ISSN: 2755-0109

Journal of Media & Management

SCIENTIFIC Research and Community

Review Article

Open Access

Effects of Information and Communication Technologies (ICTs) on Youths Participation in Sesame Seed Production in Kwali Area Council, Abuja, Nigeria

Alfa Mohammed Kudu[1*], Sennuga SO[1], Maimunatu KH[1], Ajuma Ebhohon[1] and Funso Omolayo Alabuja[2]

[1]Department of Agricultural Extension and Rural Sociology, Faculty of Agriculture, University of Abuja, Abuja, Nigeria

[2]Department of Agricultural Economics, Faculty of Agriculture, University of Abuja, Abuja, Nigeria

ABSTRACT

Youths play a major role in Agricultural production and enhancement of Agricultural productivity. The broad objective of this study is ascertaining the effects of ICT on youth's participation in the production of sesame seed in Kwali Area Council of the Federal Capital Territory Abuja. Primary data was used for the study. Purposive sampling of sesame youths farmers was employed to select 20 sesame youths farmers each from five political wards that are known to be cultivating sesame which gave 100 respondents. Descriptive statistics, likert scale and problem confrontation index were used to achieve all the specific objectives. From the result majority of the farmers are male (70%), married (66%) with a household size of 2.5(57%) and having a majority between ages of 31-40years representing 40%. The level of education of the majority which is secondary school and that may determine to an extend the use of ICT ranges 38% farm size which may encourage them to request for better knowledge of sesame production is also low(1ha). Other factors includes effectiveness in the use of ICT (GSM 100%, Radio 100%, Cassette 4%, TV 9%, Cassette and Recorder 2%, Video 5%, Media van 2%, Agric Book 0%, Internet 17%, Projector 3% and Storage device 0%.). Knowledge of ICT of sesame farmers having 100% use of GSM and Radio while the rest parameter has varying low percentages. The challenges associated with the use of ICT among youths in sesame production shows that lack of ICT facilities 66%, lack of skills 72%, poor power supply 72%, cost of maintenance 76% & theft 78%. The study therefore, recommended prompt attention on the part of government is required to provide ICT facilities, strengthen information dissemination through sensitization and Extension service delivery among others.

***Corresponding author**

Alfa Mohammed Kudu, Department of Agricultural Extension and Rural Sociology, Faculty of Agriculture, University of Abuja, Nigeria.
E-mail: alfamk2017@gmail.com

Received: July 12, 2022; **Accepted:** July 19, 2022, **Published:** July 27, 2022

Introduction

Youths undoubtedly, play a major role in Agricultural production as also will be agreed that Agriculture gives job opportunity to the class of youths especially. According to, Nigeria is said to have the capacity to produce adequate food for the country, particularly in terms of land and people resources of which the larger number is within the youth folk [1-3]. Hence, to archive food self-sufficiency as stated is the issue of food boosting the development of the most promising and stable food and cash crop in the country which must be addressed [4,5]. In reality, the role of youth's participation in the production of sesame seed is influenced by several socio-economic factors (including Gender, Marital status, Household size, Age, Level of education and farm size).

Information and communication technologies (ICT) are progressively becoming the fundamental drivers of social and economic development, including agriculture, in today's world, not just in affluent countries but around the world [6,7]. Sub-Saharan Africa has seen a substantial increase in the use of ICT during the previous two decades Conger. However, identified several barriers to ICT adoption, including a lack of awareness; an immature legal framework for information sharing; infrastructure issues; low global network connectivity; maintenance issues; insufficient research and development; and expensive taxes. Many African individuals and workers in a variety of industries now own personal ICT devices such as laptops, tablets, and cellphones [8]. Smallholder farmers are also adopting ICT (mostly mobile phones with SMS texting capabilities) for a number of purposes, ranging from personal communication to market intelligence [9]. Indeed, in Sub-Saharan Africa, the mobile telephone Global System for Mobile communication (GSM) is considered as having the highest growth rate of any continent's ICT, with some unique and new applications being discovered [10,7].

Farmers and rural communities require knowledge in order to adopt relevant and appropriate innovations; as a result, one of the key duties of extension workers is to provide important agricultural information to farmers [11]. Agricultural extension has been an important driver in the agricultural sector, helping various developing countries achieve economic growth. In Nigeria, for example, the government has identified the public-sector extension system (ADPs) as a crucial participant in bridging the production gap that exists between agricultural research output and farmers [12]. Communication between important actors in agriculture and rural development must be interactive, characterized by an interchange of ideas, a focus on discourse, and the ability to grasp

other points of view while delivering honest feedback [9].

