 revealed that some medicinal plants species were discovered to be used for treating COVID-19 manifestations. Some were

for cough while some were used both for cough and flu, while some were used for feverish manifestation. The herbs and plant derivatives that

were identified as being mostly used for different types of COVID-19 manifestations are depicted in the table below.

Table 3: Some of the medicinal plants recorded for treating COVID-19 manifestations

COVID-19 manifestations	Scientific name	Common name	Local name	Part of plant used	Administration
Cough, difficulty in breathing, sore throat	<i>Allium sativum</i>	Garlic	Ayu	Bulb	Nasal
Flu	<i>Alstonia booni</i>	Stool weed	Dokita igbo	Leaves of tree	Oral
Flu, fever	<i>Azadirachta indicus</i>	Neem	Dongoyaro	Leaves and back of tree	Oral
Cough and flu	<i>Citrus aurantiifolia</i>	Lime	Oronbo were	Juice extraction from fruit	Oral
Flu, difficulty in breathing	<i>Capsicum frutescens</i>	Pepper	Ataweere	Fruit of herbs	Juice extraction and used orally
Cough and flu	<i>Curcuma longa</i>	Tumeric	Ata'le	Rhizomes	Oral
Flue	<i>Gymnanthemum amygdalinum</i>	Bitter leaf	Ewuro jije	Leaves of shrubs	
Flu and respiratory tract infection	<i>Citrus lemon</i>	Lemon	guinguin	Fruit	Oral

Source: Field survey 2023

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**DETERMINATION OF SOIL ORGANIC CARBON OF USMANU DANFODIYO UNIVERSITY MAIN
CAMPUS, SOKOTO STATE**¹Ibrahim M., ¹Muhammad, U. M., ²Sauwa M. M.¹Department of Forestry and Environment, Usmanu Danfodiyo University, Sokoto State, Nigeria²Department of Soil Science and Engineering, Usmanu Danfodiyo University, Sokoto State, Nigeria**ABSTRACT**

Soil plays a vital role in the global carbon cycle making its assessment essential. This study estimated the soil organic carbon stock in the main campus of Usmanu Danfodiyo University Sokoto, Nigeria. Fifteen 50m line transects were laid and each transect was divided into 10m × 10m plots in each transect two plots were randomly selected giving a total of 30 plots. Soil samples were collected for carbon estimation and bulk density using a soil auger and soil corer respectively. Soil organic carbon was determined using the Walkley black method. The result was analysed using descriptive statistics and means were separated using Duncan's Multiple Range Test (DMRT). The total soil organic carbon stock (SOCS) determined in the study area was 92.08 t/ha. This indicates that shelterbelts can accumulate a high amount of soil organic carbon stock when managed properly through litter fall. However, the SOC also varies with depth. The depth of 0-10cm had the highest SOCS. From the finding of this research, it was concluded that shelterbelt increases SOCS through litter accumulation which serve as a carbon sink. Therefore, more shelterbelts should be established for soil organic carbon accumulation and soil sequestration.

Keywords: Soil organic carbon, shelter belt, carbon sequestration.

INTRODUCTION

Soil plays a crucial role in mitigating climate change by absorbing carbon dioxide and acting as a source and sink of greenhouse gases (Jahangeer *et al.*, 2012). It constitutes the largest pool of organic carbon in the terrestrial biosphere and has the potential to store carbon, reducing CO₂ levels in the atmosphere (Powlson *et al.*, 2011a; Scharlemann *et al.*, 2014). Tropical countries face challenges such as reduced agricultural productivity, low rainfall, flooding, and increased temperatures. Industrialization and greenhouse gas emissions are to blame. To address these issues, there is need to estimate how much carbon soil can store. This will help in determining if afforestation and reforestation can help solve these problems.

The objective of this study is to determine the amount of soil organic carbon (SOC) stock present in Usmanu Danfodiyo University Campus. This will involve analyzing the quantity of SOC stock at various depths and calculating the total amount of SOC stocks in the area. The findings of this study are important for comprehending the soil's role in the global carbon cycle and assessing biospheric reactions to climate change.

METHODOLOGY

This study was conducted at the main campus of Usmanu Danfodiyo University Sokoto, which is situated in Wammako Local Government Area of Sokoto in northwestern Nigeria. The campus is located at Latitude 13°06'01" and Longitude 5°11'10" E, as per Google Earth (2019). The study area has a long dry season from October/November to April/May and a short rainy season from May to September/October. Rainfall occurs from late May to early October, with an annual amount of 400 to 700 mm (Senchi *et al.*,

2014). The minimum and maximum temperatures range from 19°C to 39°C, respectively, with an average annual temperature of 27°C and relative humidity of 52-56%. The area's vegetation is classified within the Sudan Savannah vegetation zone. The soils in this zone are predominantly sandy to loamy in texture, with some areas having patches of clayey subsoil. The vegetation consists of a variety of grasses and legumes, with patches of bushes and sparsely distributed indigenous tree species, the majority of which are thorny.

For the study, 30 plots were randomly selected from a 50m line transect divided into 10×10m plots.

Soil samples were collected from selected plots using a soil auger. Three samples were collected from different depths, air-dried, ground, and sieved through a 2mm sieve. The sieved soils were taken to the lab for chemical analysis. Bulk density was determined by collecting samples using a soil corer, oven-drying them at 105°C, and then dividing the oven-dry mass by the volume of the soil corer.

Determination of the Percentage of Organic Carbon

The percentage of organic carbon was determined using the Walkley and Black wet oxidation method.

Determination of Soil Organic Carbon Stock (SOCS)

$$SOC = \rho \times d \times OC\%$$

$$BD = \frac{\text{oven dry weight of soil}}{\text{volume of soil core}}$$

ρ = soil bulk density (gcm⁻³), d = total depth at which samples were collected (cm), %C = carbon concentration (%) and BD = bulk density.

RESULTS AND DISCUSSION**Soil organic carbon stock**

Table 1: Mean of the Soil Organic Carbon Stock of each Location with Depth

LOCATION	SOCS1 (0-10cm)	SOCS2 (10-20cm)	SOCS3 (20-30cm)
1	37.2167 ^a	23.0479 ^b	17.9280 ^c
2	30.0000 ^a	21.5720 ^b	19.8840 ^b
3	34.9500 ^a	24.4410 ^b	18.6619 ^c
4	20.7863 ^a	17.0200 ^b	10.7360 ^c
SEM	1.786	1.786	1.786

Mean with different superscripts across the row are significantly different at (P<0.05) level.

The total stock of soil organic carbon in Usmanu Danfodiyo University's main campus was 92.08 t/ha (Table 2). This high value was due to the accumulation of litter in the shelterbelt and good management practices. The value was less than the values obtained by Zhu *et al.* (2010) (107.6 Mg ha⁻¹), Sharma *et al.* (2010) (159.40 Mg ha⁻¹) and

Tolunay and Comez (2008) (448 Mg ha⁻¹). The value was also higher than the result obtained by Liu (2011) (20.2 Kg C m⁻²) and Kim *et al.* (2009) (2.7 Mg ha⁻¹) and Janssens *et al.* (1999) (73.1 Mg ha⁻¹) Çömez (2012) (28.7-46.4 Mg ha⁻¹) and falls within the range obtained by HariPriya (2000) (48.3 to 97.30 Mg ha⁻¹).

Table 2: Total Soil Organic Carbon Stock for each Location

Location	SOC Stock
L1	26.06
L2	23.82
L3	26.02
L4	16.18
Total	92.08

L1= Energy Research Centre, L2 = Chemistry Department, L3 = Registry Department and L4 = Bursary Dept.

The study found that soil organic carbon (SOC) content varies with depth, with the highest concentration found in the top 0-10cm layer (Table 3). About 40% of SOC is found in the topsoil, and SOC concentration decreases with increasing soil

depth due to less litter accumulation. Soil organic carbon is typically concentrated in the top surface soil, as also found by McCarty *et al.* (2010). This study is consistent with the findings of Bangura and Grime (2015) that SOC stock decreases with depth.

Soil Organic Carbon Stock with Depth

Table 3: Total Soil Organic Carbon Stock for each Depth

Depth	SOCS (t/ha)
0 – 10 cm	29.98
10 – 20 cm	21.22
20 – 30 cm	16.81
Total	68.01
SEM	1.786

CONCLUSION

Shelterbelt accumulates high soil organic carbon stock at 92.08 t/ha. The highest litter accumulation area had the most soil organic carbon stock. Soil organic carbon stock varies by depth: 0-10cm > 10-20cm > 20-30cm. However, establishing more shelterbelts in semi-arid environments is recommended to create carbon sinks.

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**WILLINGNESS TO PARTICIPATE IN PLATFORM COOPERATIVES AMONG MEMBERS OF
ABUNDANT FARMERS' COOPERATIVE SOCIETY, IKORODU, LAGOS STATE**

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ABSTRACT

One of the efforts to improving the livelihood of citizens within the rising e-economy space is cooperatives promotion among agricultural producers. Despite this, inequality and poverty have been on the rise while e-business is increasing. This has led to the rethinking of conventional cooperatives to shift to platform cooperatives (PCoop) for market expansion and surplus sharing. But literature on PCoop is lean, world-wide. The study therefore investigated the willingness to participate in PCoop, among members of Abundant Farmers' Cooperatives in Ikorodu, Lagos. 85 cooperative members were selected by multistage sampling procedure. With questionnaire, data was obtained on socio-economic characteristics and willingness to participate in PCoop. The data was presented by means of frequency distribution, percentage and analysed using probit regression. The results showed that majority were male (60.71%), below 50 years old (58.34%), had first degree (54.76%), maximum of one-million-naira yearly farm income (48.81%) and aware of PCoop (86.90%). None of the regressors' coefficients are significant. However, the female respondents (-0.354) have lower and those that were aware of PCoop (0.307) have higher probabilities of willingness to participate in PCoop than their opposite categories. Years of formal education (0.006) and age (-0.031) have positive and negative relationship with the probability of willingness to participate in PCoop respectively. Awareness campaign on PCoop should commence for agricultural cooperatives members to shift to PCoop.

Keywords: Platform cooperatives, farmers' cooperatives, awareness, online.

INTRODUCTION

Cooperatives as a form of business organisation will continue to be relevant in all economies of the world. One major reason for this is the basic principle of cooperatives, which include equity in terms of voting right and distribution of business surpluses to all its members. Despite the promotion of cooperatives, poverty and income inequality have been on the increase while e-business is rising. The features of cooperatives motivated the rethinking of the operation of businesses, especially those run through the internet, to be done as platform cooperatives (PCoop), a cooperative to boosts the income of all the stakeholders of the business (Zhu and Marjanovic, 2021). PCoop as a business model will directly reduce income inequality and poverty as it promotes sharing of business surpluses as against the practice of owners-takes-all in other forms of businesses (Scholz, 2017).

Agricultural cooperatives can be run on the internet for members to consummate exchange transactions in their input and output markets to take advantage of platform cooperatives. With PCoop, distance and location are not barrier to membership. There is more opportunity for market expansion as it improves the accessibility of input and output markets for members across many locations. It is therefore necessary to study the willingness to join platform cooperative in Nigeria locality especially among agripreneurs. But individual's awareness of a group precedes decision to participating in it, the research thus provides answers to these questions: what is the level of awareness of PCoop among the respondents? And what are the determinants of the respondents' willingness to participate in PCoop?

The literatures on PCoop started with Scholz (2014 and 2017) and research works on it is lean world-wide (Zhu & Marjanovic, 2021 and Philipp *et al.*, 2021). Philipp *et al.*, (2021) reported that more research need to be done on PCoop to boost its literature. Ogunyemi *et al.* (2021) pioneered PCoop studies in Nigeria followed by Ogunyemi (2022) and Ogunyemi *et al.* (2023). This study is therefore important for academic and research purposes. Anigbogu *et al.*, 2017, Ologbon *et al.*, 2020 and Twumasi *et al.*, 2021 reported that socioeconomic characteristics influence cooperative membership.

METHODOLOGY

The study was conducted in Lagos State University of Science and Technology, Ikorodu, Lagos State. Multistage sampling was adopted. The first and second stages involved the purposive selection of the university and Abundant Farmers Multipurpose Cooperative Society in the university community respectively. The last stage involved simple random sampling of 85 members from 205 membership in the register of the cooperative society as at March, 2023. The data was on socio-economic features of the respondents, their awareness of and willingness to participate in platform cooperative. The data was presented using frequency distribution and percentage while probit regression model was used to analyse the factors that influence the respondents' willingness to participate in platform cooperative. The Probit model was adapted from Etim *et al.* (2020) and its mathematical model for the decision to participate in platform cooperative is:

$$Y_i^* = P(Y_i = 1) = \beta_0 + \beta X_i + \varepsilon_i \dots \dots \dots \text{eqn 1}$$

Y_i is the respondents' willingness to participate in PCoop. It takes the value of 1, if respondents says Yes, and 0 if No. Y_i^* is the estimated value of Y_i ($Y_i^* = 1$) if $Y_i > 0$. ϵ_i is the error term that has mean (μ) = 0 and variance (σ) = 1; features of a normal distribution. The probability function is the P, β_0 is intercept, β is the vector of parameter for estimation, X_i is the array of predictor variables that determine the i th respondent's decision to participate in platform cooperative; and they are defined as follows:

X_1 = Gender (Dummy variable: Male = 0; Female = 1)

X_2 = Age (Years)

X_3 = Marital status (Dummy variable: Single = 0; Married/Divorced/Separated = 1)

X_4 = Formal Education (Years: Primary education = 6; Secondary education = 12, National Diploma Education = 15; Bachelor's degree = 16; Master's degree = 18; Doctorate degree = 21)

X_5 = Years of experience in agro-production

X_6 = Time involved in agro-production (Dummy variable: Full-Time = 0; Part-Time = 1)

X_7 = Income per year (Naira)

X_8 = Awareness of Platform Cooperatives (Dummy variable: Not-aware = 0; Aware = 1)

RESULTS AND DISCUSSION

Socioeconomic features

As shown in table 1, majority of the respondents, 60.71%, were male. Also, majority were youths with 58.34% within the age 21 and 40 years. 54.76% of the respondents had first degree educational level implying that the respondents were

educated enough to understand the concept of Platform Cooperatives (PCoop). 48.81% had yearly income of one million and below. 86.90% of the respondents were aware of PCoop. These are in line with Ogunyemi (2022) and, Ogunyemi *et al.* (2021 and 2023) that majority of respondents were aware of PCoop.

Factors that influence the willingness of respondents to participate in PCoop

Table 2 reflects that none of the variables are significant, but, the signs of their coefficients offer useful insights to the direction of relationship between the willingness of the respondents to participate in PCoop and their selected socioeconomic variables. The female respondents are less likely to participate in PCoop than the male respondents which disagree with Ologbon *et al.* (2022). As age of respondents increased, their willingness to participate in PCoop declines. The probability of respondents' willingness to participate in PCoop declines as one move from single to married respondents implying that married respondents are less likely to participate in PCoop. Also, respondents that engaged in agro-production on part-time basis have lower probability of participating in PCoop than those that engaged in agro-production on full-time basis. From table 2, as year of formal education, experience in agro-production and income of respondents increase, the likelihood of their participating in PCoop increases in line with Ologbon, *et al.* (2022) and Twumasi *et al.* (2021). Respondents that are aware of PCoop have higher probability of willingness to participate in PCoop, indicating that there is prospect for PCoop among the respondents.

Table 1: Socioeconomic characteristics of respondents

Characteristic	Frequency	Percent	Characteristic	Frequency	Percent
Gender			Formal Education		
Male	51	60.71	Primary	2	2.38
Female	33	39.29	Secondary	11	13.10
Total	84	100.00	National Diploma	16	19.05
Age (Years)			Bachelor's degree	46	54.76
21 – 30	16	19.05	Master's degree	8	9.52
31 – 40	33	39.29	Doctorate degree	1	1.19
41 – 50	19	22.62	Total	84	100.00
51 – 60	12	14.29	Income/year (N'm)		
61 – 70	4	4.76	≤ 1.00	41	48.81
Total	84	100.00	1.10 - 2.00	19	22.62
PCoop Awareness			2.10 - 3.00	8	9.52
Aware	73	86.90	3.10 - 4.00	4	4.76
Not aware	11	13.10	4.10 – 5.00	6	7.14
Total	84	100.00	≥ 5.10	6	7.14
			Total	84	100.00

Table 2: Probit regression results of factors that influence respondents' willingness to participate in Platform Cooperatives

Variable	Coefficient	Standard Error	Z-score	P-value
Gender	-0.354	0.429	-0.82	0.41
Age	-0.031	0.031	-1.01	0.32
Marital Status	-0.772	0.784	-0.99	0.32
Formal Education	0.006	0.081	0.07	0.95
Year of Experience in Agro-production	0.031	0.048	0.63	0.53
Time status in production	-0.976	0.495	-1.97	0.05
Income per Year	0.000	0.000	1.19	0.24
Awareness of Platform Cooperatives	0.307	0.609	0.50	0.61
Constant	2.657	1.774	1.50	0.13

No. of Observations: 84 Log likelihood = -26.01 Probability Chi Square = 0.32

Level of significant: *** = 10%; ** = 5%; * = 1%

CONCLUSION AND RECOMMENDATIONS

The study reveals that the socioeconomic features of members of the Abundant Farmers Multipurpose Cooperative Society influence their willingness to participate in PCoop. Awareness creation on PCoop should be started among agricultural cooperatives members for them to shift to PCoop. Also, PCoop should be promoted among the younger agricultural cooperative members.

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EFFECTS OF ICT INFRASTRUCTURE ON FOOD CRISIS: EVIDENCE FROM NIGERIA¹Yusuf, O. J., ²Sulaimon, T. T., ³Olanrewaju, K. O., and ¹Ambali, Y. O.¹Department of Agricultural Economics and Extension Services, Kwara State University²Department of Economics and Development Studies, Kwara State University³Department of Agricultural Extension and Rural Development, Osun State University**ABSTRACT**

Agriculture is an important sector in Nigeria, with over 70% of the population relying on it for a living. While literatures have established positive linkage between the application of information and communication technology (ICT) in agriculture and increased production and efficiency, yet, yield from agriculture is low, and food insecurity remains a problem. Thus, this study examined the impact of ICT infrastructure on Nigeria's food crisis from 1991 to 2022. Macroeconomic variables such as ICT goods export, ICT goods import, mobile cellular subscriptions, internet use and fixed broadband were used as measures of ICT infrastructure while food insecurity index was used as a proxy of food crisis. Annual data of all the considered variables, were obtained from World Bank's World Development Indicators. The study adopted the long-run cointegrating method to estimate the regression equation specified for the models. The result shows that ICT Goods export, mobile cellular subscriptions, internet use and fixed broadband subscriptions have negative effect on prevalence of food insecurity. However, ICT Goods import has positive effect on prevalence of food insecurity. In line with the findings, the study recommends that government should prioritise the development of ICT infrastructure and policies that encourage ICT usage in agriculture. This would necessitate collaboration between the government, food and agricultural business sectors, and other stakeholders to guarantee that the benefits of ICT adoption are realized in the agriculture sector.

Keywords: ICT Infrastructure, Food insecurity, Cointegration technique, ICT adoption

INTRODUCTION

Agriculture is a crucial sector in Nigeria, with over 70% of the population relying on it for a living. Literature and empirical research have consistently highlighted the potential benefits of Information and Communication Technology (ICT) infrastructure deployment in agriculture, given its propensity to enhance agricultural productivity, efficiency, and sustainability (Pawlak & Kołodziejczak, 2020). ICT infrastructure includes ICT goods export, ICT goods import, mobile cellular subscriptions, internet use and fixed broadband. ICT goods refer to computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods.

The ICT goods exports refer to the percentage of total goods exports that are information and communication technology (ICT) goods. According to the United Nations Conference on Trade and Development, Nigeria's exports of ICT goods in 2021 was \$40,595.838 thousand. According to the United Nations Conference on Trade and Development's UNCTADstat database, Nigeria's ICT goods imports accounted for 2.8% of the country's total goods imports in 2021 (UNCTAD, 2022). This percentage has been decreasing over the years, with a maximum value of 9.49% in 2008 and a minimum value of 2.46% in 2000. The number of mobile cellular subscriptions in Nigeria has been increasing since 2000, when it was only 0.03 million. As of 2021, there were 195 million mobile cellular subscriptions in Nigeria. The number of mobile cellular subscriptions per 100 inhabitants in Nigeria was 91.4 in 2021.

ICT applications in agriculture include the use of mobile applications for crop management, access to weather information, and market data, as well as the utilization of the internet for knowledge dissemination, etc all which have contributed to increased production and efficiency in agriculture (OECD, 2014). Despite the potential benefits of ICT adoption in agriculture, the yield from agriculture is low, and food insecurity remains a problem in Nigeria. The study seeks to understand why, despite the potential advantages of ICT applications in agriculture, the country continues to experience a food crisis characterized by low agricultural yields and food insufficiency. The specific objectives of the study are therefore to: 1) determine the influence of macroeconomic variables related to ICT (ICT goods export, ICT goods import, mobile cellular subscriptions, internet use, and fixed broadband subscriptions) on food insecurity. 2). To determine the relationship between ICT infrastructure and food insecurity in Nigeria.

METHODOLOGY

The study area is Nigeria. Secondary data on macroeconomic variables such as ICT goods export, ICT goods import, mobile cellular subscriptions, internet use and fixed broadband were used as measures of ICT infrastructure while food insecurity index was used as a proxy of food crisis. Annual data of all the considered variables, were obtained from World Bank's World Development Indicators (1991 – 2022). For analytical procedure, the study adopted the long-run cointegrating method to estimate the regression equation specified for the models.

RESULTS AND DISCUSSION

Results of Unit Root Test

As proposed by Persaran *et al.*(2001), ARDL is only valid for use when the variables are either 1(0) or 1(1) order of integration. To ascertain the level of integration of the variables included in the ARDL analysis, a unit root test was carried out using Augmented Dickey-Fuller (ADF) Test. This is to ensure that the included variables are of order of integration 1(0) or 1(1). Thus, result of the ADF test is presented in Table 1.

Result shows that at the original level, Fixed Telephone Subscription, ICT Good export and

Internet usage were stationary as their estimated ADF test statistics were higher than Mackinon critical values. The remaining variables such as Food insecurity, ICT Good import and Mobile cell subscription were non-stationary as their estimated ADF test statistics were lower than Mackinon critical values. However, at first difference, all the variables became stationary. This implies that the considered macro variables such as Food insecurity and its determinant were of 1(0) and 1(1) order of integration respectively. Therefore, the use of ARDL for estimation is appropriate for this study.

Table 1: Augmented Dickey-Fuller Test of Stationarity of ICT Infrastructure Variables

Variable Status	Variable Name	ADF t-stat	Mackinon Critical value (5%)	ADF P-value	Remarks
LEVEL	Ln (Foodinsecurity)	-0.1205	-3.6584	0.9903	Non-stationary
	Ln(FixedTelephoneSubscrip)	-4.6116	-3.6908	0.0093	Stationary
	Ln(ICTGoodexport)	-5.2447	-3.6328	0.0019	Stationary
	Ln(ICTGoodimport)	-3.3968	-3.6328	0.0776	Non-stationary
	Ln(Internetusage)	-2.7967	-1.9581	0.0076	Stationary
	Ln(Mobilecellsub)	-3.4016	-3.6328	0.0769	Non-stationary
FIRST DIFFERENCE	D(Foodinsecurity)	-5.3922	-3.6584	0.0017	Stationary
	D(FixedTelephoneSubscrip)	-3.1523	-3.6449	0.1206	Non-stationary
	D(ICTGoodexport)	-5.0595	-3.6584	0.0033	Stationary
	D(ICTGoodimport)	-8.7019	-3.6449	0.0000	Stationary
	D(Internetusage)	-2.3938	-3.6736	0.3704	Non-stationary
	D(Mobilecellsub)	-5.5126	-3.6449	0.0012	Stationary

Table2: ARDL (1, 2, 2, 2, 2, 2) Short-Run Influence of ICT Infrastructures on Food Insecurity

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Log(foodinsecurity(-1))	0.6607	0.0717	9.2143	0.0008***
Log(fixed_telephone_subscrip)	-0.3142	0.0684	-4.5932	0.0101***
Log(fixed_telephone_subscrip(-1))	0.0868	0.0673	1.2894	0.2668
Log(fixed_telephone_subscrip(-2))	0.1241	0.0475	2.6115	0.0593*
Log(ICTgoodexport)	0.0026	0.0061	0.4291	0.6900
Log(ICTgoodexport(-1))	0.0076	0.0052	1.4665	0.2164
Log(ICTgoodexport(-2))	-0.0085	0.0054	-1.5697	0.1916
Log(ICTgoodimport)	0.1118	0.0488	2.2916	0.0837*
Log(ICTgoodimport(-1))	0.4464	0.0747	5.9715	0.0040***
Log(ICTgoodimport(-2))	0.0773	0.0735	1.0508	0.3526
Log(internet_usage)	-0.0532	0.1224	-0.4348	0.6861
Log(internet_usage(-1))	1.0561	0.1030	10.2512	0.0005***
Log(internet_usage(-2))	-0.0520	0.0403	-1.2897	0.2667
Log(mobile_cell_sub)	-0.4599	0.1957	-2.3502	0.0785*
Log(mobile_cell_sub(-1))	-0.7295	0.1064	-6.8589	0.0024***
Log(mobile_cell_sub(-2))	0.0814	0.0807	1.0086	0.3702
C	19.3995	2.5588	7.5816	0.0016***
R-squared	0.982			

Short-Run Influence of ICT Infrastructure on Food Insecurity

Table 2 presents the result of ARDL model for short-run influence of ICT infrastructures on

food insecurity. The current year level of food insecurity was negatively and significantly affected by the food insecurity in last one year at 1% level of significant. This implies that in the short-run, an

increase in food insecurity in the previous year led to a decrease in food insecurity of the current year. Likewise, previous values of mobile cell subscription had negative impact on the level of food insecurity, implying that the higher the mobile cell subscription in the previous years, the lower the level of food insecurity. Other factors such as fixed telephone subscription, ICT good import and internet usage had positive influence on the level of food insecurity at various level of significant and different lag periods. This implies that the more the value of fixed telephone subscription, ICT good import and internet usage, the higher the prevalence of food insecurity. In contrast to other variables, only ICT good export had no significant influence on food insecurity. The overall fitness of the model reveals an R² value of 0.98, implying that 98% of the variation in the level of food insecurity was explained by variations in ICT infrastructures.

Long-Run Influence of ICT Infrastructures on Food Insecurity

Table 3 presents the long run cointegrating influence of ICT infrastructure on food insecurity. In the long run, the fixed telephone subscription and mobile cell subscription purely had negative and significant influence on food insecurity at 1%, indicating that the higher the fixed telephone subscription and mobile cell subscription in the long run, the lesser the prevalence of food insecurity. Variables such as

ICT good export, ICT good import and internet usage were positively significant on food insecurity in the long run and by implication, the higher these ICT infrastructures the more the prevalence of food insecurity. The error correction model (ECM) of long run co-integrating is -0.339, showing that the speed of adjustment towards long run equilibrium among the variables under study is 33.9%.

Table3: ARDL (1, 2, 2, 2, 2, 2) Co-integrating Long-Run Influence of ICT Infrastructure on Food Insecurity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dlog(fixed_teleph...	-0.314214	0.024457	-12.84772	0.0002***
Dlog(fixed_teleph...	-0.124058	0.015793	-7.855271	0.0014***
Dlog(ICTgoodexport)	0.002634	0.002121	1.241686	0.2822
Dlog(ICTgoodexpo...	0.008502	0.002025	4.198113	0.0137**
Dlog(ictgoodimport)	0.111780	0.021576	5.180717	0.0066***
Dlog(ictgoodimpor)..	-0.077259	0.022058	-3.502510	0.0248**
Dlog(internet_usa...	-0.053234	0.035132	-1.515279	0.2043
Dlog(internet_usa...	0.051998	0.015716	3.308645	0.0297**
Dlog(mobile_cell_...	-0.459898	0.037171	-12.37248	0.0002***
Dlog(mobile_cell_...	-0.081426	0.019830	-4.106288	0.0148**
Cointeq(-1)*(ECM)	-0.339310	0.012209	-27.79140	0.0000***
R-squared	0.9933			

CONCLUSION AND RECOMMENDATION

ICT infrastructures such as fixed telephone subscriptions, ICT Goods import, internet usage, and mobile subscriptions significantly influenced the level of food insecurity at various lag periods. Likewise in the long run, most of the ICT infrastructures except ICT Goods export had negative but significant impact on the level of food insecurity. Since most of the ICT infrastructures had significant influence on the level of food insecurity, it is therefore recommended that the government should prioritize the development of ICT infrastructure and policies that encourage ICT usage in agriculture. This would necessitate collaboration between the government, business sector, and other stakeholders to guarantee that the benefits of ICT adoption are realized in the agriculture sector.

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NATURE OF TECHNOLOGY USED FOR ARTISANAL FISHERIES AMONG FISHING COMMUNITIES ALONG SHIRORO AND KAINJI DAMS, NIGERIA

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ABSTRACT

This study assessed the nature of technology used for artisanal fisheries among the fishing communities along Shiroro and Kainji dams, Nigeria. Questionnaire was used to collect data from 460 respondents. Multi-stage and proportionate sampling techniques were used in selecting the respondents. Descriptive statistics involving frequency distribution count, percentages, mean and ranking were used for data analysis. The results of the study showed that majority of the respondents (51.3%) were within the age bracket of 29-41 years, indicating that respondents were middle aged fishers who fall within the active fishing age. Majority (87.0%) of the fishers were married with an average household size of 6 persons. Results on boat technology used by the fishers' shows that non-motorized boat/local technology accounted for the majority (92.0%). On type of net technology used by fishers, majority of the fishers uses set long line which constitute 60.0% respondents, closely followed by cast nets with (52.4%) respondents and falling gear accounting (43.3%). Conclusively, the fishers mostly use non-motorized boat technology in fishing because of its affordability and less cost of maintenance. High cost of motorized equipment limited its wide application in artisanal fisheries activities in the study area. Long lines were the most prevalently used nets in the study area because it gives better output than other net technologies. The study therefore, recommended that government and other financial institutions should grant credit facilities to fishers in order to purchase motorized boats for efficient fisheries activities and their educational level should be improved so as to be able to read fisheries bulletins and to have a better understanding of the improved fisheries practices.

Keywords: Artisanal Fisheries activities, Nature of Technology, Fishing communities, Shiroro and Kainji Dams.

INTRODUCTION

The fisheries subsector of the Nigerian agriculture is an essential tool for rural development through its of income, high-quality protein, and socioeconomic development of fishing communities in Nigeria (Anko and Eyo, 2017). The relevance of the fisheries sub-sector to the Nigerian economy and benefits derived by Nigerians from fish and other fish products led to the high consumption and hence the increased demand for fisheries products. The importance of the fisheries sector to individuals and the economy of many developed and developing countries cannot be overemphasized. It is notable that fish provides more than 60.0% of the world's supply of protein, especially in developing countries. Its importance could be felt directly and indirectly among rural and urban residents in Nigeria. In Nigeria, fisheries is particularly an important subsector that contributes about 3.00–5.00% to the agriculture share of the Gross Domestic Product (GDP). Despite the neglect of the artisanal fishery, it provides the largest proportion of domestic fish supply in Nigeria. Artisanal fisheries contribute to the livelihoods of the poor through improved food supply, employment and income (Asaku, 2017). One of the major roles played by artisanal fisheries in the economy of Nigeria is its contribution to the dietary needs of the populace. Animal protein is essential for proper growth, repair and maintenance of body organs and tissues (Bell *et al.*, 2016).

Artisanal Fisheries and aquaculture play an essential role in the livelihoods of millions of people around the world and contribute to food security and poverty alleviation (Anko and Eyo, 2017). The demand for fish has been rising rapidly in Nigeria as a result of increase in population, per capita income and price of alternative sources of animal protein (Ekekeet *et al.*, 2018). However, the domestic supply of fish does not satisfy the demand. Attempts to meet the demand have seen the country resorting to importation of fish.

Nigeria's current annual national fish demand is in excess of 3.2 million metric tonnes. The national production is about 1.1 million metric tons from all sources, including aquaculture, artisanal and industrial fishing sectors, leading to a supply shortfall/ supply gap of about 2.1 million metric tons (Anyanwu *et al.*, 2013). Artisanal fishing consists of various small-scale, low-technology, low-capital, fishing practices undertaken by individual fishing households (as opposed to commercial companies). Artisanal fishery has a great economic, social and cultural value, and is characterized by local systems composed of professional small-scale coastal fishing communities (Anning *et al.*, 2015).

In Nigeria, the gap between demand and supply of fish is widening due to increase in population, per capita income and prices of alternative sources of animal proteins. Many studies have been conducted on artisanal fisheries along Shiroro and Kainji dams, but scientific evidence

related to the nature of technology used for fish catch have not been adequately provided empirically. Artisanal fisheries are particularly an important subsector of the Nigerian economy that contributes about 3.00–5.00% to the agriculture share of the Gross Domestic Product (GDP). Despite the neglect of the artisanal fisheries, it still provides the largest proportion of domestic fish supply in Nigeria. Artisanal fisheries contribute to the livelihoods of the poor through improved food supply, employment and income (Asaku, 2017). However, artisanal fisheries in Shiroro and Kainji Dams supply most of the fish and fish products in North central and Northwest and is generally neglected leading to utilization of mostly local technology which cannot yield better results and/or lead to poor output and hence reduced income of fishers and poor livelihood conditions.

The broad objective of the study is to assess the nature of technology used for fishing activities along Shiroro and Kainji dams, Nigeria. The specific objectives are to:

1. describe the socioeconomic characteristics of artisanal fishers
2. assess the nature of technology used for fishing activities in the study area

METHODOLOGY

The study was carried out along Shiroro and Kainji Dams. The population of Shiroro is projected in 2020 to be 322,918 people using 3.2% growth rate (NPC, 2006). The climate, edaphic features and hydrology of the state allows sufficient opportunities for harvesting fresh water fish such as *Tilapia* spp, *Bagruss* spp, *Clarias* spp, *Gymnarchus niloticus*, *Heterotis* spp, *Labeo* spp, *Mormyrus* spp, *Lates niloticus*, and permit the cultivation of most of Nigeria's staple crops such as maize, yam, rice, millet and sorghum. The Shiroro hydropower reservoir is a storage based hydroelectric facility located in Shiroro Local Government, Niger State at the Shiroro Gorge with approximately between Latitude 9° 57' 25N and Longitude 6° 49' 55E. It is located approximately 90 km southwest of Kaduna on River Dinya. About 70% of inflows into the reservoir are from river Kaduna, with lateral contributions from rivers Dinya, Guni, Sarkin-Pawa, Erena and Muyi. Annual temperature around the reservoir varies between 27 and 35°C (Egesi, 2016).

The study employed multi-stage and proportionate sampling techniques. Firstly, two dams in North central region where artisanal fisheries activities are widely practiced were purposively selected. The dams are Shiroro and Kainji. Secondly, 30 Villages were randomly drawn along Kainji dam and 20 along Shiroro dam, thereby giving a total number of 50 villages for the study. Thirdly, proportionate sampling technique was then employed to select 10% of the fishing population

from each of the selected villages, thus making 240 fishers along Kainji dam and 220 along Shiroro dam, thereby giving a sample size of 460 fishers for the study. The study identified 296 fishing villages along Shiroro dam and 550 fishing villages along Kainji dam. The fishing villages have a fishing population of about 3,632 in Shiroro and 3,823 in Kainji. These figures (3,632 and 3,823) represent the sampling frame out of which the sample size of the study was drawn. The basis for the random selection was that, names of all the villages were written on small pieces of papers and mixed accordingly in containers, there after 30 pieces of papers were drawn at random. The rationale behind the selection of more fishers and fishing communities along Kainji dam than along Shiroro dam was that, Kainji dam have more concentration of fishers and fishing communities than Shiroro dam.

Both primary and secondary data were used for the study. Primary data was obtained using structured questionnaires designed in line with the study objectives. The copies of which were administered to the respondents selected for the study. Secondary data were collected from relevant text books, internet, journals, seminar documents, conference articles, annual reports and other relevant materials

Data collected were analyzed using descriptive. Descriptive statistics such as frequency distribution count, percentages, mean and ranking were used to analyse objectives of the study.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 indicated that 2.8% of the respondents which is the least in the age distribution structure fell within the age grade of 16-28 years, 51.3% are within the age bracket of 29-41 years, 24.1% fell within the ages of 42-54 years and 21.7% grouped within the ages of 55 years and above with a mean of 46. It is evident from the table that majority of the respondents are middle aged young fishers who fell within the active fishing age with high vigor and energy to contribute meaningfully to fishery development. The age distribution of the respondents as shown in the table 1 indicated that most of the fishers fell between 16 and 28 years of age with a mean age of 2.8. This implies that most people engaged in artisanal fishing enterprises were still active and physically fit to paddle the canoes. The implication is that the respondents were within the productive and economic active age, and are able to increase fishing productivity and improve livelihood of the fishing households. This is consistent with other fisheries studies such as Anyanwu *et al.*, 2013). This also shows that most of the fishers in this age grade have the ability to engage intensively in artisanal fisheries activities that will enhance their food security status, income and general standard of living. The result equally

indicated that most of the fisher folks were within the economically active age of the population and therefore, constitutes a good labour force in artisanal fisheries since efforts are being made to increase fish output from the artisanal sector by the Federal Government of Nigeria in recent years. There is a sharp decline in the number of fishers that were between the age range of 16-28 years and 55 years above. However, those fishers that were between the ages of 55 years and above who are supposed to be dependent age group were still active in fishing. The implication of this might be due to the fact that the fishers took fishing as a way of life because majority of them are into the business because they inherited it from their parents and many communities that are located near the dams depend on fishing for food and their livelihood (Anko and Eyo, 2017). The results in Table 1 also showed that 82.20% respondents were male while female formed the minority with only 17.8%. This is very clear because artisanal fisheries activities is male dominant with female mostly found in processing and marketing of fish. Male respondents dominate the activity of diving in water to catch fishes. This research is in tandem with Anyanwu *et al.* (2013) who posits that majority (58%) of the respondents in their study were male indicating that male was more in artisanal fishing activities in the study area which revealed that male dominate artisanal fishing industry.

As regards marital status, 87.0% of the respondents were married, 8.9% were single, 1.3% were divorced, 0.9% widows and 2.0% widowers. It is revealed from this result that greater percentage of the respondents were married indicating that they were saddled with the responsibility of meeting their family basic needs of life such as ensuring that their households are food secured. This agrees with Chilaka *et al.*, (2013) who also found out that majority (73%) of the artisanal fishers were married indicating that many of them were faced with family responsibilities and as such have the tendency of abandoning artisanal fisheries if enough financial proceed to take care of their family is not forthcoming. The findings of Anyanwu *et al.*, (2013) also conforms to this study which reported male dominance of artisanal fishing. The result revealed that majority of the respondents 73.3% were married, while 25.8% were single, only 1% of the respondents were separated. The results in table 1 showed that 14.1% of the respondents acquired only primary school education, 16.3% had only junior secondary school, 32.6% schooled up to senior secondary school, 7.4% obtained tertiary education and the rest of the respondents with 29.6% had no formal education but only had either Qur'anic or adult education. This may to some extents have a bearing on their livelihood. This low level of education implies that the demand and access of the respondents to bank credit and contact with

extension agents would be affected. This finding is supported by Edward and Frank (2021) who in his studies showed that majority of artisanal fishery operators studied up to only secondary school.

