

VOL 17 (SEPTEMBER, 2025)

The Nigerian Journal of Rural Extension and Development

ISSN 0795-7432

THE NIGERIAN JOURNAL OF RURAL EXTENSION AND DEVELOPMENT (NJRED)

Aims and Scope

The Nigerian Journal of Rural Extension and Development (NJRED), a referred journal, is an annual publication of the Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria. The journal is intended to encourage systematic and continuous publication of practical ideas and empirical research work in the area of Rural Extension and Development as it relates to Rural Development, Women in Development, Agriculture and Extension Education, Rural Sociology, Livelihood, Mass and Extension Communication, Health and Nutrition Extension, Home Economics, Adult Education and Multi-disciplinary Rural Extension issues.

In addition, the Journal publishes book reviews and research and research –in-brief articles.

The Review Process

NJRED employs a two-tier review system.

First, the editor reviews each submission to determine its suitability for further peer review by the NJRED Manuscript Review Committee. If the submission is judged as unsuitable, the editor either rejects the submission or highlights weaknesses and proffers revision suggestions to the author(s).

Second, submission judged suitable for further review is sent to 2 reviewers for in-depth assessment based on a blind review process. The reviewers focus on contribution to knowledge and appropriateness of methodology alongside writing style.

Editorial Board

Editor-in-Chief

Prof B. R. Olajide

Editorial Advisers

Prof. Janice E. Olawoye

Prof. O. B. Oyesola

Managing Editor

Prof O. T. Yekinni

Corresponding Editor

Dr N. S. Olutegbe

Associate Editors

Dr F. Ibeto

Editorial Assistant

Mrs Temitope Oyawale

All correspondence to: njred.ui@gmail.com

Note to contributors

Mission of Manuscripts

Articles must be original research work which should not have been submitted for publication elsewhere. Formatting of articles is to be done using MS Word (any version) with tables and figures well formatted, heading and other illustrations clearly distinguishable.

Articles submitted should be provided with a short abstract of about 250 words at the beginning of the text, reporting concisely the main results and important conclusions. At least 3 keywords are required at the base of the abstract. The cover sheet should contain:

- a. Title of the article
- b. Author (s), name (s), indicating correspondence author with e-mail address
- c. The first page of the manuscript should contain the title of the article.

List of references for each work cited should be given at the end of the text, in alphabetical order using the APA style of referencing, that is, surname of author (s), initials, year of publication in parenthesis, title of paper, name of journal (underlined or italicized) or book, volume, and first and last pages of the reference.

Tables and figures must be numbered, self-explanatory and appropriately referred to in the body of paper. All measurements must be in metric system with currency conversions stated.

Only e-copies of manuscripts are acceptable, as the journal assumes no responsibility for loss of manuscripts or accompanying materials in the mails. Authors are advised to retain copies of their submission.

Author(s) of accepted manuscript will receive a pdf and hard copy of the journal volume in which their article appears. Authors will be required to pay a set of fees to off-set the cost of publication, which are **Reviewing fee = ₦10,000** and **Publication charge = ₦25,000**.

Annual Subscription*

Overseas	Surface Mail	Airmail
Institution/Organisations	\$100 \$50	\$120 \$60
Individuals		
Student	\$20	\$30
Africa		
Institutions /Organisations	₦10,000.00	

E-Copies of paper are to be sent preferably by e-mail to: njredunibadan@yahoo.com