The significant arguments against using ICT in agricultural extension services stem from their characteristics that have the potential to influence extended services. According, ICT may improve rural areas and reach millions of people at the same time by overcoming geographical barriers, providing regular and repeated interaction, capturing the truth of the event, storing, and sending and receiving information [13,14]. Agricultural extension, whether public or private, cannot function effectively without a constant flow of trustworthy information and technology, and as a result, farmers' growth is largely dependent on their ability to access the most up-to-date and relevant information [6,15]. In many rural development efforts to overcome the knowledge gap, ICT has proven to be invaluable.

Sesame has been one of the sought-after cash crops after cocoa in Nigeria, hence Nigeria has been one of the largest producing countries of sesame as opined by [16]. In Africa, Sudan is the major sesame producers followed by Nigeria where Kwali in FCT geographically is located before spreading to other states in Nigeria. Sesame seed otherwise known as Benni-seed is one of the Agricultural enterprises that helped not only in boosting farmers' incomes but also as a means of generating revenues to the government at various levels both locally and internationally. It was realized that the crop can be cultivated on rough areas and it is resistant to drought and high temperature [17,18]. It is one crop that performs very well on marginal soils of and West Africa Sahel climate [19]. And as contain in National Agricultural Extension and Research Liaison Service (NAERLS), 2010, that in the world production of edible oil seeds, sesame ranks eight. Despite the international spread of ICTs, availability, benefits, and use implications have been unevenly distributed around the globe. For example, in Nigeria, there are a number of obstacles to farmers owning and utilizing ICTs, including high costs of ICT facilities, inadequate network access, irregular power supply, and a lack of awareness of the benefits of ICT usage in agriculture, to name a few. As a result, local people and farmers in rural areas are less likely to have access to contemporary technologies. The Federal Capital Territory's remote regions appear to have a poorly built ICT infrastructure that hinders agricultural information search. Although some farmers now use ICT gargets for data and information management, the majority of them have little or no internet connectivity [18].

Sesame seed is a blooming plant that belongs to the sesamum indicum genus and is distributed throughout the world's tropical regions. It was cultivated and consumed as a food item for the first time 3000 years ago [20]. The seed's quality is that it is extremely drought tolerant, allowing it to thrive even when other crops fail. As a result of its drought resistance, sesame seed is becoming a more popular choice for growing in Northern Nigeria. The production and growth are extensively noted in the north of Cross River states and in Ebonyi, but it did not produce a large quantity of seeds in the Delta region [21]. Approximately 300,000 tonnes of sesame seed are now being produced by Nigeria states, including Taraba, Benue, Jigawa and Nassarawa. Sesame is currently grown in 26 countries around the world, and its output is predicted to increase, resulting in high costs [21]. This means that when worldwide demand for sesame grows, Nigeria can easily set desired export prices in the global market. According to, the bulk of sesame seeds are utilized to extract oil, with the remainder being consumed as food [22]. It is a beneficial seed that is robust and resistant to extreme temperatures, and its production is essential for both financial and nutritional demands [23]. As a result, increased attention and focus on production efficiency through the use of improved technology and automation is required [24,25].

We therefore, found out in this research work the extent to which ICT is being used by the youths and its effectiveness in the study area in promoting sesame seed production both food and cash.

Methodology

The study was carried out in Kwali Area Council in the Federal Capital Territory of Nigeria. Kwali Area Council is located at the southern part of the Federal Capital Territory and bordered by 60th Abaji Area Council to the south, Kuje Area Council to the east and Gwagwalada Area Council to the west laying between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of the Greenwich Meridian. Kwali Area Council is located within Federal Capital Territory which covers an area of approximately 7,315km/2. It is situated within savannah region with moderate climatic condition. Kwali Area Council is made up of nine wards namely Kwali central, Gomani, Ashara, Dafa, Pai, Kundu, Piri, Yeru and Wako wards Kwali Area Council was purposively chosen. This was because of the fact that Kwali Area Council seems to be the Area Council cultivates sesame most as compare to the other area councils in FCT. Five out of the nine wards were randomly selected, thy include Ashara, Dafa, Kundu, Wako and Gomani ward. Purposive sampling was made to select 20 youth's participating in sesame production which gives a total of 100 respondents. The instruments for data collection were for questionnaire administered to youths involved in sesame farming. The questionnaire was structured according to the objectives. The analytical technique used is descriptive statistics to archive the objectives.