The result in Table 1 revealed that 15.0% respondents have a household size of less than 5 persons, 40.2% which is the majority has 6-13 persons in their households, 36.1% respondents have a household size of 14-21 members and another 15.0% respondents have a household size of 22 and above members. Large household size is associated with the availability of timely, free and cheap labour for the fishing households; in this case larger families are likely to be more effective and productive. Although this helped to increase the output of fish, substantial amount of fish was also consumed by the household causing a reduction in the overall households' income. The results further revealed that 25.0% respondents belong to one fishing association or the other while greater percentage of respondents accounting to 75.0% does not belong to any form of fisher association. It can be seen from the findings that majority of the fishers do not belong to any form of cooperative association and cooperative associations are very important to fishers as it can be a source of credit, source of training/information for improved fishing techniques, source of motivation and source of fishing gears. This also implies that fishers who belong to organization through interaction could acquire information that could help them to improve their productivity (Chilaka *et al.*, 2013). Experience is very important in every enterprise, especially artisanal fishing. The view of the role of experience in fishing comes from the fact that it enables fishers to have information on fishing locations and water current. As shown in Table 1, the number of years the respondents have been engaged in fishing reveals that majority (48.7%) has more than 20 years of experience. 25.9% have between 13-19 years of fishing experience in enlightening fishers on new fishing techniques through periodic organization/arrangement of capacity building programmes targeted at improving fishing efficiency. However, majority of the fishers' years while 22.6% have between 6- and 12-years' experience in fishing and the least respondents with 2.8% have less than 5 years' experience with a mean of 19.0. The results in table 1 further indicated that 84.6% respondents had no contact with extension agents while only 15.4% fishers had contact with extension services. Extension agents play a very vital role interviewed do not have access to extension agents and that had indirectly limited their level of productivity in terms of fish catch and other artisanal fisheries activities. Credit is important for the acquisition and maintenance of fishing crafts and gears. The results in this table as regards access to credit facility shows that 93.0% respondents who

were the majority had no access to credit facility while only 7.0% fishers had access to credit.

Table 4. 1: Socioeconomic characteristics of the artisanal fishers (n = 460)

Variables	Frequency	Percentage	Mean
Age			
16 – 28	13	2.8	
29 – 41	236	51.3	
42 – 54	111	24.2	46.0
55 and above	100	21.7	
Sex			
Female	82	17.8	
Male	378	82.2	
Marital Status			
Married	400	87.0	
Single	41	8.9	
Divorced	6	1.3	
Widow	9	0.8	
Widower	4	2.0	
Level of Education			
Primary Education	65	14.1	
Junior Secondary Education	75	16.3	
Senior Secondary Education	150	32.6	
Tertiary Education	34	7.4	
No Formal Education	136	29.6	
Household Size			
Less than 5	69	15.0	
6 – 13	185	40.0	12.0
14 – 21	166	35.0	
22 and above	40	10.0	
Membership of Association			
Member	115	25.0	
Non-Member	345	75.0	
Fishing Experience			
Less than 5	13	2.8	
6 – 12	104	22.6	
13 – 19	119	25.9	19.0
20 and above	224	48.7	
Access to Extension			
No	389	84.6	
Yes	71	15.4	
Access to Credit			
No	428	93.0	
Yes	32	7.0	
Total	460	100	

Source: Field Survey, 2023

Boat technology used in fishing

Table 2 reveals the boat type used by the fishers in the study area. Non- Motorized boat accounted for 92.0% respondents which was the majority while motorized boat technology constituting the minority accounted for only 8.0% respondents. This could be because motorized equipment are costly and the fishers lack the necessary finance to purchase them. This situation is evidenced in the study area by the use of artificial materials such traps, cork as floats; stones as sinkers; hook and line as fishing gears, and overdue fishing

nets and non-motorized boats/canoes by some fishers. In addition, because of lack of modern and sophisticated motorized equipment in the study area which invariably implies limited range and capacity of the canoes used, the bulk of fishers could only exploit resources close to their settlements. In addition, fish is landed in small quantity in these settlements and consequently cannot be handled, processed or marketed in bulk as required for maximum efficiency.

Asaku (2017) described boat motorization as the usage of inboard and outboard motors for

propulsion and haulage of boats to distant water ways to catch fish and other aquatic animals. Motorized boat Technology is central to artisanal fishery this is because fishers carry different fishing equipment in addition to the supplies such as food and items necessary for survival on the water bodies while fishing. Once boat owners arrange all the necessary fishing gear and supplies, family members and or some wage earners are hired to carry them and load the boats. Crew members also contribute their labour in loading the necessary fishing gears and other necessary equipment for fishing. Edward and Frank (2021) reported that once the necessary materials are loaded and all crew members are on board, a boat is ready to leave for the fishing trip provided the water level is good enough for a boat to propel. In order to sustain their livelihood, fishers

particularly motorized boat owners, have to travel further into distant water ways to exploit fisheries resources (Bell *et al.*, 2016). The low level of fish output may be due to the use of non-motorized boat by the majority, over exploitation of fisheries resources and fluctuation in the volume of water may be implicated for the low and unstable level of income from artisanal fishing. A great variability was also found in income among the fishers in the study area. Therefore, there is the need to explore alternative income generating opportunities for small-scale fishing communities, given the current level of resource exploitation and the large number of people involved in fishing (Egesi, 2016). The continual increase in prices of petroleum products during the period under study affected the use of motorized boats.

Table 2: Distribution of fishers based on boat technology used in fishing

Boat Type	Frequency	Percentage
Non-motorized boat Technology/ Local Technology	423	92.0
Motorized boat technology/ Modern Technology	37	8.0
Total	460	100

Source: Field Survey, 2023

Net Technology used in fishing in the study area

The various types of net technology used for fishing in the study area is shown in Table 3 Majority of the fishers use set long line which constitute 60.0% fishers. This is closely followed by cast nets with 52.4% respondents, falling gear accounting for 43.3%, lift nets with 40.0% and drift net accounting to 39.6% respondents. However, the least percentage of the respondents uses seine nets (17.4%), calabash (17.8% and earthen pot (8.3%) respectively for fishing. Similarly, fish traps constituting 24.8% respondents, Hook and line amounting to 31.5%, and encircling gear 28.3% respectively were also used for fishing by the fishers in the study area. The various type of nets used were with meshed size ranging between ½ inch to a bigger inch net of 8 inches. Frequently used gears were cast nets, lift nets, falling gear, set long line and drift nets. Fishing traps of various kinds were also employed. They include, basket traps, bamboo traps and traps made from wire mesh. Hooks and lines are also important fishing equipment. The study indicated that, the fishers employ combination of various fishing methods.

Anning *et al.*, (2015) pointed out that, the use of active gear is illegal but does produce 65-70% of fish landing in the Volta Lake. However, observation showed that all fishing methods could be dangerous depending on the type of nets used. For instance, cast net which is considered to be one of the safest fishing methods can be bad if the mesh size used is small in such a way that immature fishes are caught. Also, with the exception of bamboo

tubes meant for cat fish, the other types of fish caught are not solely limited to the various fishing methods. This depends on fishing methods used and the quantity of the nets. Discussions with fishers during field work shows that, bumper fishing months start from June to November which corresponds with the rainy months. During this period, the water level of the lake continues to rise, indicating inflow of water from its tributaries and watershed. The water becomes turbid since suspended materials from upstream of the various tributaries attract fish nearer to the banks. From December to May, fishing is usually poor as the level of the dams steadily decreases. The water becomes clearer during these months and the fishers shift their attention mostly to other livelihood activities majorly farming in the draw-down zone as the water level recedes (Obandeet *et al.*, 2005). Similar observations were made by Ekekeet *et al.*, (2018) that the dominant gears used by fishers across the study locations mostly consisted of set long line nets (41%), cast nets (38%), hooks and lines (10%) and others such as traps and seine nets (11%). Gill nets were most frequently used in catching *Clarias spp*, Tilapia, lung fish and *Heterotis*. The findings in this study are also in agreement with Chilaka *et al.*, (2013) who reported that gill nets, cast nets, malian traps and long lines were typical of most Nigerian waters and that their catches generally included small sized fish, notably Tilapia. The implication of scarcity of fishing gears often leads to over exploitation of fish resources and resort to cheap but destructive fishing practices. This may lead to

overfishing and harvesting of immature fishes which derailed fish catch levels. Therefore, fishery households should imbibe fishery practices and technology, though that are economical and efficient but play more emphasis on maximum sustainable yield as canvassed by (Asiedu and Francis, 2018). Set long line/ Gill nets are nets which are set perpendicular to the shore and lake bed. They can be set in both shallow and deep areas and across bays where they are stretched between tree stumps in the water and the floating plants. Observation in the study area showed that set long line/gill net is the most commonly used fishing technology. This is because it is applicable during major fishing or raining season (when the dams are increasing in volume) and the lean season (when the volume of the water decreases). Gill nets are prepared with corks and lead. The lead sinks the nets whilst the corks float it. The fish get entangled as they come across the net and try to pass through it. It is a very safe fishing technology employed by the fishers except when the mesh size is too small and the immature fish are caught.

Cast net is a specially prepared net, thrown to envelope and trap fish. It is then slowly and carefully drawn out. It is one of the safest fishing methods used if bigger mesh size nets are used. However, when smaller mesh size nets are used,

immature fishes are trapped and discarded which negatively affect long-term output of the fishers leading to reduced income. Cast nets are however labour intensive and mostly used by the very poor fishers who lack the necessary financial assistance to invest in the other fishing inputs. Hook and line/long line is another important fishing technology used by the fishers in the study area. It basically consists of a line with hooks to which baits are attached. The bait lures the fish to swallow it together with the hook and the fish gets hooked until it's been harvested. Observation in the study area showed that, it can be individual lines with hooks or long lines on which the hooks are tied with specific intervals. Encircling nets also known as surrounding nets and pot traps are also used in the two study locations. It is a surrounding net because, they are set in a semi-circle form with both ends attached to the mainland. It therefore serves as a barrier to the fish from escaping to the deeper waters during the day after feeding in shallow waters at night. This is because the nets are tied to specially prepared sticks which raise the net above the water level. Fish traps are set along these specially prepared sticks and it serves as an opening to the fish. This surrounding net mostly attract the usage of chemicals with the intention of forcing the fish to the deeper waters.

Table 3: Distribution of the fishers based on net technology used

Equipment	Frequency	Percentage	Ranking
Seine net	80	17.4	1
Lift net	184	40.0	2
Encircling net	130	28.3	3
Falling gear	199	43.3	4
Trap	114	24.8	5
Hook and line	145	31.5	6
Calabash	82	17.8	7
Cast net	241	52.4	8
Drift net	182	39.6	9
Set long line	276	60.0	10
Earthen pot	38	8.3	11

Source: Field Survey, 2023

*Multiple Responses

CONCLUSION AND RECOMMENDATIONS

The boat technologies used for fishing were predominantly non- motorized in nature while motorized boat technology constituted the minority. This could be because motorized equipment are costly and the fishers lack the necessary finance to purchase them. The study further described the various fishing net technologies and revealed that, fishing net technologies such as set long line, fish trap, cast net, falling gear, lift nets, hook and line and purse seine were very safe fishing methods used in the study area. Nigerian fishers use gear types made up of both natural and synthetic fibers. Majority of the fishers uses set long line, closely followed by cast nets, falling gears and lift nets respectively.

Considering the immense benefits that can be derived from sustainable exploitation of the nation's water bodies and in order to overcome the challenges that confront the artisanal fishing industry, the following recommendations are made:

1. The government should also improve conditions of schools by providing school buildings, teaching and learning materials and teachers to such communities to enhance effective teaching and learning of the fishers. This will boost fishery development in the area as more people will be able to read fishery bulletins, technical papers and extension guides on sustainable exploitation of fishery resources and thus increase efficiency.

2. Government and other financial institutions should give financial assistance to the fishers to enable them to seamlessly undertake their fishing activities to improve their livelihood conditions and Banks should relax their collateral requirements for accessing such credits.
3. Based on technology used for artisanal fisheries, government should encourage development of local fishery technologies by financing relevant research institutes to come up with fisheries developmental strategies such as provision of improved/modern fishing and processing inputs to fishers at subsidized rate. Provision of such fishing inputs such as nets and outboard engines to the fishers at subsidized prices will help enhance their fishing activities, promote fishing efficiency, remove drudgery associated with fishing, save labour and time and achieve a technological transformation of the fishers.

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ACCEPTABILITY OF IMMUNIZATION PROGRAMME AMONG RURAL WOMEN OF REPRODUCTIVE AGE IN OYO STATE, NIGERIA

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ABSTRACT

Immunization is aimed at the prevention of infectious diseases. In Nigeria, the National Programme on Immunization (NPI) suffers recurrent setbacks due to many factors including ethnicity and religious beliefs. Based on this, the study was carried out to determine the acceptability of immunization programme among rural women of reproductive age in Oyo state, Nigeria. A multistage sampling procedure was used to select 220 respondents for the study and data collected through questionnaire were analysed using both descriptive and inferential statistics. Measles was confirmed to be common in the study area by 98.6% of the respondent. Majority (64.1%) of the respondents had high awareness of and high acceptability (58.6%) of the immunization programme, but were constrained by inadequate vaccines (mean value of 1.37). Government should make vaccines available at the health centres to meet the respondents' needs.

Keywords: Acceptability, Immunization, Rural women, Reproductive age

INTRODUCTION

Immunization is one of the most powerful and most cost-effective tools for improving public health. The benefits of immunization are enormous both to the family and society. It prevents disability and death in children. Statistics show that vaccines avert 2.5million child deaths every year (WHO 2018). Consequently, it gives children the opportunity to grow up healthy and improve their life prospects. Nigeria's poor child health indices are reportedly associated with low immunization coverage, which is among the lowest worldwide (Ophori, Tula, Azih, Okojie, and Ikpo, 2014). In Nigeria, the Expanded Program on Immunization (EPI) was introduced in 1979 to combat six major childhood diseases, namely, tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, and measles.

In pursuance of better coverage, Nigeria revitalized the EPI in 1995 and renamed it the National Program on Immunization (NPI), which was housed as an agency under the Federal Ministry of Health (FMoH). By 1999, there was increase in immunization coverage although below 50%. In 2004, Nigeria included hepatitis B and yellow fever vaccines in its schedule to increase the number of vaccines under RI, making it eight in number. The country also adopted the WHO-African Regional Office's (AFRO) Reach Every District (RED) strategy and named it Reach Every Ward (REW), since the ward is the lowest administrative and political body in Nigeria. (NIP, 2009; NPHCDA, 2013). The idea behind REW was to ensure that all Nigerian children have equitable access to immunization services, irrespective of where they reside.

However, despite all these efforts by Nigerian government and international agencies to ensure optimal utilization of immunization programme, millions of children are still at risk of preventable diseases (NPHCDA, 2013). Worldwide, approximately 3 million children die every year as a result of diseases that could be prevented by

immunization, which is a reflection of incomplete coverage with existing vaccines which based on this, Nigeria has failed to meet the fourth goal of the Millennium Development Goal (MDG, 2015), which expected under five mortality rate to reduce to 64 deaths per 1000 births by 2015. Moreso, in September 2015, countries adopted a set of Sustainable Development Goals (SDGs) to end poverty, protect the planet and ensure prosperity for all as Immunization is one of the best buys in global health and has a crucial role in achieving 14 of the 17 SDGs being one of the most far-reaching health interventions that closely reflects the ethos of the SDGs which is "leaving no one behind" (SDG, 2020).

Many scholars have carried out studies on immunization. Endurance, *et al*, (2014) carried out a study on current trends of immunization in Nigeria (Prospect and Challenges) and Ngozi *et al*, (2019) carried out a study on exploring factors influencing immunization utilization in Nigeria—a mixed methods study. However, little or no research has been done especially in Oyo state to quantify the acceptability of immunization programme among women farmers. This therefore makes it pertinent to carry out the study considering the following specific objectives:

1. ascertain the ailments/illnesses that are common in the study area,
2. determine the level of awareness of respondents about immunization programme
3. describe the constraints faced by respondents in immunization programme
4. determine the acceptability of immunization programme among rural women

The study's hypothesis is as follows:

H₀1: There is no significant relationship between awareness of immunization programme and the level of acceptability of immunization programme.

METHODOLOGY

This study was carried out in Oyo State, Southwestern Nigeria. It geographically lies

between latitude 7^o2¹ and 9^o11 North and longitude 2^o4¹ East. Agriculture is the major source of income for the greatest number of people including women of the State (SACC, 2021). The state has three levels of healthcare: primary, secondary, and tertiary level of care, with 735 public health facilities and 935 registered private health facilities. In rural areas health centres were established to cater for the health issues of the people which include maternal, issues pre and post child health, total wellbeing of the people (Adelabu, *et al*, 2022).

Multistage sampling procedure was used to draw out the sample size. Two senatorial districts (Oyo South and Oyo Central) were selected using simple random sampling technique. Ten percent of the nine LGAs in Oyo South and 11 LGAs in Oyo Central were randomly selected to give one Local Government from each of the senatorial districts and Egbeda and Ido were selected from Oyo South and Oyo Central respectively. There are 10 wards in Egbeda and Ido LGA. Thirty percent of the wards were selected to give a total of 3 wards selected each. List of communities in each selected wards was compiled and thirty percent of the communities were randomly selected.

Thereafter, 6% of the total numbers of households in selected communities in selected wards in Ido and Egbeda LGAs were randomly selected to give total of 129 and 91 households respectively to make a total of 220 respondents for the study.

A structured questionnaire administered was used to elicit information from the respondents and both descriptive (mean, percentages, frequencies) statistical tools were used to analyze the data for this study.

The dependent variable for the study was acceptability of immunization programme among rural women of reproductive age. Respondents were asked to indicate their acceptability of immunization based on its service delivery, vaccine supply and quality, disease surveillance and advocacy, communication and social mobilization among others. This was measured on a scale of highly accepted, accepted and not accepted. Score of 2, 1 and 0 were assigned respectively. Composite mean was found and used to categorize the respondents as having high or low acceptability of the immunization programme in the study area.

RESULTS AND DISCUSSION

Common ailment and illnesses

Table 1 reveals that measles (98.6%) malaria (70.2%) and Typhoid fever (44.5%) were the common ailments in the study area. This can be corroborated by NCDC (2021) that confirmed Oyo state as the third only behind Borno and Lagos state with occurrence of Measles in Nigeria in 2021, and that the three states accounted for about 62.8% of the suspected cases reported in that year alone.

Table 1 Respondents level of Ailment/illness occurrence

Common Ailments/illness	Common (%)	Not common (%)
Measles	215(98.6)	3(1.4)
Malaria	153(70.2)	7(3.2)
Cholera	65(29.8)	153(70.2)
Typhoid fever	97(44.5)	121(53.5)
Chicken pox	43(19.7)	175(80.3)
Convulsion	54(24.8)	164(75.2)
Ear infection	41(18.8)	177(81.2)
Hand, foot, skin and mouth infection	78(35.8)	139(63.8)
Whooping cough	79(36.2)	137(62.8)

Source: field survey 2023

Awareness about immunization programme

Table 2a reveals that the respondents had a good awareness about almost all identified immunization programmes. Diphtheria, T. T, Pertusis Vaccine (DPV) immunization programme administration and Vitamin A Vaccine administration had the highest level of awareness among the respondent with 91.3% of the respondent confirming to have awareness of them. Measles,

which is the most prevailing ailment in the study area, had 89.9% level of awareness from the respondents. Further results in Table 2b show that majority (64.1%) of the respondents had high awareness about different immunization programme. This implies that most of the respondents were adequately abreast of different immunization programme in the study area.

Table 2a: Respondents awareness about different immunisation programme

Level of Awareness about Immunisation programme	Not Aware	Aware
Basillus Clamette Guerin (BCG) Vaccine administration	30(13.8)	188(86.2)
Hepatitis B Vaccine administration	31(14.2)	187(85.8)
Oral Polio Vaccine (OPV) administration	32(14.7)	186(85.3)
Diphtheria, T. T, Pertusis Vaccine (DPV) administration	19(8.7)	199(91.3)
Pneumococcal Conjugate Vaccine (PCV) administration	20(9.3)	198(90.8)
Inactivated Polio Vaccine (IPV) administration	22(10.1)	196(89.9)
Rotavirus Vaccine (RV) administration	51(23.4)	167(76.6)
Menigitis Measle Vaccine (MMV) administration	59(27.1)	159(72.9)
Yellow Fever Vaccine administration	37(17.0)	176(81.7)
Vitamin A Vaccine administration	18(8.3)	199(91.3)
Measles	21(9.6)	196(89.9)

Source: Field survey, 2023

Table 2b: Categorization of respondents' awareness about different immunization programme

Awareness level	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0-9.3)	79	35.9	0	12	9.4	2.8
High (9.4-12)	141	64.1				
Total	220	100.0				

Source: Field survey, 2023

Constraints to acceptance of immunization programme

Table 3 below reveals inadequate vaccines and immunization supply in the health care facilities as the most severe constraints (mean value of 1.37) in the study area. this can be corroborated by

Akwataghibe et al. (2019) which stated that unavailability of vaccines at the scheduled times was the most frequent complaint by respondents in a Focus Group Discussion of a similar study conducted in Ogun state.

Table 3: Constraints to acceptance of immunization programme

Constraints	Mean
High cost of services	0.45
Long distance to health care facilities	1.08
Inadequate health personnel	0.89
Lack of belief in health personnel	0.78
Inadequate health care facilities	0.91
Inadequate vaccines and immunization supply in the health care facilities	1.37
Inadequate cold chain equipment	0.88
Influence of religion	0.17

Source; Field survey, 2023

Acceptability of different immunization programme

According to Table 4, Oral Polio Vaccine (OPV) was the most acceptable immunization programme in the study area (mean value 1.22) followed by Hepatitis B vaccine (1.21) and measles (1.20). This can be confirmed by NBS and UNICEF

(2015) that Oyo state has a consistence yearly record of one of the best coverage of OPV on the south west Nigeria, which is the zone with the overall best yearly coverage of the immunization programme. Table 4b further shows that majority (58.6%) of the respondents had high acceptance rate for different immunization programmes in the study area.

Table 4a: Acceptance rate for different immunization programme

Acceptability of Immunization programme	Mean
Basillus Clamette Guerin (BCG) Vaccine	1.17
Hepatitis B Vaccine	1.21
Oral Polio Vaccine (OPV)	1.22
Diphtheria, T. T, Pertusis Vaccine	1.18
Pneumococcal Conjugate Vaccine (PCV)	1.12
Inactivated Polio Vaccine (IPV)	1.12
Rotavirus Vaccine (RV)	0.96
Meningitis Vaccine (MMV)	1.05

Acceptability of Immunization programme	Mean
Measles	1.20
Yellow Fever Vaccine	1.18
Vitamin A Vaccine	1.20

Source; Field survey, 2023

Table 4b: Categorization of acceptability of different immunization programme

Acceptance level	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0-12.4)	91	41.4	0	22	12.5	4.5
High (12.5-22)	129	58.6				
Total	220	100.0				

Source: Field survey, 2023

CONCLUSION AND RECOMMENDATIONS

The study concluded that measles was a common ailment in the study area. The women farmers were aware of the immunization programmes. The women also found the immunization programmes acceptable, but were often constrained by inadequacy of vaccine supply at the health centres. The immunization awareness campaign should be sustained, while government should ensure that vaccines are always made available so that rural women can have access to them on regular basis.

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**ATTITUDE OF FARMERS TOWARDS AGRICULTURAL RADIO PROGRAMMES IN
OGBOMOSHO AGRICULTURAL ZONE OF OYO STATE**

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ABSTRACT

The study assessed farmers' attitude towards agricultural radio programmes broadcasted by radio stations in the Ogbomosho agricultural zone of Oyo State, Nigeria. A multi-stage sampling procedure was used to select 110 registered farmers in the study area for the study. Primary data were gathered using structured questionnaire. Collected data were analyzed using both descriptive and inferential statistics. The findings revealed that the mean age of the respondents was 38.8 ± 11.4 years. Majority (84.5%) of the respondents were male, married (52.7%) and literate (75.6%), with at least a primary education as the highest educational attainment. A substantial proportion (85.4%) of respondents were aware of the agricultural programmes broadcasted, and 61.8% demonstrated a high level of engagement by regularly listening to these programmes. The primary challenges faced by respondents included unreliable power supply, difficulties in comprehension, and inconvenient broadcast timings. Majority (64.5%) of the respondents exhibited a favorable attitude towards the agricultural radio programmes. The study established a significant relationship between farming experience ($r = 0.304$, $p < 0.05$) and respondents' attitude towards the aired agricultural radio programmes. It was therefore concluded that farmers in the agricultural zone maintained a high level of engagement and favorable attitude towards agricultural programmes being aired by radio stations in the agricultural zone. The study recommends that agricultural programmes should be scheduled during their preferred listening times.

Keywords: Attitude of farmers, Agricultural radio programmes

INTRODUCTION

Agricultural programmes are vital in achieving the essence of agricultural communication which Yahaya (2003) elucidated as development communication that facilitates interaction among farmers which should stimulate improvement in quality of information output for agricultural development. One of the modes of dissemination is the individual method which involves the extension agent interacting with the farmers on one-on-one basis through farm and home visit, office calls and inquiries, informal contact during social occasion, field flags, telephones etc. This method is considered to be usually time consuming. Moreover, the ratio of extension agents to farmers is at all time low beyond minimum and cannot serve the needs of farmers in case of emergency such as pest infestation, where much reliance will be on extension agents who may not quickly and effectively attend to the diverse challenges of the farmers simultaneously. The media method reaches a large number of individuals simultaneously in spatially different places, examples include newspapers, television, radio, newsletters, internet, billboard, leaflets, pamphlets, fact sheet folders etc.

In addition to reaching out to farmers, appropriate communication media also ease message dissemination thereby relieving the extension worker of a huge assignment of covering a wide area. The use of media in extension work thus enables extension personnel operate more effectively. Mass media can serve as a potent tool to achieve this (Age, Obinne and Demenongu, 2012). The mass media as a source of information utilizes three major channels of communication which are television, radio, and print. While these three channels have their various uses and importance, radio is considered the most effective and efficient

in disseminating information to farmers over a wide area (Familusi and Owoeye, 2014). Also, Auma, Wangia, Ligare and K'obill (2017) posited that the fastest media channel that can disseminate accurate and relevant agricultural market information to mass of smallholder farmers is community radio.

Radio cuts across distance as Uwandu, Thomas and Okoro (2018) found that mass media, especially radio play an important role in creating awareness about new agricultural technologies among farming communities across the world and thus has immediate effect. It has been considered the only medium of mass communication the rural population is familiar with (Yahaya, Adamson and Kareem, 2018). This is because a radio set is cheap to obtain and widely owned in rural areas since the advent of the battery-operated transistorized sets.

Specific objectives of the study include:

1. Profiling of agricultural programmes being aired by the selected stations in the study area.
2. Identify the socio-economic characteristics of farmers in the study area.
3. Determine the awareness of farmers of radio agricultural programmes aired in the study area.
4. Investigate challenges farmers faced when listening to agricultural programmes from the selected radio broadcast.
5. Assess the radio listening status of farmers to radio agricultural programmes in the study area
6. Attitude of farmers of radio agricultural programmes aired in the study area.

METHODOLOGY

This research study was conducted in Ogbomosho agricultural development zone, Oyo state, south-western Nigeria. All registered farmers in the Ogbomosho agricultural zone formed the

study population. Multi stage sampling procedure used to select 110 respondents from the study area.

RESULTS AND DISCUSSION

Profiling radio stations airing agricultural programmes

Results of the profiling showed similarities and differences of the two radio programmes. Similarities include: The same frequency of airing, duration of programme, Language used, sponsorship status and the programme focus. Differences observed were: Day and time of airing, anchor's level of education, type of programme and the reason for creation.

Socioeconomic characteristics of the respondents

The result shows that 85.4% of the respondents were between ages 20-50 years. The mean age was 38.8 ± 11.4 years implies that majority of the respondents are still in their youthful age, (84.5%) of the respondents were male,

significant proportion completed their primary (35.5%), secondary (39.1%), and tertiary (11.6%) education, (69.1%) the range of 4-6 members in their households with mean household size of 6.4, farming experience ranged from 1 to 10 years (48.2%) and 11 to 20 years (44.6%) with mean of 13.7 years, and (66.4%) earn less than three hundred thousand naira, with mean annual income of two hundred and eight thousand naira.

Respondents' awareness of agricultural programmes on radio in the study area

The result reveals that a significant majority of respondents (90%) and (80.9%) were aware of *Agbe l'oba* (Ajilete 92.1fm) and *Ise ile wa* (Brave 91.1fm) agricultural programmes aired respectively. The result further shows that majority (70.9%) had high awareness of agricultural programmes.

Categorization of awareness of respondents to radio agricultural programmes aired

Awareness	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (1 - 1.71)	32	29.1	1.0	2.0	1.71	± 0.46
High (1.71 - 2)	78	70.9				
Total	110	100.0				

Listening status of respondents to agricultural radio programmes aired in the study area

The results revealed that majority (61.8%) had high listening status while some (38.2%) had

low listening status. This aligns with the findings of Belden *et al.*, (2020) that radio programs targeted at farmers have shown considerable high listenership in agricultural communities worldwide.

Categorization of listening status of respondents to agricultural radio programmes aired in the study area

Listening status	Frequency	Percentage	Minimum	Maximum	Mean	S. D.
Low (2 - 4.12)	42	38.2	2.0	6.0	4.12	± 1.07
High (4.13 - 6)	68	61.8				
Total	110	100				

Source: Field survey, 2023

Challenges faced by respondents with airing agricultural programme on radio station

Major challenges were poor power supply, lack of comprehension of agricultural information aired, inconvenient time of broadcast, poor feedback and short duration of the programme. This corroborates with the findings of Kotze *et al.*, (2021) who examined the information sources used by South African farmers, including radio, and identifies power supply as a critical barrier to accessing radio programs.

Respondents attitude towards the agricultural programme aired by radio stations in the study area.

Result shows that (64.5%) of respondents had favourable attitude and (35.5%) had unfavourable attitude to agricultural programmes aired by radio station in the study area. This corroborates positively with research of Busch *et al.*, (2021) their study examined the impact of interactive radio programming on farmer livelihoods in Uganda.

Categorization of attitude of respondents to agricultural programmes aired

Attitude	Frequency	Percentage	Minimum	Maximum	Mean	S. D.
Unfavourable	39	35.5	57	83	71.1	± 5.53
Favourable	71	64.5				
Total	110	100.0				

Pearson Product Moment Correlation between the radio listening status of farmers and their attitude to agricultural programmes being aired

Results in Table 4.7.2 shows that a significant relationship exist between listening status ($r = 0.334$, $p < 0.05$) of respondents and their

attitude to agricultural radio programmes aired. This implies that the more respondents listen to radio agricultural programmes, the more they have a favourable attitude (positive correlation) towards the agricultural radio broadcast.

Pearson correlation result between radio listening status of farmers and their attitude to agricultural programmes being aired

Variable	r value	p value	Decision
Listening status	0.334	0.000	S

Source: Field survey, 2023

CONCLUSION

Farmers in Ogbomosho ADP zone had favourable attitude towards agricultural programmes being aired by Brave 91.1FM and Ajilete 92.1FM, while they faced the following challenges in listening to the radio programme; poor power supply, lack of comprehension, inconvenient time of broadcast, poor feedback and short duration of the programmes.

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IMPACT OF WEST AFRICAN SOY LIMITED (WASIL) ON MAIZE FARMERS FOOD SECURITY IN NORTH-WEST, NIGERIA

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ABSTRACT

In Nigeria, farmers depend largely on supports for farm inputs which can be in the form of subsidies in order to improve their livelihoods. These supports are usually made available and accessible to them by government and non-governmental organizations. In this article, the impact of West African Soy Limited Maize Farmers Intervention Scheme was investigated. The study employed Propensity Score Matching to net out the average treatment effect on treated which is the impact of the programme on the beneficiaries. Two hundred and eighty-two households head who benefitted from the programme were purposively and proportionately selected while another 282 non-beneficiary's household heads were randomly selected and used as control group. The result revealed that the programme had a positive and significant influence at 5 % level of confidence on their food security status, the average treatment effect on treated (ATT) was 0.2037 (20%). The size of the estimated treatment effect suggests an improvement in the livelihood of the beneficiaries compared to the non-beneficiaries. The programme, though a private sector initiative is such that has potential of ensuring increased income as well as food security of the poor resource small scale farmers in the rural areas of North West, Nigeria. The study therefore recommends that female household head need to be encouraged to key into the programme in order to improve their income base. And also, there is need for increased and rigorous capacity building of the farmers by extension agents of the programme in order to sustain the gains.

Keywords: Average Treatment Effect, Farming households, Food security WASIL

INTRODUCTION

Despite the discovery of crude oil and the rapid development in the industrial sector, Nigeria's economy is still greatly influenced by agriculture (Food and Agricultural Organization, FAO 2019a). This is evident in the fact that some Nigeria communities are mostly rural and agrarian by occupation as over 70% of the 150 million people in these rural areas are engaged in agricultural production Iheanacho and Ozegbe (2020). However, the Nigerian agriculture is still at subsistence level. There is the need to increase research and development efforts as well as extension outreach.

WASIL a subsidiary of WACOT with the mandate of promoting maize farming and enhancing maize farmers livelihood in North West Nigeria. WASIL has its presence in four (4) North Western states (Kaduna, Katsina, Kano, Jigawa) with a mandate of working with farmers, granting extension support, provision and credit facilitation, market outsourcing, provision of inputs and promotion of maize farming in those states. WASIL has been in operation and has been carrying out its poverty alleviation, food security and livelihood enhancement activities through provision of inputs such as chemicals, seeds, fertilizer and advisory services, credit facilitation, and market linkages in the North-West region of Nigeria for the past 9 years. This reality provides the justification for an empirical based impact assessment such as these. Thus, this study seeks to analyse the impact of WASIL on the livelihoods of maize farmers in North-Western Nigeri with the following research objectives: assess the impact of WASIL maize intervention programme on food security of the beneficiaries in the study area.

The North-Western region of Nigeria comprises of seven states namely Katsina, Kaduna Zamfara, Kebbi, Sokoto, Kano and Jigawa. The region is located between Latitude 9°0'0"N and 13°0'0"N of the Equator and Longitudes 6°0'0' and 10°7'0'0'E of the Greenwich meridian. The region occupies a land mass of about 216 065 km² which translates to about 18% of the total land area of Nigeria. As projected from the (NPC) (2006) estimates, there are 53, 154, 891 million people living in the region with majority having agriculture as their major means of livelihood. The soil is reddish brown or brown soils of the semi-arid and arid areas and are known as tropical ferruginous soils which are made up of about 85% sand with pH values that varied between 6.0-7.0 (Dogonyaro, Abaje and Bello (2022).

METHODOLOGY

Sampling Procedure and Sample Size

The study was carried out in the North Western Nigeria, which consist of seven (7) States (Katsina, Kaduna, Kano, Jigawa, Kebbi, Zamfara, and Sokoto) out of which (3) States (Kaduna, Katsina and Jigawa) were purposively selected for this study because of the specificity of WASIL on maize production in the states. A multi-stage sampling technique was used to select the sample for the study which involves the following stages: Stage I: involves a purposive selection of Kaduna, Katsina and Jigawa States because WASIL programmes in these selected states is specific on maize production; Stage II: involves a purposive selection of two (2) LGAs from each State. In this regard, Zaria and Giwa in Kaduna State, Malumfashi and Kafur in Katsina State, and Gagarawa and Gumel LGAs

Jigawa State. The reason for the selection of the LGAs in these states was based on the concentration of maize farmers in them more than in other LGAs in the states. Stage III: From a list of WASIL register made available, there were 1,052 maize farmers in the selected LGAs out of which 282 maize farmers were proportionately selected with RAOSOFT sample size calculator using 5% of the population at 5% level of significance. Stage IV: A list of 2710 registered maize farmers who were not on WASIL list of farmers was obtained from ADPs of the three states out of which 282 was randomly and proportionately selected as control group, primary data source was employed. Propensity score matching (PSM) was used to achieve the objective of this study which was to assess the impact of the programme on the livelihood of beneficiaries. The impact (ATT) of programme on the income of the beneficiaries can then be estimated using Equation (1).

$$ATT = [E(\Delta_1/I_i = 1)] = \frac{1}{I_i} \sum (Y_1) I_i$$

$$= \frac{1}{I_i} \sum \Delta_1 I_i \text{-----}$$

- (1)

RESULT AND DISCUSSION

Impact of WASIL Extension Programme on Household Food Security Food Security Status of Beneficiaries and Non-beneficiaries

The result in the Table below presents the impact of WASIL programme on food security. The result revealed that participation in WASIL programme had positive and significant influence at 5 % level of confidence on the food security status of smallholder farmers, the average treatment effect on treated (ATT) was 0.2037. This implies that about 0.20 or 20 % increase in food security of participating households. The result further shows ATU of about 0.14 or 14 % for non-participants, this also implies 14 % increase in food security of non-beneficiaries had it been they participated in the programme. Increase in food security status may be because participating farmers obtained higher yield and premium price of maize, which enables them to have more income to cater for household food expenditure than the non-beneficiaries' maize farmers. The result is consistence with findings of Obisesan and Akinola (2021) and Siewe *et al.* (2021).

Table 1: Impact of WASIL Extension Participation on Food Security Status

Outcome	Sample	Treated	Control	Difference	SE	t-test
Food Security	Unmatched	0.3873	0.2672	0.1200	0.0432	2.77***
	ATT	0.8762	0.6725	0.2037	0.0985	2.40**
	ATU	0.6625	0.5254	0.1371		
	ATE			0.0665		

Note: SE= standard error, ** p>0.05 and *** p>0.01. Source: Field survey, 2022

CONCLUSION AND RECOMMENDATIONS

The WASIL maize intervention Programme has impacted positively on the livelihood of its intended beneficiaries in the North Western region of Nigeria in terms of achieving its set out objectives of ensuring food security among small scale maize farmers. The programme has great potential, which if properly managed and sustained could serve as the spring board for future private agricultural development initiatives.

Based on the findings that there are more male beneficiaries in the programme,

- WASIL should expand the number of benefitting states so as to accommodate more beneficiaries as it was found to have made significant impact on the food security status of beneficiaries to the tune of about 20% as revealed by the findings of these research work.
- Although extension contact was significant, it should be sustained and if possible improved upon as the gains of the programme can only be sustained through that.

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**LEVEL OF USAGE OF INFORMATION COMMUNICATION TECHNOLOGY FACILITIES
AMONG YAM PRODUCERS IN KWARA STATE**¹Ayanda, I. F., ¹Abdulrahman, O. L., ²Ukpi, M. S. and ¹Ibitoye, A. O.¹Kwara State University, Malate - Department of Agricultural economics and extension services - Kwara State University, Malate²National Biotechnology Development Agency, Bioresources development centre, Ogbomosho, Oyo State**ABSTRACT**

The study assessed the Information and Communication Technology (ICT) usage among yam producers in Kwara State, Nigeria. A four-stage sampling procedure was used to select 120 respondents where data was collected using a structured interview schedule and analysed using percentages, mean score, ranking, Pearson Product Moment Correlation (PPMC) and Chi square. Information was gathered with this result calculated $X^2 = 8.986$, tabulated = 1.20. The mean age of the respondents was 45.5 years, 65.0% had formal education with an average of 19 years' experience in production. Radio (3.0) and mobile phones (2.9) were the most available ICTs in the study area, while information on accessibility of market (3.5) and marketing information (3.4) were the major benefits derived from the use of ICT. However, incessant outage of electricity (2.5) and network fluctuation (2.4) were the constraints hindering ICT usage. A significant relationship existed between respondents' income and their usage of ICT ($r = 0.294$, $p = 0.001$). A significant relationship was also established between constraints and the usage of the ICT from the results collected. The results clearly indicate that, when the level of income of the respondents is high, there is tendency to increase their use of ICT and vice versa. In conclusion, the government should improve on electricity supply since the poor supply is affecting the farmers greatly. The farmers can also jointly acquire a generator or solar energy system as an alternative power supply for their ICTs facilities during outage of government electricity supply.