TABLE OF CONTENTS

Titles	Pages
Influence of youth participation in decision making on implementation of agricultural extension programmes <i>Nyang'au, M. K. and Maobe, S. N.</i>	5 – 10
Participation of in and out of-school youth in decision making on use of information communication technology to facilitate implementation of agricultural programmes and markets <i>Nyang'au, M. K. and Maobe, S. N.</i>	11 – 18
Perceived effects of climate change on tomato production in selected local government areas of Ondo state, Nigeria <i>Aminu, O. O.</i>	19 – 29
Transborder smuggling and youth participation in agriculture in Badagry local government area of Lagos state <i>Taiwo, A. M. and Hussain, L. A.</i>	30 – 36
Determinants of poverty among coastal artisanal fishers in Lagos state, Nigeria <i>Oyetade, O. P. Olaoye, O. J., Ojebiyi, W. G., Oyebamiji, B. A., Adekunle, T. O, Iskil-Ogunyomi, S. A. and Akintade, T. O.</i>	37 – 47
Determinants of utilisation of digital financial services among rural farmers in Ido local government of Oyo state, Nigeria <i>Olutegbe, N. S., Afolabi, N. A., Fajumo, B. M.</i>	48 – 55
Effects of self-isolation policy on the psychosocial state (condition) of senior citizens in Nigeria, Pakistan and South Africa <i>Adebo, G. M., Magsi, H., Oluwatayo, I. B., Adebo, A. I.</i>	56 – 65
Adoption of pesticides safety practices among cucumber farmers in Giwa Local Government Area of Kaduna State, Nigeria <i>Ojo, I. H., Suleiman, R. and Alibaba, M.</i>	66 – 74
Influence of Nigerian hip pop music on perceived moral values of rural youth in Kosofe local government area of Lagos state <i>Adelakun, O. E. and Williams, O. S.</i>	75 – 81

Influence of youth participation in decision making on implementation of agricultural extension programmes

¹Nyang'au, M. K. and ²Maobe, S. N.

¹Department of Agricultural Education and Extension, Kisii University, P.O Box 402 – 40200, Kisii, Kenya

²Department of Agricultural Sciences, Kisii University
Correspondence details: mkemunto@kisiuniversity.ac.ke

ABSTRACT

There is low participation of young people in decision making on implementation of agricultural extension programmes leading to failure in their acquisition of vocational skills for self-reliance. This study determined influence of out-of-school youth participation in decision-making on the implementation, to suggest measures to enhance their engagement for success. It was conducted in five typical Kenyan farming systems. Cross-sectional survey design, stratified, simple random and purposive sampling were used to select 160 adolescents who studied school agriculture but once out, had registered with youth groups engaged in it for self-reliance. Data was collected with questionnaires, analyzed by qualitative and inferential statistics at probability level $p \leq 0.05$. The linear regression correlation analysis confirms significant positive correlation ($R = 0.437$, $p = p \text{ value} \leq 0.001$) between level of participation in decision making and level of implementation of agricultural extension programmes. The result suggests that improving participation of out-of-school youth in decision-making would boost success in the implementation of agricultural extension programmes and enhance acquisition of vocational skills thus enhancing self-reliance. Spearman's rank correlation coefficient showed that level of implementation increases with rise in participation in decision making. Therefore, the proposed strategies possibly represent an effective scheme to transfer vocational skills to youth to enhance involvement in the implementation of the programmes for self-reliance.

Keywords: agricultural extension programmes, self-reliance, Youth decision-making on implementation

INTRODUCTION

The aspirations of the secondary school agriculture curriculum in Kenya were to promote the study of agriculture science both as an academic discipline and as vocation for self-reliance (Ochieng- Konyango & Asienyo, 2015). The vocational goal is meant to be achieved through a practical approach in the implementation of the curriculum which results in the transfer of farming skills to adolescents. But Ochieng- Konyango & Asienyo, (2015) observe that school agriculture programme has probably not made an impact on the practical aspect of the subject meant to promote vocational skills. Therefore, out of school youth who have completed the curriculum may have constraint of inadequate vocational skills in agriculture for self-reliance. To address the limitations, the Government of Kenya (GoK) initiated the Kenya agricultural rural youth extension programme in 1995 to transfer knowledge, skills and change attitudes of young people in rural areas. It is through youth groups that the Ministry engages young people in the implementation of

agricultural extension programmes in various aspects of the agricultural activities in which they are involved such as education content, crop and livestock production and nutrition. Specific measures in the programmes are to empower youth through capacity-building under technical and vocational training in farming. Also, introduction of new farming technologies such as green houses, drip kits, fish ponds and water harvesting facilities, that reduce drudgery, increase productivity and returns to labour (Kenya national youth policy, Ministry of Youth Affairs, 2007). Mager & Nowak (2012) define participation as involvement in collective decision-making process that includes dialogue amongst participants and other decision-makers and is not confined to individual decision making. The definition suggests that participation is said to occur when those involved have some influence over the decisions being made and actions being taken, rather than "taking part" or "being present".