Descriptive Statistics

Mean, Percentages and Frequency among others were used in the descriptive statistics. It was however used to analyze the socio-economic features of the youth sesame farmers, also analyze the effectiveness in the use of ICT of youths in the study area, analyze the knowledge of ICT of youth sesame farmers in the Kwali Area Council and found out the challenges associated with the use of ICT among youths in sesame production in Kwali Area Council.

Four Point Likert- Type Scales

A four-point likert-type scale was used to get information on the challenges associated with the use of ICT among youths in sesame production in the research area.

Problem Confrontation Index

A problem confrontation index based on the likert scale was utilized to analyze the constraint experienced by the youths involved in sesame production in Kwali Area Council. The problem confrontation index is stated as

PCI= Pn Lo + P1 L1 + Pm L2 + Ph L3 _____ (1)

PCI = Problem confrontation index (Units)

Pn = The Frequency of farmers that they haven't issues (Units)

Pl= Farmers who actually evaluated the challenges as minor in number (Units)

Pm= Farmers who evaluated the problems as moderate in frequency (Units)

Ph= The Frequency of farmers who evaluated the situation as severe (Units)

Results and Discussion

Table 1: Socio-Economic Characteristics of the Respondents

Socio-Economic variables	Percent
Gender	
Male	70.0
Female	30.0
Marital status	
Married	66.0
Single	34.0
Household size	
2-5	57.0
6-10h	36.0
11-15	7.0
Age	
18-30 years	28.0
31-40 years	40.0
41-50 years	21.0
50 & Above	9.0
Level of Education	
Primary	18.0
Secondary School	38.0
Tertiary Education	14.0
Non-formal Education	11.0
No education at all	19.0
Size of Farm	
1ha	78.0
2ha	19.0
3ha	3.0

Source: Field Survey (2021)

Data in Table1 shows the socio-economic characteristics of youths involved in sesame production in the study area. The table reveals that (70%) of the respondents are male while (30&) are females. While (66%) of the respondents are married and (34%) were single. The result further reveals that 57% represents a house hold size ranging between 2-5 while 30% represents household of between 6-10 and 7% represents household of between 11-15.s. expansion however of the family occurs through marriage, marital status which has a significant impact on household size and household labor availability. This is in line with the findings of [26].

The result of the study further revealed that 40% of the respondents are between the ages of 31-40 years and that age brackets are the highest involved in the production of sesame seed in the study area, while 28% are of the ages between 18-30 years which rank second highest. Respondents within the ages of 41-50 years constitute 21% and very few respondents within the ages of 50 and above are just within 9%. The active ages of the respondents as revealed in the study for the production of sesame seed is 31-40. This age brackets are usually self-motivated, innovative, energetic and can cope with the physical demands of farming [27].

Response on the level of education as shown in Table1 indicates that majority of the respondents had a secondary education with the study revealing 38.0%, while those with no any form of education ranking second with 19%, this may be responsible for low use of ICT in fetching out innovations and best practice in sesame production as the result of the study revealed. However 18% of the sampled population had tertiary education. The least among the respondents have non formal education with 11%. Respondents as the study revealed have challenges with the land holdings in spite of their level of knowledge in the production of sesame seed, about 78% of the respondents produce sesame seed under 1ha, while 19% of them cultivates the crop under 2ha and very minimal 3% cultivates up to 3ha of the sesame seed.

Table 2: Effectiveness in the Use of ICT Among Youths in the Study Area

Effectiveness of use of ICT among Youth	Response	Percentage
GSM	Yes	100.0
Radio	Yes	100.0
Cassette	Yes	4.0
	No	96.0
TV	Yes	9.0
	No	91.0
Camera & Recorder	Yes	2.0
	No	98.0
Video	Yes	5.0
	No	95.0
Computer	Yes	41.0
	No	59.0
Media Van	Yes	2.0
	No	98.0
Agric Book	Yes	0
	No	100.0
Internet	Yes	17.0
	No	83.0
Projector	Yes	3.0
	No	97.0
Storage Device	Yes	0
	No	100.0

Source: Field Survey (2021)

The responses of the respondents as indicated in Table2 were structured lobe either yes or no and so virtually all the respondents uses GSM (100%). And still on the same Table 2 the use of Radio was by all the respondents' i.e 100%. Only 4% of the respondents uses cassette recorder to listen to best practice in sesame production while 96% indicated that they do not use cassette. Only 9% of the total respondents uses Television to view programs on sesame production while 91% do not as indicated on table2 and according to education enables an individual to gain knowledge and skill which increases their power of understanding. This position explains the effects of having the quest for knowledge on the best ways to cultivate, package and market sesame seed which has direct bearing with the effectiveness in the use of ICT among the target youths involve in sesame production.