Keywords: Information Communication Technology (ICT), Yam farmers, Radio, Electricity

INTRODUCTION

The role of ICTs is identified in Millennium Development Goal Number 8 (MDG8), where the relevance of emerging technologies to combat poverty was enhanced especially in Nigeria. The crop yam (*Dioscorea* species) is a root tuber crop which grows annually with about 600 species, out of which six species are socially and economically important in nutrition and medicine (IITA, 2009). For instance, species such as *Dioscorea alata*, *D. rotundata* etc are planted in tropical regions as well as cultivated in the savannah region of West Africa (FAO, 2017). As a matter of fact, Nigeria is the largest producer worldwide with 47,942,712 tons in 2017, then Ghana 5,000,000 tons, and Coted'Ivoire 3,900,000 tons. (FAO, 2017). In Agricultural extension, ICTs used include; radio, television, mobile phones, social media Apps, FinTech, and web publishing etc. These technological advancements have great impact on productivity, effective communication etc. Unfortunately yam production in Nigeria is faced with numerous challenges such as poor yielding varieties, soil fertility decline, soil and storage pests and diseases among others. The low adoption and penetration of ICTs by farmers is a huge challenge, like wise the ratio of extension worker to farmers which is lower (1:2000) than recommended figure globally (1:500) FAO (2017). And this has a negative effect on the free flow of information. It is therefore, very crucial to employ ICTs in promoting exchange of information that could lead to higher yam productivity, effective chain of product delivery between farmers and buyers etc among yam farmers in Kwara State. The general objective was

to assess the usage of information and communication technology (ICT) facilities among yam producers in Kwara state.

The specific objectives of the study were to: determine the socio – economic characteristics of the respondent, identify the type of ICT available for the respondent and their level of usage.

H_{01} = There is no significant relationship between the income of the yam producers and the usage of ICT in yam production.

METHODOLOGY

This study was carried out in Kwara State Nigeria. The target population was the yam producers in Kwara State, which was about 120 farmers. A four – stage sampling techniques was adopted in the selection of sample size. A well-structured questionnaire was used to elicit information from respondents. The variables measured were the socioeconomic characteristics of yam producers and a three-point Likert-scale of occurrence on the usage of ICTs in yam production, the data was analyzed using descriptive statistics such as frequency, percentages, mean were used for analyzing the data. The validity and reliability test were done on the data collected from the questionnaire the co-efficient of correlation ($r = 0.77$) was obtained and it was concluded that the instrument was reliable as the value of (r) ranged between 0 to 1. Inferential statistics such as Correlation coefficient and Chi square.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Results represented in Table 1 shows that all the respondents were males while their average age was 45.5 years indicating that there are young and aged, young people can imbibe and learn new ideas and innovations such as the usage of ICT

facilities to enhance productivity since there are more mentally alert and have greater flexibility in accepting new ideas., and can take risks and uncertainties (Sanni 2009). 75 % of them were married men with a production experience of 21 years. This shows that they are vastly experienced in yam production.

Table 1: Socio – economic characteristics of respondents

Variable	Class	Frequency	Percentage (%)
Gender	Male	120	100
Age (years)	21 – 30	12	10
	31- 40	18	15
	41 – 50	24	20
	51 – 60	36	30
	61 and above	30	25
Average	45.5		
Marital status	Single	12	10
	Married	90	75
	Widower	18	15
Monthly income (N)	20,000-40,000	12	10
	41,000-60,000	12	10
	61,000-80,000	42	35
	81,000 and above	54	45
	Average income	62,000	
Production experience	Below 5 years	18	15
	6 – 10 years	12	10
	11 – 15 years	18	15
	16 -20 years	24	20
	21years above	48	40
Average	19		
Membership cooperative	Yes	7	14
	No	42	86
Farm size (hectare)	< 1	12	10
	2 - 3.9 ha	24	20
	4 -5.9 ha	42	35
	6 - 7.9 ha	42	35
	Average	6.7 ha	
Yield (t/ha)	< 2	6	5
	2 - 3.9 t/ha	30	25
	4 – 5.9t/ha	30	25
	6 – 7.9t/ha	36	30
	8 and above	18	15
Average	6.2t/ha		

Source: Field survey, 2020

Type and level of Usage of ICT by farmers in Kwara State

Table 2 shows that about 100% of the farmers always use radio while 95% use cell phone. The usage of radio was the most commonly used ICT facilities by the respondent in the study area

giving a mean score of 3.0. Others include mobile phone with a mean score of 2.9, television 1.3. This is in line with the findings that mobile phone is another ICTs tool accepted by farmers for getting and disseminating innovations (Falola and Adewumi (2012).

Table 2. Type and level of Usage of ICT by farmers in Kwara State

ICT	Always	Sometimes	Never	Mean (STD)	Rank
Radio	120 (100)	0(0)	0 (0)	3.00(0.00)	1 st
Mobile phones	114 (95)	0 (0)	6(5)	2.90(0.44)	2 nd
Television	0 (0)	30 (25)	90 (75)	1.30(0.44)	3 rd
Cinema	12 (10)	0 (0)	108 (90)	1.10(0.45)	4 th
DVD	6 (5)	0 (0)	114 (95)	1.10(0.44)	5 th
Camera	6 (5)	0 (0)	114 (95)	1.10(0.44)	5 th
Multimedia	6 (5)	0 (0)	114 (95)	1.10(0.44)	5 th
Newspaper	6 (5)	0 (0)	114 (95)	1.10(0.44)	5 th
Web publishing	6 (5)	0 (0)	114 (95)	1.10(0.44)	5 th
Fax	0 (0)	6 (5)	114 (95)	1.10(0.22)	6 th
Computer	0 (0)	0 (0)	120 (0)	1.00(0.00)	7 th
Internet	0 (0)	0 (0)	120 (0)	1.00(0.00)	7 th
Handbill and fliers	0 (0)	0 (0)	120 (0)	1.00(0.00)	7 th

Source: Field survey, 2020

H₀₁ = the hypothesis tested the relationship between selected socio – economic characteristics (level of income) and the usage of ICT. The result

indicated that there is no significant relationship between the income of the yam farmers and the usage of ICT (multimedia) in yam production.

Table 5: Pearson’s Ranked Ordered Correlation test for establishing a significant relationship between level of income and usage of ICT.

S/No			Level of income	Multimedia	Remarks
1	Level of income	Pearson Correlation	1	-0.294**	Significant
		Sig. (2-tailed)		.001	
		Sum of Squares and Cross – products	111.300	-10.200	
		Covariance	.935	-.086	
		N	120	120	
2	Multimedia	Pearson Correlation	0.294**	1	Significant
		Sig. (2 – tailed)	.001		
		Sum of Squares and Cross – products	-10.200	10.800	
		Covariance	-.086	.091	
		N	120	120	

** Correlation is significant at the 0.01 level (2 – tailed)
Field survey, 2020

CONCLUSION AND RECOMMENDATIONS

In conclusion, the study showed that all the respondents in the study area are males, married and in their active ages. The always use radio and cell phones as ICT facilities. It was recommended that the extension arm of the government should organize regular trainings and seminars for farmers on the level of usage of ICTs facilities. With the provision of ICTs facilities for the farmers, as little as it may be, this will create a room for the introduction of e – extension services to farmers in Nigeria.

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enterprises in West Africa: a case study of
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ASSESSMENT OF SOCIAL MEDIA USAGE BY EXTENSION AGENTS FOR DISSEMINATING AGRICULTURAL INFORMATION IN ONDO-STATE

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ABSTRACT

This study looks at the extension agents' purpose of social media usage, examined the frequency of social media usage in disseminating agro-information and identified the constraints encountered in using social media. The study was carried out in Ondo State. A multistage procedure was used in the first stage, four LGAs were selected from each agricultural zone. The second stage involved the selection of 5 rural communities from which 20 respondents were randomly selected making 100 respondents. (77.1%) of respondents were males. The mean age of the respondents was 42years, while the mean year of working experience is 12 years. The extension agents that relied on salary for living were (98%). Extension agents used Facebook in disseminating their personal information with friends and family and had (85.4%) while WhatsApp had (80.2%). For distribution of respondents on frequency of social media usage for disseminating agro-information, Facebook had the highest usage of ($x=1.35$) followed by WhatsApp ($x=1.26$). The major constraints to social media usage was poor internet network with a mean score ($x=3.01$). In conclusion the level of usage of Facebook, WhatsApp and Yahoo was high for disseminating agro-information by extension agents while other applications were rarely used.

Keywords: Social media, extension agents, usage, agro-Information, and dissemination

INTRODUCTION

Social media have long been used in agriculture for facilitating communication among stakeholders, especially extension personnel (Sophie, 2013). These potentials make social media a highly relevant and beneficial platform for extension personnel to engage with their clients and peers. Lack of connectedness with farmers have long been cited as a serious lacunae of extension services and social media gives ample opportunities to solve this issue. The professional usefulness of social media has formed favorable attitudes among agricultural extension workers towards use of social media. They have found social media to be a beneficial tool to increase their job performance in line with the task requirements.

Objectives:

- i. describe the socio-economic characteristics of the extension agents;
- ii. ascertain extension agents' purpose of social media usage;
- iii. examine the frequency of social media usage in disseminating agro-information;
- iv. identify the problems encountered in using social media.

METHODOLOGY

The study was carried out in Ondo State. Random sampling was used in selecting the respondents. Twenty-five extension agents were selected randomly from four of the Local Government Area ADP zones in Ondo state. A total of one hundred respondents were used for the study. Questionnaire was used for data collection.

RESULTS AND DISCUSSIONS

Respondents' social economic characteristics

Majority (77.1%) of respondents were males. The mean age of the respondents was 42 years. 93.8% of the respondents have less than 25 years working experience. 97.8% of the respondents make their living from the Agricultural Extension work while 19.8% are extension agents that took farming as their job and 5.2% combine agricultural Extension work with trading and others were 1.0%. This implies that 98% of the extension agents are fully salary earners, they only rely on their salary for living. Many (39.6%) of the respondents are Village Extension Agents while 33.3% were in semi urban and (27.1%). It shows that 59.4% of the respondent speak Yoruba fluently while 40.6% speaks English fluently.



Table 1: Distribution of Respondents According to their Socio-economic Characteristics, n=96

Variable	Frequency	Percent	Mean
Sex			
Male	74	77.1	
Female	22	22.9	
Age			
31-40	41	42.8	
41-50	42	43.8	42±8.45
>51	13	13.5	
Working Experience (years)			
<25	90	93.8	12±6.40
26-30	2	2.0	
>31	4	4.2	
Source of Income			
Salary	94	97.8	
Farming	19	19.8	
Trading	5	5.2	
Others	1	1.0	
Location/ Place of Residence			
Village	38	39.6	
Semi-urban	32	33.3	
Urban city	26	27.1	
Linguistic Competence			
Yoruba	57	59.4	
English	39	40.6	

Source: Field Survey, 2021

Distribution of respondents According to their purpose of Social Media usage

According to Mugo and Vermeulen (2011), social media can help to promote agricultural production. Specifically, they stated that social media can be used to document what farmers are doing in one region. The implication of the study shows that majority of the extension agent use Facebook and WhatsApp in disseminating personal information, disseminate agro-information to

farmers and clients and also interact with friends and families. Apart from the usage of agricultural dissemination purpose, social media can also be used by the extension agents for making friends and interact with friends and families. i.e social media usage is not new to the extension agents and they know the purpose and importance of using it either for disseminating agro-information or for personal use.

Table 2: Distribution of Respondents According to their purpose of Social Media usage

Social media Applications	Disseminate personal information	Disseminate agro-information to farmers & clients	Interact with friends	Entertainment purpose
Facebook	82(85.4)	62(64.6)	75(78.1)	47(49.0)
WhatsApp	77(80.2)	65(67.7)	78(81.3)	50(52.1)
Twitter	5(5.2)	6(6.3)	3(3.1)	---
Blog	9(9.4)	4(4.2)	8(8.3)	----
Instagram	11(11.5)	9(9.4)	11(11.5)	7(7.3)
Second life	11(11.5)	4(4.2)	9(9.4)	5(5.2)
Wiki	10(10.4)	4(4.2)	9(9.4)	4(4.2)
WordPress	4(4.2)	2(2.1)	4(4.2)	----
LinkedIn	6(6.3)	3(3.1)	2(2.1)	1(1.0)
Yahoo	49(51.0)	45(46.9)	41(42.7)	39(40.6)

Source: Field Survey, 2021

Frequency of Social Media Usage for Disseminating Agro-Information

WhatsApp and Facebook were prominent among the social media and they had greater than 1 as mean value. However, the non-use /low use of the

other media affected the overall grand mean of the two media. It further confirms Apantaku and Lawal-Adebawale (2009)'s report that information

communication technology devices were owned and used by some agricultural extension and research organizations.

Table 3: Distribution of Respondents on frequency of social media usage for disseminating agro-information

Social media applications	Interact with farmers & chat	Disseminate information on inputs	Disseminate information on agricultural technology product & service	Disseminate information on weather & climate	Disseminate information on marketing	Disseminate information on disease outbreak	Disseminate information on farmers meeting	Total Grand mean	Ranking
Facebook	1.55	1.28	1.25	1.24	1.37	1.25	1.50	1.35*	1 st
Whatsapp	1.42	1.30	1.29	1.18	1.16	1.22	1.23	1.26*	2 nd
Twitter	0.12	0.15	0.14	0.13	0.26	0.15	0.15	0.15	9 th
Blog	0.03	0.05	0.04	0.10	0.22	0.01	0.01	0.06	10 th
Instagram	0.18	0.21	0.16	1.16	0.26	0.17	0.17	0.19	7 th
Secondlife	0.04	0.07	0.03	0.03	0.12	0.03	0.03	0.32	4 th
Wiki	0.04	0.06	0.03	0.03	0.12	0.03	0.03	0.31	5 th
Wordpress	0.02	0.01	0.01	0.01	0.01	0.10	0.01	0.16	8 th
Linkedlin	0.08	0.01	0.01	0.03	0.01	0.10	0.01	0.24	6 th
Yahoo	0.99	0.85	0.83	0.80	0.80	0.85	0.80	0.73	3 rd

*High level of usage ≥ 1.0 Low level of usage ≤ 1.0 , 3: Field Survey, 2021

Problems Encountered in Using Social Media in Disseminating Agro-Information

The major problem is poor internet network with a mean score of 3.01. Closely following is cost effectiveness with a mean score of 2.66. While others in descending order of influence are lack of infrastructures (2.54), high cost of data bundle (2.35), cost of social media device (2.22) and

so on. Even though mobile phone subscriptions have increased, getting functional network is still a struggle in many rural areas of the state. Topped with high data charges, internet is inaccessible to many rural communities. Also, high internet cost restricts the use of multimedia like images and videos as they consume much more data than text (Andres and Woodard, 2013).

Table 4: Problems Encountered in Using Social Media in Disseminating Agro-Information

Problems encountered	Mean score	Ranking
Poor internet network	3.02	1 st
Level of literacy of farmers	2.22	6 th
Exposure of farmers to social media	2.18	8 th
Exposure of extension agents in using social media	1.96	11 th
Knowledge of usage by extension agents	2.05	9 th
High cost of data bundles	2.35	4 th
Cost-effectiveness	2.66	2 nd
Lack of infrastructure	2.54	3 rd
Farmers fear in using social media	1.82	16 th
Lack of skills in using social media	1.81	17 th
Lack of farmers interest in using social media	1.91	13 th
Lack of trust in social media usage	1.88	15 th
Lack of proper cultural context in using social media	1.96	11 th
Lack of farmers awareness about benefits of social media	2.01	10 th
Lack of extension agents' awareness in the social media usage for extension	1.53	19 th
Discourage participation among farmers	1.58	18 th
Discourage continuous engagement among farmers	1.89	14 th
Nonuse of local language in preparing social media	2.23	5 th
Cost of social media device	2.22	6 th

Source: Field Survey 2021



CONCLUSION AND RECOMMENDATION

This study identified the various uses of social media by extension agents in which majority of the social media are rarely used. The level of usage of Facebook, WhatsApp and Yahoo is quite high. The implication of the study is that there is effectiveness in the use of social media in their extension service delivery. Extension agents should take personal initiative to use social media as part of their job within the norms of institutional guidelines. Power supply and access to network services are necessary to access social media.

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EFFECTS OF SOCIOECONOMIC VARIABLES ON FOOD SECURITY STATUS AMONG RURAL FARMING HOUSEHOLDS IN YAGBA EAST LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA

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ABSTRACT

The study determines the effects of socio-economic variables on food security status among rural farming households in Yagba East Local Government Area of Kogi State, Nigeria. Multi-stage sampling procedure was used in selecting two hundred and twenty-five (225) rural farming households. Structured questionnaire complimented with interview schedule was used for data collection. Information was collected on the food security status of the households and effect of socio-economic variables on food security status among rural farming households. Data was analysed using frequency, percentage, food security index and logit regression. The result showed that the mean per capital expenditure of the households was N126264.444 while the food security line was N84176.3. About 69.9% of the households were food secure while 69.9% were food insecure. The coefficient of age (-0.0818006), household size (-0.0883087), educational level (0.36731) and annual income (0.4168275) had effect on the food security of rural households in the study area. It is recommended that older farmers be supported with incentives in order to reduce over-dependents on young farmers. Farmers should diversify into other viable enterprises in order to address the problem of food insecurity.

Keywords: Socioeconomic characteristics, Food security, Rural households

INTRODUCTION

Household food security is a term use to described as an access, at all times, to adequate food for an active and healthy life, which includes access to nutritionally safe foods and assured ability to acquire foods in socially satisfactory ways (Food and Agriculture Organisation, (FAO, 2011). The concept of food security is defined in terms of availability, accessibility, utilization and suitability over time (Famole and Oladele, 2007). A country can be food secured when peoples' fear of not having enough to eat is removed and the most vulnerable group, namely women and children in marginal areas have access to adequate quality of food they want (Idrisa *et al.*, 2008). A household is said to be food secured when it can reliably gain access to food of a sufficient quality in quantities that allow all its members to enjoy a healthy food for good life (Usman *et al.*, 2020). Nutritional food security is only achieved when secure access to food is coupled with a sanitary environment, adequate health services, and the knowledge and care needed to secure the good health of all individuals in the household (Ogunlela and Ogunbile, 2006). Food insecurity still persists in Nigeria despite the fact that greater proportion of the populace engage in full or part-time farming. Food insecurity over the years has worsened as a result factors such as farmers–pastoralists conflict, climate change and poor government policies. These menaces have negatively affected both the rural and urban households by contributing to the problem of food insecurity. Food insecurity among rural households have skyrocketed due to households' poor attitude to diversification, inadequate access to credit facilities and lack of issuance among rural farming populace.

It is therefore necessary to determine the effect of socioeconomic variables on food security among rural households. The objectives of the study area to: determine food security of the rural households, determine effect of socio-economic variables on the food security status and examine the constraints affecting household food security.

METHODOLOGY

This study was conducted in Yagba East Local Government Area of Kogi State, Nigeria. Yagba East has 21 Local Government Area with headquarters in Isanlu. The LGA is between Latitude 8° 16'60.00" North and Longitude 5° 49'59.99" East. The Local Government was created in 1991 with an area of 1396 km² and a population of 199,300 by 2016 (National Bureau of Statistics (NBS, 2017). The people of Yagba East Local government live in various rural villages, major occupation of the people is farming and trading practiced at subsistence level. The soil is viable for growing crops such as yam, maize, cassava, sorghum, cashew, cocoa, oil palm and coffee. Multi-stage sampling technique was employed for this study. The first stage involved random sampling of six (6) villages in the study area. The second stage involved proportional selection of 10% of the rural households making a total number of 225 households. Primary data was used for this study. Data were collected by the researcher assisted by trained enumerators using well-structured questionnaires. Objectives of the study were achieved using descriptive statistics such as frequency distribution, percentage, mean and food security index.

Analytical technique

Food security Index

The food security index is based on whether the household is food secure or insecure ($F_i \geq 1$ =food secure household and $F_i < 1$ =food insecure household).

Food security model:

$$F_i = \frac{\text{per capita food expenditure of } i^{\text{th}} \text{ household}}{\frac{2}{3} \text{ mean per capita food expenditure of all household}}$$

Where:

F_i = food security index

Decision Rule:

When $F_i \geq 1$, it implies that i^{th} household is food secure, but when $F_i < 1$, it implies that the i^{th} household is food insecure.

Logit regression index

Socioeconomic factors influencing food security among rural households was achieved using logit regression, both the implicit and the explicit models are specified below

Food security (Y) is a function of $=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, \dots, X_n)$

$$Y = (b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + U)$$

Y = Food security (1 if secure and 0 otherwise)

X_1 = Age (years), X_2 = Household size (number), X_3 = Farming experience (years)

X_4 = Education (years). X_5 = Annual farm income (N), X_6 = Income from other sources (N)

X_7 = Extension contacts (number)

RESULTS AND DISCUSSION

Food security status of the household

Table 1 indicated that the mean per capital expenditure and food security line of the households were N126264.444 and N84176.3 respectively. Also, 31.1% of the household were food secure while 68.9% were food insecure. This implies that larger proportion of the households were food insecure. This is an indication of severe hunger and starvation in the study area. This finding contradicts with that of Owolabi *et al.* (2016) who reported that majority of crop farmers in Kaduna State, Nigeria were food secure.

Table 1: Distribution of respondents according to food security status (n=225)

Variables	Frequency	Percentage
Food secured	70	31.1
Food in secured	155	68.9

Sources: Field survey, 2021

Socioeconomic factors influencing food security

Table 2 revealed that age (-0.0818006) was negatively significant at 10% level of probability, indicating that as households advances in age, their food security reduces. The coefficient of household size (-0.0883087) was negatively significant at 5% level of probability, signifying that increase in household size will their food security increase. This

might be due to the expansion in the size of the households. The coefficient of educational level (0.36731) was positively significant at 5% level of probability, signifying that as literacy increases food security increase. The coefficient of annual income was positively significant at 5% level of probability, showing that increase in income will enhance the food security status of the household.

Table 2: Distribution of respondents according to socioeconomic factors influencing food security (n=225)

Variables	Coefficients	Std. Err	Z-value
Age	-0.0818006	0.0463889	-1.76*
Household size	-0.0883087	0.042063	-2.10**
Farming experience	0.609266	0.3750739	1.62
Education level	0.36731	0.1797006	2.04**
Annual farm income	0.4168275	0.2077937	2.01**
Income from other sources	0.2665	0.283865	0.94
Access to extension	0.4378218	0.4532703	0.97
Constant	3.662307	4.035122	0.91
Log likelihood	-111.53311		
Chi-square	24.92***		
Pseudo R2	21.0%		

Sources: Field survey, 2021

** Significant at 5% level of probability, * = Significant at 10% level of probability,

Constraints affecting household food security

Table 3 showed that insufficient credit (73.3%) was the most serious constraints affecting household food security in the study area. This implies that inadequate access to credit facilities is a serious challenge to food security in the study area. Limited access to farmland (66.7%) was another serious challenge. This has increased over the years due to the activities of herders in the study area. Other serious constraints include poverty (54.7%), and poor nature of soil (56.4%). However, crisis (31.6%) was ranked as the only not serious constraints faced by the households.

Table 3: Constraints affecting household food security (n=225)

Variables	Very serious	Serious	Not serious
Poverty	123 (54.7%)	59 (26.2%)	43 (19.1%)
Poor weather condition	101 (44.9%)	74 (32.9%)	50 (22.2%)
Poor nature of the soil	86 (38.2%)	127 (56.4%)	12 (5.3%)
Limited access to farm land	150 (66.7%)	28 (12.4%)	47 (20.8%)
Insufficient credit	165 (73.3%)	43 (19.1%)	17 (7.5%)
Pest and diseases infestation	127 (56.4%)	12 (5.3%)	86 (38.2%)
Crisis/war	71 (31.6%)	25 (11.1%)	129 (56.9%)

Sources: Field survey, 2021

CONCLUSION AND RECOMMENDATIONS

It can be concluded that most of the respondents are food in secure. The coefficient of age, household size, education and annual farm income had influence on the food security among the rural households in the study area. The most constraints affecting household's food security were insufficient credit, limited access to farmland and poverty. It is recommended that older farmers

should be supported with incentives in order to reduce over-dependents on young farmers for food. Farmers should diversify into other viable enterprises in order to address the problem of food insecurity. Farmers should be provided with credit facilities in order ameliorate the problem of food insecurity in the study area.

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EFFECTS OF PETROLEUM SUBSIDY REMOVAL ON SUSTAINABLE POULTRY VALUE CHAIN IN SOUTHWEST NIGERIA

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ABSTRACT

The paper provides an overview of the structure of sustainable poultry value chains in the face of fuel subsidy removal in Nigeria. Specifically, the study examines the potential short- and long-term impacts of removing fuel subsidy on sustainable poultry value chains in southwest Nigeria. The study used mixed research methods to collect quantitative and qualitative data. Research results showed that the potential short-term impact of removing oil subsidies was skyrocketed input costs, average price of brooding charcoal increased from N2,500 to N3,500 per bag while feeds increased from an average of N6,000 to N8,750 per bag. The cost of vaccines, drugs, poultry feeds and management sky-rocketed by a 200% rise while the price of a crate of egg had 100 percent increase. Low demand enhances undulating prices of day-old chicks from an average of N500 to N150 and N 350 respectively. The same thing to the demands for eggs, broilers, and their prices. Nearly half of respondents reduced the size of their production, while 15% of poultry farms were shut down. The T-test also shows statistical difference between the average cost of input- brooding, vaccines, drugs, poultry feeds, broilers, crate of eggs, and the cost of processing birds at 1% and 5% levels of significance. There was a marginal difference in the cost of day-old-chicks. The sudden reduction in the average number of birds reared from 4, 850 to 2, 670 is a signal of unsustainability in the sector. Over the long term, research suggests a decline in innovation and adaptive capacity and a narrowing of the scope of market opportunities. The study concludes that the long-term impact of removing fuel subsidies on sustainable poultry value chains in Southwest Nigeria will be larger and more widespread than the short-term impact. The study recommends that policymakers take proactive measures to minimize the impact of removing oil subsidies on sustainable poultry value chains.

Keywords: Fuel- subsidy, poultry production, price instability, sustainability, value chains

INTRODUCTION

The poultry value chain is of great importance to the economy of Nigeria. It involves various stakeholders, from input suppliers to consumers, each playing a vital role in ensuring the efficient functioning of the poultry industry. The poultry value chain significantly contributes to the Nigerian economy by providing income and employment opportunities to several stakeholders. This includes input suppliers, farmers, processors, distributors, marketers, and retailers. The revenue generated from poultry-related activities helps boost the Gross Domestic Product (GDP) of the country. For instance, Statista (2023) remarked that the livestock sector (poultry inclusive) contributed 30.57% to the GDP in the first quarter of 2023. The governor of the Central Bank of Nigeria emphasized that the poultry sector is Nigeria's most commercialized agriculture sector, with a net worth of N1.6 trillion in 2019. Poultry products, such as chicken and eggs, are essential sources of protein and vital nutrients. They play a crucial role in improving food security by providing affordable and accessible sources of animal protein (FAO, 2020, Adeyonu *et.al.*, 2021 Elliot, 2022). Poultry products are rich in essential nutrients, including high-quality protein, vitamins, and minerals. Their inclusion in diets contributes to improved nutrition and overall health, particularly among vulnerable populations

such as children and pregnant women (Adeyonu *et.al.*, 2021 Marangoni, *et. al.*). The poultry value chain creates employment opportunities at various levels, from farm workers to processing plant employees, truck drivers, and marketers. The poultry value chain provides a source of livelihood for several stakeholders along the chain, thus, contributing to poverty alleviation, boosting local economy and influencing national economic development. Poultry value chain complements other agricultural activities and contributes to diversifying the agricultural sector. The poultry value chain adds value to raw products through processing and packaging. This adds to the overall economic value of poultry and creates opportunities for businesses and entrepreneurs (Kumar *et.al.*, 2022). The poultry value chain drives research and innovation in areas such as poultry genetics, disease management, feed formulation, and production techniques. These innovations lead to increased productivity and sustainability. The poultry value chain has the potential to attract investment in the form of improved technology, infrastructure, and research, leading to increased productivity and efficiency. This could enhance foreign exchange earnings for the country, help balance trade deficits and bolster foreign reserves.

Despite the significance of the poultry value chain to the Nigerian economy, it is

encumbered with several challenges. Some of the glitches include disease outbreaks, inadequate infrastructure, high cost of feed cost and availability, inefficient supply chain, limited access to technology, inadequate training and extension services, policy and regulatory challenges, security issues, poor market access, and environmental issues (Odemero et al., 2013; Effiong & Umoh, 2016; Awa, et al., 2017; Adeyonu *et al.*, 2021). Recently, these problems have been compounded by the removal of petroleum subsidy by the Federal Government of Nigeria.

Government subsidies could have both positive and negative effects on the economy. On the positive side, according to Mao (2015), subsidies can stimulate firms' new product innovation, especially when they are of moderate intensity, it can help increase the duration of innovation for firms as a whole, particularly when they are at a moderate level, (Clements, 1998). On the negative side, (Clement *et al.*, 1998) affirmed that high-degree subsidies can suppress firms' new product innovation. Furthermore, individual country-specific factors play a significant role in determining government subsidies, suggesting that characteristics such as a small government, a small external current account deficit, and a productive structure geared towards services and agriculture can help keep subsidy expenditures down (Clements, 1998; Ping *et al.* 2020).

The rationale for fuel subsidy removal in Nigeria is based on several factors. According to Oxford Analytica (2023), the enormous cost of fuel subsidies, which amount to around USD 3.9 billion, poses significant opportunity costs for other development objectives. Also, the distribution of resources to state governments is reduced due to these subsidies (Oxford Analytica (2022). Umeji and Eberchukwu. (2021) affirmed that the majority of the subsidy benefits better-off Nigerians, leading to an unequal distribution of resources. From the micro-economist point of view, cheaper petrol encourages pollution, congestion, and climate change. Despite these reasons, there is opposition to petrol subsidy removal because the people believe that the government is corrupt or lacks of capacity to implement compensation programs. Aside from these, a lot of enterprises were affected by the shock of the fuel subsidy removal. Hence, the study is embarked upon to investigate the effects of fuel subsidy removal on the sustainability of the poultry value chain in Nigeria. Specifically, the study aims to examine the potential short- and long-term impacts of removing oil subsidies on; Input supply (drugs, vaccines and feeds), brooding, rearing, processing and marketing of poultry products

METHODOLOGY

The study was carried out in the South Western agro-ecological zone of Nigeria. The area lies between longitudes 2° 31' and 6° 00' E and latitudes 6° 21' and 8° 37' N, with a total land area of 79,665 square kilometres representing approximately 12% of the country's total land area and an estimated population of 32,483,140 representing approximately 20% of the country's population (National Bureau of Statistics, 2012). The zone includes Ogun, Osun, Ekiti, Ondo, Oyo and Lagos States. A multi-stage sampling procedure was used in the study. Three out of six states in southwest Nigeria were randomly selected. The states are Ekiti, Ogun and Oyo states. The poultry farmers in the three states constitute the population for the study. The study used mixed research methods to collect quantitative and qualitative data from the different stakeholders in the poultry value chain. An online instrument was developed and circulated through three opinion leaders to 140 poultry farmers (producers, processors, marketers) from each state, thus a total of 420 poultry farmers were utilised for the study. An on-site visitation to veterinary shops where inputs such as drugs vaccines and poultry feeds are sold was carried out to obtain the past and current costs of the inputs used. Data collected were analysed using frequency counts, and percentages. A T-test was used to determine the mean differences and costs variations before and after fuel subsidy removal of the various segments along the poultry value chain.

RESULTS AND DISCUSSIONS

The result in Figure 1 shows the different aspects of the poultry value chain engaged in and percentages of the farmers involved. They are: layers production (86.1%), broilers production (72.2%), brooding (69.4%); marketing of eggs (44.4%) processing of birds (41.7%), marketing of eggs (44.4%), sales of drugs and vaccines (14%) and processing of birds (12%). The actors combined one or two activities within the value chain, hence we recorded multiple responses. Figure 2 shows that 33.33% of the respondents had less than 500 birds before fuel subsidy removal, 36.67 % of the respondents had between 501 and 5,000 birds, 16.67% had between 5,001 and 10,000 birds. However, 45.3% and 54.7% of the respondents had less than 500 birds and between 501 and 5,000 birds respectively after the removal of fuel subsidy. None of the respondents have above 5,000 birds after the fuel subsidy removal. The average number of birds owned by the farmers dropped from 4, 850 to 2, 670 birds after fuel subsidy removal. The drastic reduction in the number of birds was necessitated by the high cost of feeds (N6,000 to N8,750 per bag), doubled cost of drugs, and brooding materials.

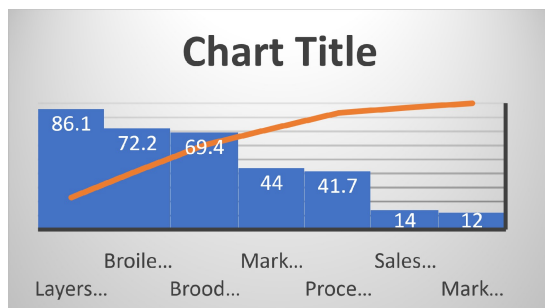


Figure 1: Activities involved in the poultry value chain

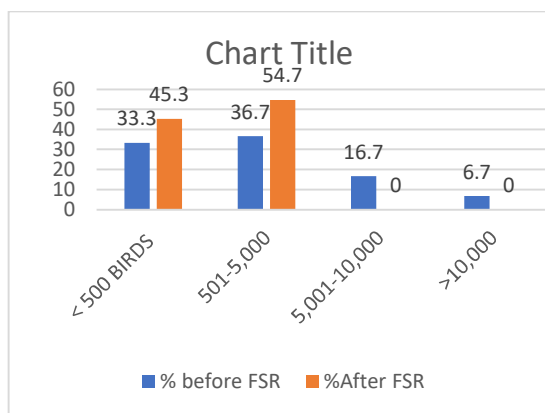


Figure 2: population of birds before and after Subsidy removal

T-test result of the mean difference in input price variation before and after Fuell Subsidy Removal

The result in Table 1 shows the statistical difference between the average cost of inputs before and after the fuel subsidy removal in Nigeria. It was revealed that the removal of the subsidy (i.e. increase in the price of fossil fuel) resulted into a substantial increase in the cost of production in the poultry industry. Most of these variations were significant with the exception to the unit price of Day-o old chicks (DOC) like broilers, day old layers, noilers and cockerels. This could result from

the low demand of day- old chick from existing farms and low entrants into the poultry business that made hatcheries to marginally increase the cost of DOC to ensure continuity in business. A substantial increase in the cost of brooding, table-sized broilers, spent layers and cost of processing were significant at 5 percent level, while the cost of vaccines, drugs, poultry feeds and management sky-rocketed by a 200% rise and significant at 1 percent level. The price of a crate of egg had 100 percent increase and significant at 1 percent level.

Table 1: T-test result of the mean input price variation before and after fuel Subsidy Removal

Products/ Input	Price before fuel subsidy removal N	Price after fuel subsidy removal N	t	Df	Sig (2-tailed)	Mean difference
Day old chicks	355.80	535.55	-1.023	219	0.231	-179.75
Brooding	2330.05	5550.45	-2.381	219	0.022	-3220.4
Vaccines	10034.33	33109.12	-7.213	219	0.001	-23074.79
Drugs	6350.22	18003.50	-7.456	219	0.001	-11653.28
Poultry Feeds	7302.20	21900.34	-9.021	219	0.000	-14598.14
Poultry management	3320.20	9992.90	-7.342	219	0.001	-6672.7
Broilers	5525.05	9459.20	-2.430	219	0.019	-3934.15
A crate of egg	1550.50	3001.05	-6.201	219	0.001	-1450.55
Total Cost of processing broilers	550.12	1450.35	-2.559	219	0.024	-900.23
Total Cost of processing layers	550.12	1450.35	-2.559	219	0.024	-900.23

SUMMARY AND CONCLUSIONS

The study examined the effects of fuel subsidy removal on the poultry value chain in Southwest Nigeria. Specifically, the study investigated the price differential in the value chain before and after the before and after the fuel subsidy removal as well as the size of the farms before and after the removal of fuel subsidy. It utilized a mix method of data gathering from all the actors along the poultry value chain. Findings of the study shows a downward trend in poultry sizes from an average of 4, 850 to 2, 670 birds after fuel subsidy removal. The T-test also shows statistical difference between the average cost of input- brooding, vaccines, drugs, poultry feeds, broilers, crate of eggs, and the cost of processing birds at 1% and 5% levels of significance. It shows that removing fuel subsidies hurts the poultry value chain, leading to higher prices, unprecedented price spikes, and reduced profits. Over the long term, research suggests a decline in innovation and adaptive capacity and a narrowing of the scope of market opportunities. The study concludes that the long-term impact of removing fuel subsidies on sustainable poultry value chains in Southwest Nigeria will be larger and more widespread than the short-term impact. The study recommends that policymakers take proactive measures to minimize the impact of removing oil subsidies on sustainable poultry value chains.

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**EFFECTS OF COVID-19 LOCKDOWN AMONG RURAL FARMERS IN FIKA LOCAL
GOVERNMENT AREA, YOBE STATE NIGERIA**¹Ismaila, H.A., ¹Idrissa, M., ¹Owoade, E.O., ¹Galadima, M and ²Ahmad, Muhammad.¹Department of Agricultural Economics and Extension, Federal University Gashua, Yobe State, Nigeria²Department of Agricultural Economics and Extension, Federal University Dutsinma, Katsina State Nigeria**ABSTRACT**

The COVID-19 pandemic prompted governments worldwide to implement lockdowns and mobility restrictions to contain the virus spread. In response to a rapid rise in COVID-19 cases in Nigeria in March and April 2020, governments in some states imposed lockdowns. While lockdowns may be crucial for disease prevention and control, they also disrupt food systems and economic activity and may have devastating impacts on vulnerable households. This study examines the multifaceted effects of these lockdowns on food security among rural farmers in Fika local government area of Yobe State, Nigeria. As a result of limited mobility and closure of food outlets, restricts people's access to affordable and nutritious food, exacerbating food insecurity. The study uses primary data through the instrument of interview schedule and secondary information through internet sources, journals and books. A two staged random sampling technique was used in the selection of the respondents. Results from the study reveals that majority of the respondents were able to perform their daily required farming activities and only 9% of the respondents receives agricultural support from the government. Also, 15% of the respondent got profit from the sales of their farm product where 6% have enough money from their farming activities and consequently, only 18% of the respondents were able to continue their farming activities after the lockdown. The study hereby recommends that with COVID-19 lockdown, the challenges hampering the attainment of food security in fika local government got deepen. To ensure that the agricultural sector is not further impacted by the distortions caused by COVID-19 lockdown, the government should ensure more palliatives are provided to farmers in the form of improved seed, basic farm implements at highly subsidized prices, and free or more affordable farm extension services.

Keywords: Covid 19, Lockdown, Food Security.**INTRODUCTION**

The COVID-19 pandemic has spread rapidly and extensively around the world since late 2019 and had serious implications for food security and nutrition. The unfolding crisis has affected food systems and threatened people's access to food via multiple dynamics.

The food security and nutrition risks of these dynamics are serious. Already, before the outbreak of the pandemic, according to the most recent State of Food Security and Nutrition report (FAO et al, 2020).

The situation becomes worse with the spread of the disease, causing serious and stringent movement restrictions, which provides rise to farm labor shortages for farm operations and difficulties for transportation of harvested products to markets by farmers (Siche, 2020).

The rural farmers are those involved in farming and completing other related farming activities within the villages. They'll cultivate food crops, mono crop, and rear livestock, engage in finishing and hunting among others, but they depend upon seasonal and natural conditions to hold on their farming activities

The lockdown instituted by the government at the highest of March came as a shock to rural/small-scale farmers in Nigeria. The very fact that movement restrictions were indiscriminately implemented by security operatives across the country meant that majority of farmers couldn't get to their fields. Farmers' access to markets also was severely disrupted. As most rural farmers don't have

storage facilities, that they had to observe their fruits and vegetables spoil, or sell them off for reasonable to unscrupulous middlemen.