There is problem of low youth engagement in decision making on implementation of

agricultural extension programmes leading to poor acquisition of vocational skills meant to enable them efficiently execute farming projects for self-reliance. In the absence of effective participation, their interests are possibly left out resulting in poor accomplishment of the programmes, achieving little in self-reliance. According to the World Youth Report (2003) harnessing the active involvement of youth in decision making represents an effective strategy for efficient implementation to achieve better outcomes. However, many stakeholders such as politicians, community leaders and society are far from convinced that without participation to decide on what is good for themselves, planning and implementation process, youth involvement would most likely remain low hence lack of self-sufficiency.

The objective of the study is to determine influence of participation of out-of-school youth in decision making on implementation of agricultural extension programmes

The hypothesis of the study is that participation of out-of-school youth in decision making does not significantly influence implementation of agricultural extension programmes.

METHODOLOGY

The study area, Kisii and Nyamira counties region, southwest Kenya, has been characterized by Jaetzold & Schmidt (1992) into five agro-ecological zones. In the study, these zones were adopted as farm types and used as unique sampling locations for youth. The farm types were used to obtain diverse youth population segments of respondents with varied exposures to agricultural activities, opportunities and experiences arising from different farming systems. The farm types are typical of similar ones in the Kenyan highlands and described as: 1) Tea-dairy zone, 2) Tea-coffee zone, 3) Maize-pyrethrum zone, 4) Coffee-banana zone and, 5) Marginal-sugarcane zone.

The out-of-school young people were purposively sampled from youth groups spread across the five farm types of the two counties. Specifically, youth who had studied secondary school agriculture and therefore presumed to have acquired vocational skills in the subject sampled as respondents. There were 75 registered

youth groups found in the five farm types and actively involved in the implementation of agricultural extension programmes for self-reliance. The groups had a total of 280 out-of-school young people who had studied agriculture in secondary schools. The number of youth sampled as respondents per farm type were proportionate to their total population. Out of the 280 (N) youths, 160 (n) were sampled as respondents in accordance to tabulated guidelines by Krejcie & Morgan (1970) which summarizes sample sizes for different study populations. Purposive and stratified random sampling proportion procedures resulted in: 29 youth from tea-dairy, 9 from maize-pyrethrum, 32 youth from tea-coffee, 32 from coffee-banana, and 58 youth from sugarcane chewing and crushing farm types. At farm type level, simple random sampling technique was used to select the youth who participated in the study.

The investigation adopted an-ex-post facto research design and a cross-sectional survey approach to study the influence of participation of youth in decision making on implementation of agricultural extension programmes (Cohen *et al.*, 2007; and Konthari, 2004).

The questionnaire used was closed type and had two Likert rating scales; one coded 1 to 10 for measuring the level of participation in decision making and level of implementation of agricultural extension programmes by youth, where 1– 4 meant low level, 5 – 7 was average while 8 – 10 meant high level of participation.

The other scale was coded, 1 to 5, and was used to rate the strategies proposed to increase the participation of youth in decision making on the implementation, where: 1=Not Important; 2=Least important; 3=Important; 4=Very Important, 5=Extremely Important. The frequency of the respondents, who ticked the scale of 1 to 5, was then used to calculate mean score for each strategy. Mean scores were described as not important if the average score was less than 1.50, least important if between 1.50 and 2.50, important if between 2.50 and 3.50, very important between 3.50 and 4.50, and extremely important if between 4.50 and 5.00.