The use of Recorders and camera was very minimal. Only 2% of the respondents use the gadgets while 98% do not use camera and recorder. Also only 5% of the respondents use video and 95% do not use video. 41% uses computer by way of receiving knowledge through watching grigles according to them instead of exploring internet to know what is happening in the higher societies of the world, and as can be seen of the table only 17% uses internet service while 83% do not. Media van service was not well known by the sampled respondents. Only 2% have ever watched Agricultural program on Media van. No one person has ever used Agric book as well as the use of storage device. The survey revealed that the respondents are willing at any opportunity to learn on the best practices in sesame production since they know and have feel that it is a crop that spine money. This position is in line with that of Yusuf et al.

Table 3: Knowledge of ICT by Sesame Farmers in Kwali Area Council

Knowledge of ICT	Response	Percentage
GSM	High	100.0
Radio	High	100.0
Cassette & Recorder	Low	100.0
TV	High	28.0
	Low	72.0
Camera & Recorder	Low	100.0
Video	Low	100.0
Computer	Low	100.0
	Low	100.0
Media Van	Low	100.0
Agriculture Book	Low	100.0
Internet	High	19.0
	Low	81.0
Projector	Yes	3.0
	No	97.0
Storage Device	Yes	0
	No	100.0

Source: Field Survey (2021)

In order to address specific objectives which try to find out the knowledge of ICT of sesame farmers in Kwali Area Council, received responses as follows; The use of GSM by the respondents was high with its percentage as 100% as well as the responses on the use of radio turning-in a 100% use, the frequency was also 100%. The knowledge of ICT by the sesame farmers using cassette and recorder was very low with all left without using cassette and recorder on acquiring knowledge of sesame seed production. The use of video in the knowledge of ICT of sesame farmers in the study area was generally low with 100% as well as the use of computer also recording 100% of low responses. The use of media van and Agriculture book were also 100% low. Internet use recorded 19% high response of 81%. This shows that the major constrains faced by the sample sesame farmers in the study area and so require Government intervention [20].

Table 4: Challenges Associated with the use of ICT among youths in Sesame Production in Kwali Area Council

Knowledge of ICT	Response	Percent
Lack of ICT facilities	Yes	76.0
	No	24.0
Low literacy	Yes	72.0
	No	28.0
High cost	Yes	66.0
	No	34.0
Lack of skills	Yes	72.0
	No	28.0
Poor power supply	Yes	72.0
	No	28.0
Cost of maintenance	Yes	76.0
	No	24.0
Lack of ICT facilities	Yes	78.0
	No	22.0
Thieves /burglars	Yes	78.0
	No	22.0

Source: Field Survey (2021)

Lack of ICT facilities for use among youths involved in sesame production in the study area had responses of 76% while 24% responded by attesting to its availability. The responses of the attested to low literacy level of up to 72% while a few number representing 28% have one form of education or the other. Most of the respondents cannot afford or own their ICT facilities, hence, 66% cannot, while 34% submitted that they can afford ICT services. 72% of the respondents lack skills and knowledge to even operate ICT facilities while only 28% could do that. ICT facilities are the poor power supply while only 28% attested to power supply. The cost of maintaining the ICT facilities where is high as submitted by 76% of the respondents while only 24% oppose to the high cost of maintenance of ICT facilities. Greater number of respondents in the study area agreed to the lack of ICT facilities in their area while only 22% agreed to the availability of ICT facilities in their area. One of the major problems as indicated in the responses was theft/burgling into where the facilities are kept. 78% of the respondents agreed to the theft and burgling of the facilities while 22% agreed to the safe keep of the facilities.