Covid-19 lockdown have had profound implication for food security, nutrition and food system, as the lockdown coincided with the planting season of certain crops like groundnut, Bambara nut, beans, millet, sorghum etc. The impact caused by the lockdown include: inability of farmers to market their product, no movement of human material resources, no supply of farm input example fertilizer, agro-chemicals etc. ,inability of marketers to sale stored goods, inability of the movement of animal to market, no support from NGOs example distribution of food stuff to rural folks and all poor individual, sources of income and livelihood we constrained and farmers were unable to go to farm to carry out their farming activities.

From the foregoing, it is imperative to understand the implication of the effect of the lockdown on the general food security of the areas having carry over effect on the livelihood of people of Fika LGA.

The glaring effect of the covid-19 lockdown raises questions to be addressed which include;

1. What are the socioeconomic characteristics of rural farmers in Fika local government?
2. Does the lockdown affect movement of human and material resources thereby having impact on food security?
3. Does the lockdown impede farming activities?

SPECIFIC OBJECTIVES OF THE STUDY

1. To determine the socio-economic characteristics of rural farmers (Respondent) in Fika Local government,
2. Ascertain the effect of lockdown on the movement of human and material resources on food security,
3. Analyze the extent of covid-19 lockdown disruption on farming activities thereby creating food insecurity.

METHODOLOGY

The study was conducted in Fika Local Government area of Yobe state, Nigeria. A two staged sampling procedure was employed to select respondents for this study. In the first stage, eight

wards were randomly selected out of the fifteen wards in the local government while the last or second stage involves a random selection of 120 respondent in order of 8 wards. Data were collected using the interview schedule, and analysed using descriptive statistics (Percentages and Frequencies).

RESULTS AND DISCUSSIONS

Results from the study reveals majority of the respondents are males, and their mean age is 33, this implies that most of the respondents are active young adults. On educational background, 37 and 33% for secondary education and tertiary education respectively and about 39% of them with farming experience.

Table 1. Socioeconomic characteristic

Variables	Frequency	Percent
Sex		
Male	97	81.00
Female	23	19.00
Age		
Mean age	33	
Educational background		
Informal	15	12.50
Primary	20	16.70
Secondary	45	37.50
Tertiary	40	33.30
Farming experience (years)		
10	19	15.83
20	47	39.17
30	30	25.00
40	23	19.17
50	07	0.83

Source: Field survey, 2022

The study revealed that more than half of the respondents move freely during the lockdown

period whereas minority experienced product deterioration.

Table 2. effect of lockdown on the movement of human and material resources

Variables	Frequency	Percent
Moving freely during lockdown	65	54
Going to the farm during lockdown	19	16
Marketing of farm product	18	15
Storing of farm product safely	12	10
Product deterioration	6	5

Source: Field survey, 2022

Furthermore, the study revealed that most of the respondents perform required farming activities and had access to credit facility while few

could not access micro loans during the lockdown period.

Table 3. access to credit facilities during lockdown

Variables	Frequency	Percent
Perform required farming activities during lockdown	78	65.00
Access to agricultural input during lockdown	09	7.00
Support from government	11	9.00
Support from NGOs	15	13.00
Agric /microfinance bank loan	07	6.00

Source: field survey,2022.

RECOMMENDATION

With COVID-19 lockdown, the challenges hampering the attainment of food security in fika local government got deepen. To ensure that the agricultural sector is not further impacted by the distortions caused by COVID-19 lockdown, the government should ensure more palliatives are provided to farmers in the form of improved seed, basic farm implements at highly subsidized prices, and free or more affordable farm extension services.

And also, enlightenment towards loans, getting access to it, importance of using loan to boost farming activities should be provided to farmers with detailed explanations.

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ANALYSIS OF COPING STRATEGIES TO FOOD INSECURITY AMONG FARMING HOUSEHOLDS IN YAGBA EAST LOCAL GOVERNMENT OF KOGI STATE, NIGERIA

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ABSTRACT

The study analysed coping strategies to food insecurity among farming households in Yagba East Local Government of Kogi State. Multi-stage sampling procedure was used to select two hundred and twenty-five (225) rural farming households. Structured questionnaire complimented with interview schedule was used for data collection. Information was garnered on socioeconomic characteristics of farming households, food security status and coping strategies to food insecurity. Data was analysed using frequency, percentage and food security index. The result revealed 77.3% of farming households were male with mean age of 43.8 years. They had mean farming experience of 12.6 years and average mean household members of 7 persons. About 69.9% of the households were food secure. The mean per capital expenditure of the households was N126264.444 while the food security line was N 84176.3. The most coping strategies to food insecurity in the study area were reduced intake of expensive food (93.3%), use savings to buy food (92.9%) and reduction in daily food intake. It is recommended that farming households should diversify into many enterprises in order to address the problem of food shortage in the study area.

Keywords: Coping, strategies, Food security, Rural households

INTRODUCTION

Food insecurity is the inability of an individual or household to meet the required consumption levels in the face of fluctuating production, prices and income as well as poor market and other infrastructure to transport food commodities from producers to consumers (Sidhu *et al.*, 2008). Food insecurity exists when individuals or households lack secure access to sufficient amounts of safe and nutritious food for normal growth and development (Eneyew, 2012). A household is said to be experiencing food insecurity when it is unable to have physical and economic access to food. Food insecurity may occur for rural households' populations because of their inadequacy to produce adequate food lack of purchasing power to take care of their food needs. Baruwa and Adesuyi (2018), defined coping strategy as "all the strategically selected acts that individuals and households in a poor socio-economic position use to restrict their expense or earn some extra income to enable them to pay for the basic necessities (food, clothing, shelter) and not fall too far below their society's level of welfare". According to Abimbola *et al.* (2013), coping strategies are mechanisms through which households or community members meet their relief and recovery needs, and adjust to future disaster related risks by themselves without outside support. Households adopt and develop diversified coping strategies as a response through which people use at the time of decline in food availability. Food insecurity is a serious challenge facing Sub-Saharan Africa inclusive. The effect of food insecurity is mostly common in the Northern part of Nigeria where hunger and starvation are serious menace. Lack of adequate access to nutritious and rich diet foods have also contributed to tropical

diseases and serious challenge in Nigeria. Adoption of coping strategies have been proven to as vital tools used in eradicating food insecurity in Nigeria. It is believe that coping strategies will ameliorate problem associated with lack of access to food diet. The objectives of the study are to: describe socio-economic characteristics of the respondents in the study area, determine food security of rural households, and identify coping strategies to food insecurity.

METHODOLOGY

This study was carried out in Yagba East Local Government Area of Kogi State, Nigeria. Yagba East has 21 Local Government Area with headquarters in Isanlu. The LGA is between Latitude 8° 16'60.00" North and Longitude 5° 49'59.99" East. The Local Government was created in 1991 with an area of 1396 km² and a population of 199,300 by 2016 (NBS, 2017). The people of Yagba East Local government live in various rural villages, major occupation of the people is farming and trading practiced at subsistence level. The soil is viable for growing crops such as yam, maize, cassava, sorghum, cashew, cocoa, oil palm and coffee. Multi-stage sampling technique was adopted for this study. The first stage involved random sampling of six (6) villages in the study area. The second stage involved proportional selection of 10% of the rural households making a total number of 225 households. Primary data was used for this study. Data were collected by the researcher assisted by trained enumerators using well-structured questionnaires. Multistage sampling technique was employed for this study. The first stage involved random sampling of six (6) villages in the study area. The second stage involved proportional selection of 10% of the rural households making a total number

of 225 households. Primary data was used for this study. Data were collected by the researcher assisted by trained enumerators using well-structured questionnaires. Objectives of the study were achieved using descriptive statistics such as frequency distribution, percentage, mean and food security index.

Food security Index

The food security index is based on whether the household is food secure or insecure ($F_i \geq 1$ =food secure household and $F_i < 1$ =food insecure household).

Food security model:

$$F_i = \frac{\text{per capita food expenditure of } i^{\text{th}} \text{ household}}{\frac{2}{3} \text{ mean per capita food expenditure of all household}} \quad (1)$$

Where:

F_i = food security index

Decision Rule:

When $F_i \geq 1$, it implies that i^{th} household is food secure, but when $F_i < 1$, it implies that the i^{th} household is food insecure

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 revealed that 77.3% of the respondents in the study area were male while 22.7% were female. This implies that majority of the household were male. More males might be attributed to involvement of women in domestic activities and may also due to the fact that majority of the households in Nigeria were headed by men. Table 1 showed that the mean age of the respondents was 43.8 years, implying activities and productive age where the respondents tend to engage in productive and viable enterprise in order to reduce food insecurity. This finding agreed with the findings of Tsado *et al.* (2018), who reported majority of rice farmers in Niger State, Nigeria were young farmers Table showed that the mean household size and farming experience were 7 persons and 12.7 years respectively.

Table: 1 Distribution of respondents according to socioeconomic characteristics (n=225)

Variables	Frequency	Percentage	Mean
Sex			
Male	174	77.3	
Female	51	22.7	
Age			
≤30	13	5.8	43.8
31-40	135	60.0	
41-50	56	24.9	
>50	21	9.3	
Household size			
1-5	67	29.8	
6-10	136	60.4	7
11-15	22	9.8	
Farming experience			
≤10	56	24.9	
11-20	134	59.6	12.6
21-30	33	14.7	
>30	2	0.9	
Educational level			
Non formal	23	10.2	
Primary	78	34.7	
Secondary	101	44.9	
Tertiary	23	10.2	

Sources: Field survey, 2021

Food security status

Table 2 revealed that mean per capital expenditure of farming households was N126264.444 while the food security line was N84176.3. Also, 31.1% of the farming households were food secure while 68.9% were food insecure.

This implies that most of the households in the study area were food insecure. This contradicts the findings of Usman *et al.* (2021), who reported that majority of farmers in Niger State of Nigeria were food secure.

Table 2: Distribution of respondents according to food security status (n=225)

Variables	Frequency	Percentage
Food secure	70	31.1
Food in secure	155	68.9

Sources: Field survey, 2021

Food security coping strategies

Table 3 indicated that reduce intake of expensive food (93.3%) was the most strategies to food security. This was followed by use saving to buy (92.9%). This implies that reduction in the intake of expensive food and diverting saving to buy food are the most strategies for curbing food

insecurity in the study area. Other most highly ranked strategies to food security in the study area were reduction in daily food intake (89.3%), reduce the amount of food consumed by the households (85.3%), borrowing money to purchase food (80.8%), and selling of stored farm products to purchase other food item (80.9%).

Table 3: Food security coping strategies (n=225)

Variables	Frequency	Percentage	Ranking
Reduction in daily food intake	201	89.3	3 rd
Sale of livestock	167	74.2	7 th
Borrowing money to purchase food	182	80.8	6 th
Bowing of food from family and friends	129	56.0	8 th
Borrowing money from spouses	98	43.6	10 th
Use saving to buy food	209	92.9	2 nd
Selling of stored farm products to purchase other food items	182	80.9	5 th
Relying on relatives to feed family	37	16.4	11 th
Reduce the amount of food consumed by the households	192	85.3	4 th
Reduce intake of expensive food	210	93.3	1 st
Selling of households' assets	111	49.3	9 th

Sources: Field survey, 2021

CONCLUSION AND RECOMMENDATIONS

It can be concluded that majority of the respondents were male in their active age and with large family size. Also, most of the rural households in the study area were food insecure. The most food coping strategies in the study area were reducing intake of expensive food, use of saving to buy food and reduction in daily food intake. It is recommended that farming households should diversify into many enterprises in order to address the problem of food shortage in the study area. Coping strategies method should be adopted by households in order to address food inadequacy

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EFFECTS OF CONDITIONAL CASH TRANSFER ON RURAL HOUSEHOLDS' FOOD SECURITY STATUS IN SOUTHWESTERN NIGERIA

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ABSTRACT

Despite criticisms labeling Conditional Cash Transfers (CCTs) as short-term wasteful poverty reduction venture, recent studies suggest that these transfers did not only mitigate poverty, but also bolstered rural household food security. This study investigated effects of conditional cash transfers on the food security status of rural households in the Southwestern Nigeria. The objective of the study encompasses household characteristics, participation in CCT activities and food security of rural households. The study employed an extensive six-stage sampling approach to collect data from 242 household beneficiaries and 242 non-beneficiaries of CCTs. Data were analyzed using descriptive and inferential statistic at $p = 0.05$. Result unveiled that 76.4% actively participating in CCT activities. Impressively, 95.0% of beneficiaries achieved food security, while 87.2% of non-beneficiaries remained food insecure. The study identified a significant correlation between beneficiaries' participation in CCT activities and food security ($r = -0.315^{**}$, $p \leq 0.05$) and a statistically significant difference in household food security between beneficiaries and non-beneficiaries ($t = 6.121^*$, $p < 0.05$). The study recommended that to further alleviate poverty and enhance food security, government and relevant stakeholders should consider expanding and improving CCT programmes in the region.

Keywords: Conditional cash transfer; beneficiaries; non-beneficiaries; food security; wellbeing

INTRODUCTION

One of the Sustainable Development Goals, established in 2015, is to end hunger and achieve food security sustainably by 2030. This objective requires enhancing food accessibility and promoting sustainable agriculture. Food security entails ensuring that everyone has the physical and economic means to obtain a sufficient supply of safe and nutritious food, promoting a healthy lifestyle. Food security is a pressing issue, particularly in developing nations, affecting people's health, education, productivity, human rights, and equality (Welteji *et al.*, 2017). Food insecurity is on the rise worldwide, with a significant surge in the African region. Western Africa experienced a substantial increase from 29.6 million in 2014 to 115.7 million in 2020 (FAO, 2021). Food insecurity hampers human capital development, particularly in Nigeria, where millions, especially in rural areas, face economic challenges. To address this issue, the Nigerian government, in partnership with the World Bank, introduced the Conditional Cash Transfer (CCT) program in 2016. The CCT programme aims to provide cash assistance to eligible households, supporting various developmental goals. Its objectives include improving household consumption, healthcare utilization, school enrollment amongst others. Cash transfers can contribute to broader food security initiatives by empowering households to invest in agriculture and in Africa, where food insecurity is a severe concern, these financial injections can have transformative effects. However, there has been little or no assessment on effect of CCT on food security of rural households. Hence, this study. The main objective of the study is to evaluate the effects of CCT on food security of rural households in

Southwestern, Nigeria. The specific objectives of the study are to: determine the household characteristics of the CCT beneficiaries and non-beneficiaries in the study area; ascertain the level of participation of households in CCT activities; evaluate the food security status of household's beneficiaries and non-beneficiaries in the study area.

METHODOLOGY

The study was conducted in Southwestern Nigeria and focused on households registered as beneficiaries and non-beneficiaries of the Conditional Cash Transfer (CCT) programme. The sampling procedure involved a six-stage process. Ekiti, Osun, and Oyo States were purposively selected as pioneer states for CCT in the region. Ten percent of the poorest Local Government Areas (LGAs) in each of these states were then purposively chosen. Within the selected LGAs, two political wards and one community per ward were randomly chosen. A total of 583 respondents (beneficiaries: 242; non-beneficiaries: 283) were randomly selected from the National Poor and Vulnerable Register. Propensity Score Matching was applied to select 242 non-beneficiaries with characteristics homogeneous to the beneficiaries, resulting in a final sample of 484 respondents (beneficiaries: 242; non-beneficiaries: 242). To operationalize participation in CCT activities, a list of seven items was presented, using a three-level scale (high, moderate, and low). Respondents were categorized into low or high participation based on their mean score. Household food insecurity was assessed using a scale adapted from the USAID Household Food Insecurity Access Scale (HFIAS), with nine questions related to anxiety over food quantity and quality in the past four weeks. Scores ranged from 0 for 'No' to 3 for

'Often,' with respondents categorized as food insecure or secure based on the mean score. Data analysis involved descriptive statistics, including percentages, frequencies, mean scores, and standard deviation. Inferential statistics, such as the Pearson product-moment correlation and T-test, were used for analysis

RESULTS AND DISCUSSION

Participation of beneficiaries in CCT activities

Table 1a presents the distribution of beneficiary participation in CCT activities. Using their mean scores, the findings indicate that the top-ranked activities were training in life skills and empowerment programs (2.77 ± 0.53), followed

closely by continuous coaching and mentoring for sustainable livelihood (2.77 ± 0.51), and workshops on health, education, nutrition, and the environment (2.77 ± 0.50). This preference likely stems from beneficiaries' strong interest in achieving sustainable livelihoods. The fourth-ranked activity was local savings groups for raising capital for livelihood (2.76 ± 0.52), possibly reflecting beneficiaries' desire to learn how to save locally for their livelihoods. The result on the level of participation of beneficiaries in CCT activities in Table 1b indicates that a significant majority (76.4%) actively participated. The high participation is expected as it is part of programme's requirements before and during CCT disbursement.

Table 1a: Distribution of household beneficiaries based on participation in CCT activities

ITEMS	High Participation	Moderate participation	Low participation	Mean \pm SD	Rank
Training on life skills and empowerment programmes	200 (82.6)	32(13.2)	10(4.1)	2.77 \pm 0.53	1 st
Continuous coaching and mentoring of the beneficiaries on sustainable livelihood	197(81.4)	35(14.5)	10(4.1)	2.77 \pm 0.51	1 st
Workshop on health, education, nutrition and environment	195(80.6)	38(15.7)	9(3.7)	2.77 \pm 0.50	1 st
Local saving groups for raising capital for livelihoods	193(79.8)	39(16.1)	10(4.1)	2.76 \pm 0.52	4 th
Workshop on household use of transfer	190(78.5)	40(16.5)	12(5.0)	2.74 \pm 0.54	5 th
Training on processing and packaging of agricultural produce and products	173(71.5)	48(19.8)	21(8.7)	2.63 \pm 0.64	6 th
Training and capacity building of farming households on good agricultural practices livelihood support	175(72.3)	45(18.6)	22(9.1)	2.63 \pm 0.65	6 th

Table 1b: Distribution of household beneficiaries by level of participation in CCT activities

Level of participation in CCT activities	Frequency	Percentage	Minimum value	Maximum value	Mean	SD
Low (7.00-19.06)	57	23.6	7.00	21.00	19.07	3.50
High (19.07-21.00)	185	76.4				
Total	242	100				

Level of households' food security

The findings in Table 2 reveal the level of food security among households. The Table reveals that 95% of beneficiaries enjoyed food security, aligning with the study of Haddabi *et al.*, (2019)

where 74.1% of the respondents were food secured. This suggests that the non-beneficiaries struggle to meet food needs due to limited access to CCT and affordability issues.

Table 2: Level of beneficiaries and non-beneficiaries based on food security of households

Level of food security	Beneficiaries		Non-beneficiaries	
	Frequency	Percent	Frequency	Percent
Food insecure (2.00-15.78) (1.00-13.77)	12	5.0	211	87.2
Food secure (15.79-18.00) (13.79-18.00)	230	95.0	31	12.8
Total	242	100	242	100
Mean \pm SD	15.79 \pm 3.19		13.78 \pm 3.86	
Minimum value	2.00		1.00	
Maximum value	18.00		18.00	

Source: Field survey, 2022

Test of relationship between beneficiaries' participation in CCT activities and food security

Correlation analysis on Table 3 shows a significant relationship between participation in CCT activities by beneficiaries and food security status ($r=-0.315^{**}$, $p\leq 0.05$). This suggests that an

increase in their participation in various programs like life skills training, empowerment workshops, health education, nutrition, and environment workshops would lead to enhanced household food security.

Table 3: Correlation analysis between beneficiaries' participation in CCT and food security

Variables	r-value	p-value	Decision
Participation index* food security	0.315**	0.000	S

Source: Data analysis, 2022 r =correlation, p =significant level ($p \leq 0.05$), S- significant

Test of difference between food security of beneficiaries and non-beneficiaries

The t-test in Table 4 reveals a significant difference in food security between beneficiaries and non-beneficiaries ($t=6.121^*$, $p<0.05$). This

implies CCT beneficiaries enjoy better food security than non-beneficiaries. This finding supports CCT's effectiveness, aligning with the study of Adeaga *et al.*, (2020) which showed a similar welfare gap between beneficiaries and non-beneficiaries.

Table 4: Test of difference between food security of CCT beneficiaries and non-beneficiaries in the sampled states

Variables	N	Mean	Standard Deviation	Mean Difference	t-value	Degree of freedom	p-value	Decision
Food security								
Beneficiaries	242	52.20	23.79	4.12	6.121*	483	0.000	S
Non-beneficiaries	242	47.11	19.67					

Source: Data analysis, 2022 *Significant at ($p \leq 0.05$)

CONCLUSION AND RECOMMENDATION

The study indicates that active participation in the program contributes to improved food security outcomes. Also, the program had a positive impact on the food security of beneficiaries. The study recommends that to further alleviate poverty and enhance food security, government and relevant stakeholders should consider expanding and improving CCT programs in the region. This could include increasing the coverage of beneficiaries, revising the conditionalities to ensure they align with the specific needs of the target population, and ensuring timely and reliable disbursement of cash transfers.

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CASSAVA PROCESSORS' TRAINING NEEDS ON SAFETY PRACTICES IN KWARA STATE, NIGERIA

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ABSTRACT

This study assessed the cassava processing training needs on safety practices among processors in Kwara State, Nigeria. A three-stage sampling procedure was used to select 205 cassava processors while interview schedule and focused group discussion were used to collect data. The data were analyzed using descriptive statistics. Pearson correlation was used for the hypotheses. Mean age of the processors was 45 years, majority (89.3%) were female, literates (72.2%), married (68.8%) and mean household of 5 members. Majority (4.53) had positive perception of knowledge in hygienic environment, protective glasses and effluent management. Respondents needed training on adequate salt intake (4.02), use of treated test paper (4.01) and tetanus immunization (3.90) while training methods preferred were demonstration (3.91) and audio-visual methods (3.71). Factor that mostly influenced their training needs was change in technology (4.58) while major constraint faced by the cassava processors was poor extension contact (4.44). Age ($r=-0.333$), size of household ($r=-0.247$), year of schooling ($r=-0.247$), year of processing experience ($r=0.264$), annual income ($r=-0.146$) had negative significant relationship with training needs. Furthermore, regular tetanus immunization ($r = -0.183$), channel of smoke through chimney (-0.120) and regular medical check-up ($r = -0.201$) had negative significant relationship with training needs in safety practices of cassava processors at $p<0.5$. The study concluded that despite the positive perception of knowledge by cassava processors on safety practices, the frequency of practice is low and therefore necessitating training. The study recommended that extension agents should be recruited and equipped by the government and private organizations so as to train the cassava processors on training need identified, the government agencies should enforce environmental pollution laws and ensure strict adherence to other safety rules so as to have a very healthy society.

Keywords: Cassava processing, Training needs, Safety practices, Processors

INTRODUCTION

Cassava (*Manihot spp*) is a popular staple meal in Nigerian families across ethnicities and social classes. The majority of the tubers produced are eaten as traditional meals in the area. Cassava processing is widespread in rural areas, with the crop being the most formalized in the country's Southern and Middle Belt regions (Ehinmowo and Ojo 2014). The International Occupational Hygiene Association (IOHA) defines occupational health and safety (OHS) as the science of anticipating, recognizing, evaluating, and controlling hazards that may arise in or from the workplace and endanger workers' health and well-being, while also considering the potential impact on surrounding communities and the general environment. Any situation of a job that can cause illness or harm is considered an occupational hazard. (ILO, 2020). Omueti, (2004) categorized hazards as physical, mechanical, chemical, biological, environmental, and social hazards; each of these hazards could be detected at various phases of cassava processing while processors are exposed to various hazards at each level. Training entails the acquisition of knowledge and the development of skills or attitudes that will lead to increased competence in the performance of a task (Farinde and Ajayi 2005). According to Mohammed, (2016), recognized training needs must be timely, quantitative, and relevant to the work nature. In this view, the study assessed cassava processing training needs on safety practices among processors in Kwara State, Nigeria.

Specifically, the study objectives were to examine the perceived knowledge level on safety practices, identify the hazards experienced during processing and identify the area of training needs of cassava processors in the study area.

METHODOLOGY

The study area is Kwara state, Nigeria. A three-stage sampling technique was used in the selection of respondents for the study. Stage 1 involved a purposive selection of three (3) ADP Zones from the four ADP Zones that is, Zones B, Zone C & Zone D in the State. Stage 2 involved purposive selections of three (3) Local Governments from the selected ADP Zones, i.e Patigi, Ilorin East and Ekiti Local Governments Areas of Kwara State because of cassava processors preponderance in the Local Government. Stage 3 involved stratified random selection of two (2) circles from a block in Zone B, three (3) circles from two (2) blocks in Zone C and selection of four (4) circles from two (2) blocks in Zone D due to predominance of cassava processors summing up to nine (9) villages. Twenty (20%) of registered cassava processors having forty (40) respondents from Zone B, sixty (60) respondents from Zone C one hundred and five (105) from Zone D making a sum of two hundred and five (205) respondents. This selection was due to sizes of cassava processors in each circle.

Primary data used in this study were obtained through an Interview schedule and Focus Group Discussion (FGD). The members of the target

group of this study were cassava processors in Kwara State. The data collected were analysed using descriptive statistics, which were mainly the frequency, percentages, mean scores and standard deviation for the objectives.

Perceived knowledge level on safety practices on hazards associated with cassava processing

Results from Table 1 reveals that the respondents perceived knowledge level are as ranked in descending order as follow hygienic environment and protective glasses (4.53) ranked 1st, effluent management(4.51) ranked 2nd, working in ventilated area(4.48) ranked 3rd, protective machine handling (4.46) ranked 4th,

home level drying of meals (4.39) ranked 5th, regular medical checkup and protective shoes (4.38) ranked 6th, nose cover (4.32) ranked 7th, protective clothing (4.30) ranked 8th, drying/packageing of peels (4.26) ranked 9th, sufficient water intake(4.23) ranked 10th, close burning of peels to ashes (4.11) ranked 11th, smoke through chimney(4.10) ranked 12th, rubbing oil to scare insects(4.04) ranked 13th, immunization against tetanus(3.81) ranked 14th, dryer to dry meals(3.80) ranked 15th, adequate salt intake (2.95) ranked 16th, use of treated test paper (1.81) ranked 17th. Virtually all the respondents were knowledgeable of the safety practices associated with cassava processing.

Table 1: Perceived knowledge level on Safety Practices on Hazards Associated with Cassava Processing (n= 205)

Variables	VH (%)	H (%)	M (%)	L (%)	VL (%)	Mean score	SD (+)	Rank
Hygienic environment	58.0	40.0	0.5	0.0	1.5	4.53	0.66	1 st
Protective glasses	48.3	42.4	4.4	2.9	2.0	4.53	0.66	1 st
Effluent management	59.5	36.6	2	0.0	2	4.51	0.72	2 nd
Working in ventilated area	58.0	38.0	1.0	0.0	2.9	4.48	0.79	3 rd
Protective machine handling	58.5	33.2	5.4	1.5	1.5	4.46	0.79	4 th
Home level drying of meals	49.8	44.4	3.4	0.0	2.4	4.39	0.77	5 th
Regular medical check up	47.8	45.9	4.4	0.5	1.5	4.38	0.72	6 th
Protective shoes	48.3	45.4	3.9	1.0	1.5	4.38	0.74	6 th
Nose cover	50.2	40.0	5.4	0.5	3.9	4.32	0.91	7 th
Protective clothing	47.5	44.4	5.4	0.5	2	4.30	0.77	8 th
Drying/packageing of peels	40.5	48.3	9.8	0.0	1.5	4.26	0.76	9 th
Sufficient water intake	47.8	37.1	10.7	0.0	4.4	4.23	0.96	10 th
Close burning of peels to ashes	39.0	42.9	10.7	4.9	2.4	4.11	0.95	11 th
Smoke through chimney	35.6	49.3	8.8	2.0	4.4	4.10	0.95	12 th
Rubbing oil to scare insects	32.2	49.8	12.7	1.0	4.4	4.04	0.94	13 th
Immunization against tetanus	42.4	30.2	5.9	9.3	12.2	3.81	1.38	14 th
Dryer to dry meals	16.6	60.0	15.6	2.4	5.4	3.80	0.93	15 th
Adequate salt intake	3.4	25.4	44.9	15.6	10.7	2.95	0.99	16 th
Use of treated test paper	1.0	1.0	10.2	54.1	33.7	1.81	0.96	17 th

Source: Field Survey, 2021

VS= Very Severe, S= Severe, MS= Moderately Severe, SS= Slightly Severe, NS=Not Severe, SD= Standard Deviation

Hazards associated with cassava processing

Results from the Table 2 shows the mean score of hazards experienced in descending order of effect of fatigue (4.50) ranked 1st, environmental pollution (4.49) ranked 2nd, inhalation of smoke and dusts (4.47) ranked 3rd, hydro cyanide exposure (4.45) ranked 4th, insects bite (4.42) ranked 5th, respiratory disorder (4.20) ranked 6th,, back and joint pains (4.18) ranked 7th, heat cramp (4.12) ranked 8th dehydration (3.90) ranked 9th, eye irritation (3.64) ranked 10th, scald and burns (3.14) ranked 11th, cuts and bruises (2.81) ranked 12th which is inevitable in cassava processing, skin irritation (1.8) ranked 13th. The findings is in line

with the study by Adedeji *et al.*, (2011) who reported various occupational hazards in cassava processing to include; excessive heat which could generate heat cramps, heat exhaustion and heat stroke, this in turns leads to income loss due to existing occupational health hazard. Similarly, Oyediran, (2017) also noted that women processors were exposed to chemical, physical and psychosocial hazards during cassava processing activities. It was further noted that lower back pain and other musculoskeletal disorder were the most recurring health issues faced by the processors. On this background, it is imperative to assess various occupational hazard associated with cassava processing activities.

Table 2: Hazards Experienced During Cassava Processing

Variables	VS %	S %	MS %	SS %	NS %	Mean Score	SD (±)	Rank
Fatigue	60.0	30.2	9.8	0.0	0.0	4.50	0.66	1 st
Environmental pollution	52.7	43.9	2.9	0.5	0.0	4.49	0.58	2 nd
Inhalation of smoke and dusts	69.3	11.7	16.1	2.9	0.0	4.47	0.86	3 rd
Hydro cyanide exposure	59.5	29.3	7.3	3.4	0.5	4.45	0.83	4 th
Insects bite	48.3	46.3	5.4	0.0	0.0	4.42	0.59	5 th
Respiratory disorder	1.0	27.8	18.5	15.1	2.4	4.20	4.22	6 th
Back and joint pains	35.1	47.8	17.1	0.0	0.0	4.18	0.70	7 th
Heat cramp	31.2	49.3	19.5	0.0	0.0	4.12	0.70	8 th
Dehydration	27.3	46.8	17.6	6.8	1.5	3.90	0.92	9 th
Eye irritation	6.8	25.9	35.6	28.3	3.4	3.64	0.98	10 th
Scald and burns	10.7	18.0	45.4	25.9	0.0	3.14	0.92	11 th
Cuts and bruises	5.4	14.6	45.4	25.4	9.3	2.81	0.98	12 th
Skin irritation	0.0	5.4	11.7	40.0	42.9	1.8	0.85	13 th

Source: Field Survey, 2021

VS= Very Severe, S= Severe, MS= Moderately Severe, SS= Slightly Severe, NS=Not Severe, SD= Standard Deviation

Areas of training needs in safety practices in cassava processing

Results in Table 3 shows the mean score and standard deviation of cassava processors area of training needs in ascending order of:

Adequate Salt Intake ranked (4.02+0.75) ranked 1st; Treated Test Paper (4.01+0.89) ranked 2nd; Training in Tetanus Immunization (3.90+0.92) ranked 3rd; Cassava Effluent Management (3.85+0.86) ranked 4th; Use of Chimney to Channel Smoke (3.80+0.86) ranked 5th; Regular Medical Check-up (3.47+0.98) ranked 6th; Close Burning of

Peels to Ashes (3.45+0.98) ranked 7th; Rubbing of Oil to Scare Insects (3.41+1.16) ranked 8th; Maintenance of Hygienic Environment (3.40+0.86) ranked 9th; Dryer to Dry Meals (3.31+0.85) ranked 10th; Home Level Drying (2.49+1.03) ranked 11th; Wearing Protective Clothing (2.45+1.30) ranked 12th; Sufficient Water Intake (2.31+0.98) ranked 13th; Protective Shoes (2.26+0.87) ranked 14th; Mouth and nose cover (2.23+0.73) ranked 15th; Drying and Packaging of Peels (1.42+0.59) ranked 16th, Working Under Ventilated Building (1.42+0.59) ranked 17th.

Table 3: Areas of training needs in safety practices in cassava processing

Variables	VI %	I %	M %	I %	UI %	Mean Score	SD (+)	Rank
Adequate salt intake	24.9	56.1	15.1	0.0	3.9	4.02	0.75	1 st
Use of treated test paper	27.8	53.2	15.1	0.0	0.0	4.01	0.89	2 nd
Tetanus immunization	25.4	50.2	13.7	10.2	0.5	3.90	0.92	3 rd
Effluent management	22.0	42.0	35.1	0.0	0.5	3.85	0.86	4 th
Channel smoke through chimney	21	44.4	27.8	5.9	0.5	3.80	0.86	5 th
Regular medical check up	20.5	38.0	35.1	0.0	6.3	3.47	0.98	6 th
Close burning of peels for ashes	18.0	27.8	37.1	0.0	17.1	3.45	0.98	7 th
Rubbing oil to scare insects	21.0	27.8	27.3	19.0	4.9	3.41	1.16	8 th
Hygienic environment	8.8	38.0	38.0	14.6	0.5	3.40	0.86	9 th
Dryer to dry meals	4.4	42.4	33.7	19.0	0.5	3.31	0.85	10 th
Home level drying of meals	0.0	20.0	29.3	30.2	20.5	2.49	1.03	11 th
Protective clothing	10.7	9.8	22.4	27.8	29.3	2.45	1.30	12 th
Sufficient water intake	0.5	13.2	25.4	38.5	22.4	2.31	0.98	13 th
Wearing of protective shoes	0.5	5.9	33.7	39.0	21	2.26	0.87	14 th
Nose protector	0.5	2.9	29.8	53.2	13.7	2.23	0.73	15 th
Drying/packageing of peels	0.5	0.5	0.5	37.6	61.0	1.42	0.59	16 th
Working in a ventilated place	0.0	0.0	4.8	32.7	62.4	1.42	0.59	17 th

Source: Field Survey, 2021

VI= Very important, I= Important, M= Moderate, Slightly Important, UI= unimportant, SD= Standard Deviation

CONCLUSION AND RECOMMENDATIONS

The results shows that the cassava processors level of knowledge of safety practices in processing was high in the study area and were

predisposed to hazards associated with cassava processing at different stages of processing but despite that, their level of practice was low, and these in turn takes toll on their lives, lower their



income and shorten their life expectancy. Areas of training needs were identified as adequate salt intake, use of treated test paper and immunization against tetanus. Based on the study, it is recommended that there should be recruitment and equipment of extension agents by governmental and non-governmental organisations in the state while safety training should be conducted at least twice a year in the identified areas of training needs for cassava processors to improve their abilities, skills and competencies. Also, government agencies should enforce environmental pollution laws and ensure strict adherence to other safety rules so as to have a very healthy society.

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CONSTRAINT INFLUENCING FARMER'S ADOPTION OF NEW AGRICULTURAL TECHNOLOGIES IN KEBBI STATE

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ABSTRACT

The research examined the factors influencing farmer's adoption of new agricultural technologies in Kebbi State, Nigeria. Both multi-stage simple random sampling and purposive sampling techniques were employed for the selection of 120 respondents. Structured questionnaires were used for data collection. Data were analyzed using descriptive statistics involving frequency distribution count, percentages and mean score and ranking. The results showed that the most prominent factors that hinder the adoption of new agricultural technologies by farmers in Kebbi State were poor extension services from change agents, climatic factors, incentives, fear of loss and cost of technologies introduced while factors such as superiority, profitability, simplicity and compatibility of new farming technologies promote its adoption by farmers in the study area. It is recommended that farmers should be educated on the importance of agriculture to economic development. Change agents should be adequately supported. Loans and credits should be made available to farmers at zero interest. Researchers should ensure recent technologies are highly profitable, superior and simple to understand and should be compatible with the existing values, norms, past experiences cultures and needs of farmers.

Keywords: Constraints, Farmers, Agricultural technologies, Adoption, Kebbi State.

INTRODUCTION

Agriculture remains the main stay of greater number of Nigerian populace and still retains its position as the bulk walk upon whose solid foundation of the economy of Nigeria is based. Growth in agriculture has been linked to development in other sectors which invariably contributes to poverty alleviation (Khan, 2015). According to Ladebo (2004) adoption of new farming technologies was found to be dependent on the interaction of a number of factors. The organized delivery of inputs and outputs, provision of technical advices, stable, price and credit for participating farmers are all important determinants of farmers' adoption of new farming technologies Adams (2002). Furthermore, Onyewaku (2011) indicated that profitability and advice from change agents were the major reasons for adoption, while the characteristics of the innovation itself "relative advantage, cost, complexity, visibility, divisibility and compatibility" were found to be the major factors that affected the adoption of any new farming technology. There are many studies on adoption of new agricultural innovations generally in Nigeria but empirical evidence related to factors influencing the adoption of new agricultural innovations in Kebbi state has not been properly documented. The government focuses mainly on introducing new innovations without due consideration of the factors that influence the adoption of same.

Despite the empirical data on the factors affecting adoption of new farming technologies innovation which seems to be alien, not much has been documented on this in Kebbi State. Hence the research study is undertaken to provide possible

panacea to the problem, the following objectives were raised.

1. Determine the socio-economic characteristics of respondents;
2. Identify the selected improved agricultural technologies extended to the farmers.
3. Identify constraints responsible for the farmers poor adoption of new agricultural technologies

METHODOLOGY

The research was conducted in Kebbi State. Kebbi State was created out of the then Sokoto State in 1991. It lies in Northwestern region of Nigeria with its capital in Birnin Kebbi. Kebbi State is bordered by Sokoto to the north and east, Niger to the south. Kebbi State has a total land Area of about 37,698,685 square kilometers. Based on projections from 2006 census figure, Kebbi State is estimated to have a population of 4,629,880 (NPC, 2006). Kebbi State is made up of 21 Local Government Areas (LGAs), four emirate councils and four Agricultural Zones.

Sampling and sampling Techniques

Multi-stage sampling technique was employed for this research. First stage, purposive sampling method was used to select three out of the four agricultural zones. The selection was however, purely due to less research work previously conducted in those zones. Secondly, random sampling method was used to select two local government areas each from the three agricultural zones. Stage three involved random selection of two communities from each selected local government areas to give a total of 12 communities. Fourth stage

Proportionate sampling technique was employed to select 10 farmers from each community. Hence, a total of 120 farmer respondents were used as sample size. Lastly, questionnaire was administered to target respondents using simple random method.

Descriptive statistics were employed in the analysis of the data collected. Descriptive statistics such as frequency distribution tables, percentages, mean, etc. were used to analyze objective 1, 2, and 3.

RESULTS AND DISCUSSION

Table 1 showed the socio-economic characteristics of farmers. Eleven different

parameters such as” Gender, Age, Education, membership of co-operative societies, were analyzed using frequency distribution count. Analysis in the demographic result showed that 56.7 percent of the farmers home work experience of 20 years and above and 22.5 percent have 15 – 19 work experience. Table 1 that majority of farmers in Kebbi State did not receive formal education (30 percent) with 26.7 percent, 13.3 percent and 16.7 percent were able to attain primary, junior and senior secondary education respectively. It is equally on record that 51.7 percent of the farmers belonged to one cooperative group or another while 83.4 percent does not belong to any cooperative society.