The questionnaires were left with sub-county agricultural extension officers in charge of the 75 registered youth groups to assist in their

administration to the target respondents. The researcher picked the filled questionnaires from sub-county extension officers after a period of one month as agreed. There was 95% return back rate of the filled questionnaires. The respondents answered the questionnaire items by ticking [✓] the two scales that were provided appropriately.

The following qualitative and quantitative statistical tools were applied in data analysis: two tailed t-test, analysis of variance, Tukey post hoc test, Spearman correlation two tailed and linear correlation. Means were used to describe the strategies proposed to increase participation of youth in decision making process on implementation of agricultural extension programmes that concern them.

RESULTS AND DISCUSSION

Rating of strategies proposed to increase participation of out-of-school youth in decision making

There are five strategies that were proposed to improve participation of out-of-school youth engagement in decision making on implementation of agricultural extension programmes (Table 1). The mean percentage scores of the five strategies are tabulated in Table 1. The F-test on the ratings of the strategies is presented in Table 2 ($F = 4.96541$, $P \text{ value} \leq 0.000588$) and indicates significant difference in the rankings of the five strategies by out-of-school youth. Tukey post hoc test provided mean separation of the strategy ratings (Table 3). From the result, the five strategies were all rated as being very to extremely important (Table, 3). The result shows that strategy 5 had significantly the highest rating mean ($\bar{x} = 4.3125$) compared to the rest. However, this was with exception of strategy 4 which though with a lower ranking mean ($\bar{x} = 4.1$) was statistically similar to strategy 5. Therefore, strategies 5 and 4 are comparable in ranking and are held highest by out-of-school youth as a means to enhance their participation in decision making on implementation of agricultural extension programmes. Strategies 1, 2 and 3 were not significantly different in their mean ratings ($\bar{x} = 3.8813$, $\bar{x} = 3.926$ and $\bar{x} = 4.0125$). Strategy 1 which noted that views of youth should influence decisions of agricultural extension programmers that concern them since

youth are the best agents of their own change was ranked significantly lower than strategies 5 and 4.

Therefore, as stated in strategy 5, out-of-school youth should be provided with accurate information about the agricultural extension programmes to enable them to make informed decisions. Also as indicated in strategy 4, out-of-school youth should be involved in discussions of rules and regulations of accessing extension programme funds for youth-thought modalities to be put in place. The high rating of the need for information to the youth as one of the means to enhance their participation in decision making on implementation of programmes corroborate similar findings by Loncle, Leahy, Muniglia, & Walther (2018). The latter emphasized that youth need the right information in order to participate in decision making. There is need for a mechanism to be put in place to ensure correct information reaches the youth because they are the target of agricultural programmes meant to benefit them. Youth friendly modalities of funding would enhance their access to funding and enhance involvement in implementation of the programmes. According to Amsler *et al.*, (2017) youth are always downplayed when it comes to accessing programme funds on grounds of being irresponsible. The observation is probably the reason youth get discouraged from engagement in decision making ultimately leading to inefficient implementation of the extension programmes, and failure to attain self-reliance objectives. Mager & Nowak (2012) note that, one-off consultations and simple forms of participation such as answering questions and taking part in activities or being represented by adults are not considered participation in the context of decision-making. The result shows that mean for the other strategies; 1, 2 and 3 were rated as important though significantly lower than that of strategy 5 which was considered very important. The finding suggests that strategies 1, 2 and 3 should as well be taken into consideration though of less weight than strategy 5, to facilitate implementation and achieve self-reliance in youth. The overall result in the study, points to the significance of improving participation of out-of-school youth in decision making on implementation to enhance acquisition of skills, and performance of extension programmes to achieve self-reliance in young people in rural areas.