Conclusion and Recommendation

The study assessed the effect of ICT on youth's participation in the production of sesame seed in Kwali Area Council, FCT, Nigeria. The result of the study shows that more males who are married are involved in sesame production than the women folk. The study also revealed that even through the respondents that are literate at various levels and are expected to have knowledge of ICT do not actually have, let alone to benefits them in boosting their production of sesame seed. Most of the respondents do not have sufficient land that will enable them produce sesame seed at commercial level let alone for them to have a boost in their

revenue drive. The category of farmers involved in the production of sesame seed in terms of number do not fall under the most active age of 18-30 years rather are of the age between 31-40 years which may also be responsible for low scale of production of sesame. Other constrains such as insufficient knowledge of ICT in the production of sesame, low effectiveness in the use of ICT among youths and the daunting challenges associated with the use of ICT are also responsible for low production rate of sesame seed in the study area.

The study therefore, recommends that government should make frantic effort to sensitize sesame farmer on the benefits of using ICT to gain knowledge on the best practices in sesame production among youths so as to increase income to the farmers, reduce youth restiveness and also reduce crime within the rural area. Government should also intensify effort in providing more extension services to increase knowledge of the youths in sesame production because of its value. Government effort should also be geared towards steady source of light and security so as to encourage youths to establish ICT centers in their domains [28-31].

References

1. Adeoye NO, Ayanlade, A, Babatimehin O (2012) Climate changes and menace of floods in Nigerians Cities: Socio-economic implications. Advances in natural and Applied Sciences 2: 113-134.
2. Egboduku CO, Sennuga SO, Okpala EF (2021) Factors influencing the interest of youths towards career in agriculture: A case study of Bwari Area Council, Abuja, Nigeria. International Journal of Advance Agricultural Research 9: 61-68.
3. Ebisike C, Fadiji TO, Sennuga SO (2021) Awareness and Usage of Information and Communication Technologies (ICTs) among Farmers in Federal Capital Territory, Nigeria. Journal of Current Trend Agriculture Environment Sustainability 2: 1-4.
4. Balogun NA, Ehikhamenor FA, Mejabi OV, Oyekunle RA, Bello OW, et al. (2020) Exploring Information and Communication Technology among rural dwellers in Sub-Saharan African communities. Africa Journal of Science, Technology, Innovation and Agriculture and Forestry 4: 6-15.
5. Chibuike FE, Sennuga SO, Bako H, Wilberforce AG (2022) Exploring the effect of Rural-Urban Migration among Youths in Abuja Municipal Area Council (AMAC) FCT, Abuja. International Journal of Agriculture Extension and Social Development 5: 54-58.
6. Sennuga SO (2019) Use of Information and Communication Technologies (ICTs) among Smallholder Farmers and Extension Workers and its Relevance to Sustainable Agricultural Practices in, A Thesis submitted for the degree of Doctor of Philosophy (PhD) Coventry, University, United Kingdom. https://pure.coventry.ac.uk/ws/portalfiles/portal/30430186/Sennuga_PhD_Pure.pdf
7. Adeyongo IL, Sennuga SO, Lai-Solarin WI, Ezinne ME (2022) Impact of cyber-extension and social media (WhatsApp and Facebook) on Extension workers job in Federal Capital Territory, Abuja, Nigeria.s Applied Research Frontiers 1: 28-33.
8. Chikaire JU, Anyoha NO, Anaeto FC, Orusha JO (2017) Effects of Use of Information and Communication Technologies (ICTs) on Farmers' Agricultural Practices and Welfare in Orlu Agricultural Zone of Imo State, Nigeria. International Journal of Research and Development 10: 85-93.
9. Lai-Solarin WI, Adeoye WA, Sennuga SO (2021) Technology Adoption Capabilities of Small Farm Dairy Cattle Holders in Gwagwalada, Abuja: Effects of Asymmetric Information and Extension Approaches. International Journal of Agricultural Economics 6: 315-323.
10. Irungu KRG, Mbugua D, Muia J (2015) Information and Communication Technologies (ICTs) Attract Youth into Profitable Agriculture in Kenya. East African Agricultural and Forestry Journal 81: 24-33.
11. Ebisike C, Sennuga SO, Tuedon OA, Maimunatu KH (2021) Exploring the Use of Information and Communication Technologies (ICTs) among Village Extension Agents in Federal Capital Territory, Nigeria. Journal of Research in Science and Technology 2: 78-84.
12. Nwali PN, Sennuga SO, Emeka O (2022) Evaluation of Small-Scale Women Farmers' Utilization of ICT in Accessing Agricultural Information in Gwagwalada Area Council, Abuja, Nigeria. Green Reports 3: 34-38.
13. Colle R, Roman R (2016) IOS Press Content creation for ICT development projects: Integrating normative approaches. Information Technology for Development 10: 85-94.
14. Afolayan OA, Sennuga SO, Ezike DN, Wilberforce AG (2022) Assessment of Inputs Accessibility to Smallholder Farmers in Nigeria: A Case Study of Kuje Area Council, Abuja. International Journal of Advanced Multidisciplinary Research and Studies 2: 322-326.
15. Olorunniyi AA, Ezinne ME, Osiboye OO, Sennuga SO (2022) Effect of social media in Enhancing Agricultural Extension among Farmers in Gwagwalada Area Council, Abuja. Journal of Research in Science and Technology 3: 24-32.
16. Dennis BI, Baba KM, Mohammed I, Bello HM (2018) Impact of inflation on farm families in sokoto. Proceedings of the 23rd annual conference of the Farm Management Association of Nigeria. Sokoto Chapter 98-103.
17. Fadiji TO, Sennuga SO, Angba AO (2021) Differentials in usage of Information and Communication Devices among Extension Agents: A Study on North-Western Zone Nigeria. American Journal of Agriculture and Forestry 9: 42-48.
18. Omabuwa AT, Sennuga SO, Bako H, Olorunniyi AA (2022) Assessment of Factors Militating Against Youths Participation in Agriculture Based Livelihood Activities in Kuje Area Council, Abuja. International Journal of Advanced Multidisciplinary Research and Studies 2: 69-74.
19. Dossa K, Konteye M, Niang M, Doumbia, Y, Cisse N (2017) Enhancing sesame production in West Africa's sahel: A comprehensive insight into the cultivation of this untapped crop in Senegal and Mali. Agriculture and Food Security 6: 17-26.
20. Balarebe IY, Muhammad BM (2019) Socio-economic characteristics of farmers in Sokoto state: A Baseline Assessment for agricultural project. Journal of Business and Management, 21: 13-20.
21. Agronigeria (2016) Angro Nigeria: Sesame Seed. https://agronigeria.ng/2016/05/27/sesame-seed/.
22. El Khier MKS, Ishag KEA, Yagoub AEA (2008) 'Chemical composition and oil characteristics of sesame seed cultivars grown in Sudan'. Journal of Agriculture and Biological Sciences 4: 761-766.
23. Akinoso R, Igbeka JC, Olayanju TA (2006) Process optimization of oil expression from sesame seed (Sesamum indicum Linn.). Agricultural Engineering International: CIGR Journal 5: 26-38.
24. Imaenyin NI (2015) Agriculture in Nigeria: identifying opportunities for increased commencialization and investment. Bulletin of Eurasian Science 7: 26-38.