Table 1: Distribution of Farmers ‘according to Socio-economic Characteristics

Results	Frequency	Frequency %
Gender		
Male	68	56.7
Female	52	43.3
Age (years)		
Below 25	5	4.2
25 – 34	11	9.2
35 – 44	36	30.0
45 – 54	40	33.3
55 and above	28	23.3
Level of education		
Non – formal education	36	30.0
Primary education	32	26.7
Junior secondary education	16	13.3
Senior secondary education	20	16.7
Tertiary education	8	6.7
Others	8	6.6
Membership of Co-operative		
Yes	62	51.7
No	58	48.3
Farm work Experience		
Below 5 years	4	3.3
5 – 9	12	10.0
10 – 14	9	7.5
15 – 19	27	22.5
20 and above	68	56.7
Total	120	100.0

Source: Field Survey, 2023

Table 2: Frequency Distribution of selected improved Technologies extended to Farmers*

Selected innovation	Frequency	Percentage	Ranking
Fertilizer	70	58.3	1 st
Improved seed varieties	56	46.7	3 rd
Agrochemicals	39	32.5	2 nd
Pest and disease control	43	35.8	5 th
Fish spawning	15	12.5	7 th
Cross breeding of livestock	12	10.0	8 th
Fish rearing	52	43.3	4 th
Snail breeding	00	00.0	9 th
Poultry management	31	25.8	6 th
Total	345		

Source: Field Survey, 2023

Note: *Implies multiple responses

Table 3: Constraints responsible for farmer's poor adoption of new agricultural technologies*

Constraints	Frequency	Relative frequency (%)	Ranking
Fear of loss	83	69.2	3 rd
High cost of new technologies	62	51.7	2 nd
Lack of fund	68	56.7	1 st
Lack of adequate information	76	63.3	4 th
Cultural belief	14	11.7	8 th
Identification problem	97	80.8	6 th
Climatic risk factors	113	94.8	5 th
Lack of government incentive	62	51.7	6 th

Source: Field Survey, 2023

Note: * Implies multiple responses

The results in Table 2 showed that, according to the decision only result demonstration is practiced. It implied poor extension services. So, change agents should be encouraged to step up enlightenment campaigns especially to non-educated respondents in order to address their farming related issues.

Table 3, it is clear that majority of the farmers are constrained with climate risk factors (94.2%), lack of funds (56.7%), high cost of recent technologies (51.7%). It then implied that farmers were affected with many challenges that limited their adoption of agricultural technologies.

CONCLUSION AND RECOMMENDATIONS

From the empirical result, educational level of the farmers, age bracket of active farmers, poor extension services, lack of fund and government incentives were important factors that affected the adoption of improved technologies. Furthermore, superiority, simplicity, compatibility and profitability of technologies triggered farmers interest towards adoption of innovation as well as membership of cooperative group also were contributory to adoption of new farming technologies.

It is recommended that:

1. Level of education and training of farmers should be encouraged. school going children in undertaking any work during school hours.
2. Change agents should be adequately supported to enable them discharge their duties.

3. Loans and credits should be made available to farmers at zero interest.
4. Researchers should insure recent technologies are highly profitable, superior, and simple to understand as well as compatible with the existing values, norms, past experience, cultures and needs of farmers.

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ASSESSMENT OF LAND USE PATTERNS AMONG ARABLE CROP FARMERS IN NORTH CENTRAL STATES, NIGERIA

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ABSTRACT

Intensive use of land for agricultural production is now one of the major sources of agricultural growth in many developing countries. The study assessed the land use pattern among arable crop farmers in North central Nigeria. A multi-stage sampling procedure was used to select 372 arable crop farmers for the study, using questionnaire administration and interview schedule. Data on socio economic characteristics and land use intensity of the farmers were analyzed using descriptive statistics and Ruthenberg value. The pooled results reveal arable crop farmers' mean age, household size and farm size was 41 years, 7 persons per household, and 1.96 ha, respectively. Most of the respondents were male (83.7%), married (81.7%) and had farming as the major occupation (89.5%). Result also show that rice (29.8%), yam (27.7%), cassava (22.3%) and maize (21.5%) were the most dominant crops grown by the farmers. The result of land-use intensity scores indicates an average fallow rotation index of 73.8. The computed nutrient intake index estimated had a mean of 2.15. The study concluded that there was low competition among the crops grown for the available soil nutrient despite the fact that there was low fallow period. The low fallow period was attributed to limited agricultural land. Therefore, farmers are encouraged to practice mixed cropping, intercropping and crop rotation to sustain available nutrient for continuous cropping. In addition, to achieve sustainable land management, appropriate choice of policies, such as enacting laws and development of management plans must be put in place.

Keywords: Land use pattern, Nutrient intake, Crop rotation, Rutenberg value, Land policy

INTRODUCTION

Land is a critical input in agricultural production; the criticality is imposed by its availability, quantity and quality (Oladimeji *et al.*, 2020a). In many agriculture-based poor economies, soil erosion and degradation of agricultural land present a threat to food security. Land degradation which is also seen as a decline in land quality caused by human activities, has been a major global issue since the 20th century and it has remained high on the international agenda in the 21st century (Oladimeji *et al.*, 2020b). It does not only reduces farm productivity affecting livelihood and regional economies, but it also leads to reduced biodiversity and stream sedimentation that affects water quality, storage and marine resources. Land degradation in most developing countries is becoming a major constraint to future growth and development (Reddy, 2003).

However, increase in crop production and productivity cannot be achieved without an attempt to restore depleted land and crop diversification. Diversification is needed to restore the degraded natural resource base or to enhance the value of natural resources. In several instances, cropping systems have been diversified or new cropping systems have been introduced to retain or to enhance the value of natural resources, principally land and water. There is also the claim that diversification tends to stabilise farm income at a higher level. This happens when the pattern of diversification is such as to accommodate more and more rewarding crops (Ojo *et al.*, 2014). Opportunities to diversify as well as increase overall land productivity, is necessary to

develop viable, acceptable, diversified and sustainable cropping systems, which could enhance crop production and productivity by maximizing the utilization of available resources.

The aim of this study is to assess the land use pattern and examine the determinants of arable crop diversification in the study area.

METHODOLOGY

This study was conducted in North Central Nigeria. It has an estimated population of 28.7 million people, at annual growth rate of 3.5% in 2016 (NBS, 2016). It comprises of six states, namely, Benue, Kogi, Kwara, Niger, Nasarawa and Plateau States, and the Federal Capital Territory (FCT), Abuja. The zone occupies a total land area of 296,898 km² representing about 32% of the land area of the country (NBS, 2016). This region produces large quantities of yam, cassava, sweet potatoes, sorghum, maize and rice. Also, cowpea, soybean, groundnut and onion and sugar-cane are produced here. Agriculture employs the larger percentage of the working population in the area, but agricultural landholdings are generally small. The predominant form of crop husbandry in this region is the rain-fed cultivation of annual crops.

A multi-stage random sampling technique comprising a random selection of three states (Benue, Kogi and Niger States) in North-central of Nigeria, also random selection of two agricultural zones from each State making a total of six agricultural zones and two Local Government Areas (LGAs) were randomly selected from each agricultural zone to give a total of twelve LGAs. In

addition, three farming villages were purposively selected from each LGA due to the high rate of land degradation problems, making a total of thirty-six farming villages and lastly a total of 372 arable crop farmers were sampled for the study comprising 120, 122 and 130 arable crops farmers for Benue, Kogi and Niger were used, respectively. Primary data was collected in 2015/2016 cropping season. The analytical tools used include Ruthenberg value land use intensity.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results in Table 1 show that majority of the respondents from the pooled data had a mean age of 41 years. The trend is the same in the three States, showing Benue (75%), Kogi (79.51%) and Niger (61.54%) States, with the mean ages of 38, 40 and 46, years, respectively. This finding implies that farmers were still within the active and economically viable age, which could increase the chance of active involvement in agricultural production and likely to adopt agricultural innovations more than those in higher age brackets in line with study of Oladimeji *et al.* (2020b), on effects of Shiroro dam irrigation farming on livelihood shocks among rural households in Niger state, Nigeria.

The Results in Table 1 also show that majority (84%) of arable crop farmers in the study area were male from the pooled data. The trend is the same for Benue (76%), Kogi (83%) and Niger (92%) States respectively. This indicates that women involvement in farming in the study area was very low in line with Yisa (2013), who affirmed that farming activities are best handled by men because of the tedious nature of farm operations. The results further reveal that majority (82%) of arable crop farmers were married which could lead to increased availability of cheap family labour source as opposed to their unmarried counterparts who may depend solely on hired labour. Results further reveals that pooled mean farm size was 1.96 ha, an indication that the farmers were small size farm holders. This finding is in line with Awoyemi (2009), who reported that most rural farmers in Nigeria cultivate on small scale basis.

Figure 1 shows the distribution of land acquisition of the respondent in the three States, most of the respondents in Benue, Kogi and Niger State acquired their land through inheritance, with Niger State having the highest (66%) which is close to that of Benue (63) and Kogi having the least (55%), the high percentage in Niger State may be as a result of large land area, available for crop production.

Table 1: Dominant indicators of socio-economic characteristics of arable crops farmers by states

Variables		Benue (n = 120) F(%)	Kogi (n = 122) F(%)	Niger (n=130) F(%)	Total (n = 372) F(%)
Age (years)	Mean	38.00	40.00	46.00	41.00
Sex	Male	91 (75.83)	101 (82.79)	120(92.31)	312 (83.87)
	Female	29 (24.17)	21 (17.21)	10(7.69)	60 (16.13)
Marital Status	Single	31 (25.83)	18 (14.75)	7(5.38)	56 (15.05)
	Married	83 (69.17)	98 (80.33)	123(94.62)	304 (81.72)
1st Occupation	Farming	106(88.33)	109(89.34)	118(90.77)	333(89.48)
Household size	Mean	5.00	6.00	11.00	7.00
Farm size	Mean	2.40	1.18	2.27	1.96

Source: Field Survey, 2016

Analysis of crop diversification

The results of crop diversification index in the three States are shown in Table 2. The result shows that Simpson index of crop diversification among surveyed household ranged from 0.06 to 0.10 with a mean of 0.64 from the pooled data, suggesting a shift towards more diversified crop farming. The

trend is the same across the three States respectively. This implies that arable crop farmers undertook one form of crop diversification or the other to avoid risks and uncertainty of low yields among other reasons. The finding is similar to Acharya *et al.* (2011), who reported a mean of 0.61 and 0.55 in their studies.

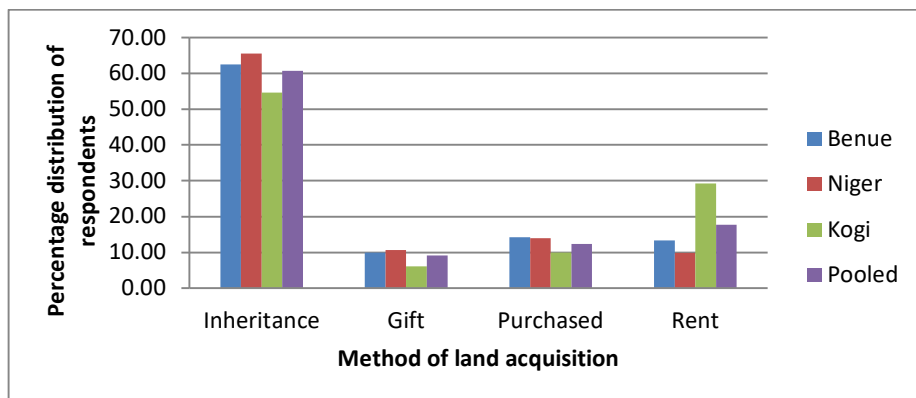


Fig. 1: Distribution of respondents according to method of land acquisition

Analysis of crop diversification

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Table 2: Descriptive Statistic computed for diversification indices across locations

Location	Mean	StDev	Minimum	Maximum
Kogi	0.65	0.06	0.50	0.80
Niger	0.60	0.15	0.00	0.75
Benue	0.67	0.06	0.44	0.75
Pooled	0.64	0.10	0.00	0.75

Source: Field survey, 2016

Assessment of land use pattern and Intensity

The results in Table 3 show distribution of arable crop farmers according to various type of crop enterprise in the area. The results reveal that rice, yam, cassava and maize, were the most dominant crops grown by the farmers from the pooled data. The result is similar to the findings of Lawal *et al.* (2010), who reported that rice, maize, sorghum, yam are the most preferred crop enterprises by farmers in

the study area. The results also show that rice is the dominant and most preferred crop planted as sole crop in the study area accounting for 29.84% from the pooled data. This is same in both Benue and Niger States respectively. This result does not concur to the findings of Amaza (2000), which reported mixed cropping as the dominant cropping system of farmers in Northern Nigeria.

Table 3: Distribution of arable crop farmers according to enterprises undertaken

Crops	Benue State (n = 120) F%	Kogi State (n = 122) F %	Niger (n=130) F%	State	Total (n = 372) F%
Sole crops					
Rice	53(44.17) *	5(4.10) *	53(40.77) *		111(29.84) *
Cassava	75(62.50)	31(25.41)	123(94.62)		83(22.30)
Yam	52(43.33)	27(22.13)	24(18.46)		103(27.69)
Maize	31(25.83)	18(14.91)	32(24.64)		80(21.51)
Sorghum	16(13.33)	17(13.93)	24(18.46)		57(15.32)
Soybean	9(7.50)	7(5.74)	16(12.31)		32(8.60)
Millet	1(0.83)	9(7.74)	7(5.38)		15(4.03)
Cowpea	2(1.67)	10(8.20)	9(6.92)		21(5.65)
Mixed crops					
Maize/Cowpea	15(12.50)	8(6.56)	10(7.69)		33(8.87)
Maize/Cowpea/Sorghum	4(3.33)	-	6(4.62)		10(2.69)
Yam/Maize	18(15.00)	14(11.48)	9(6.92)		41(11.02)
Sorghum/Maize	6(5.00)	3(2.46)	11(8.46)		20(5.38)

Crops	Benue State (n = 120) F%	Kogi State (n = 122) F %	Niger (n=130) F%	State	Total (n = 372) F%
Cassava/Maize	24(20.00)	24(19.67)	3(2.31)		51(13.71)
Soybeans/Maize	12(10.00)	17(13.93)	21(16.15)		50(13.44)
Sole crop as % of total	75.16	65.26	82.76		76.05
Mixed crop as % of total	24.84	34.74	17.24		23.95

Source: computed from field survey data 2016; *Multiple responses

Land use intensity

The study generated land-use intensity scores using Ruthenberg value, the value shows if the length of fallow period is adequate for soils to restore natural fertility. The results in Table 4 show that the land use intensity was very high. Average fallow rotation index for arable farmers in the pooled sample was 73.76, Benue, Kogi and Niger States had values of 69.86, 74.90 and 76.29 respectively indicating that arable farmers observe

low fallow rotation period and continuous cropping. The fallow periods found in the study area could also be attributed limited agricultural land due to population pressure, road construction, and infrastructural development. In a similar vein, Okoruwa *et al.* (2009), reported high frequency (79%) of cultivation on a particular piece of land, due to population pressure and infrastructural activities.

Table 4: Descriptive Statistic of Land use intensity among arable crop farmers

Location	Observation	Mean	Standard deviation	Min	Max
Benue	120	69.86	20.40	42.86	100
Kogi	122	74.90	15.82	50	100
Niger	130	76.29	21.75	33.33	100
Pooled	372	73.76	19.67	33.33	100

Source: Field survey, 2016

Nutrient intake index (NII)

Results in Table 5 show the computed NII across the three States, the results show a mean of 2.15 from the pooled sample. The trend is the same across the three States respectively. Therefore, the distribution of nutrient intake index among the sampled arable farmer indicates low competition among the crops grown for the available soil nutrient. In such a situation the nutrient available is

sufficient, as the crop nutrition is not affected, which would be translated into high crop yield, above sustainable and economic threshold. This finding is in line with Lawal *et al.* (2010), who reported mean nutrient intake index (NII) of 1.89. However, this result is not in conformity with the findings of Udoh (2000), who reported NII of 3.25 among farmers in eastern Nigeria, because of the high cultivation of root/tuber crops in combination.

Table 5: Nutrient Intake Indices of arable crop farmers in Benue, Kogi and Niger States

Location	Mean	Std dev	Min	Max
Benue	2.27	0.41	1.00	3.00
Kogi	2.24	0.51	1.00	3.00
Niger	1.96	0.34	1.00	3.00
Pooled	2.15	0.44	1.00	3.00

Source: Computed from field survey data 2016; Note: Note: ≥ 2.00 = Low nutrient intake; 2.01-2.99 = Moderate nutrient intake & ≤ 3.00 = High nutrient intake

CONCLUSION AND RECOMMENDATIONS

The study concluded that the farmers diversified their crop cultivation as majority of the farmer's planted more than one crop and the intensity of land use was high. The nutrient intake index among the sampled arable farmer indicates low competition among the crops grown for the available soil nutrient which implies the nutrient available is sufficient, as the crop nutrition is not affected, which would be translated into high crop yield, above sustainable and economic threshold. For crop diversification to be more realized among

the arable farmers, there is need for land development through the government and traditional leaders, through their statutory and customary system of land distribution respectively, to enable the farmers expand and cultivate more crops.

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FARMING HOUSEHOLDS' PERCEIVED EFFECTS OF COVID-19 PANDEMIC ON FOOD SECURITY IN KWARA STATE, NIGERIA¹Yusuf, O. J., ²Ekanem, J. T., ³Olanrewaju, K. O., ¹Olatinwo, L. K., ⁴Issa, F. O., ¹Samuel, P. S., ⁵Adebo, G. M.¹Department of Agricultural Economics and Extension Services, Kwara State University²Department of Agricultural Economics and Extension, Akwa Ibom State University³Department of Agricultural Extension and Rural Development, Osun State University⁴National Agricultural Extension & Research Liaison Services, Ahmadu Bello University, Zaria⁵Department of Agricultural Extension and Rural Development, State University**ABSTRACT**

In the context of lockdowns and movement restrictions imposed during the COVID-19 pandemic, this study investigates how farming households in Kwara State perceived the effects of the pandemic on their food security. A multistage sampling technique was employed to select 150 participants from the study area. Data were analyzed using frequency counts, percentages, and weighted mean scores. The study reveals that respondents had low (2.85) knowledge about covid-19 and perceived that the pandemic resulted in increased costs of foods (4.51) while inadequate funds at hand was regarded as the most severe factor influencing the effects of the pandemic on food security (3.59). Rural households characteristically poor socio-economic power precipitates huge impact of the covid-19 pandemic on the food security condition. This underscores the need for increased sensitization about asymptomatic covid-19 cases possibility to the farming households.

Keywords: COVID-19, Lockdowns, Food security, Farming households, Palliatives

INTRODUCTION

The veracity of covid-19 pandemic is evident in the overhauling effects on basic processes for sustaining the global population especially food supply and access in many regions of the world.

The most recent estimates indicate that as many as 161 million additional people experienced chronic undernourishment in 2020 as the pandemic took hold, with the number of people facing chronic hunger rising from an estimated 650 million in 2019 to between 720 and 811 million people in 2020. The number of people facing moderate or severe food insecurity also rose by some 320 million people, with hunger at these levels now facing nearly one in three people (FAO et al., 2021). In the Nigerian context of the pandemic, despite the federal government's directives that vehicles and lorries carrying food, water, and other essential services should be allowed free movement, the corrupt nature of the security agents such as the police, army, civil defense corps, federal road safety corps, and neighborhood watch securities at the various security posts on the federal highways made this largely impossible (Ologele et al., 2023).

These portend direct repercussions on food security as household spending on food normally takes up to 58% of household expenditures, with poorer households spending more than 75% of their resources on food (FAO, 2020). These culminate to affect the food security of Nigerian households through various channels (Baldwin and Weder di Mauro, 2020; Haddad et al., 2020). The differentiation of this at the grassroots would definitely underpin the strategic redress that needs to be in place. Thus, a pointer to the reality of food insecurity in Kwara state, a typical north central state, avails an imperative for immediate response. While general effects are documented as offshoot of the pandemic, localized enquiry of views about the

interaction of the pandemic and grassroots food security scenarios portends germane significance in the body of knowledge. As such, this study examined the knowledge level of the farmers on covid-19 pandemic, determined their perception on the effect of covid-19 pandemic on farming households' food security and examined the constraints to food security in the study area.

METHODOLOGY

The study area is Kwara State, located within the North Central geopolitical zone of Nigeria. Farming households were the target population and a multi-stage sampling procedure was employed for their survey. The first stage involved the random selection of 3 LGAs from Kwara state. The second stage involved the random selection of 10 communities from each of the LGA. In the third stage, 5 farmers were selected from each of the communities to give a total sample size of 150 respondents. An Interview schedule was used for primary data collection. Data collected were summarized using percentages and weighted mean scores.

RESULTS AND DISCUSSION***Knowledge of Farmers about Covid-19***

Results in Table 1 show that most of the farmers were able to correctly affirm that Covid-19 is transmitted by contact with infected people (89.3%), covid-19 infection symptom could include severe and dry cough, sour throat, headache, tiredness, aches and pains (88%) and that wearing of nose mask, washing of hands and keeping a safe distance can reduce the spread of covid-19 (87.7%), while 60% consented that not all covid-19 cases develop severe illness. However, one fifth of the respondents categorically negated that not all covid-19 cases develop severe illness just as another 19.3%

were not sure of this statement. More so, majority also recognized covid-19 as a global pandemic (89.3%) and that it was first discovered in Wuhan, China. These results in agreement with Olapegba *et al.* (2020), indicate that the rural households had basic knowledge of covid-19 origin and global spread as well as the mode of transmission, symptoms and preventive gears. However, the substantial proportion (40%) of the respondents who

were either unsure or wrongly negated the fact that not all covid-19 cases present severe illness as symptom points out a deficiency in the farmers knowledge of covid-19 characterization. while risking infection from asymptomatic covid-19 infected people. This highlights the need for sensitization to clarify the imperative of no discrimination in observation of preventive measures.

Table 1: Knowledge level of farmers about covid-19

Knowledge	Yes true F (%)	Not true F (%)	Not sure F (%)	Ranking
People can be infected with covid-19 by direct contact	137(91.3)	4(2.7)	9(6.0)	1 st
Covid-19 is a world pandemic affecting not just Nigeria	134(89.3)	6(4.0)	10(6.7)	2 nd
Covid-19 is can be contracted from infected person	134(89.3)	5(3.3)	11(7.3)	3 rd
Covid-19 can also be responsible for severe and dry cough, sour throat, headache, tiredness, aches and pains	132(88.0)	3(2.0)	15(10.0)	4 th
Covid-19 was first discovered in Wuhan, China	129(86.0)	8(5.3)	13(8.7)	5 th
Wearing of nose mask, washing of hands and keeping a safe distance can reduce the spread of covid-19	131(87.7)	4(2.7)	16(10.7)	6 th
The corona virus was imported disease from China	127(84.7)	9(6.0)	14(9.3)	7 th
Covid-19 is a viral disease	125(83.3)	1(0.7)	24(16.0)	8 th
Covid-19 be contacted by touching infected surface or and then touching their own mouth, nose or eye	118(78.7)	14(9.3)	18(12.0)	8 th
Not all persons with covid-19 will develop severe illness	90(60%)	31(20%)	29(19.3%)	9 th
It was a political way of making money	38(25%)	94(62%)	18(12.0%)	10 th
Precautionary measures against covid-19 infection is applicable to only adults	25(16%)	107(71.3%)	18(12.0%)	11 th

Source: Field survey, 2022

Perception on the effect of Covid-19 on household food security

Results presented in Table 2 shows the perception on the effect of covid-19 on farming household food security. The highest ranked mean score of 4.51 shows affirmation by most of the respondents that the pandemic resulted in increased cost of food. Also, majority of the respondents indicated that the pandemic reduced the marketability of their own farm produce (WMS=4.50) just as many indicated the pandemic

brought about decline of food accessibility within the household (WMS=4.42). These add up to the point that food stock distribution was perverted and as such the exchange of farm produce through market channels. These equate to the superficial occurrence of scarcity amidst of postharvest wastage on farmers' farm. This agrees with Ologele *et al.* (2023) which states that covid-19 lockdown significantly reduce the amount of nutritious food consumed by people in the study area.

Table 2: Perception on the effect of covid-19 on farming household food sec

Perception	Strongly agree F (%)	Agree F (%)	Undecided F (%)	Disagree F (%)	Strongly Disagree F (%)	Mean	Std	Rank
Pandemic increased food cost	94(62.7)	47(31.3)	2(1.3)	5(3.3)	2(1.3)	4.51	.80	1 st
The pandemic reduced marketability of farm produce	97(64.7)	41(27.3)	4(2.7)	8(5.3)		4.50	.80	2 nd
Food became unaffordable	92(61.3)	46(30.7)	3(2.0)	7(4.7)	2(1.3)	4.46	.97	3 rd
Movement restriction disrupt transportation of farm inputs	82(54.7)	61(40.7)	1(0.7)	6(4)		4.46	.71	4 th
The pandemic brought decline in food accessibility	93(62.0)	44(29.3)	1(0.7)	7(4.7)	5(3.3)	4.42	.79	5 th
The pandemic resulted in food unavailability in households	87(58.0)	51(34.0)	2(1.3)	5(3.3)	5(3.3)	4.40	.86	6 th
Covid-19 disrupts Input access	80(53.3)	57(38.0)	3(2.0)	7(4.7)	3(2.0)	4.36	.89	7 th
Covid-19 reduced income.	89(59.3)	42(28.0)	2(1.3)	6(4)	11(7.3)	4.28	1.1	8 th
Farm labor availability reduce	80(53.3)	49(32.7)	2(1.3)	12(8)	7(4.7)	4.22	.93	9 th

Perception	Strongly agree F (%)	Agree F (%)	Undecided F (%)	Disagree F (%)	Strongly Disagree F (%)	Mean	Std	Rank
The pandemic negatively affected farmers health	58(38.7)	65(43.3)		27(18)		4.03	.89	10 th

Source: Field survey, 2022

Constraints to household food security during the pandemic

Results in Table 3 shows the highest mean score of 3.59 was indicated for inadequate fund for catering for food needs, followed by high cost of labor for agricultural production, high cost of required inputs, incidence of pests and diseases, and poor market linkages with the mean scores of 3.47, 3.46, 3.21 and 3.19, respectively. These results reflect the respondents' indication of their poor food

purchasing power as the most important predisposing factor to covid 19 aggravated food crisis experienced. Furthermore, households' food production prowess was equally constrained by increased cost of inputs and lack of opportunity for marketing harvested food produce. These findings indicate a double-edged loss to farmers as their own food production efforts were largely put to waste while they were unable to access food from other areas due to poor purchasing power.

Table 3: Constraints to household food security during covid-19 pandemic

Factors	Very serious F (%)	Serious F (%)	Moderately serious F (%)	Not serious F (%)	Mean	Std	Rank
Inadequate funds	118(78.7)	5(3.3)	25(16.7)	2(1.3)	3.59	.812	1 st
High cost of labor	109(72.7)	5(3.3)	33(22.0)	3(2.0)	3.47	.902	2 nd
High cost of inputs	107(71.3)	8(5.3)	32(21.3)	3(2.0)	3.46	.894	3 rd
Pests and diseases	80(53.3)	25(16.7)	41(27.3)	4(2.7)	3.21	.936	4 th
Poor market linkages	84(56.0)	15(10.0)	46(30.7)	5(3.3)	3.19	.986	5 th
Lack of fertilizers and agro-chemicals	63(42.0)	34(22.7)	33(22.0)	20(13.3)	2.93	1.085	6 th
Inadequate planting materials	77(51.3)	10(6.7)	33(22.0)	30(20.0)	2.89	1.238	7 th
Inadequate processing facilities	60(40.0)	24(16.0)	45(30.0)	21(14.0)	2.82	1.112	8 th
Untimely access to information	50(33.3)	36(24.0)	51(34.0)	13(8.7)	2.82	.997	9 th
Poor storage facilities	62(41.3)	18(12.0)	27(18.0)	43(28.7)	2.66	1.279	10 th

CONCLUSION AND RECOMMENDATION

The rural households had basic knowledge of covid-19 origin, the global spread transmission mode as well as use of preventive gears. However, many farmers were bereft of sound knowledge about the possibility of asymptomatic covid-19 cases thereby posing potential source of infection risk. More so, predominant views entrench the occurrence of superficial scarcity of required food stock in the rural households in the midst of postharvest wastage of locally produced food stock. It was concluded that rural households characteristically poor socio-economic power precipitates huge impact of the covid-19 pandemic on their food security condition. The study underscores the need for the government and grassroots stakeholders to extend sensitization about the pandemic especially on asymptomatic cases possibility to the farming households. Also, concerted efforts must be made to ensure that palliative measures to provide food item supports for the public should reach the farming households.

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INFORMATION FLOW OF POSTHARVEST LOSSES AND REDUCTION STRATEGIES FOR FOOD SECURITY IN IMO STATE, NIGERIA

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ABSTRACT

This research investigates the information flow concerning postharvest losses of food crops, specifically maize, cassava and yam, and explores strategies for reducing these losses to enhance food security in Imo State, Nigeria. The study employed a survey research design, with a sample size of 96 respondents. The participants comprised food crop farmers and food crop marketers selected through purposive sampling technique. The study revealed that the information flow related to postharvest losses in the region is low, more of informal sources, and therefore lacks proper coordination among key stakeholders. 81.3% of the respondents relied on informal channels such as fellow farmers and local markets for information on postharvest loss reduction strategies. In terms of knowledge about reduction strategies, 56% of respondents demonstrated awareness of methods such as improved storage techniques, postharvest handling practices, and effective transportation systems. However, only 32% of respondents reported adopting improved strategies. Despite this awareness, there is a gap between knowledge and actual implementation. The study recommends enhancing information dissemination in local language through social media networking, print and broadcasting media for food crop farmers, traders, and other stakeholders in the food supply chain. In addition, there should be active involvement of agricultural extension agents to bridge the gap between awareness and practical implementation. Investments in infrastructure, such as improved storage facilities and transportation systems, are also crucial for minimizing postharvest losses and improving food security in the region.

Keywords: Food Security, Postharvest Losses, Information Flow, Imo State

INTRODUCTION

Postharvest losses have been posing a significant threat to food security and economic development in Nigeria. Food security is a multifaceted concept that encompasses availability, accessibility, utilization, and stability of food resources within a population or region (FAO, 2017). The inefficiencies in handling and storing harvested crops create a ripple effect throughout the entire food supply chain, affecting farmers, consumers, and the broader economy. Therefore, mitigating postharvest losses is not only an economic imperative but also a fundamental step toward achieving and maintaining food security in Nigeria.

Previous studies (Cui, & Lawal, 2021; Ogundele, 2022) observed that postharvest losses in Nigeria impact food security due to factors like inadequate storage, poor transportation, and improper handling, affecting the quality and quantity of crops such as maize, yam, plantain, and cassava.

Several other studies (Olayemi & Okoruwa, 2018; Adeola, 2020; Anyaoha, et al., 2023) have emphasized the magnitude of postharvest losses in Nigeria, and their implications on food security. For instance, Olayemi and Okoruwa (2018) highlight the substantial losses experienced in the tomato value chain and the need for efficient postharvest management.

Imo State, situated in the Southeastern region of Nigeria, plays a vital role in the country's agricultural landscape, characterized by production of diverse food crops such as rice, cassava, yam, maize and vegetable among others. Small scale farmers and sellers form the bulk of food crops

production and distribution in Imo State (Ohajianya, Obasi, & Orebiyi, 2006). Despite its agricultural potential, the state grapples with substantial postharvest losses, which hinder efforts to achieve food security and sustainable agricultural development.

While numerous studies (Adeola, 2020; Adelokun, 2023; Opara, 2008) address postharvest losses and reduction strategies among farmers, very few (Opara, 2008) delve into the specifics of how information about these strategies is disseminated, received, and utilized within the local agricultural communities. Lack of awareness, about best practices and innovative technologies for reduction of postharvest losses among small scale food producers and marketers, may be a serious challenge towards reducing post-harvest losses, and by extension food insecurity, particularly in Imo State Nigeria.

Anyaoha et al., (2023) explored postharvest handling practices and losses of cassava in Imo State, providing insights into the various handling techniques adopted by cassava farmers. The study observed that farmers experienced different forms of post-harvest losses at one point or the other. This was attributed to lack of finance, poor storage, pest and disease infection, and inappropriate harvesting time. Adeola (2020a) identified such factors as pest infestation, diseases outbreak, lack of storage facilities, poor handling, harsh weather conditions, inadequate extension services, improper packaging and marketing system, as well as poor policies as major causes of post-harvest losses among vegetable farmers in Mbaitoli Local Government Area in Imo state, Nigeria. Additionally, Adeola (2020b) found that lack of

awareness of good practices and technology was among the factors that constrained post-harvest management practices among rice farmers in Imo State Nigeria. It would therefore be germane to consider the extent of information flow about post-harvest best practices and innovations to and among stakeholders in the food crop supply chain. Access to accurate, timely and reliable information about effective post-harvest management strategies of the diverse food crops would reduce losses and by extension promote food security in the region.

Effective information flow concerning reliable post-harvest management practices to and among food crop producers and distributors is vital for mitigating postharvest losses and promoting food security in Nigeria.

Access to timely and relevant information empowers farmers and stakeholders in making informed decisions regarding postharvest handling, storage, and transportation (FAO, 2017; United Nation Department of Economic and Social Affairs, 2021).

Information dissemination through modern technologies, extension services, and farmer training programs plays a critical role in raising awareness about best practices and innovative technologies to reduce postharvest losses. Integrated information systems facilitate real-time monitoring and decision-making, aiding in minimizing losses and optimizing the supply chain. Opara (2008) emphasized the need for extension agency to regularly identify those sources of information that farmers prefer, or use most, as this will enable them deliver agricultural information effectively to the farmers.

Based on existing literature, there are limited empirical studies on level of information flow and extent of adoption of appropriate postharvest management practices among small-scale food crop farmers and marketers in Imo State. Thus, suggesting a need for more research to fill this gap in knowledge.

Specifically, the study seeks to determine the level of information flow by assessing the level of awareness and knowledge among food crop farmers and marketers regarding postharvest losses and effective reduction strategies, available

channels of information concerning reduction strategies, and adoption rates of effective methods in selected rural communities of Imo State.

METHODOLOGY

The study was a cross-sectional survey, limited to 2 randomly selected rural communities, namely Ndegwu and Mbieri in Imo State, Nigeria. Given that most rural dwellers are homogenous in nature with little variability in terms of the characteristics of the target population, we aim for a small sample size with a power analysis.

We used the following formula for calculating the required sample size.

$$n = (Z^2 \times p \times (1 - p)) / E^2$$

A sample of 96 participants, including food crop farmers and food crop traders, was selected using purposive sampling technique. The selection was based on the major occupation, and only those whose major occupation was either food crop farming or marketing qualified for the study. All the copies were duly filled and returned. A semi-structured questionnaire was used for the quantitative data collection, addressing levels of knowledge and awareness of post-harvest losses and appropriate reduction strategies, and channels of information concerning reduction strategies and as well as rate of adoption of effective post-harvest loss reduction strategies.

RESULTS

Level of information flow

The level of flow of information was measured by the level of awareness and knowledge of postharvest losses and appropriate reduction strategies among the participants, 52.1% demonstrated "Low Level of Information Flow," while only 13.5% showed a "High Level of Information Flow," with 34.4% in the "Moderate Level" category. Awareness and knowledge of methods such as improved storage techniques, postharvest handling practices, and effective transportation systems were examined. This indicates a potential issue with information dissemination or communication within the surveyed population.

Table 1: Distribution of Respondents according to Level of Information

Variables	Frequency	Percentage
High Level of Information Flow	13	13.5
Moderate Level of Information Flow	33	34.4
Low Level of Information flow	50	52.1
Total	96	100.0

Source: Field Survey, 2023

Sources of information

Our study revealed that a significant majority of respondents (81.3%) rely on informal channels such as fellow farmers and local markets for information on postharvest loss reduction

strategies, while formal sources constitute only 18.8%. This indicates a strong reliance on peer-peer communication networks and local interactions for knowledge acquisition in the agricultural community of Imo State, and could be harnessed to

improve the level of information flow and awareness.

Table 2 Sources of Information of Postharvest losses and Management Strategies

Variables	Frequencies	Percentage
Formal Sources	18	18.8
Informal Sources	78	81.3
Total	96	100.0

Source: Field Survey, 2023

Adoption rates of effective reduction strategies

The majority of respondents (52.1%) exhibit a low level of adoption, with only 17.7% showing high adoption rate. About 30.2% indicate moderate level of adoption. This suggests that even with some participants (47.9%) indicating some level of awareness, the actual adoption of

appropriate reduction strategies remains limited. Diffusion theory posits that adoption rates vary among different segments of the population. The early adopters and innovators are often followed by the early and late majority, while some individuals may never adopt the innovation (Rogers, 2003).

Table 3: Adoption Rates of Effective Reduction Strategies

Variables	Frequencies	Percentage
Low Level of Adoption	50	52.1
Moderate Level of Adoption	29	30.2
High Level of Adoption	17	17.7
Total	96	100.0

Source: Field Survey, 2023

DISCUSSION

This study suggests that the level of information flow regarding postharvest losses and appropriate reduction methods is low. This aligns with the study by Adeola (2023) who identified lack of awareness of good practices and technology as one of the constraints to reduction of postharvest losses in Imo State. The moderate level of information flow (34.4%) among respondents regarding postharvest loss reduction strategies suggests a need for improvement in awareness campaigns and training programs. Agricultural extension agents can play a pivotal role in disseminating accurate and comprehensive information by reaching out to small scale farmers and traders to bridge this awareness gap. The high reliance on informal channels (78%) for information on postharvest loss reduction strategies indicates the importance of strengthening these channels for disseminating relevant knowledge. This suggests that efforts should be made to utilize these channels effectively to enhance awareness and understanding of reduction strategies. The low adoption rate (32%) of reduction strategies highlights the need for tailored interventions to encourage farmers and traders to implement improved postharvest handling practices. The low level of adoption of improved strategies agrees with the study by Adeola, (2020) who observed poor handling attitudes among vegetable farmers in Mbaitoli Local Government Area in Imo state.

The low level of information flow and adoption of postharvest loss reduction strategies among food crop farmers and traders in Imo State

indicates that a significant portion of the food produce may go to waste. By improving awareness and adoption of these strategies, more crops can be preserved and brought to the market, leading to increased food availability. Food availability is one of the pillars of food security, alongside food access, utilization, and stability. When food is consistently available, households and communities are better equipped to meet their nutritional needs. As a result, food security is enhanced, and individuals are less vulnerable to hunger and malnutrition.

SUMMARY AND CONCLUSION

The data shows a low level of information flow of postharvest losses and adoption of improved reduction strategies, given that most respondents showed low level of knowledge and awareness. Informal sources dominate as channels of information. The rate of adoption of improved postharvest management practices is primarily low.

This research shows low level of information flow, knowledge, and adoption rates of postharvest loss reduction strategies among food crop farmers and traders in selected communities in Imo State, Nigeria. The reliance on informal channels for information underscores the need to strengthen these avenues to ensure accurate and timely dissemination of knowledge.

RECOMMENDATIONS

Agricultural stakeholders should develop and implement tailored educational initiatives focusing on dissemination of information on postharvest loss reduction strategies, considering the

specific needs and challenges of food crop farmers, and marketers in Imo State. These initiatives should encompass practical demonstrations, workshops, and easy-to-understand informational materials.

Agricultural extension agents should leverage community gatherings, agricultural fairs, or cooperative meetings to disseminate information on postharvest loss reduction. Information should be delivered in local languages to ensure better understanding and accessibility for all community members. The transportation system and infrastructural facilities should be improved to aid easy transportation of farm goods to market centers in Imo State.