Table 1: Proposed strategies to increase out-of-school youth participation in decision making on implementation of on agricultural extension programmes

No	Proposed strategies to increase participation of out of school youth in decision making	Rating scale and mean ($\bar{x}$) score				
		1	2	3	4	5
1	Inviting youth to agricultural extension meetings/workshops for their voices to be heard rather than adults speaking on their behalf from experience	1.9	4.4	21.3	40.6	31.9
2	The views of youth should influence decisions of agricultural extension programmers that concern them since youth are best agents of their own change	3.1	4.4	18.8	48.8	25.0
3	Involving youth in the discussions of rules and regulations of accessing programme funds for youth thought modalities to be put in place	1.3	5.6	16.3	35.6	41.3
4	Youth to have a greater say in choosing agricultural extension programmes for implementation since they are the best agents of their own change and thus the best agents to influence decisions	1.9	6.9	18.1	34.4	38.8
5	Providing youth with accurate information about the initiation, planning and selection processes of agricultural extension programmes, to enable them to make informed decisions	1.3	1.9	10.6	36.9	49.4

Table 2: Analysis of variance (ANOVA) of out-of-school youth mean rating of strategies proposed to increase their participation in decision making on implementation of agricultural extension programmes

Source of Variation	Sums of Squares	df	Mean Square	F	P-value	F critical
Between Groups	17.42	4	4.355	4.96541	0.000588	2.383132
Within Groups	697.2688	795	0.877068			
Total	714.6888	799				

Table 3: Tukey post hoc test of out-of-school youth mean rating of strategies proposed to increase their participation in decision making on implementation of agricultural extension programmes, n = 160

No.	Proposed strategies to increase participation of out of school youth	Subset for $\alpha \leq 0.05$	
		1	2
1	The views of youth should influence decisions of agricultural extension programmers that concern them since youth are the best agents of their own change	3.8813	
2	Inviting youth to agricultural extension meetings/workshops for their voices to be heard rather than adults speaking on their behalf from experience	3.9625	
3	Youth to have a greater say in choosing agricultural extension programmes for implementation since they are the best agents of their own change and thus the best agents to influence decisions	4.0125	
4	Involving youth in the discussions of rules and regulations of accessing programme funds for youth thought modalities to be put in place	4.1000	4.1000
5	Providing youth with accurate information about the initiation, planning and selection processes of agricultural extension programmes, to enable them make informed decisions		4.3125
	Sig.	.226	.253

Influence of level of participation of out-of-school youth in decision making on level of implementation of agricultural extension programmes

The linear correlation analysis in Figure 1 indicates a highly significant positive correlation ($R = 0.437$, $p \text{ value} \leq .001$) between the level of participation in decision making by out-of-school youth and the level of implementation of agricultural extension programmes.

The result suggests that improving participation of out-of-school youth in decision-making would boost success in the implementation of agricultural extension programmes and enhance acquisition of vocational skills thus enhancing self-reliance. Probably, because increased involvement of youth in decision making would ensure that the extension programmes are designed to incorporate their interests. In that case implementation of programmes would be

successful in transfer of skills in youth thus assisting to achieve their self-reliance. Similar findings were found by Ayinde *et al.*, (2016) who observed that youth were able to put into practice the skills they had acquired from school agriculture or skills acquired by imitating their parents. The ranking of all strategies proposed as important possibly is an indication that out-of-school youth would like to be part and parcel of decision making on implementation of the agricultural extension programmes. Such engagement especially on rules and regulations governing accessibility of funds for the implementation of programmes as suggested in strategy 4 would guarantee their modalities in funding are taken care of in the processes of conception, selection, planning and execution. Also, it would ensure their recognition as mature persons who can make decisions on issues concerning them rather than being represented or dictated, yet they would be the best agents of their own change.