25. Indahgiju WD, Sennuga SO, Bako H, Maisule SA (2022) Exploring the Utilization of Cowpea Storage Mechanisms for Post-Harvest Loss Avoidance in Kuje Area Council, Abuja, Nigeria. International Journal of Agricultural Research Pesticides and Biofertilizers 3: 1-6.
26. Okunlola JO, Ajileye A, Owolabi O (2020) Rural women involvement in post-harvest Rice Production Activities in Ekiti State, Nigeria. Asian Journal of Agricultural Extension, Economics and Sociology 38: 100-105.
27. Effiong JB, Ejioma JC, Okolo LC (2015) Participation of women farmers in rice production in Bende Local Government Area, Abia state. International Journal of Agricultural and Rural Development Studies 2: 1-9.
28. Conger S (2015) Knowledge Management for Information and Communications Technologies (ICTs) Attract Youth into Profitable Agriculture in Kenya. East African Agricultural and Technology for Development 81: 24-33.
29. FAO (2012) "Food and Agricultural Organization of the United Nation". FAOSTAT.
30. Sennuga SO, Baines RN, Conway JS, Naylor RK (2020) Role of Information and Communication Technologies (ICTs) in Enhancing Food Utilization among Smallholder Farmers' Households in Northern Nigeria. International Journal of Information and Knowledge Management 10: 24-32.
31. Sennuga SO, Conway JS, Sennuga MA (2020) Impact of Information and Communication Technologies (ICTs) on Agricultural Productivity among Smallholder Farmers: Evidence from Sub-Saharan African Communities. International Journal of Agricultural Extension and Rural Development Studies 7: 27-43.