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**ACCESS TO CREDIT AMONG SMALLHOLDER FARMERS IN OYO EAST LOCAL
GOVERNMENT AREA OF OYO STATE, NIGERIA**

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ABSTRACT

Smallholder farmers' access to credit and formal financial services significantly limit ability to invest in agricultural activities for productive farm enterprises. The study therefore evaluated access to credit among smallholder farmers in Oyo East Local Government Area of Oyo State, Nigeria. A multistage sampling procedure was used to select 120 respondents. Data were collected through questionnaire and analyzed using percentages, mean, frequencies, Chi square and Regression. Result revealed that mean age was 35±5 years, majority (64.2%) of the respondents were male, Christians (55.8%), married (73.3%), educated (93.3%), had mean household size of 7±5 members and self-employed (65.8%). Majority (70.0%) of the respondents sourced information on agricultural credit through cooperative, more than half (57.5%) had awareness of agricultural credit, majority (90.0%) had favorable dispositions to cooperative bank, applied for loan (91.7%) and received loan (74.2%) from Cooperative and Thrift. The respondents' access to credit was primarily constrained by the location of credit facilities ($\bar{x} = 0.70$). A significant relationship existed between household size ($r=4.267$, $p=0.000$), information sources to credit ($r = -0.668$, $p=0.000$) and Access to credit in the study area. The factors limiting access to credit was significant different ($F=24.528$, $p=0.000$) across the study locations. Terms and condition ($\beta=0.220$) and credit facility location ($\beta=-0.135$) were major predictors of access to credit in the study area. Access to credit was limited by credit facility location and terms and conditions to access the loan.

Keywords: Access to credit, Smallholders' farmers, financial services, Cooperative and Thrift

INTRODUCTION

Agriculture is a vital sector in Nigeria, contributing 22.35 percent to the GDP in the first quarter of 2021, with over 70 percent of the population engaged in subsistence farming (Sasu, 2022). Challenges like rural migration, poor infrastructure, and insufficient input supply hinder agricultural productivity, mainly due to inadequate funding. Access to agricultural credit is crucial to address these issues.

Agricultural credit involves borrowing funds for farming activities and plays a pivotal role in enabling farmers, particularly smallholders, to purchase essential inputs such as seeds, pesticides, and labor (Chen, 2021). Credit availability empowers farmers to scale up production, enhance their quality of life, and positively impact the economy (Mahmood et al., 2009). In Nigeria, individuals have access to formal, semi-formal, and informal sources of credit, but only about 23 percent of adults can access formal financial institutions (Enhancing Financial Innovations and Access, 2012). Small-scale farmers often prefer informal sources due to ease of access and fewer formalities (Mgbakor et al., 2014).

Recent research suggests that limited access to agricultural credit hampers technology adoption among smallholders, primarily due to supply-side factors like limited credit sources, unsuitable financial products, and high borrowing costs (Balana et al., 2022). While addressing supply-side constraints is essential, the behavior and characteristics of smallholders, such as risk aversion and high transaction costs, also influence their decision to take loans (Balana et al., 2022). Agricultural credit eliminates financial constraints

and incentivizes the adoption of new technologies (Mohsin, Ahmad and Anwar, 2011).

Despite government efforts and policies, the problem persists, with reports of credits reaching false farmers and being misused (Nwaeze, 2011). While numerous studies have examined the impacts of limited credit access, this study aims to delve deeper into the factors impeding access, providing empirical evidence to inform policy decisions and empower smallholders to enhance their productivity and livelihoods.

The broad objective of this study is to investigate the access to credit among smallholder farmers. The Specific Objectives of the study are to:

1. Determine the socioeconomic characteristics of the respondents.
2. Identify the information sources to access credit for agricultural enterprise.
3. Determine the respondents' perception to access credit to bankroll the farming enterprise.
4. Ascertain the factors limiting access to credit in the study area.
5. Determine the level of access to credit in the study area.
6. Examine the respondents' level of awareness about agricultural credit.

METHODOLOGY

This study was carried out in Oyo East Local Government Area of Oyo state. The target population of the study comprises all the smallholder farmers in Oyo East Local government area and multi-stage sampling procedure was employed in selecting a total of 120 respondents.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Result shows that majority (96.7%) of the respondents were aged 30 years and above with a mean age of 35±5 years, (64.2%) were male, while 35.8% of them were female, (73.3%) were married, (74.2%) had secondary education, (70.1%) had 6-10 members with mean household size of 7±5 members, and (65.8%) of the respondents were farmers.

Sources of information on agricultural credit

Results on sources of information on agricultural credit shows that majority (70.0%) of

the respondent source information on agricultural credit through cooperative society in the study area. This is followed by mass media (65.0%) and friends and families (60.0%).

Respondents' awareness of Agricultural credit

Result shows that majority (57.5%) of the respondents had high awareness of access to credit while 42.5% of them had low awareness of the scheme in the study area. This is in accordance with the findings of Ajah and Nmadu (2012) that also reported high awareness among farmers in a similar study.

Categorization of respondents' awareness of the scheme

Awareness level	Frequency	Percentage	Minimum	Maximum	Mean
Low (0-6.58)	51	42.5	0	16	6.58±3.2
High (6.57-16)	69	57.5			
Total	120	100.0			

Source: Field survey, 2023

Respondents' disposition towards agricultural loan

Result of disposition towards agric. Loan shows that most of the respondents had more dispositions to cooperative bank (90.0%) and credit groups (81.6%) in the study area.

Factors limiting access to credit

Result shows that based on highest mean, credit facilities location (0.70) was the major factor limiting the respondents' access to credit in the study area. This is followed by terms and condition (0.52).

Respondents' application for credit

Result of respondents' application for loan shows that majority (91.7%) applied for loan while few (8.3%) of them do not apply for loan in the study area. This implies that most of the respondents had applied for credit from cooperatives & thrifts, commercial banks, agricultural banks or friends & family in the study area.

Respondents level of access to credit in the study area

Result shows that more (53.3%) of the respondents had high access to credit while a considerable proportion (46.7%) of them had low access to credit in the study area.

Categorization of respondents' Level of access in the study area

Access level	Frequency	Percentage	Minimum	Maximum	Mean
Low (0-5.77)	56	46.7	0	11	5.77±21
High (5.78-11)	64	53.3			
Total	120	100.0			

Source: Field survey, 2023

Hypotheses testing: Analysis between selected variables and access to credit in the study area

Result on shows that a significant relationship existed between primary occupation ($\chi^2=2.267$, $p=0.025$), household size ($r=4.267$, $p=0.000$), information sources to credit ($r=-0.668$, $p=0.000$) and access to credit in the study area in the study area.

CONCLUSION

The study concluded that, the access to credit is mostly hindered by the terms and conditions to which credits are offered in the study area. The study also reflected that location of the credit facilities was another factor limiting the respondents' access to credit in the study area. Also, the awareness of agricultural credit was revealed to be high and majority of the respondents prefer to

source for loans from informal institutions than more formal institutions.

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FORECASTING SHOCK-INDUCED FOOD PRICES IN NIGERIA USING THE ARIMA MODEL

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ABSTRACT

In this study, we use the Autoregressive Integrated Moving Average (ARIMA) model to forecast food prices from July to December 2023. Data on the price of major food commodities was obtained from the National Bureau of Statistics (NBS) between 2019 and 2023. The ARIMA model estimated using the Box-Jenkins approach showed that the forecasted prices for major food commodities in Nigeria such as maize, beans, and catfish increased by 6.2, 0.97, and 4.1 percent respectively between July and December 2023. We conclude that preparing responses to future shocks in food prices is imperative for achieving national food and nutrition security.

Keywords: COVID-19, Russia-Ukraine war, ARIMA, Box-Jenkins' approach, NBS, FOREX

INTRODUCTION

In recent times, global shocks such as the COVID-19 pandemic, the Russia-Ukraine war, and climate change have adversely affected the living conditions, well-being, and livelihood status of world economies. For instance, food insecurity stands out as a major consequence of these shocks as the Global Food Security Index (GFSI) has continuously nose-dived, especially in developing nations (Zhou, 2019). Hence, the need to attain global food security remains a top priority (FAO, WTO, World Bank, 2023), as it aligns with the second Sustainable Development Goal (SDG) aimed at achieving zero hunger by 2030. Approximately 735 million people were in a state of chronic hunger globally with an estimated 2.4 billion people faced with moderate to severe food insecurity in 2022. Albeit, Asia and Latin America made progress towards reducing hunger between 2021 and 2022, hunger is still on the rise in subregions of Africa, especially Nigeria (FAO, IFAD, UNICEF, WFP & WHO, 2023) where an estimated 25 million Nigerians were projected to be at risk of food insecurity in 2023. This shows a sharp increase from the estimated 17 million figure in 2022.

Furthermore, the residual effects of the COVID-19 pandemic and the outbreak of the Russia-Ukraine war have impacted the agricultural sector, leading to a surge in international and local food prices (Lin *et al.*, 2023). This has strained the importation of food and other agricultural-related inputs and products in Nigeria. Other internal occurrences such as the Boko-Haram insurgency, farmer-herder conflicts, flooding, and more recently, the Naira redesign policy and fuel subsidy removal have led to transportation price hikes and by extension a reduction in local food production in Nigeria. Thus, the lingering effects of these shocks over the past few years have resulted in instability and an increase in the prices of food items. This is not farfetched, as exploring the data released by NBS showed that the headline inflation rate in Nigeria rose from 21.82% in January 2023 to 27.33% in October 2023 while the food inflation rate rose from 24.32% in January 2023 to 31.52% in

October 2023 (NBS, 2023a). Undoubtedly, this rise in food inflation and the headline inflation rates are connected to the increase in prices of food items (NBS, 2023b).

Moreover, to understand the negative impact of the shocks mentioned above on food prices, several econometric models like Autoregressive Moving Average (ARMA), Autoregressive Integrated Moving Average (ARIMA), Seasonal Variations autoregressive Integrated moving average (SARIMA), Autoregressive Conditional heteroskedasticity ARCH), generalized autoregressive conditional heteroskedasticity (GARCH) *inter alia* have been deployed (Sun *et al.*, 2023). Particularly, the ARIMA model has vast applicability in studies focused on oil prices, Gross Domestic Product (GDP), health, and agriculture among others. Arguably, its strength and reliability in forecasting is when there is a paucity of information about the dependent variable to be forecast. Additionally, its strong short-term predictability and clarity have particularly encouraged its use for forecasting future data (Li *et al.*, 2021).

In tandem with the aforementioned, various studies have been conducted to model and forecast time-series data, particularly food prices, using the Auto Regressive Integrated Moving Average (ARIMA) model (Mao *et al.*, 2022; Ndunagu *et al.*, 2022; Ramos *et al.*, 2023). Therefore, it is on this premise that this study examined price-induced shocks on a wider range of food items in Nigeria such as maize, beans, bread, tomato, catfish, rice, sweet potato, palm oil, and wheat as influenced by global and internal shocks.

METHODOLOGY

This study forecasted the prices of major food commodities in Nigeria (sourced from the National Bureau of Statistics) by employing a univariate ARIMA model developed by Box-Jenkins. It requires that the number of sample observations must be at least 50 (Meyler *et al.*, 1998). It is a model which ignores the independent variables before forecasting. Essentially, the

ARIMA model is applicable when there is insufficient information about the dependent variable to be forecasted (Hanke and Wichern, 2005; Roberts, 2006). It combines two different processes viz., Autoregressive (AR) and Moving Average (MA) as well as underscoring the assumption that the dependent variable is correlated with its lags.

The ARIMA model was estimated explicitly as:

$$Y_t = \beta_0 + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \dots + \Phi_p Y_{t-p} + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} + \dots + \theta_q \varepsilon_{t-q} \dots \dots (1)$$

Where Y_{t-1} to Y_{t-p} and ε_{t-1} to ε_{t-q} are the autoregressive and moving average processes respectively;

Φ s and θ s are the coefficients of AR and MA, respectively.

RESULTS AND DISCUSSIONS

This study estimated different ARIMA models for the nine major food commodities. Consequently, in selecting the best model, the

different models were subjected to Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). The ARIMA models estimated for the food items are ARIMA (2,1,4) for maize, ARIMA (7,1,14) for beans, ARIMA (2,1,6) for catfish, ARIMA (1,1,1) for bread and ARIMA (2,1,8) for tomato. In addition, ARIMA (2,1,1), ARIMA (2,1,2), ARIMA (2,1,4) and ARIMA (2,1,6) were estimated for rice, sweet potato, palm oil and wheat, respectively. The results from Tables 1 and 2 showed that the price of maize, beans, catfish, bread, tomato, rice, sweet potato, palm oil, and wheat increased by 6.2, 0.97, 4.1, 7.5, 2.3 4.5, 8.0, 12.1 and 6.7 percent, respectively. Based on the foregoing, it is evident that palm oil experienced the highest price increase, while beans had the lowest price surge. These results align with the findings of Kpodar and Liu (2022); Habanabakize and Dickason-Koekemoer (2021) and Zmami and Ben-Salha (2019) who reported that food inflation and prices increased during the timeframe under consideration.

Table 1: Forecasted Prices for Selected Food Items

Month	Palm oil		Wheat		Maize		Beans		Catfish	
	Forecast	%Δ	forecast	%Δ	forecast	%Δ	Forecast	%Δ	forecast	%Δ
June	1174.199849	-	1380.449	-	388.2507	-	651.1209	-	1694.851	-
July	1287.903121	9.7	1133.56	-17.9	394.84	1.7	657.9814	1.1	1295.411	-23.6
August	1257.566023	7.1	1115.852	-19.2	381.9195	-1.6	633.8355	-2.7	1261.675	-25.5
September	1258.390057	7.2	1407.848	2.0	394.0441	1.5	648.0247	-0.47	1692.753	-0.12
October	1272.116553	8.3	1435.296	4.0	422.1035	8.7	648.6444	-0.38	1724.349	1.7
November	1299.183492	10.6	1448.042	4.9	425.1243	9.5	652.8471	0.27	1736.669	2.5
December	1316.747643	12.1	1472.506	6.7	412.2142	6.2	657.437	0.97	1764.134	4.1

Table 2: Forecasted Prices for Selected Food Items

Month	Bread		Tomato		Rice		Sweet potato	
	Forecast	%Δ	Forecast	%Δ	Forecast	%Δ	forecast	%Δ
June	593.5604	-	547.282495	-	839.839	-	318.5303381	-
July	607.9337	2.4	548.468287	0.22	812.9118	-3.2	346.0227218	8.6
August	613.6891	3.4	532.044229	-2.8	787.7737	-6.2	328.9959815	3.3
September	619.8827	4.4	688.970934	25.9	794.8046	-5.4	330.5821532	3.8
October	625.9666	5.5	704.856721	28.8	801.8853	-4.5	336.3883435	5.6
November	632.1733	6.5	557.525816	1.9	809.8635	-3.6	340.4301947	6.9
December	638.233	7.5	559.680103	2.3	877.843	4.5	344.0720254	8.0

CONCLUSION

The findings from this study revealed that prices of major food commodities in Nigeria will continue to increase unless urgent and drastic actions are taken by the government and other key actors of the economy. Therefore, this study recommends that to curtail food prices from further soaring, investments in resilient and highly productive food systems are of utmost importance. Infrastructural development along the agriculture value chains, policies that enhance trade, and market-led approaches are imperative for price stabilization of food commodities in the present, near, and distant futures.

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EVALUATION OF GENDER DIFFERENTIALS IN THE FORMAL EDUCATIONAL STATUS OF ARABLE CROP FARMERS IN OYO STATE, NIGERIA

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ABSTRACT

This study evaluated the gender differentials in the formal educational status of crop farmers in Oyo State. Gender norms and patterns are rigid and very often put women in disadvantaged positions relative to men, limiting women's equal access to certain opportunities in the society. Women, in particular, constitute a significant proportion of unpaid workers in agricultural enterprises, and suffer a very low educational status as compared to men resulting from their poor access to educational opportunities. The study evaluated the gender differentials in the formal educational status of Arable crop farmers in Oyo State. Specifically, the study described socio-economic characteristics of the respondents, identified various crops grown, examined the differences in the educational attainment and investigated the factors that affected the educational status of the respondents. Multistage sampling technique was adopted in selecting 160 respondents from three local government areas of Oyo State. Data were collected using structured interview schedule. Descriptive statistics (frequency count, percentage, and mean) and inferential statistics (Chow F-test, PPMC and T-test) were also used. The finding revealed that the mean age of male and female crop farmers were 45 and 46 years respectively. Similarly male (82.5%) and female (77.5%) were into crop farming. The mean years of experience for both respondents were 11 years. The mean years of schooling of the respondents were found to be 7.61 and 4.80 years respectively. The result of PPMC showed that there was no significant ($P=0.005$) difference between some of selected factors affecting educational status of the respondents. The result of t-test showed that there was a significant ($P=0.40$) difference between the perceived level of severity of factors affecting educational attainment among the respondents. The study concluded that the level of literacy among the male respondents were relatively higher than their female counterparts. It is recommended that formal adult education should be introduced to parents so as to enlighten and sensitize them not to be indifferent in dealing with their children's education irrespective of their gender.

Keywords: Evaluation, Gender differentials, Education Status, and Arable farmers,

INTRODUCTION

In Nigeria and, indeed, other part of the world, agriculture is one of the economic sectors that play multiple roles. Apart from crude oil, it is one of the major contributors to the Gross Domestic Product (GDP). One of the major important agricultural subsectors is agricultural extension services. It is very important because it is charged with the responsibility of transferring agricultural technologies from the developers to the farmers-male or female, literate or illiterate, young or old. Gender relations change over time and vary across different societies. In most societies, women are likely to work longer hours than men, have lower earnings, education, wealth and access to credit, information and knowledge. Indeed, even within the household, men and women can experience poverty differently (Olawoye, 1994). According to Quisumbing (2003), gender refers to the social differences that are learned, changeable overtime and has wide variations within and between cultures. In Nigeria, it seems myths about rural women's roles and contribution still persist while cultural constraints in many Nigerian communities and the economic roles of rural women continue to be invisible or at best viewed as an extension of their domestic roles until very recently and little definite effect were made to evolve policies that will increase rural women's access to education training,

credit, land resources etc necessary for incorporating them into the real main stream of rural development (Aishatu, 2002). Rural societies are not homogenous, but are differentiated along socio-economic lines. In developing countries, education has role to play which has been variously viewed from different perspectives (Egun, 2009).

The main focus of this study was to evaluate gender differentials in the formal educational status of arable crop farmers in Oyo-State, Nigeria while the specific objectives are to: describe the socio-economic characteristic of the male and female crop farmers in the study area; investigate the factors that contributed to educational status of male and female respondents in the study area.

Research Hypothesis: Ho: There is no significant relationship between the factors affecting the educational status of among male and female respondents and their years of schooling.

METHODOLOGY

The study was conducted in Oyo state with its capital at Ibadan. It is one of the states in the south-western geopolitical zone of Nigeria. Multistage sampling procedure was used to select respondents for the study. The first stage involved the simple random sampling of 50% of the four agricultural zones of Oyo State, i.e. Ibadan Ibarapa

and Oyo were selected for this study. The second stage involved the purposive selection of three Local government areas from the selected agricultural zones. i.e. Ibadan/Ibarapa- Akinyele, Lagelu and Ibarapa North Oyo – Surulere, Ogo-Oluwa and Orire. The third stage involved the selection of 25% of the villages in each of the selected local government and 5% of the registered crop farmers in the selected villages. At last stage involved simple random selection of 80 male and 80 female respondents from 1632 male and 1630 female registered crop farmers in the selected agricultural zones giving a total number of 160 respondents in all.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows the distribution of crop farmers according to their socio-economic characteristics. About 45.0 percent of the male respondents were between age range of 41-50 years. About 35.0 percent of the female respondents were between age range of 31-40 years. The mean age of male and female respondents was found to be 44.5 and 45 years. This implies that the respondents generally were still in their active and productive ages. Also, 31.2 percent of the male respondents had

between 1-6 years of schooling, while female respondents, about 46.3 percent had no formal education. The result implies that the level of literacy among men was relatively higher than the women given difference in their mean years of schooling which was 7.61 and 4.80 respectively. The reasons that could be adduced for this situation as given by Agu (2007) included the demand for girls as domestic helps, teenage marriage, teenage pregnancy and cost of education since government pays only the tuition component of their fees. Aderigbagbe (2004) and Agu (2007) argued further that the policy document guiding women education in Nigeria remains flimsy and the policy makers are predominantly men. Majority (87.4%) of the male farmers were married, while 76.2 per cent of the females were married. This implies that a greater proportion of the male (87.4%) and female (76.2%) farmers were married but the distribution of the marital status indicated that it is relatively easier to find female farmers who are separated, divorced or widowed but single men were slightly more than single women in the study area. This agrees with the finding of Ajah (2013) that male farmers tend to marry more than one wife (polygamy) or re-marry if there in any problem resulting in the divorce or death of their wives.

Table 1: Distribution of respondents by socio-economic characteristics N=80

Socio-economic characteristics	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Household size				
1-5	51	63.8	44	55.0
6-10	27	33.8	36	45.0
Above 10	2	2.4	-	-
Religion				
Christianity	38	47.5	42	52.5
Islam	34	42.5	32	40.0
Traditional	8	10.0	6	7.5
Primary occupation				
Farming	66	82.5	62	77.5
Trading	4	5.0	11	13.7
Artisan	2	2.5	7	8.75
Civil service	8	10.0	-	-
Secondary Occupation				
Farming	38	47.5	38	47.5
Trading	20	25.0	31	38.8
Artisan	22	27.5	11	13.7
Farm size(Ha)				
≤2	26	32.5	55	68.8
3-6	43	53.8	25	31.2
>6	11	13.7	-	-
Years of Experience				
< 10	36	45.0	51	63.8
11-20	23	28.8	21	26.2
>20	21	26.2	8	10.0
Means of land acquisition				
Purchase	59	73.75	61	76.25
Inheritance	21	26.25	19	23.75
Membership of social org				

Socio-economic characteristics	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Yes	64	80.0	66	82.5
No	16	20.0	14	17.5
	80	100.0	80	100.0

Source: Field Survey, 2014

Categorization of level of severity of factors affecting educational level of respondents.

The result of data analysis in Table 2 shows the distribution of male and female respondents based on the level of severity of factors affecting their educational level. The result revealed that among the male respondents, about 36.2 percent indicated that the factors had moderate level of severity, 33.8 percent believed the factors has a high

level of severity while the remaining 30.0 percentage indicated a low level of severity. Among the female respondents, about 43.8 percent indicated that the factors had a moderate level of severity, 41.2 percent indicated a high level of severity while 15.0 percent indicated a low level of severity. This implies that the effects of these factors on the respondents' educational level are generally moderate.

Table 2: Categorization of level of severity of factors affecting educational level

Category	Male				Female			
	Frequency	Percentage	Mean	SD	Frequency	Percentage	Mean	SD
High	27	33.8			33	41.2		
Moderate	29	36.2	2.57	0.26	35	43.8	2.65	0.22
Low	24	30.0			12	15.0		

Source: Field Survey, 2014

($\bar{x} \pm 1SD$) \bar{x} = mean, SD=standard deviation

mean (\bar{x}) = Male (2.57) and Female (2.65)

Standard (S.D) = Male (0.026) and Female (0.22)

Categorization is based on $\bar{x} \pm 1S$

Table3: Relationship between socio-economic Factors affecting educational qualification among male respondents and their years of schooling

Factors affecting	Correlation Coefficient	p-value	Remark
Poor health status of rural household	-0.324***	0.003	S
Most rural children have to raise family income	-0.322***	0.003	S
Inability of parent to pay school fees	-0.293***	0.008	S
Literacy of parent	-0.254**	0.023	S
Most rural children have no access to scholarship /bursary	-0.451***	0.000	S

Source: Field survey, 2014

2- tailed level of significance **; significant at 5% level, ***: significant at 1% level

There is no significant relationship between the factors affecting educational status and years of schooling of female respondents.

The data in Table 3 shows the relationship between factors affecting the educational status of the female respondents and their years of schooling. The result of Pearson Product Moment Correlation (PPMC) shows that poor access to educational materials ($r = -0.265^{**}$), rural children trek long distance ($r = -0.383^{***}$), most rural children have to work to raise family income ($r = -0.458^{***}$), inability of parents to pay school fees ($r = 0.225^{**}$),

parents prefer their children to learn artisan than formal education ($r = -0.368^{***}$), early marriage/ teenage pregnancy ($r = -0.383^{***}$) had decisive effect on respondents years of schooling. Similarly, the negative value of r meets the apriori expectation, since the factors under consideration are negative. The result suggests that if more educational materials are made available and accessible to rural girls, it will serve as a motivation for them to acquire more education. Based on the result of these findings, the null hypothesis is therefore rejected and alternate hypothesis was accepted.

Table 4: Significance difference between factors affecting educational status among male and female respondents.

T-Test Analysis

Paired variables	Mean difference	t-value	P. value	Result	Decision
Male	2.57	2.087	0.040	Significant	Reject H ₀
Female	2.65				

Source: Field survey, 2014

The null hypothesis specifies that male farmers have access to formal education than their female counterpart and that the variation in their access was only due to a random effect. The generalized likelihood ratio result shows that variation existed among the farmers in the study area. The test used was the t-ratio test and was conducted at $\alpha = 0.05$ given a degree of freedom 98 for the respondent respectively. Therefore, if parents redirect their preference towards education rather than for their female children to learn artisan the more years such female children will be able to invest in schooling. Moreover, if rural girls in their young age categories are brought together to form a group and different enlightening programmes are organized to educate them on the importance of education it will reduce the peer pressure that makes them to lose focus on their educational pursuit. Lastly, as teenage pregnancy and teenage marriage reduces, among rural girls, they will be able to acquire more education with little or no distraction.

CONCLUSION AND RECOMMENDATION

Based on the findings from the study, the following conclusions were drawn. The respondents were still in their active and reproductive age. The study indicated that farming is the major occupation of the people in the study area. It was revealed that female respondent had as much as years of experience with their male counterpart. The study also concluded that the level of literacy among male respondents was relatively higher than female and also concluded that the male respondents have access to more lands than their female counterparts. It was concluded that there is significant relationship between the socio-economic characteristics of the respondents and their educational status. Finally, the study also concluded that there is significant relationship between factors affecting the educational status and year of schooling of both male and female crop farmers.

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PERCEIVED EFFECT OF COVID-19 PANDEMIC ON GENDER ROLES AMONG MAIZE FARMERS IN IDO LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA¹Odebode, S. O., ²Adetunji, T. A. and ²Adeniyi, R. T.¹Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Nigeria²Department of Agricultural Economics and Extension, Ajayi Crowther University, Oyo, Nigeria**ABSTRACT**

The study investigated the perceived effects of the COVID-19 pandemic on gender role among Maize Farmers in Ido Local Government Area of Oyo State, Nigeria. A multistage sampling procedure was used for 120 respondents. Data on respondents' socioeconomic characteristics, perceived effect of COVID-19 in maize production, and perceived effect of gender roles and constraints of the farmers were collected using an interview schedule; and analyzed using percentages, frequency, Pearson Moment Correlation, and T-test at $\alpha_{0.05}$. The result showed that most of the respondents were male (73.0%) with a mean age of 42.0 ± 10.0 years. Both genders were engaged in fertilizer application (100.0%) and maize processing (100.0%). Respondents perceived the effect of COVID-19 on gender roles was the diversification of livelihood (67.5%); favourable for 67.5%. A significant relationship existed between respondents' age ($r=-0.244$), monthly income ($r=-0.236$), and the perceived effect of COVID-19 on respondents' gender roles in maize production. However, a significant difference existed ($F=7.166$) in the perceived effect of COVID-19 among male and female maize farmers in the study area. In conclusion, the gender role mitigated the effects of the pandemic on maize production; hence, respondents should hold on to their gender role in the production of maize to cope with emergencies.

Keywords: Perception, Effect, Pandemic, Covid-19, Maize farmers**INTRODUCTION**

Agriculture has been a main source of livelihood and economic development in Nigeria, contributing about 23 percent to the GDP and supplying about 70 percent of the labour force. also, it However, the national development from the agricultural sector was obstructed during the coronavirus (COVID-19) pandemic which globally disrupts human lives and economic activities, including the rearing of animals and cultivation of crops. The rapid global effects of the pandemic made millions of people vulnerable to food insecurity and malnutrition (OECD, 2020)

The incidence resulted in rural households losing up to 33 % of their incomes at the farm gates due to restriction of movement. Studies have shown that cassava and Maize are crops mainly grown by subsistence farmers and has enhanced the food and nutrition security of rural household (ATBU,2022). The choice to cultivate the crops might be due to their ability to be intercropped; which comes with a lot of benefits for both male and female farmers. However, for the successful production of Maize by rural households, males and females have to be efficient in playing their roles that are informed by the level of their access to and control over the scarce resources of production (Amah, et al. 2020). Hence it becomes necessary to investigate the perceived effect of covid-19 pandemic on gender roles among Maize Farmers in Ido Local Government Area of Oyo State, Nigeria with the following objectives:

1. Determine the socio-economic characteristics of the respondents in the study area
2. Ascertain the specific roles of men and women in maize cultivation in the study area

3. Investigate the perceived effect of covid-19 pandemic on gender roles of maize cultivation in the study area

The hypothesis for this study was to test the significant relationship between the socio-economic characteristics of the respondents and the perceived effect of covid-19 pandemic on gender roles, and to test the significant differences in the perceived effect of covid-19 among male and female respondents in the study area.

METHODOLOGY

The study area for this study was Ido Local Government Area of Oyo state with the study population been all Maize farmers in the study area. The Local government comprised of aten wards and the basic occupation of the people is farming, especially the cultivation of arable crops such as maize and rice. A multistage sampling procedure was used to select respondents for this study. At stage one, simple random sampling technique was used to select 40% of the 10 wards in the study area to give four wards; (Aba Emo/Ilaju/Alako; Bakate/Idi-Aya; Apete/Ayegun/Awotan; and Omi Adio/Omi Onigbagbo). The second stage involved the simple random selection of three villages in each ward. The third stage involved the generation of Maize farmers' list in each of the selected villages; while the fourth stage involved the systematic random selection of 10 Maize farmers in the selected villages giving the sample size of 120 respondents. Data collected with a structured questionnaire using an interview schedule was analysed using descriptive (Percentage, Mean, Rank; t-test), and inferential statistics (Pearson Product Moment correlation; PPMC) at α 0.05.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The result in Table 1 indicates that most of the respondents were female (60.8%) who had monthly (93%) contact with extension agents with mean age and income of 42±10 years and 40,000±10,000 respectively. This implies that most

of the respondents who engaged in maize production in the study area were female which could be due to the easy way of cultivating Maize; while the result of monthly contact with extension agents indicates that extension service delivery is active in the study area

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage	Mean	SD
Age			42	10
26-35	34	28.3		
36-45	38	31.7		
46-55	28	23.3		
56-65	20	16.7		
Sex				
Male	47	39.2		
Female	73	60.8		
Monthly income			40,000	10,000
20,000-30,000	30	25.0		
30,001-40,001	46	38.3		
40,002-50,002	42	35.0		
50,003-60,000	2	1.7		
Contact with an extension agent				
Yearly	2	1.7		
Monthly	112	93.3		
Weekly	6	5.0		

Source: Field survey, 2021

Specific roles of men and women in maize cultivation

Results in Table 2 show that all (100.0%) of the respondents were engaged in fertilizer

application, weeding, harvesting and maize processing respectively. However, most of the respondents were least involved in stumping (35.8%).

Table 2: Specific roles of men and women in maize cultivation

Gender role	Male	Rank	Female	Rank
Land clearing	63.8	9 th	60.3	9 th
Bush burning	10.6	14 th	11.0	14 th
Stumping	21.3	12 th	34.2	11 th
Harrowing	38.3	11 th	15.1	13 th
Ridge making	21.3	12 th	45.2	10 th
Planting	100.0	1 st	95.5	7 th
Fertilizer application	100.0	1 st	100.0	1 st
Thinning	97.9	7 th	100.0	1 st
Supplying	97.9	7 th	100.0	1 st
Weeding	100.0	1 st	95.9	6 th
Harvesting	100.0	1 st	100.0	1 st
Marketing	100.0	1 st	94.5	8 th
Maize processing	100.0	1 st	100.0	1 st

Perceived effect of the covid-19 pandemic on gender roles of maize farmers

Table 3 shows that most of the respondents were able to diversify into other things during COVID-19 (67.5%), with men being involved in maize cultivation than women (64.2%). Further

result in Table 3 shows that most (67.5%) of the respondents felt the effect of covid-19 pandemic on gender. This means that the majority of the respondents are favourable to the statements that covid-19 pandemic hurt their gender roles in the study area. (Amah, Paul and Adah, 2020)

Table 5: Perceived effect of covid-19 pandemic on gender roles of maize farmers

Gender roles of maize farmers	Percentage	Rank
I was able to diversify into other things during Covid 19	67.5	1 st
The COVID-19 pandemic has more involvement of males than female	64.2	2 nd
I spent less time on the farm during the Covid	50.8	3 rd
I get more involved in social activities than maize cultivation	9.2	10 th
I was able to market my maize produce during the COVID-19 pandemic	6.7	11 th
I spend more time with my family more than before	5.8	12 th
Level	%	
Negative	32.5	
Positive	67.5	

Source: Field survey, 2021

Pearson correlation result between selected socio-economic characteristics of respondents and the perceived effect of the COVID-19 pandemic on gender roles

Table 5 shows that a significant relationship exists between respondents' age (r=

0.244), monthly income (r=-0.236), and the perceived effect of covid-19 pandemic on gender roles in the study area. This implies that respondents' age and monthly income influenced the perceived effect of the COVID-19 pandemic on gender roles in the study area.

Table 6: Relationship between the selected socioeconomic characteristics and the perceived effect of covid-19 pandemic on gender roles in Maize production

Variables	r-value
Age	-0.244*
Household size	0.018
Monthly income	-0.236*

Source: Field Survey, 2021

*P ≤0.05 level

t-test result of significant difference in the perceived effect of COVID-19 among male and female maize farmers

Result in Table 6 show that a significant difference exists (F=7.166) in the perceived effect of COVID-

19 among male and female maize farmers in the study area. This implies that the way male and female respondents perceived the effect of COVID-19 differs in the study area.

Table 7: t-test result of significant difference in the perceived effect of COVID-19 among male and female maize farmers

	N	Mean	Std. Deviation	F	P-value	Decision
Male	47	3.5532	1.09958	7.166	0.008	S
Female	73	4.1644	0.86625			

Source: Field survey, 2021

CONCLUSIONS AND RECOMMENDATIONS

Characteristics like age and income are inversely proportional to the perceived effect of covid-19 pandemic on the gender roles in maize production. Men formed the larger population proportion of Maize cultivators in the study area. Despite the different perceptions and diverse roles played by males and females during the pandemic, both genders were mostly involved in post-planting operations in maize farming. The study recommends that the respondents should form a cooperative group for joint marketing of Maize, pooling together resources for better funding of their enterprise and bulk purchase of farm input especially during the emergency period. Also, the extension activities and intervention policies from the government for maize farmers should focus on improving farmers' knowledge of strategies to mediate the negative

effects of covid-19 pandemic on maize production and the coping mechanisms needed during emergencies

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Evaluation of the Impact of the Coronavirus (COVID-19) on Fruit and Vegetables Trade, 31 March 2020, TAD/CA/FVS/WD (2020)

DETERMINANTS OF MIGRANTS' LIVELIHOOD SECURITY IN OGUN STATE, NIGERIA¹Mustapha, B. I., ¹Adejumo, A. A., ¹Yekinni, O. T., and ²Taiwo, A. O.¹Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria²Department of, Oyo State College of Agriculture and Technology, Igbo-ora, Oyo State, Nigeria**ABSTRACT**

Migrants in rural areas face multifaceted challenges in the midst of which they engage in a range of activities to secure their livelihood. This study examined the determinants of migrants' livelihood security in rural areas in Ogun State. A multi-stage sampling procedure was used to obtain data from 129 respondents using a well-structured interview schedule. Data were gathered on socio-economic characteristics, perceived livelihood activities, livelihood asset, livelihood abilities, and livelihood security. Data were analyzed using frequency count, percentages and linear regression. Results showed that the mean age was 40 years, majority (60.5%) were male, (38.8%) had spent between 1 to 9 years in the community, (81.4%) were members of a social group and 40.3% had left their home community between 12 to 22 years. A high percentage (81.4%) migrated due to improved employment opportunities, 58.8% were involved in food crop production while 51.2% of the respondents had high livelihood assets. More than half (51.2%) had less secure livelihood security. Length of stay in the community ($\beta = 0.193$), livelihood activities engaged in ($\beta = 0.248$), and livelihood assets ($\beta = 0.454$) determined respondents' livelihood security. Migrants' length of stay in the community, livelihood activities engaged in, and livelihood assets acquired influenced respondents' livelihood security. The study therefore recommends that migrants should be involved in more than one livelihood activities and also stay longer in their host community to better secure their livelihood.

Keywords: Livelihood security, migrants, livelihood assets, livelihood activities

INTRODUCTION

In the past, agriculture was known to be the mainstay of Nigeria's economy. However, the emergence of oil exploration and production in the Niger-Delta region has resulted in a shift from the agricultural sector. Consequently, rural infrastructure was abandoned while more investments were stationed at the urban centres. Despite this, agriculture still provides a means of livelihood for about 65%-70% of Nigeria's population and is the major driver of the non-oil sector of the economy by contributing about one-third of the annual economic growth (Ethem and Udoh, 2018).

Traditionally, Nigeria's rural economy is agrarian but in recent times only a few rural households derive income exclusively from farming as a result of the influx of abled young men and women from rural areas to urban areas in search of white-collar jobs which has drastically reduced the rural population and make labour increasingly scarce (Ethem and Udoh, 2018).

This leaves agriculture in the hands of the aged farmers thereby constraining the expansion of the agricultural sector which has a negative implication on food security considering that Nigeria agriculture is still labour intensive and characterised by the use of primitive tools which makes it less efficient and productive as ageing sets in among these farmers.

To cater for the deficit of manpower in the rural areas, it has been observed that migrants from cross border nations like Benin Republic, Togo, and Niger Republic and even within Nigeria migrate from their host nations or communities to the rural areas. A study of rural-rural migration by Agbonlahor & Philip (2015) revealed that the

migration to the rural areas in Southwest Nigeria is mostly influenced by the availability of farmland since crop farming and farm labour constitute the major livelihood of the migrant.

These migrants are often faced with various challenges ranging from access to services, language barriers and access to land because of the dominance of land owners who control the right to land. In the midst of these challenges, migrants still engage in a range of on-farm and off farm activities to secure and meet their basic needs. Against the background of the significance of migrants in sustaining the growth, preventing jeopardy in the agricultural sector and to ensure food security in the Nation, this paper will be assessing the determinants of migrants' livelihood security in Ogun State. The hypothesis tested stated that selected independent variables are not a significant determinant of the livelihood security of the migrants.

METHODOLOGY

The study was carried out in Ogun State. A multi stage sampling procedure was used to sample 129 migrants in the study area. Primary data was collected through the use of a structured questionnaire and interview schedule. Descriptive statistics involving the use of frequency, percentage and mean score were used while the hypothesis was tested using linear regression analysis.

RESULTS AND DISCUSSIONS

The results of the study revealed that 38% of the migrants are between 29-39 years, the mean age was 40 years, which presents them as agile and able-bodied and are in their productive ages. The result is in line with the reports of Oyesola and Ademola (2011) who reported that the majority of

the labour force in rural areas of Southwest Nigeria were of ages between 20–55 years. This is expected to have a positive effect on their livelihood activities which in turn affect their livelihood security. Majority (60.5%) were male, (38.8%) had spent between 1 and 9 years in the community, (81.4%) were members of a social group and 40.3% had left their home community between 12 to 22 years ago. A high percentage (81.4%) migrated in search of improved employment opportunities while about half of them (55.0%) earned between 39553-59105 Naira monthly while the mean monthly income was 57282.9 Naira. This reveals that the majority of the migrants earn above the ₦30,000 minimum wage despite living in the rural area. This result is in line with the findings that revealed that a larger percentage of migrants are male and earn above Nigeria minimum wages which indicates that migration has a positive effect on migrants' standard of living (Popoola et al., 2017). Also, most of the migrants have stayed above 6 years (79.8%) in the study area.

The on-farm activities engaged in by the respondents are food crop production, livestock production and cash crop production with each having a percentage of 58.8%, 47.3% and 38%

respectively. For the off-farm and non-farm category, 46.5% were involved in livestock production while 27.1% were involved in trading. However, food crop production and livestock production were the dominant activities involved in both dry and wet seasons. This implies that less attention is drawn towards exploring other opportunities that exist in the rural areas. This result agrees with Adesugba and Mavrotas (2016) that the majority of those living in the rural areas are engaged either directly or indirectly in agriculture.