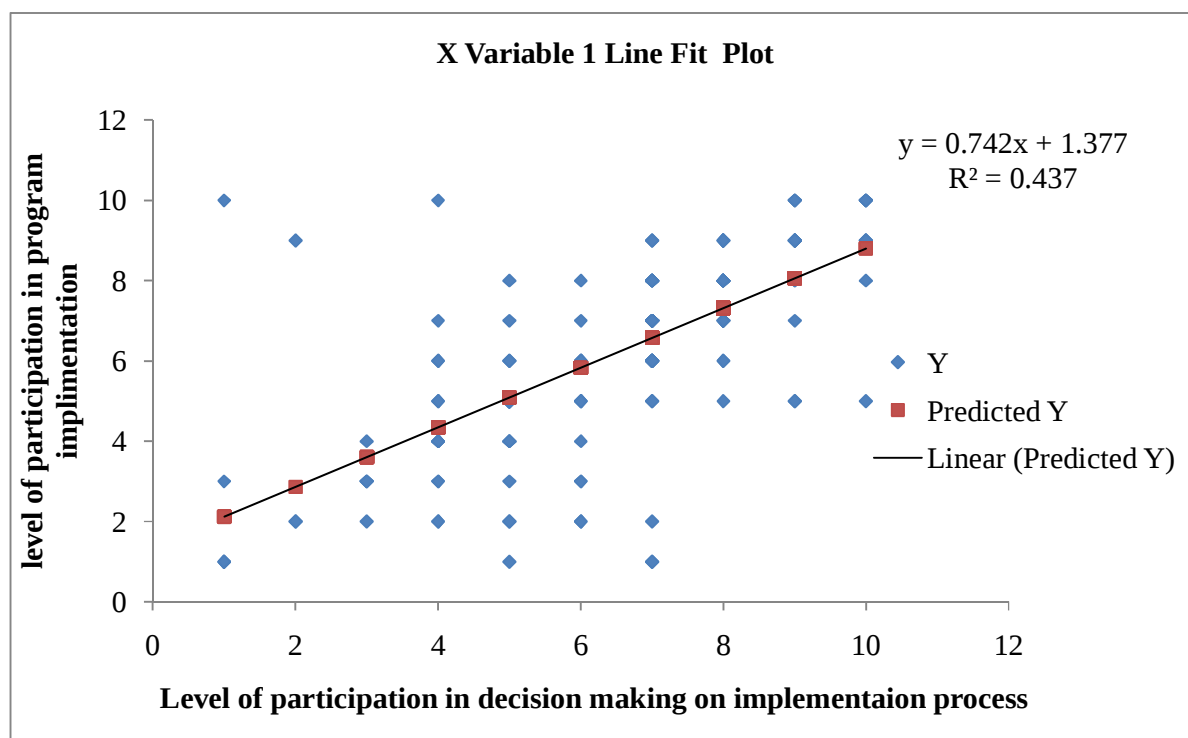


Figure 1: Relationship between level of participation of out-of-school youth in decision making and level of implementation of agricultural extension Programmes

CONCLUSIONS

The proposed strategies possibly represent an effective scheme to transfer vocational skills to

youth. The level of participation in decision making by out of school youth influences the level of implementation of agricultural extension

programmes to acquire vocational skills for self-reliance.

RECOMMENDATIONS

In agricultural extension, strategy 5 and 4 should be taken into consideration to enhance implementation of programmes and acquisition of vocational skills meant to make youth self-reliant.

REFERENCES

- Amsler, K., Hein, C., & Klasek, G. (2017). *Working Paper CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) Youth Decision Making in Agricultural Adaptation to Climate Change An Analysis in East Africa*. 2. www.ccafs.cgiar.org
- Ayinde, J. O., Olarewaju, B. E., & Aribifo, D. L. (2016). Perception of Youth On Government Agricultural Development Programmes In Osun State, Nigeria. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, 16(3).
- Cohen, L., Manion, L., & Morrison, K. (2007). Book Reviews Research Methods in Education. *The Austr Alian Educational Researcher*, 2, 147–156.
- Jaetzold, R., & Schmidt, H. (1992). *Farm management Handbook of Kenya: Natural Conditions and Farm Management Information*. West Kenya (Nyanza and Western Provinces). Ministry of Agriculture, Kenya, in Cooperation with the German Agricultural Team (GAT) of the German Agency for Technical Co: Vol. II/A. *Kenya National Youth Policy Ministry of Youth Affairs* (Issue July). (2007).
- Konthari, C. R. (2004). Research Methodology. Methods and Techniques. In *New age International Publishers*. New Delhi: India. http://scioteca.caf.com/bitstream/handle/123456789/1091/RED2017-Eng-8ene.pdf?sequence=12&isAllowed=y%0Ahttp://dx.doi.org/10.1016/j.regsciurbe.co.2008.06.005%0Ahttps://www.researchgate.net/publication/305320484_System_Pembetulan_Terpusat_Strategi_Melestari
- Krejcie, R. V, & Morgan, D. W. (1970). Determining Sample Size For Research Activities. *Educational And Psychological Measurement*, 30, 607–610. <https://doi.org/10.4324/9780203017852-23>
- Loncle, P., Leahy, P., Muniglia, V., & Walther, A. (2018). Youth participation: In *Youth participation in Europe*. <https://doi.org/10.2307/j.ctt9qgr4k.6>
- Mager, U., & Nowak, P. (2012). Effects of student participation in decision making at school. A systematic review and synthesis of empirical research. *Educational Research Review*, 7(1), 38–61. <https://doi.org/10.1016/j.edurev.2011.11.001>
- Ochieng- Konyango, J. ., & Asienyo, B. O. (2015). Secondary school agriculture: Participatory approaches to the implementation of secondary school agriculture curriculum in Kenya between 1959 and 2012. *International Journal of Scientific Research and Innovation Technology*, 2(1), 1–11.
- World Youth Report. (2003). *World Youth Report Chapter 10: Youth Participation in Decision Making. The World Programme of Action for Youth to the Year 2000 and Beyond*.

Participation of in and out of-school youth in decision making on use of information communication technology to facilitate implementation of agricultural programmes and markets

¹Nyang'au, M. K. and ²Maobe, S. N.

¹Department of Agricultural Education and Extension, Kisii University, P.O Box 402 – 40200, Kisii, Kenya

²Department of Agricultural Sciences, Kisii University

Correspondence details: mkemunto@kisiuniversity.ac.ke

ABSTRACT

Youth may not be interested in primary farm production agriculture because of its drudgeries and low remuneration nature but application of ICT in implementation in its various nodes offers them alternative occupation for self-reliance. However, secondary school agriculture curriculum might be inadequate in information communication technology (ICT) that would initiate youth at that early stage to ICT use to facilitate implementation of agricultural programmes and markets. The consequence is low participation of youth out-of-school in decision-making on ICT use to facilitate the implementation. Research was carried out to determine the influence of participation of in and out of school youth in decision-making on use of ICT to facilitate the programmes and markets. The research was done in five farming systems prevalent in Kenya and three categories of secondary schools. Cross-sectional survey design, purposive, stratified and simple random sampling were used to select 160 out-of-school youth and 361 school youth taking agriculture subject. Data was collected using questionnaires and analyzed by qualitative and inferential statistics at probability level 0.05. Results show that out-of-school youth rated their use of ICT to facilitate implementation of the programmes as considerably lower than those in school. Strategy 5 was ranked significantly highest as solution followed by strategy 4. Strategy 5 suggested as solution the establishment of digital infrastructure in rural areas to enable out of school youth who are ICT knowledgeable create platforms and support youth farmers by sharing information. Strategy 4 propose to establish and manage networks for youth agri-preneurs to enable them share experiences for efficiency in agricultural production and marketing as the answer. The rest of the strategies 1, 2 and 3 were also rated as very important thus indicating their potential as solutions. There is a significant positive linear regression correlation ($R^2 = 0.751$; $p \leq 0.005$) between level of participation in decision making on use of ICT by out-of-school youth and level of its application in the operation of agricultural programmes and markets.