Majority (88.4%) of the respondents have access to land, 72.1% have access to farmland while only 22.5% of them owned the land. This shows that the migrants have access to land either for agricultural activities or non-agricultural activities. This result conforms to the findings of Popoola et al., (2018) that reveals that good access to land is one of the major considerations for choosing a destination area by migrants. 69.8% of the migrants were members of religious groups while only a few of them belong to other groups. 72.9% have access to education, however a large proportion 69.8% lack access to loans. The result on Table 1 shows that about half (54.3%) of the respondents have low livelihood assets.

Table 1: Distribution of level of livelihood asset of respondent

Assets	Freq.	Percentage	Minimum	Maximum	Mean	SD
Low (2.14-10.8548)	70	54.3	2.14	18.47	10.8548	3.28154
High (10.8548-18.47)	59	45.7				
Total	129	100				

Six different livelihood outcomes were assessed and presented in Table 2 to present the index scores for different aspects of livelihood security. Food security, educational security and habitat security of the respondents are moderately high in that they have the composite index of a value slightly above the midpoint index score in the scale of one to five. Food security could be related to the fact that the respondents live in an agriculturally based community and are mostly engaged in agricultural activities all year round. This is contrary to the findings of Matemilola & Elegbede, (2017) that the majority of rural households are food insecure, Obayelu et al. (2021) emphasised that engaging primarily in farming increases the probability of households being food insecure in Nigeria. The migrants' educational security result could be associated with the availability of schools

in the study area and the literacy level of the migrants since the majority of them can read and write. Notwithstanding, the values of overall habitat security index which show the migrants are moderately secure, a higher percentage of the migrants are vulnerable to diseases and their living condition is bad.

The table also shows that the migrants are economically, socially and health wise vulnerable. This is obvious from the composite index score of their economic security, health security and social network security which is lower than the midpoint index score in the scale of one to five.

The categorisation of the livelihood security of the migrants into two ranges using means for stratification revealed that more than half (51.2%) had a low/ less secure livelihood security.

Table 2: Aggregate mean score of each livelihood outcomes/indicators

Livelihood outcomes/Indicators	Indices
Food Security	3.20
Economic Security	2.15
Health security	2.83
Educational security	3.75
Habitat security	3.03
Social network security	2.90

Overall LS security 2.98

From the results on table 3, length of stay in the community, livelihood activities engaged in and livelihood assets were found to be significant and hence influenced the livelihood security of the migrants. Age and income were however found not to be significant. The length of stay of the migrants was significant at 5% with a positive coefficient of ($\beta = 0.193$), this implies that an increase in the migrants' length of stay in the community will increase the probability of their livelihood security of the migrant. Likewise, livelihood activities and livelihood assets were significant at 1% with a

positive coefficient of $\beta = 0.248$ and $\beta = 0.454$ respectively implying that an increase in the livelihood activities and livelihood asset of the migrants will increase the probability of the livelihood security of the migrants in the study area. This result conforms to the findings of Gautam & Jha, (2023); Syafrial et al., (2022) that livelihood security is influenced by various factors such as livelihood activities, access to livelihood capitals, social assets, and sustainable land management practices.

Table 3: Regression Results of the Determinants of Livelihood Security

Variables	Beta	t-value	Sig
Constant		10.262	0.000
Age	-0.118	-1.160	0.248
Length of stay in the community	0.193	2.133	0.035*
Income	0.149	1.644	0.103
Livelihood activities	0.248	2.764	0.007*
Livelihood assets	0.454	3.805	0.000*

CONCLUSION AND RECOMMENDATIONS

The study revealed that migrants in the study area are male that migrated to seek better employment, earning above the monthly minimum wage, have spent substantial years in the host community and are involved in agricultural activities. They have moderate food security, education security and habitat security. Also, their livelihood activities, livelihood assets and length of stay in the host community were the main determinant of livelihood security therefore, these variables should be targeted for improvement in order to further increase the livelihood security of the migrants'. Based on the findings of this study, the following recommendations were made:

Migrants should be encouraged to venture into different activities; off farm and non-farm activities during the off season, stay longer or permanently in their host community for them to be accepted and integrated into the community also, non-members of cooperative societies should join and actively participate.

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ANALYSIS OF CONFLICT RESOLUTION MECHANISMS BETWEEN CROP FARMERS AND HERDERS IN KATSINA STATE, NIGERIA.

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ABSTRACT

The study was conducted in Katsina state with the broad objective of analysing conflict resolution mechanisms between crop farmers and herders in Katsina State, Nigeria. Specific objectives are to identify causes of conflicts and the resolution mechanisms, and, examine the institutions involved in the management each of the conflicts. Purposive and snowball sampling procedures were adopted to obtain a sample size of 126 respondents. Data were gathered with the aid of structured interview schedule and focus group discussion conducted with separate groups of herders and farmers. Results of the findings indicated that 75% of the cattle herders had no formal education. Crop damage by cattle, encroachment of cattle routes and inadequate grazing reserves were the major causes of the conflict. Traditional rulers and *Miyetti Allah* Cattle Breeders Association of Nigeria (MACBAN) were found to be very effective in handling farmer-herder conflicts in the study area. The study recommended survey, demarcation, beaconing and gazette of the government owned grazing reserves and cattle routes, and amending the land use policy to reflect existing reality.

Keywords: Conflict, Resolution Mechanism, Crop Farmers, Herder, Katsina State

INTRODUCTION

Conflicts in the Sahel between farmers and herders are recurrent and increasingly becoming more complex politically and economically. One major problem confronting world peace today is the manifestation of conflicts in different dimensions across the globe (Gaye, 2018). This involves periods of violent herder conflagration over settled farmers and the conversion of pastoral lands to cultivation. These current levels of conflict that occur in some locations across Nigeria are significantly intolerable for farmers, herders and also for the environment. Nigeria has experienced and is still experiencing conflicts of grave proportions among several ethnic and religious communities across the states. These conflicts significantly vary in dimension, process and the groups involved. Adisa, (2012) observed that the farmers-herdsmen conflict has remained the most preponderant resource-use conflict in Nigeria. Pastoralists usually graze over areas outside farm lands, and these have been accepted to be the norm from time immemorial. Their movements are opportunistic and follow pasture and water resources in a pattern that varies seasonally or year-to-year according to availability of resources (FAO, 2011).

According to Abbas (2009), a study of major sources of conflicts between the Fulani pastoralists, and farmers shows that struggles over the control of economically viable lands cause more tensions and violent conflicts among communities.

Social and economic factors continue to provoke violent conflicts among the Fulani pastoralists and farmers especially over access to farmland and cattle route (*labi*). These conflicts have constituted serious threats to the means of survival and livelihoods of both the farmers and pastoralists and what both groups are tenaciously protecting. (Abbas, 2009). The intensity and variations of the conflicts largely depend on the nature and type of the user groups where the pastoralists graze. Historical tensions between Nigeria's pastoralist Fulani and settled indigenous farmers have intensified in recent years, with dwindling natural resources and land unavailability greatly contributing to the ongoing, escalating conflict in the country (Okello *et al.*, 2014). The increasing number of reports of violence at this occupational boundary makes understanding herder-farmer conflicts an urgent task. There is need to know not just why friction begins, but also why and how conflicts unfold, articulate with religious, ethnic, and political conditions (Morizt, 2010). The competition between these two agricultural land user-groups has often times turned into serious overt and covert hostilities and social friction in many parts of Nigeria (Adisa, 2012).

Adisa and Adekunle (2010) reported that the link between agriculture and conflict has still not received sufficient analysis and discussion considering the incessant and widespread of herdsmen-farmers' conflict across various States of Nigeria, especially Katsina State. Also, the scenarios

of evolving complex dimensions characterized by massacre of lives and the use of sophisticated and dangerous weapons. The broad task here is to analyse some of the factors responsible for the conflict in Katsina State, Nigeria. The specific objectives were to describe socio-economic characteristics of the conflict actors in the study area, ascertain the perceived causes of conflicts, and, examine the conflict resolution mechanisms to managing this conflict between crop farmers and cattle herders in Katsina State, Nigeria.

METHODOLOGY

The study was carried out in Katsina state, North-western Nigeria. The state has 34 Local Government Areas with total land area of 24,971 square kilometers with estimated population of 7,783,781 (unfpa.org, 2018). The state shares common boundaries with Niger Republic, Zamfara, Kaduna Kano and Jigawa States. Sudan savannah is the main vegetation type in the state. Due to its arable land, crops are grown all year round including irrigated agriculture along river banks and the several dams developed by the State and Federal governments. Crops grown include cotton, groundnut, cowpea, millet, sorghum, maize, rice, wheat and vegetables. Livestock reared include cattle, sheep, goats and poultry which provide food for human consumption with potentials of providing raw materials for industries. Katsina is predominantly a Muslim community. Fulani and Hausa are the main ethnic groups in the state. However, there is considerable number of Fulani cattle herders, whose males rear livestock, while the females hawk locally prepared fermented milk in towns and villages.

The target populations for this study are the cattle herders and crop farmers. Purposive sampling was used to select the respondents of this study. Also, snowball method is used by identifying one respondent that helps the researcher to identify the others and focus group discussion was used for the study. In all, 126 respondents were selected for enumeration by use of structured interview. Data for the study were collected in 2018- 2019.

RESULTS AND DISCUSSIONS

The study revealed that 95.2% of the sampled farmers are male and while all the cattle herders are males. This result seems to be consistent with the findings by Adisa (2012) that all respondent herdsman were males. Also, majority of the respondents were within the age range of 40-49 years for crop farmers (41.3%) and 30-39 years for the herdsman (39.7%), respectively. The study further reveals that half 50.8% of the farmers had formal education in contrast to about two-thirds (74.6%) of cattle herders who had none. The result also shows that, majority of both the farmers (82.5%) and herders (54%) have been living in the area for more than 16 years. About 54% of the farmers do not have farm size of more than 1 hectare. The implication is an increase in the tendency of the farmers to encroach more land reserves and cattle tracts, thereby creating room for conflict.

Causes of the Farmer-Herder Conflict

Result from the analysis shows that crop damage by cattle was perceived to be an immediate cause having scored a total mean of 4.5; this is followed by encroachment of cattle routes (total mean=4.0) which is also an immediate cause. Inadequate grazing reserves is also an immediate need as perceived by the respondents (Total weighted mean=4.6), even though the farmers' mean score was lower (mean=4.3) than the herders' (mean=4.9) because the later are directly affected. Pollution of water points, (total weighted mean=3.0) was regarded as a remote cause. Indiscriminate bush burning was regarded as a remote cause (Total mean =3.4). The farmers (mean=2.6), however, does not seem to see it as such. This is because, according to a herder in one of the villages in Kaita local government during a focus group discussion, "*the farmers burn the trees, cut and burn the shrubs within their farms during the dry season just with the full intention to starve our cattle, and this is provocative*"

Table 1: Rating of causes of farmer-herder conflict

Conflict Causes	Farmers	Herders	Total	Overall perception
Crops damage by cattle	4.8	4.2	4.5	Immediate Cause
Encroachment of cattle routes	3.1	4.9	4.0	Immediate Cause
Inadequate grazing reserves	4.3	4.9	4.6	Immediate Cause
Lack of access to water points	2.7	3.3	3.0	Remote Cause
Killing of stray cattle	1.8	3.8	2.8	Not a cause
Pollution of water points	2.7	3.2	3.0	Remote Cause
Indiscriminate Bush Burning	2.6	4.2	3.4	Remote Cause
Banditry	3.7	3.6	3.7	Remote Cause
Cattle Rustling	3.7	3.5	3.6	Remote Cause
Land Tenure	4.0	3.4	3.7	Remote Cause
Change in Climate Conditions	3.5	3.3	3.4	Remote Cause
Family Problem	2.8	3.6	3.2	Remote Cause

Conflict Causes	Farmers	Herders	Total	Overall perception
Financial Problem	3.5	2.7	3.1	Remote Cause
Perceived Hatred	2.8	2.7	2.7	Not a cause

Institutions and involved in managing and resolving farmer-herder conflict

Result from the study indicates that about 63% of the respondents acknowledged involvement of Miyetti Allah Cattle Breeders Association of Nigeria (MACBAN) in conflict management and resolution in the area. This was followed by Government committees (48.4%) which are ad-hoc committees set up to resolve issues to do with the conflict as they arise. It usually comprises of representative from the state government, local government, representative each from the Emirate council, the district council, the police, the representative from secretariats, representative each from farmers' association, Miyetti Allah Cattle Breeders Association and the immigration, customs, police and sometimes the military. From the result, the involvement of the courts according to all the respondents seems to be very minimal (26.2%) as indicated by both the farmers (23.8%) and the herders (28.6%). Conflict, in most cases were been resolved by the institutions mentioned earlier.

Performance of Institutions Involved in Resolving Farmers-Herders' Conflict

Result from the studies also assessed the institutions' performance in managing the conflict based on the weighted mean score. Findings from the research shows that a significant number of the farmers (Mean=2.2) and herders (Mean=1.7) indicates that the police institution is inefficient having scored a total weighted mean of 2.0, which is far below the cut-off point. This shows that the police have not been efficient in the way they handle the conflict. The efficiency level of the traditional rulers was also investigated. The result reveals a total mean score of 3.5, which means that the traditional rulers are more efficient in managing the conflict. This may be attributed to the closeness between the traditional rulers and the masses. It may also be as a result of the fact that the traditional rulers are part of the farmers and can therefore be affected if measures are not taken. The study further reveals that, Miyetti Allah (MACBAN) are more efficient in managing the conflict having recorded a total mean of 3.2. This was agreed by both farmers (mean=3.3) and the herders (mean=3.5). It can be inferred from this that the nomadic leaders are capable of managing the conflict. This may likely be because they are directly involved in the conflict being among the herders' ethnic group and can speak and understand their language and culture. Data in the Table also shows the total mean score of 2.4 for the courts, which means that the courts are not efficient in handling the conflict. This may be as a result of the delay and the alleged corrupt practices in the judicial system.

The government committees, having scored a total weighted mean of 3.0, are therefore regarded as efficient in managing the conflict. This may be due to the inclusion of traditional leaders and MACBAN officials into the committee's membership. It can be inferred from the table that the traditional rulers and cattle Breeders Association are the most successful institutions that can manage the conflict, while the police and courts are regarded as unsuccessful. This is probably as a result of the following reasons: people live and respect their customs, traditions and leaders, while the police, courts and local government officials are perceived to be corrupt and make unequal treatment when the conflict occurs.

Mechanisms Employed by the Institutions in Managing Farmer-Herder Conflict

Result from Table 4.16 shows the various methods of conflict resolution commonly employed in managing/resolving the farmer-herder conflict in the study area. Greater percentage of the respondents (42.5% of farmers and 37.6% of herders) indicated amicable resolution as the most popular method of managing/resolving conflict followed by verbal warning with a score of 38.2% farmers and 36.0% herders). Payment of compensation (18.9% of farmers and 26.4% herders) was less popular in the survey area, so also with the re-allocation of new plot which was never experienced. The pattern of result obtained above can likely be attributed to the leading role played by the informal institutions in resolving the conflict as per the finding stated earlier.

CONCLUSION AND RECOMMENDATIONS

Result from the studies indicates that crop damage by cattle, encroachment of cattle routes and inadequate grazing reserves were the immediate causes of the conflict. Also, all the respondents identified traditional rulers, police and Miyetti Allah Cattle Breeders Association of Nigeria (MACBAN) as major arbitrators of farmer-herder conflict in the study area. Result of the performance of institutions in managing the farmer-herder conflict using 'efficiency' as yardstick indicates that, traditional rulers, the herders' association, that is Miyetti Allah Cattle Rearing Association (MACBAN) were more efficient in handling the conflict than the local government committees achieved through amicable solution of the farmer-herder conflict.

The recommendations from the study include survey, demarcation, beaconing and gazetting of the government owned grazing reserves and cattle routes, to reduce pressure on the already overstretched grazing reserves should be effectively



executed by relevant bodies. Also, traditional rulers should be given constitutional roles, centering on their reconciliatory and arbitration effort.

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**GENDER ACCESS TO AGRICULTURAL LAND AMONG GROUNDNUT FARMERS IN AGWARA
LOCAL GOVERNMENT AREA OF NIGER STATE**

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ABSTRACT

This study analysed gender access to agricultural land among groundnut farmers in Agwara Local Government Area of Niger state, Nigeria. Multistage sampling procedure was used to select 160 farmers for the study. Data were collected using an interview schedule. The data were analysed using descriptive statistics (frequency and percentage) and student t-test. Findings showed that most (68.75%) of the respondents fell within the range of 20-29 years and married (80.63%). About 56% had no cooperative membership. Acquisition of land was mainly through inheritance among both men (32.58%) and women (32.39%). Majority of both the men (87.64%) and the women (83.10%) owned land within the range of 1-3.9 hectares. Result of the t-test showed no significant difference in men and women access to land, hence, men and women groundnut farmers had equal access to land in the study area. Majority (79.78%) of the male farmers contributed to household income to a large extent, while 56.34% of the female farmers contributed to household income to a large extent. The contributions were mainly in the areas of children's education, food and health care. It is established from this study that males and female farmers had equal access to agricultural land. It is also discovered that men contributed more to household income than their female counterparts. Hence, men were the major contributors to household income. It is recommended that land allocation and distribution pattern in the area should be upheld to maintain equal access to both men and women.

Keywords: Gender access, agricultural land, groundnut farmers

INTRODUCTION

Agricultural landownership is crucial for any meaningful agricultural development. It is a source of income, bargaining power, security, and independence. It is a direct means of achieving sovereignty for people, especially women in developing countries where men are generally much more likely to own land than women (Lambrecht and Karoff, 2020). For rural women and men, land is often the most important household asset for supporting agricultural production and providing food security and nutrition. In many parts of the world both men and women have inadequate access to secure rights over land. Women are particularly disadvantaged in this regard. Reliable sex-disaggregated data on land is crucial for highlighting disparities in land rights between women and men (FAO, 2018).

Gender gap in ownership of agricultural land is still wide in many developing countries, mainly in favour of men (Kongela, 2020). A growing strand of literature on gender equality in agricultural land ownership in rural areas shows that women are not accorded the same rights as men (Kongela, 2020; FAO, 2018; Dery, 2015; Doss *et al.*, 2018). Although women comprise about 43 percent of agricultural labour force in developing countries, only a small fraction of farmland is owned by women in some form of secure long-term tenure

(Kongela, 2020; Prosterman, 2013). Fewer than 15 percent of agricultural landholders around the world are women (FAO, 2018).

Agriculture and agricultural land play a major role in the socioeconomic characteristics of the farmers and subsequently, economic development of many developing countries. It is a significant source of food security for the people and a means of livelihood for the most vulnerable citizens of these countries. Consequently, raising agricultural policy that is focused on increasing men and women farmers' access to agricultural land is important. This is central to growth, income distribution, improved food security and poverty alleviation among men and women groundnut farmers in Agwara Local Government Area (LGA) of Niger State. Sustainability and productivity of the agricultural sector largely depend on the availability and access to land. However, the scarcity of documented information on the difference to agricultural land among male and female groundnut farmers makes this study relevant. Hence, this study was conducted to critically assess the men and women farmers' access to agricultural land among groundnut farmers in Agwara LGA of Niger State.

The broad objective of this study was to assess men and women access to agricultural land among groundnut farmers in Agwara LGA of Niger State. The specific objectives were to:

1. determine men and women access to agricultural land for groundnut production; and
2. examine the contribution to household income from groundnut production by men and women in the study area.

The study was guided by the following hypothesis that there is no significant difference in men and women groundnut farmers' access to agricultural land.

METHODOLOGY

This study was conducted in Agwara L.GA of Niger State, Nigeria. It is one of the 25 LGAs in Niger State. It has its headquarters in Agwara. The LGA is found between longitude 10°42'N and 4°35'E and latitude 10.700°N and 4.583°E of the equator. The LGA has a land mass of 1,450 km² and a projected population of 98, 400 (NPC, 2022).

Agwara LGA has two seasons, namely, the wet and the dry seasons. Controlled by the West maritime and South-westerly monsoon wind from the Atlantic Ocean, the wet season usually starts from the end of April, breaks briefly in August, and stops by mid-October. At the beginning of the season, conventional rainfall is frequent and it is usually accompanied by thunder. The heaviest rains are recorded between July and September. The mean annual rainfall has been approximated at between 1016mm and 1524mm. The dry season is characterized by the harmattan wind, which is a North-easterly wind from the Sahara Desert. This season normally starts from late November and lasts till the end of March (NBS, 2020).

A multistage sampling procedure was used to select respondents for this study. In the first stage, seven villages were purposively selected out of the twenty-nine villages in the LGA, notable for intensity of groundnut farming. In the second stage, simple random sampling was used to select 91 male and 71 female (5%) farmers out of 1820 male and 1400 female groundnut farmers. The sample size for the study therefore constituted 162 farmers.

Primary data for this study were obtained through the use of an interview schedule. Data obtained were on men and women access to agricultural land and their contributions to household income from groundnut production.

The data were analyzed using frequencies, percentages, means and student t-test. The frequencies, percentages and means were used to determine the men and women access to agricultural

land. Student-test was used to test for significant difference in men and women groundnut farmers' access to agricultural land (the study hypothesis).

Model Specification

The student t-test is specified as:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)}}$$

Where;

\bar{X}_1 and \bar{X}_2 = Average sizes of land accessed by men and women farmers

S_1^2 and S_2^2 = variance of each the land accessed by men and women farmers

n_1 and n_2 = Sample size of men and women farmers

RESULTS AND DISCUSSION

Men and women access to agricultural land for groundnut production

Land ownership

Results of this study indicated that 32.58% of the men and 32.39% of the women owned their land through inheritance. Overall, 31.88% of the farmers owned their land through inheritance. About 30.34% of the men and 45.83% of the women acquired their land through leasing. Moreover, very few of the respondents acquired land through land allocation and gift (Table 3). This indicates that land ownership system in the study area is largely by inheritance. Oriaghan (2018) reported that land acquisition for men and women in Nigeria, for the most part, is through inheritance, which to a great extent is influenced by the prevailing customs and norms in different parts of the country. Most often, men have a greater chance of inheriting land over women, a patrilineal system of land inheritance that persists despite the provisions of the law. Hence, there is a huge gender gap in land ownership in Nigeria, and less than 2% of women, compared to 17% of men, own land by themselves.

Land size

Land size refers to the area of farmland belonging to a farmer. This study revealed that majority (85.65%) of the respondents, with 87.64% of men and 83.10% of women owned land within the range of 1-3.9 hectares. The mean land sizes were 1.89 and 1.96 for men and women, respectively, with an overall mean of 1.93 hectares (Table 3). This indicates that men and women groundnut farmers in the study area are small scale farmers with less than 4 hectares of farm land.

Table 3: Distribution of respondents according to men and women access to agricultural land for groundnut production

Variable	Men (n=89)		Women (n=71)		Pooled Sample (n=160)	
	Freq	Perc	Freq	Perc	Freq	Perc
Land ownership						
Inheritance	29	32.58	23	32.39	51	31.88
Gift	12	13.48	8	11.27	20	12.50
Land allocation	10	11.24	11	15.49	21	13.13
Purchase	11	12.36	18	25.35	29	18.13
Leasing from other holders	27	30.34	11	15.49	39	24.38
Land size (ha)						
Less than 1	7	7.87	5	7.04	12	7.50
1-3.9	78	87.64	59	83.10	137	85.63
4-5.9	2	2.25	5	7.04	7	4.38
6 and above	2	2.25	2	2.82	4	2.5
Mean land size		1.89		1.96		1.93

Source: Field Survey, 2019

Difference in men and women groundnut farmers' access to land

Result of the t-tests showed that men and women had equal access to land in the study area. The t-test analysis of no significant difference in men and women access to land gave a t-calculated value of 0.7375. At 1% level of significance, t-value at 156 degrees of freedom is 1.6547 (one-tail test) and 1.9753 (two-tail test). From the p-value, both for the one-tail test and the two-tail test, it is therefore inferred that at this level of significance men and

women had equal access to land. This is based on the ground that the t-calculated (0.7353) is less than the t- tabulated (1.9753) (Table 4). Hence, the null hypothesis is accepted. This finding agrees with Sada and Mohammed (2013) who reported that women in Safana Local Government of Katsina State, Nigeria were not discriminated against in land ownership issues, adding that there was less inequality in land ownership by gender (male and Female) in the study area, hence there was no discrimination between gender in land holding.

Table 4: Difference in Men and Women Groundnut Farmers' Access to land

	Men	Women
Mean	2.988764	2.802817
Variance	2.806691	2.274849
Observations	89	71
Hypothesized mean	0	
Degree of freedom	156	
t-statistic	0.737468	
p-value (one tail)	0.230973	
t critical one tail	1.65468	
p-value (two tail)	0.461946	
t critical two tail	1.975288	

Source: Field Data, 2019

Contribution to household income from groundnut production by men and women

About 79.78% of the male farmers contributed to household income to a large extent, 8.99% contribute to household income to some extent and 11.24% hardly contributed to household income. 56.34% of the female farmers contribute to household income to a large extent, 36.62%

contribute to household income to some extent and 7.04% hardly contribute to household income (Table 5). About 82.02% of men contributed to household income relative to their women counterparts with 36.62%. The result further showed that, the men (79.78%) contributed more than the women (56.34%). This implies that men contributed more to household income than women in the study area.

Table 5: Distribution of the Respondents according to their Contribution to Household Income

Variable	Men (n=89)		Women (n=71)		Pooled Sample (n=160)	
	Freq	Perc	Freq	Perc	Freq	Perc
Extent of contribution						
To a large extent	71	79.78	40	56.34	111	69.38
To some extent	8	8.99	26	36.62	34	21.25
Hardly	10	11.24	5	7.04	15	9.38
Areas of contribution						
For food	52	58.43	51	71.83	103	64.38
For clothing	31	34.83	44	61.97	74	46.25
For shelter	21	23.60	27	38.03	48	30.00
For health care	51	57.30	50	70.42	101	63.13
For children's education	77	86.52	63	88.73	140	87.50

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATION

It is established from this study that male and female farmers had equal access to agricultural land in Agwara LGA of Niger State. It is also discovered that men contributed more to household income than their female counterparts. Hence, men were the major contributors to household income.

It is recommended that agricultural land allocation and distribution pattern in the area should be upheld to maintain equal access to both men and women.

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THE USE OF EXTENSION AGRONOMIC PRACTICES AMONG RICE FARMERS IN KANO STATE, NIGERIA

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ABSTRACT

In Nigeria, rice consumption far exceeds production which resulted into huge deficit between supply and the ever-growing demand of rice. This study assessed the use of extension agronomic practices among rice farmers in Kano State, Nigeria. Multi-stage sampling procedure was used in the selection of 102 rice farmers for the study. Data were collected from primary sources using structured questionnaire. Frequency, Percentages and mean and were used for data analysis. The findings revealed 92.2% were male; mean age of 39years; household size of 7 persons; farm size of 1.14 ha and farming experience of 14 years. The study concluded that four extension agronomic practices were least utilized by the rice farmers. It is recommended that more extension agronomic practices should be use to increase production.

Keywords: Extension, Agronomics practices, Rice farmers,

INTRODUCTION

Nigeria's dependence on oil export alone, made the economy vulnerable and susceptible to shocks generated by international oil prices. Nigeria's food import bill rose steadily from N24 million in the mid-1950s to N47million, N126 million, N2 billion and N7 billion in 1960s, 1970s 1980s, 1990s respectively. By the year 2011, the import bill for Wheat, Rice, Sugar and Fish put together reached N1.31trillion (FMARD, 2011). National rice demand in the year 2016 was estimated at 6.3 million metric tons while the domestic supply was put at 2.3 million metric tons (FMARD, 2016). The deficit stands at 4 million metric tons which was expected to be filled by import. This importation has dwindled the production and consumption of local foods, thereby putting more pressure to the economy weakened by corruption and mismanagement which led to severe recession (Kano Investment Promotion Agency (KIPA) (2018).

However, in Nigeria, rice consumption has risen tremendously, usually served during religious and social gatherings. It has also become important as a daily dietary feeding stuff which cuts across sex, age, tribe and religion. Although Nigeria has resources to produce adequate quantity and quality of rice for consumption, however the existing farmers' skills, knowledge, and equipment are grossly inadequate to support the production of about 6 million tonnes of rice required per annum (Oladimeji, 2017). The attainment of this production level is only feasible if the farmers duly access requisite skills, knowledge and equipment that can ease the rice value chain. To help address this problem, AfricaRice, in collaboration with national partners, developed the RiceAdvice mobile app which is an android-based decision support tool (DST) that extension workers can use for providing farmers with field specific management guidelines for rice production and the extension advice to farmers on improved agronomic practice (IAP); nutrient management plan, a suggested crop calendar and information regarding best practices for rice cultivation in Kano State (Africa Rice

Centre, 2017). Therefore, the broad objective of the study was to assess the use of extension agronomic practices among rice farmers. Other objectives were to describe the socio-economic characteristics of the rice farmers and their perception in the use of extension agronomic practices in the study area.

METHODOLOGY

The study was carried out in Kano State, Nigeria, which lies between latitudes 130° N and 110° S and longitude 80° W and 100° E. The State has a land mass of about 20,760 square km (NAERLS, 2010). Based on NPC (2006), the State had a projected population of 11,206,688 in 2012. The average annual rainfall is 700mm with the mean daily maximum and minimum temperatures of 35^oc and 39^oc, respectively. Multistage sampling procedure was used for this study, the first stage involved the purposive selection of two Local Government Areas (LGAs), Bunkure in Kano River Irrigation Project (KRIP) and Bagwai in Watari Irrigation Project (WIP). Second stage involved selection of two (2) communities from each of the 2 LGAs considered for the study (namely, Bunkure and Zangon Buhari in Bunkure LGA and Daddauda and Bauje in Bagwai LGA) and third stage involved random selection of 50% from a sample frame of 204 farmers proportionately to the size of the communities. Primary data were collected using structured questionnaire with the aid of trained enumerators. Also, five (5) points Likert rating scale was used to describe the perception of rice farmers in the use of extension agronomic practices. The scale is presented as; VU= Very Useful (5), U= Useful (4), MU=Moderately Useful (3), FU= Fairly Useful (2), NU= Not Useful (1). Furthermore, any extension agronomic practices greater than grand mean, is considered to be very useful on such practices. Data was analysed using frequency, percentages and mean.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Result in Table 1 revealed that the average age of the rice farmers was 39 years. This implied that most of the farmers were young and in their productive age. This finding corroborates Sani (2015), who reported similar average age of rice farmers in the study area. The average household size was 7 members. The finding was in consonance to that of Eze, (2014), who reported a similar

average household size. The mean farming experience was 14 years indicating that the farmers were experienced in rice farming. Agyo and Ornan (2021) opined that, with duration of time in rice production, the farmers were in a better position to know the limitations associated with cultural practices, the effects of climate change and the need to adapt and cope with it.

Table 1: Socioeconomic characteristics of rice farmers (n=102)

Variables	Minimum	Maximum	Mean	Std. Deviation
Age (years)	22	68	39	9.07
Household Size (number)	1	24	7	4.13
Farming experience (years)	2	50	14	9.01
Farm Size (hectare)	0.2	4.3	1.14	1.01

Source: Field Survey, 2021

The result further revealed that the minimum farm size was 0.2 hectares; maximum was 4.3 while the mean farm size was 1.14 hectares. This implies that majority of the rice farmers were small scale. This finding conforms to a study of Cordelia

and Edwin (2020) that average farm size of the rice farmers was 1.2 hectares.

The results in Table 2 further revealed that almost all (92.2%) the rice farmers were males, an indication that rice farming was male dominated in the study area.

Table 2: Socioeconomic characteristics of rice farmers [Continuation] (n=102)

Variable	Frequency	Percentage
Sex		
Male	94	92.2
Female	8	7.8
Educational level		
Qur'anic Education	13	12.7
Primary Certificate	20	19.7
Secondary (SSCE/NECO)	64	62.7
Tertiary (ND/NCE/Degree)	5	4.9
Extension contacts		
Contact	99	97.1
No contact	3	2.9

Source: Field Survey, 2021

The dominance of males in farming activities agrees with Adeleye (2016) which found that males constitute the majority in rice production. The educational levels of the rice farmers indicated that majority (62.7%) of the rice farmers obtained secondary school certificate and only a few (4.9%) obtained tertiary education. This implies that farmers in the study area had attained certain level of education which could make rice farmers to easily use extension agronomic practices. This finding contradicts the research work by Garba (2011) who reported that less than one third of his respondents

in Kano State had secondary education. The results also revealed that almost all (97.1%) of the rice farmers had contact with extension workers.

Perception of Rice Farmers in the Use of Extension Agronomic Practices

The results of rice farmers perception in Table 3, established that land preparation (4.23), seed selection (4.37), weeding (4.16), transplanting (4.45), sowing (4.27), nursery maintenance (4.24) and fertilization (4.35) were found to be very useful to rice farmers, since their mean values were greater than the grand mean (4.15).

Table 3: Perception of Rice Farmers in the Use of Extension Agronomic Practices (n = 102)

Variables	VU	U	MU	FU	NU	Mean
(a) Field Demonstration						
Land preparation	50(49)	32(31.40)	13(12.74)	7(6.86)	-	4.23*
Seed selection	53(51.96)	34(33.34)	10(9.80)	5(4.90)	-	4.37*
Weeding	41(40.19)	43(42.15)	15(14.70)	3(2.94)	-	4.16*
Transplanting	60(58.82)	27(26.47)	13(12.74)	2(1.96)	-	4.45*
Sowing	56(54.90)	28(27.45)	14(13.72)	4(3.92)	-	4.27*
Nursery Maintenance	54(52.94)	29(28.43)	12(11.76)	4(3.92)	3(2.94)	4.24*
Water management	45(44.11)	31(30.40)	12(11.76)	13(12.74)	1(0.98)	4.01
Fertilization	59(57.84)	23(22.54)	15(14.7)	3(2.94)	2(1.96)	4.35*
Pest and disease Control	51(50)	24(23.52)	14(13.72)	9(8.82)	4(3.92)	4.13
(b) Training	34(33.34)	40(39.21)	22(21.56)	4(3.92)	2(1.96)	4.06
(c) Linkage with Market	21(20.58)	26(25.49)	24(23.52)	25(24.50)	6(5.88)	3.46
Grand Mean						4.15

Source: Field Survey, 2021; **Figures in Parenthesis Are Percentages

The study further stated that rice farmers perceived water management (4.01), pest and disease control (4.13) and training (4.06) as useful to them while linkages with market (3.46) was considered as moderately useful by the rice farmers.

CONCLUSION AND RECOMMENDATIONS

The study concludes that four extension agronomic practices were least utilized by the rice farmers, which were; water management, pest and disease control, training and linkage with market. However, many farmers affirmed that most of the extension agronomic practices were very useful to them. It is recommended that more extension agronomic practices should be use to increase rice production.

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RAPID ASSESSMENT OF IFAD – VCDP MAINSTREAMING FOR EMPOWERING GENDER AND YOUTH IN NIGERIA.

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ABSTRACT

The FGN and IFAD are jointly implementing a Value Chain Development Programme (VCDP) in the nine States of Nigeria. A total of 63 Local Government Areas participated in the programmes. The estimated total direct beneficiaries were 100,000 households (91,000 smallholder farmers, 8,000 processors and 1,000 traders) target beneficiaries. The main objective of the rapid assessment was to determine the immediate results emanating from the implementation of the mainstreaming Gender & Youth Empowerment across the nine participating States. Data were provided from each State and the indicators to be reviewed were built on the Open Data Kit (ODK) system to ensure accuracy of the data. The data were then managed for precision and consistency, and analysed accordingly. Youth entrepreneurial skills development and establishment in gender perspectives found that no fewer than 1000 individuals were supported for various skills acquisition and enhancement. Individuals that established enterprises were among the youth supported by IFAD – VCDP in all the nine (9) States, which was found to be 331 youth. The cost involved in establishing such enterprises was high. Number of adult female (4065) that received trainings on financial literacy was higher than their adult male (2850) counterparts, which was an indication of more opportunities to secure more loans/grants by these adult female farmers. Gender inclusion and youth empowerment provides opportunities for the teeming youth in the IFAD-VCDP States for job creation and self-actualisation potentials.

INTRODUCTION

The FGN and IFAD are jointly implementing a Value Chain Development Programme (VCDP) in six States of Anambra, Benue, Ebonyi, Niger, Ogun, Taraba, and in five (5) Local Government Areas each in all the States (30 LGAs in total). The programme which entered into force on 14 October 2013 is a 6 -year development initiative working on rice and cassava. The programme aims to directly improve the livelihoods of approximately 53,480 households (45,000 smallholder farmers, 7,680 processors and 800 traders).

In another development, strategy on developmental projects promote planning and implementation of gender-transformative, youth-engaging, participatory and socially inclusive climate action, including strengthening of knowledge, technologies, practices and efforts of local communities and Indigenous Peoples in responding to climate change (FAO *et al* 2021). Moreover, FAO emphasizes ensuring equal opportunities and sharing of benefits of climate action, engagement of women, youth and Indigenous Peoples in climate debates and providing support to countries to reduce social exclusion, including through legal, regulatory and institutional frameworks (FAO and UNEP. 2021).

UN (2021) observed that many developmental support from FAO in collaboration with and complementing the efforts of other agencies, across agrifood systems for sustainable local development and empowerment, particularly for those women and men who are most at risk of the changing climate across agrifood systems, including rural, peri-urban and urban smallholder

farmers, livestock keepers, pastoralists, foresters, forest-dependent people, fishers, aquaculturists, workers at different parts of food value chains, women’s groups, youth, children, Indigenous Peoples, persons with disabilities, and marginalized and minority groups to gradually reduce vulnerability.

Value Chain Development Programmes - emphasized on the mainstreaming of Financial Inclusion/Nutrition/Gender & Youth Empowerment /Climate change & environment which are to be assessed as for progress made in the implementation. One aspect of great interest to IFAD – VCDP support programmes is empowering gender and youths, which is greatly important to agricultural development in these participating States. This kind of support is necessary considering the need for involving gender/youth in agriculture and global attention on gender inclusiveness for agricultural and rural development in Nigerian States.

The main objective of the rapid assessment was to determine the immediate results emanating from the implementation of the mainstreaming Gender & Youth Empowerment across the nine participating States.

1. document the Status of Youth Entrepreneurial Skill Development and Establishment States.
2. Profiling Farmer Organisations on the basis of Gender and Youth.
3. document the achievement so far recorded by VCDP –AF in the area of migrating from gender mainstreaming to gender transformation.

METHODOLOGY

In all the IFAD – VCDP implementing States, groups that comprised of both male, female, youth and people with disabilities had up to 4,449. Farmer organizations strictly for youth as members was the second group with up to 1279 members in these States.

- No. Selected for Skill Acquisition and Support – 1087 (Male = 620 Female = 467)
- No. Received Skill Acquisition Training – 567 (Male = 330 Female = 237).
- No. Supported and Established Enterprises – 331 (Male = 204 Female = 127)

Total
Number = 1,985 (Male = 1,154 Female = 828)

Questions that are meant to answer the objectives of the assignment were built on the Open Data Kit (ODK) system to ensure accuracy in terms of location of the assignment, easy monitoring and on the spot data management. The tool was used to measure gender and youth empowerment. The questions were electronically online and downloaded on android phone. Focus Group Discussions to triangulate the data collected for ensuring consistency and integrity.

RESULTS AND DISCUSSION

Status of youth entrepreneurial skill development and establishment states

Table 1 below indicated the status of youth entrepreneurial skills development and establishment in gender perspectives and found that no fewer than 1000 individuals were supported for various skills acquisition and enhancement which doubled the individuals that received trainings in

skill acquisition. Individuals that established enterprises were the least youth supported by IFAD – VCDP in all the nine (9) States, which was as low as 331 youth. This was mainly due to the cost involved in establishing such enterprises.

In related development, although the percentages of male supported in the three aspects of skills acquisition, trainings and enterprises establishment, were relatively higher, the percentage of female supported by IFAD – VCDP in the aspects of skills acquisition, trainings and enterprises establishment, was quite impressive, with corresponding percent of 43, 42 and 38, respectively. Ability to consider female involvement in IFAD – VCDP development activities for gender and youth, was the basis for such higher percent of female in these aspects.

It was also found that skills acquisition was higher in Taraba, Kogi and Enugu States, where 184, 159 and 158 youth (male and female) received such IFAD – VCDP support, respectively. However, that was slightly different for trainings on skills acquisition, with more number of trainees in Enugu (99), Taraba (89) and Benue (87). While Niger and Ebonyi States had the least number of trainees on skills acquisition, with corresponding number of 22 and 19 youth (male and female), respectively.

The results further revealed that 93, 53 and 41 youths were supported to establish enterprises, in Taraba, Nassarawa and Kogi, respectively. The enterprises were meant to support youth (male and female) in ensuring effective post-harvest handling, storage and processing.

Table 1: Status of Youth Entrepreneurial Skill Development and Establishment States

States	No. Selected For Skill Acquisition and Support			No. Received Skill Acquisition Training			No. Supported and Established Enterprises		
	M	F	Total	M	F	Total	M	F	Total
Anambra	37 (5.9)	35(7.5)	72	36(10.9)	13(5.5)	49	28(13.7)	13(10.2)	41
Benue	58 (9.4)	45(9.6)	103	52(15.8)	35(14.8)	87	16(7.8)	9(7.1)	25
Ebonyi	68 (10.9)	23(4.9)	91	14(4.2)	5(2.1)	19	0	0	0
Enugu	83(13.4)	75(16.1)	158	49(14.8)	50(21.1)	99	24(11.8)	16(12.6)	40
Kogi	92(14.8)	67(14.3)	159	39(11.8)	32(13.5)	71	26(12.7)	15(11.8)	41
Nasarawa	63(10.1)	66(14.1)	129	40(12.1)	33(13.9)	73	32(15.7)	21(16.5)	53
Niger	49(7.9)	34(7.3)	83	12(3.6)	10(4.2)	22	12(5.9)	6(4.7)	18
Ogun	56(9.0)	52(11.1)	108	32(9.7)	26(10.9)	58	15(7.4)	5(3.9)	20
Taraba	114(18.4)	70(14.9)	184	56(16.9)	33(13.9)	89	51(25.0)	42(33.0)	93
Total	620 (57)	467(43)	1087	330(58)	237(42)	567	204(61.6)	127(38.4)	331

Values in parenthesis are percentages

Farmer organisations profiled and registered (gender and youth)

The results in figure 1 below indicated that in all the IFAD – VCDP implementing States, groups that comprised of both male, female, youth and people with disabilities had up to 4,449, which was impressive to ensure for group dynamism and self-actualisation within the groups.

Farmer organizations strictly for youth as members was the second group with up to 1279 members in these States. The composition of the youth was mainly of males and females within the age bracket of between 25 years and 45 years of age and were in their active productive age for proper utilization of support from IFAD – VCDP. The results further revealed that women only groups had almost as twice members as male only groups. That

was an indication of more women involvement in the activities of this programme than their men counterparts.

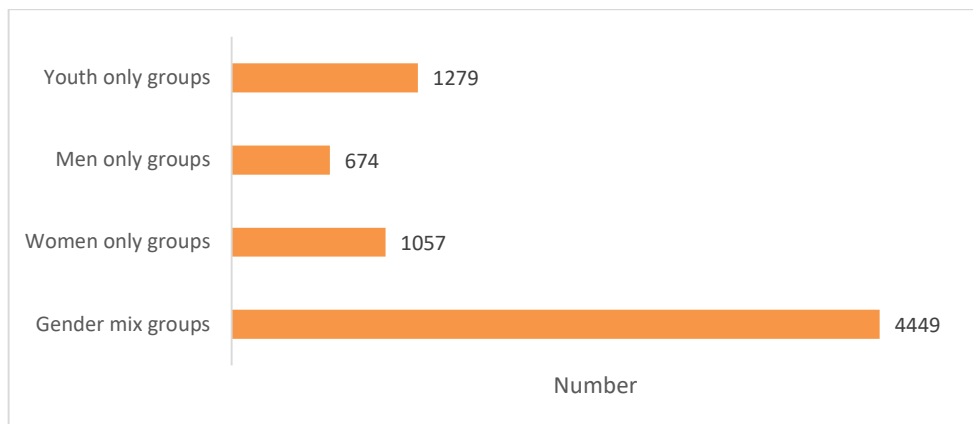


Figure 1: Farmer Organisations according to Gender and Youth.

CONCLUSION

Rapid assessment survey was carried out to determine the immediate results emanating from the implementation of the four mainstreaming themes under VCDP-AF across the nine (9) participating States. Gender inclusion and youth empowerment provides opportunities for the teeming youth in the IFAD-VCDP States for job creation and self-actualisation potentials.

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**SOCIAL, ECONOMIC AND ENVIRONMENTAL REASONS OF FARMING HOUSEHOLDS
AFFECTED BY 2020 FLOOD FOR LIVING IN SOKOTO RIMA RIVER BASIN, NIGERIA**¹Tambari, I. W., ²Umar, S., ²Jega, A. A. and ³Ambursa, A. S.¹Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Usmanu Danfodiyo University, Sokoto²Department of Agricultural Economics and Extension, Faculty of Agriculture, Kebbi State University of Science and Technology, Aliero³Department of Forestry and Fisheries, Faculty of Agriculture, Kebbi State University of Science and Technology, Aliero**ABSTRACT**

Despite the risk of being exposed to adverse effects of flood, yet there are thousands of farming households, living in flood vulnerable areas of Sokoto Rima River Basin, Nigeria for diverse reasons. It is against the framework of this background that this study sought to evaluate the social, economic and environmental reasons of the farming households, affected by 2020 flood for living in Sokoto Rima River Basin, Nigeria. However, the study used multi-stage sampling for selection of 202 farming households affected by 2020 flood in the study area; while frequency distributions, percentages and charts, were used in the study as the tools for data analysis. The study revealed that the influence of birth (63.6%), family relations (21.3%) and personal interest (15.1%); were the major social reasons of the farming households for living in the study area. The study revealed that the cultivation of crops (50.0%), attraction of farm labour (21.5%), availability of pasture for livestock (17.7%) and water for fishing (10.9%); were the major economic reasons of the farming households, for living in the study area. The study also revealed that the influence of topography (61.2%), soil fertility (21.7%) and ground water (17.1%); were the major environmental reasons of the farming households for living in the study area. The study concluded that the influence of social, economic and environmental factors, were the major reasons of farming households, affected by 2020 flood for living in the study area. Therefore, the study recommended that the farming households living in the study area, should not abuse the factors that would influence the periodic occurrence of flood, which could also affect the social, economic and environmental stability of the study area.

Keywords: Reasons, Farming Households, 2020 Flood in Sokoto Rima River Basin

INTRODUCTION

Flood was conceptualised in this study as accumulation of large volume of water within the physical terrain of flood vulnerable areas; due to influence of excessive rainfall and release of large volume of water from reservoir of Goronyo Dam, which ultimately discharge its excess water through the canal of Sokoto Rima River and its major tributaries (Tambari, 2023). To evaluate the social, economic and environmental reasons of the farming households, affected by 2020 flood for living in Sokoto Rima River Basin, Nigeria, the study was carried out in the selected local government areas, located within the physical terrain of flood vulnerable areas in Sokoto Rima River Basin, Nigeria affected by 2020 flood due to influence of multiple factors such as excessive rainfall and release of huge volume of water from Goronyo Dam; which eventually passed through the canal of Sokoto Rima River to discharge its excess water that caused the inundation of the Basin and its surroundings. Therefore, the most affected areas were purposively selected for the study, which ultimately served as scope of this study; where the farming households affected by 2020 flood, were being selected as the respondents for the study, using interview schedule.

Despite the risk of being exposed to adverse effects of flood, the farming households as argued by environmentalists are living majorly in flood vulnerable areas, due to multiple influence

linked to social, economic and environmental wellbeing of the farming households. It means that the occurrence of 2020 flood exposed the farming households to varying degrees of adverse effects, leading to loss of lives, destruction of properties and public infrastructures, worth billions of naira (NEMA, 2020; SEMA, 2020).

Orebiyi (2008) opined that the influence of agricultural activities, especially in the aspects of crop farming, livestock rearing and domestic fishing were among the major reasons of the farming households for living in flood vulnerable areas. In accordance with this premise that the answer was provided in this study, about the reasons of the farming households for living in the study area, in spite of the risk of being exposed to adverse effects of 2020 flood.

METHODOLOGY

The study was carried out within the flood vulnerable areas along Sokoto Rima River Basin, found between the Latitude 11° 00 to 14° 00 North and Longitude 3° 5' to 8° 00 East. Thus, the study area has 9 Local Government Areas (LGAs) affected by 2020 flood, because of their closeness to Sokoto Rima River and its major tributaries; where more than 80% of the farming households in the study area, were majorly engaged into crop farming, livestock rearing and domestic fishing as their major source of livelihood (Sunday Tribune, 2020), which according to SEMA (2020) were the socio-

economic activities of farming households exposed to adverse effects of 2020 flood in the study area.

According to Abdullahi, Muhammad, Adeogun, and Mohammed (2014), climatic condition in the study area is under the influence of dry airmass, originated from the Sahara and the warm airmass, originated from Atlantic Ocean; while at Inter-Tropical Convergence Zone, dry airmass and warm airmass, influenced emergence of dry and wet seasons due to interplay of tropical maritime airmass and tropical continental airmass. NiMet (2022) expressed that the dry season in the study area, due to influence of the climate change, reached four months, from June to September, with the emergence of drought, between July to August. Thus, the dry season, when the water utilised from Sokoto Rima River, was used for irrigation farming in the study area, reached six months, from October to April; while the cold and dust-laden wind experienced during the harmattan, reached two months, from December to January.

Therefore, the occurrence of 2020 flood in the study area, was attributed to the influence of excessive rainfall, slightly above 700mm, against the previously recorded 687mm, especially in 2019 rainy season, where the rainfall intensity was observed to be moderate; but in 2020 rainy season, when there was increased rainfall intensity in the study area, leading to discharge of large volume of water from Goronyo Dam, in flood vulnerable areas located in Sokoto Rima River Basin (Matazu and Umar, 2022). Furthermore, Sokoto Rima River was originated from confluence of three major Rivers, such as River Bunsuru, River Gagare and River Maradi, where Goronyo Dam was built for the purpose of achieving, effective flood control measures, attainment of sustainable irrigation for dry season farming; in addition to sufficient utilisation of water from the Dam, for artisanal fishing activities in the study area.

The widespread of Sokoto Rima River and its tributaries covered 9 LGAs in the study area, which formed its confluence at Wamakko LGA, the

precise location where River Sokoto that originated from River Niger and Sokoto Rima River are converged.

Thus, the study area in terms of vegetation falls within the Savannah Ecological Zone, characterised as Tse-tse insect free area, suitable for livestock grazing and cultivation of crops, due to nature of fertile soil and influence of Sokoto Rima River; utilised for dry season farming and fishing activities.

The study used multi-stage sampling for the selection of 202 farming households affected by 2020 flood in the study area; while primary and secondary data were obtained in the study. Thus, frequency distributions, percentages and charts, were used in the study as the tools for data analysis, prior to conceptualisation and measurement of variables used in the study.

RESULTS AND DISCUSSION

Social reasons

The result presented in Table 1 revealed that in the study area, 63.6% of farming households affected by 2020 flood indicated the influence of birth as their social reason for living in the study area; 21.3 % of farming households affected by 2020 flood indicated family relations as their social reason for living in the study area; 15.1% of farming households affected by 2020 flood indicated personal interest as their social reason for living in the study area. However, this revelation suggested that the farming households affected by 2020 flood are living in the study area based on the influence of birth, family relations and personal interest as indicated in (Figure 1). This means that the farming households exposed to adverse effects of 2020 flood were living in the study area based on the influence of birth, family relations and personal interest. Therefore, this result was concurred with the report released by Vanguard Newspaper (2020) that the farming households living in Sokoto Rima River Basin were affected by 2020 flood.

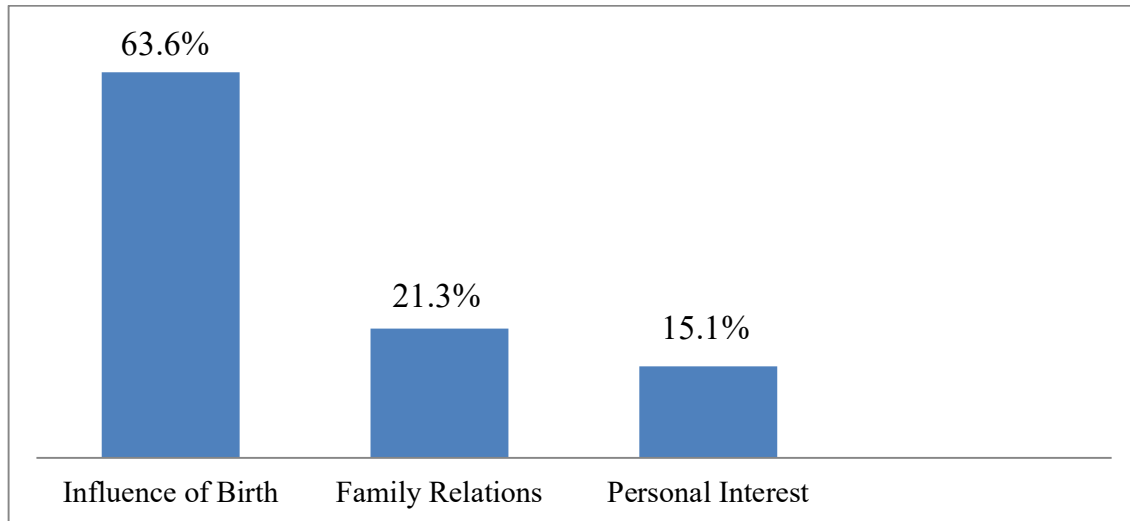


Figure 1: Social reasons for living in the study area

Economic reasons

The result presented in Table 1 revealed that in the study area, 50.0% of farming households affected by 2020 flood indicated the cultivation of crops, especially in rainy and dry seasons as their economic reason for living in the study area; 21.5 % of farming households affected by 2020 flood indicated the attraction of farm labour as their economic reason for living in the study area; 17.7% of farming households affected by 2020 flood indicated the availability of pasture for the livestock grazing as their economic reason for living in the study area; while 10.9% of farming households affected by 2020 flood indicated the availability of

water for fishing as their economic reason for living in the study area. Thus, this revelation suggested that most of the farming households affected by 2020 flood are living in the study area for economic reasons as indicated in (Figure 2). This means the farming households involved in the cultivation of crops, compared to farming households involved in livestock and fishing activities were majorly affected by 2020 flood in the study area. Therefore, this result was concurred to the report released by SEMA (2020) that the crops cultivated within the Sokoto Rima River Basin were affected by 2020 flood.



Figure 2: Economic reasons for living in the study area

Environmental reasons

The result presented in Table 1 revealed that in the study area; 61.2% of farming households

affected by 2020 flood indicated the influence of topography, as their environmental reason for living in the study area; 21.7 % of farming households

affected by 2020 flood indicated the influence of soil fertility, as their environmental reason for living in the study area; 17.1% of farming households affected by 2020 flood indicated the access to ground water, as their environmental reason for living in the study area. Thus, this revelation suggested that the influence of topography, soil fertility and ground water as indicated in (Figure 3) required for wet and dry seasons farming were major

environmental reasons of the farming households for living in the study area. This means that the farming households were mostly affected by 2020 flood in the study area due to influence of topography. Therefore, this result was concurred to the report released by SEMA (2020) that the topography within the physical terrain of Sokoto Rima River Basin was affected by 2020 flood.

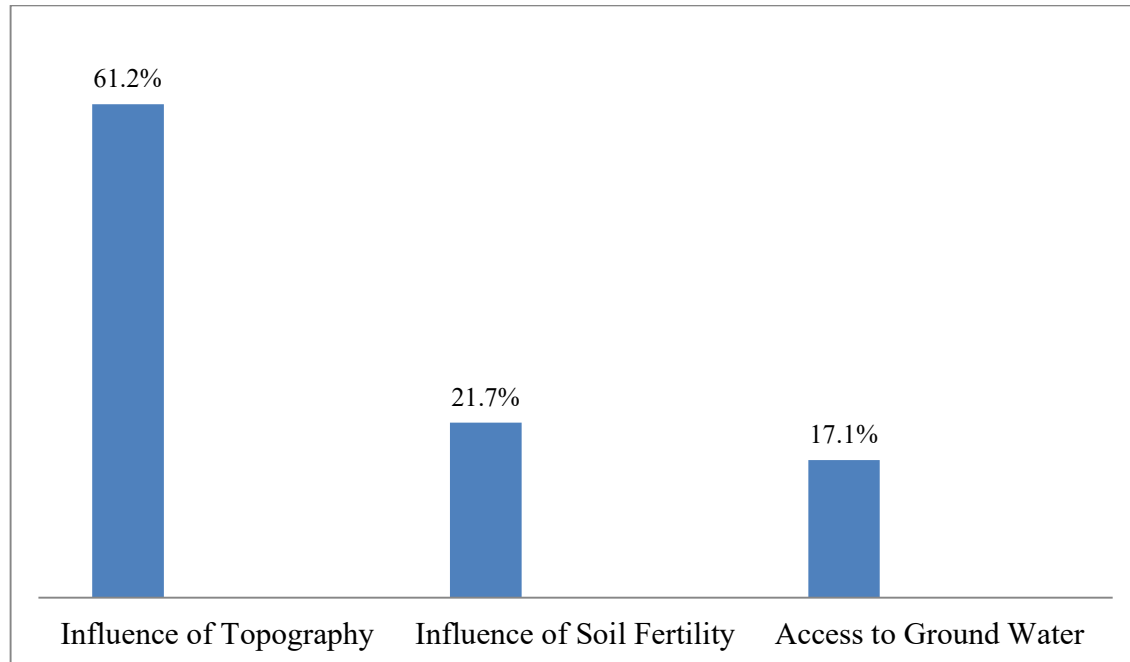


Figure 3: Environmental Reasons for Living in the Study Area

Table 1: Reasons of Farming Households Affected by 2020 Flood for Living in the Study Area

Variable	Frequency	Percentage (n = > 202)
Economic Reasons		
Cultivation of Crops	184	50.0
Attraction of Farm Labour	79	21.5
Pasture for Livestock	65	17.7
Water for Fishing	40	10.9
Social Reasons		
Influence of Birth	173	63.6
Family Relations	58	21.3
Personal Interest	41	15.1
Environmental Reasons		
Influence of Topography	211	61.2
Influence of Soil Fertility	75	21.7
Access to Ground Water	59	17.1

Source: Field Survey, 2022; Multiple Responses of 985 were obtained as Frequency

CONCLUSION AND RECOMMENDATION

The study concluded that the influence of birth was major social reason; cultivation of crops was major economic reason and influence of topography was major environmental reason of the farming households affected by 2020 flood for living in the study area. Therefore, the study recommended that the farming households living in

physical terrain of the study area, should not abuse the factors that could influence the occurrence of flood, which could affect the social, economic and environmental stability of the study area.

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USE OF SMART AGRICULTURAL TECHNOLOGIES AMONG RESEARCHERS IN AGRICULTURAL RESEARCH INSTITUTES IN OYO STATE, NIGERIA

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ABSTRACT

Smart agricultural technologies (SAT) are the emerging technologies used to improve the efficiency, productivity and sustainability of agriculture. This study investigated the use of smart agricultural technologies among researchers in agricultural research institutes in Oyo state, Nigeria. A multistage sampling procedure was used to select a total of 165 researchers, and information on the knowledge, perception, and level of use of SATs was garnered for the study. The results were analysed using both descriptive and inferential tools. The study revealed that 66.1% of the researchers had high knowledge on the use of smart agricultural technologies such as Sensors, Drones, Artificial intelligence, Geographical Information Systems, and 58.8% had a favourable perception towards the use of smart agricultural technologies. However, the level of use was low; 55.2% had a low level of use of smart agricultural technologies. The researchers' level of education ($\chi^2 = 8.172$, $p < 0.05$) and research institution ($\chi^2 = 8.579$, $p < 0.05$), among other socio-economic characteristics, had a significant relationship with the use of SATs. There was a significant but negative relationship between the respondents' perception on the use of SATs ($r = -0.242$, $p < 0.05$) and their use of smart agricultural technologies. Although the respondents were knowledgeable about the use of SATs and had favourable perceptions towards its use, their level of use of SATs was low, and this could be due to the unavailability of these technologies in the research institutes. To promote the use of SATs by researchers, the government should provide adequate funding for the purchase and implementation of SATs to all government-owned agricultural research institutes.

Keywords: Smart Agriculture, Researchers, Emerging Technologies, Agricultural Research Institute

INTRODUCTION

Smart agricultural technologies are emerging technologies such as sensors, the Internet of Things, drones, artificial intelligence, geographical information systems and digital image mapping systems. These technologies are utilised to enhance the efficiency, productivity, and sustainability of agriculture by analysing and visualising the agricultural environment. Smart Agriculture, as the implementation of these technologies to manage farms to increase yield and obtain quality crops, represents a transformative approach to farm management. This concept leverages modern technology to optimise agricultural processes, enabling the collection and analysis of data and deploying control mechanisms to improve efficiency and reduce wastage (Radhi & Abu Bakar, 2020).

Among the array of technologies, sensors provide essential data for crop monitoring and optimisation, while IoT devices enable automation and remote data collection (Sadiku et al., 2020). Robotics play a vital role in automating various physical tasks in agriculture, including inspection, data collection, and yield prediction (Sadiku et al., 2020). Drones offer fast and efficient methods for crop scouting, treatment planning, and soil quality assessment (Mistry et al., 2022). GIS, complemented by remote sensing and GPS technology, facilitates the analysis and visualisation of agricultural landscapes, land management, and crop yield estimation (Alam & Ahmed, 2008; Adekunjo et al., 2013).

Despite the potential of smart agricultural technologies to revolutionise the agricultural sector,

their utilisation and impact on research activities and development remain relatively unexplored, particularly in Nigeria. Against this backdrop, this study aims to address the following questions:

1. What are the socioeconomic characteristics of the researchers?
2. What is the researchers' knowledge level on the use of smart agricultural technologies?
3. What is the perception of researchers on the use of smart agricultural technologies?
4. What is the level of use of smart agricultural technologies?

METHODOLOGY

The study was conducted in Oyo State, Nigeria. The agricultural research institutes in the state were selected for the study, including IAR&T, NCRI, IITA, CRIN, FRIN, NACGRAB, and NIHORT.

The study population consisted of agricultural researchers from the selected institutes. A two-stage sampling procedure was used to select 165 respondents. The first stage involved randomly selecting 60% of the seven agricultural research institutes within the state, resulting in the selection of four research institutions. The selected agricultural research institutes were NIHORT, IITA, CRIN and FRIN. The second stage involved randomly selecting 30% of the total number of researchers obtained from the research institutes to give 41, 45, 41 and 38 researchers, respectively. Structured questionnaires were used for data collection. Content and face validity were used to validate the instrument.

RESULTS AND DISCUSSION

The analysis showed that 45.5% of respondents were aged 31-40, 24.8% were 30 or younger, 23% were 41-50, and 6.7% were over 50. The mean age was 37.3 years, indicating a predominantly young, agile researchers. This is consistent with Banmeke and Oose (2012) who found Southwest Nigerian agricultural researchers' mean age to be 37, with most falling within 31-40 years.

Table 1 indicates 54.5% of respondents were female, with 45.5% male, suggesting a higher female presence in research institutions. This signifies potential benefits from diverse perspectives and expertise, enhancing agricultural research outcomes through gender balance and women's inclusion. This contrasts with Sokoya, Onifade, and Alabi (2012) and Banmeke and Oose's (2012) findings, which noted a male dominance among agricultural researchers in Nigeria.

The study found that 50.3% of agricultural researchers held Master's degrees, 31.5% had BSc/B.Tech., 10.9% held PhDs, and 7.3% had HNDs, indicating a well-educated cohort capable of leveraging smart agricultural technologies. This corroborates Barakabitze et al. (2015) observations of high literacy levels among agricultural researchers, particularly with Master's degrees as the prevalent highest educational attainment.

Respondents reported 1 to 28 years of research experience, with 40.6% having 6 to 10 years, 35.8% having 1 to 5 years, 17.0% having 11 to 15 years, 3.0% having 16 to 20 years, and 3.6% having over 20 years. The mean experience was 7.8 years, suggesting ample expertise to independently conduct research and utilize smart agricultural technologies. This aligns with Ojesanmi et al. (2014) finding of an average of eight years of experience among agricultural researchers.

Table 1: Socioeconomic characteristics of researchers

Variables	Frequency	Percentage	Mean
Age (Years)			37.3
≤ 30	41	24.8	
31-40	75	45.5	
41-50	38	23.0	
≥ 51	11	6.7	
Sex			
Male	75	45.5	
Female	90	54.5	
Level of Education			
HND	12	7.3	
BSc/B.Tech	52	31.5	
MSc	83	50.3	
PhD	18	10.9	
Years of Experience			7.8
1-5	59	35.8	
6-10	67	40.6	
11-15	28	17.0	
16-20	5	3.0	
≥ 21	6	3.6	
Total	165	100	

Source: Field survey, 2023

Respondents' Knowledge on the Use of Smart Agricultural Technologies

The vast majority of respondents were aware of the capabilities of Internet of Things (IoT) technologies, with 97.0% acknowledging their use in monitoring environmental elements like wind, soil, atmosphere, and water over large areas. Similarly, 95.2% recognized the potential of Geographical Information Systems (GIS) for data capture, storage, and analysis, with 93.9%

specifically citing its application in soil mapping. Furthermore, 93.3% agreed on the capacity of Unmanned Aerial Vehicles (UAVs) to gather field data using cameras, sensors, and GPS while also acknowledging GIS's role in processing geographical data and integration into maps (92.7%). Majority of the respondents (92.1%) acknowledged GIS's effectiveness in erosion identification and remediation, as well as its ability to provide robust data analysis (92.7%).

Regarding specific applications, 90.9% recognized the use of sensors for investigating variations in plant water stress levels, as well as UAVs for irrigation management. Additionally, 89.7% acknowledged the potential of robots for field inspection and data collection, UAVs for generating high-resolution imagery of crops and fields, and sensors for measuring soil properties and light frequencies. Moreover, 89.1% confirmed UAVs' applicability in disease detection and crop spraying, while 88.7% recognized sensors' ability to determine soil pH and nutrient levels, monitor climate conditions and climate change, and UAVs' suitability for mapping weeds. The agreement on using IoT to mitigate pesticide-related risks to crops and humans was slightly lower at 75.2%. Overall, these findings highlight a comprehensive understanding of the use of smart agricultural technologies among respondents.

Respondents' level of knowledge on the use of smart agricultural technologies

Table 2: Respondents' level of knowledge on the use of smart agricultural technologies

Level of Knowledge	Frequency	Percentage	Min	Max	Mean	Std dev
Low ($<$ mean)	56	33.9	10	32	28.26	4.04
High (\geq mean)	109	66.1				
Total	165	100				

Source: Field Survey, 2023.

Respondents' perception on the use of smart agricultural technologies

Majority of the agricultural researchers (97.5%) agreed that agricultural research activities are made easier with the use of these technologies. Most respondents (95.2%) agreed that smart agricultural technologies would help provide sustainable solutions to agricultural problems and that smart agricultural technologies make the research experience enjoyable. Majority 95.7% agreed that agricultural issues (such as climate change, irrigation, etc.) can be addressed using these technologies. Most of the respondents (94.3%) agreed that a lot could be achieved using these technologies. Similarly, 93.9% agreed that the data obtained from these technologies are vast and well-detailed.

On the other hand, 80% of the respondents disagreed with the statement that researchers cannot achieve much when they use smart agricultural technologies, 72.2% of the respondents disagreed that these technologies could not be used for agricultural research activities, 75.1% of the respondents disagreed with the statement that data

Table 2 shows the level of respondents' knowledge of the use of Smart Agricultural technologies. Majority (66.1%) exhibited high knowledge, while 33.9% had low knowledge. This suggests that researchers in the study area possess a strong grasp of these technologies and understand their concepts, functionalities, and potential benefits. This indicates a positive outlook for the adoption and integration of smart agricultural technologies in research practices. However, the sizable proportion with low knowledge (33.9%) highlights the necessity for targeted interventions and capacity-building initiatives. Training, workshops, and educational resources should be provided to enhance understanding and awareness among researchers. Addressing this knowledge gap will enable researchers to fully leverage these technologies, enhancing agricultural efficiency, productivity, and sustainability in the study area.

captured by these technologies are not useful for research activities.

Respondents' level of perception on the use of smart agricultural technologies

Table 3 shows respondents' perceptions regarding the use of smart agricultural technologies. About 58.8% had favorable perceptions, recognizing the potential benefits these technologies offer to research activities. They perceive smart agricultural technologies as valuable tools for enhancing the research process. This positive perception reflects a readiness to adopt and utilize these technologies if accessible.

However, a significant portion (41.2%) of respondents expressed unfavorable perceptions. This suggests that some researchers have reservations, concerns, or doubts about the effectiveness, usability, or practicality of these technologies in their specific research context. Addressing these concerns through enhanced information dissemination, training, and support initiatives could alleviate skepticism and promote greater adoption of smart agricultural technologies among this group.

Table 3: Frequency distribution of respondents' level of perception on the use of smart agricultural technologies

Perception towards the use	Frequency	Percentage	Min	Max	Mean	Std dev
Unfavorable	68	41.2	73	124	101.97	11.58
Favorable	97	58.8				
Total	165	100				

Source: Field survey, 2023

Respondents' use of smart agricultural technologies

The result reveals varying levels of use of smart agricultural technologies among respondents. About 33.9% regularly use Geographical Information Systems (GIS) for geographical data capture, while 30.9% consistently utilise the Internet of Things (IoT) for data gathering. Similarly, 30.3% always employ GIS for geographic data processing and integration, with 29.1% relying on IoT for gathering environmental data.

However, 41.2% of respondents occasionally use sensors for monitoring soil and climate conditions, while 38.8% occasionally utilise GIS for solving geographical issues. Additionally, 37.6% occasionally employ GIS for data processing and mapping. This implies that some researchers use these technologies, but their frequency and level of use vary. The activities for which they use these technologies also differ as these researchers have different areas of specialisation.

Respondents' level of use of smart agricultural technologies

Respondents were categorised based on their usage scores, with those scoring below the mean (18.0) considered to have a low level of use, while those scoring at or above the mean were categorised to have a high level of use. About 55.2% of the respondents had a low level of use indicating, a significant underutilisation of smart agricultural technologies among agricultural researchers in the study area. This highlights the need to promote their adoption and utilisation.

Conversely, 44.8% of the respondents have a high level of use, indicating a successful integration of these technologies into their research practices. It would be valuable to study this group's characteristics, approaches, and experiences to identify best practices and success factors that can be shared and replicated to encourage broader adoption and higher levels of use among other researchers.

Table 4: Frequency distribution of respondents' level of use of smart agricultural technologies

Level of use	Frequency	Percentage	Min	Max	Mean	Std Dev
Low (< mean)	91	55.2	0	53.0	18.0	15.15
High (≥ mean)	74	44.8				
Total	165	100				

Source: Field Survey, 2023

Test of Hypothesis

Chi-square analysis of researchers' socioeconomic characteristics and use of smart agricultural technologies reveals that the respondents' level of education ($\chi^2 = 8.172, p < 0.05$) and research institution ($\chi^2 = 8.579, p < 0.05$) had a significant relationship with their use of smart agricultural technologies. The statistically significant relationship suggests that these factors influence agricultural researchers' adoption and utilisation of these technologies. It implies that researchers with higher levels of education are more likely to use smart agricultural technologies. For the research institutions, the implication is that the organizational context and support provided by the research institution influence the use of smart agricultural technologies.

PPMC analysis of respondents' knowledge and use of smart agricultural technologies reveals

that there is no significant relationship ($r = 0.083, p > 0.05$). This implies that knowledge does not necessarily lead to their practical application. Conversely, the PPMC analysis of respondents' perceptions and use of smart agricultural technologies reveals a significant negative relationship ($r = -0.242, p < 0.05$). Despite the favourable perceptions, usage levels remain low, indicating additional factors beyond perception affect adoption and utilization.

CONCLUSION AND RECOMMENDATION

The study revealed that agricultural researchers in Oyo State possess knowledge and hold favourable perceptions regarding smart agricultural technologies. However, their actual utilisation of these technologies remains low, likely due to limited availability and access to these technologies in research institutes. To address this,



it is recommended that the government allocate sufficient funding to agricultural research institutes for the acquisition and implementation of smart agricultural technologies. Additionally, institutes should ensure adequate infrastructure support, such as runway facilities for fixed-wing UAVs, to facilitate the effective utilization of these technologies by researchers.

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CONSTRAINTS TO UTILISATION OF CLIMATE INFORMATION SERVICES AMONG CROP FARMERS IN EBONYI STATE, NIGERIA

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ABSTRACT

The study assessed the challenges faced by crop farmers in utilising climate information services (CIS) in Ebonyi State, Nigeria. The multi-stage sampling procedure was used to select the 405 farmers from the State and data was analysed using factor analysis. The constraints to utilisation of climate information included inadequate farmland to implement the advice (0.774), high costs of input (0.850), lack of finance to buy the inputs to implement the advice (0.831), difficulty in understanding the terms used in communicating climate information (0.828), difficulty in understanding the language used in communicating climate information (0.803), and climate information not accompanied with any advice (0.593). The study recommends that farm inputs should be made affordable through provision of affordable credit facilities to the farmers. Climate information should also be communicated to the farmers in a timely, efficient, and effective manner, and using appropriate languages and terms that farmers would understand.

Keywords: Climate information services; constraints; factor analysis; crop farmers

INTRODUCTION

Climate resilience and mitigation strategies are now prioritised issues of the agriculture sector (Onyeneke *et al.*, 2014). Some of the solutions sought after including the climate advisory services (such as climate information services); hence climate information services (CIS) are not absolutely alien to the farmers nowadays. The Global Framework for Climate Services (GFCS) identifies agriculture as a priority sector regarding the demand for and supply of climate information, and these climate services were mainly used for adaptation purposes and then mitigation (Perrels *et al.*, 2020; Tart *et al.*, 2020; Larsen *et al.*, 2021).

According to the World Meteorological Organization (WMO) (2014), its member countries should have weather stations located not more than 50km gaps apart to ensure adequate climate monitoring. Nigeria as a member country is yet to achieve this requirement based on the network of stations of Nigerian Meteorological Agency (NiMET). Weather stations and out-stations are setup to carry out a range of services of which agrometeorological information and climate data collection and synthesis are part of. Information from these stations and agencies are also made available to the public remotely, through the mass-media, through researchers, through the disaster management agencies, etc. In Ebonyi State, agriculture contributes to a large portion to the inhabitants' occupation and livelihood. Rain-fed agriculture is a major feature of the farming communities and CIS is needed to adapt. A lack of knowledge of the challenges to use of climate information services would logically limit its usage otherwise. Hence, this study analysed the constraints to utilisation of CIS by crop farmers in Ebonyi State.

METHODOLOGY

The study was conducted in Ebonyi State, Nigeria. The State is divided into three agricultural zones in the State – Ebonyi North zone, Ebonyi South zone and Ebonyi Central zone – and thirteen Local Government Areas. The multistage sampling procedure was adopted in the selection of 405 crop farmers across the State for the study. Structured questionnaire was the main data collection tool for this study. Data collected was analysed using factor analysis.

RESULTS AND DISCUSSION

Constraints to Utilisation of Climate Information Services

Table 1 shows the Varimax rotated component matrix on constraints associated with CIS utilisation. From the table there were two principal factors that hindered the utilisation of CIS from the result of the loadings of the components. These include input associated problems and communication and market constraints. The constraints related to lack/inadequate farm inputs/assets and resources included inadequate farmland to implement the advice (0.774), high costs of input (0.850), and lack of finance to buy the inputs to implement the advice (0.831). The problems associated with communication of CIS to the farmers and market access were difficulty in understanding the terms used in communicating climate information (0.828), difficulty in understanding the language of communication (0.803), climate information not accompanied with any advice (0.593), and poor/inadequate access to input markets (0.510). This is why increasing farmers' access to extension and engaging and training extension agents more in disseminating CIS in the language understandable to the farmers is important. From the result there were two principal factors that hindered the utilisation of CIS from the

result of the loadings of the components. These include input associated problems and communication and market access associated problems. The constraints related to lack/inadequate farm inputs/assets and resources included inadequate farmland to implement the advice (0.774), high costs of input (0.850), and lack of

finance to buy the inputs to implement the advice (0.831). This is like the findings of Umeh and Chukwu (2015), who found lack of financial resources and rising cost of farm labour as constraints to adaptation among food producers in Ebonyi State.

Table 1. Varimax rotated component matrix on constraints associated with utilisation of climate information services

Constraints	Factor 1 (Input Constraints)	Factor 2 (Communication and Market Access Constraints)
Difficulty in understanding the terms used in communicating climate information	0.012	0.828
Difficulty in understanding the language used in communicating climate information	0.029	0.803
Not accompanied with any advice	0.051	0.593
Lack of trust on the climate information provided	0.244	0.393
Inadequate farmland to implement the advice	0.774	0.186
Lack of finance to buy the inputs to implement the advice	0.831	-0.021
High cost of inputs	0.850	0.084
Poor/inadequate access to input markets	0.456	0.510

Source: Field Survey, 2022

Furthermore, poor access to input market, high costs of input and the lack of finance to buy the inputs to implement the climate advice make it hard to implement some climate advice if not impossible. Ensuring an inclusive agricultural production cum rural development requires steady input supply. Not only that but also, the availability, accessibility, affordability, and the supply of the needed inputs must be ensured (Belt *et al.*, 2015) for necessary climate advice and improved agricultural production to be achieved. Overcoming these identified major constraints will assist in ensuring better impact of crop farmers' access and utilisation of CIS. Also, communicating CIS to farmers in a language and manner they would understand posed a significant problem. The problems associated with CIS communication to the farmers and market access were difficulty in understanding the terms used in communicating climate information (0.828), difficulty in understanding the communication language (0.803), climate information not accompanied with any advice (0.593), and poor/inadequate access to input markets (0.510). These constraints can be handled by effectively engaging agricultural extension officers in communicating climate information to farmers. This is because, extension activities employ necessary teaching methods to ensure that farmers grasp the messages that are meant for them (Ofuoku, 2013), including the use simple languages and technicalities that would ensure farmers understanding of the message being passed across to them (Sikhondze, 2020). Besides, the laggards among the farmers still find it hard to trust climate

information on effective production, and this has made the usability of the climate information to be questioned by them (Afangideh *et al.*, 2012). This is out of their attachment to their traditional beliefs which must be separated from them for the achievement of the success of CIS.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that the major constraints to CIS utilisation include lack or inadequate farm inputs to implement the advice received and communication/language and market access constraints. These constraints include inadequate farmland to implement the advice, lack of finance to buy the inputs to implement the advice, high cost of inputs, poor/inadequate access to input markets, difficulty in understanding the terms used in communicating climate information, and difficulty in understanding the language of communication. Provision of credit to finance inputs needed to use climate information by the farmers is necessary to ensure the successful accomplishment of climate mitigation and adaptation. Also, bottlenecks to access to farmlands should be removed. This will increase access to land where the farmers can easily implement climate advice for increased production, while farmers should be persuaded to have better trust of the climate information for better utilisation. Increasing farmers' access to extension and engaging and training extension agents more in disseminating CIS in the language understandable to the farmers could be important strategies to increasing the access and use of CIS in farming.

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