Keywords: Agricultural programmes, decision-making, ICT, markets, youth

INTRODUCTION

Secondary school agriculture curriculum may be inadequate in relevance that would lead to attainment of self-reliance for out-of-school youth. Konyango & Asienyo (2015) justifies the need for its reform to fill a gap that exists between the demand for quality of academic grades and the relevance of lessons implemented for its practical and vocational objective. Ibrahim, (2015) in Nigeria recommends refocusing agricultural education's curriculum and methodology in line with training for self-reliance. This deficit in agricultural education curriculum has also been attributed to weak linkages in the agricultural research-education-extension nexus. The information communication technology (ICT) offers an excellent opportunity for improved coordination across the agricultural nexus, bridging the information gap, sharing information and creation of knowledge. Students are required to develop rigorous digital skills to suit themselves to the multi-faceted world (Nallusamy *et al.*, 2015). Kenya youth agribusiness strategy 2017-2021 recognizes the ICT sector as source of solutions and products that would make the agriculture sector more efficient. Further, the strategy describes the rates of uptake of ICT innovations and technological platforms as being higher in the youthful

age bracket compared to other demographic segments (GOK, 2017). It therefore becomes necessary to integrate ICT in school agriculture curriculum as a tool to enhance decision making on the implementation of agricultural programmes and markets for efficiency. The ICT refers to communication by electronic (e) means. It denotes hardware, software, networks and media for collection, storage, processing, transmission and presentation of information in the formats of voice, data, text and images (Bhattacharjee & Saravanan, 2013). Youth and their parents may not be interested in farm production agriculture because of its low remunerative and drudgeries nature. However, agriculture occupation is the major fallback option for the creation of livelihoods in rural areas for 75% of the human population in developing world. The use of ICT in the sector offers alternative occupation for in-and-out of school youth in the implementation of agricultural programmes and markets for creation of livelihoods (Kiambi, 2018). Bhattacharjee & Saravanan (2013) observe that youth could best employ ICTs in agriculture since it can make agriculture 'modern' and thus attract them to participate in the sector. In this case, the synergy of youth and ICT could be utilised to facilitate implementation and a symbiotic relationship established to reap its optimum benefits for

adolescents. The integration of ICT would facilitate the execution of programmes in wide array of sectors including extension mechanism, crop and animal production and protection, disaster management, market information and participation, financial institutions and information, natural resource management, fishery-wave heights, location of fish shoals etc. But along with that, ICT could make information more accessible and user-friendly to enable young people to play a greater and more effective role in decision making on its use in the implementation of agricultural programmes and markets. The use of ICT tools characterizes the new age digital literacy (Nallusamy *et al.*, 2015). This study is motivated by the need to harness the liking of ICT by the youth out-of-school to modernize agriculture. The study investigated participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets.

Statement of problem

There is low participation of in and out of school youth in decision making on use of ICT to facilitate the implementation of agricultural programmes and markets that would create occupation opportunities for self-reliance. The shortfall may be attributed to ICT content in school agriculture curriculum which may be inadequate to initiate youth to its application in implementation of programmes at that early stage of education. There is therefore a gap in the aspect and strategy interventions are necessary to guide best way forward in facilitating out-of-school youth to participate in ICT application in agriculture as an occupation. The available literature is scanty on opinion of in and out of school youth on the low application of ICT by youth who are technology savvy to provide solutions, and modernize implementation of agricultural programmes, markets and productivity (Nyang'au, 2012). Probably, youth should be involved in the development of ICT innovations and technological platforms to ensure its appropriateness for adolescent audience in agriculture and markets. The importance of meaningful youth involvement in decision-making in what concerns them is demonstrated by Dewey the father of modern progressive education (Dewey, Referred & Yat-sen, 1911). The later delineated a course of learning that is easily adaptable for student involvement in education decision-making (Ogwora, 2013). The lesson derived from Dewey (Referred & Yat-sen, 1911) in this context is that it may not be possible for youth to make informed contributions on use of ICT to facilitate operations in agriculture if they are isolated from the curriculum debates taking place, strategies being developed, and decision making process. Kempe (2012) notes, education is the next important area for engaging the youth and for their development thereby

suggesting necessity for interventions to change the situation.

Objectives of the study are to determine the influence of participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agriculture programmes and markets.

The hypothesis was stated that there is non-significant difference in the participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets.

METHODOLOGY

Study area - Jaetzold *et al.* (2009) characterized the Kisii and Nyamira counties region, southwest Kenya into five agro-ecological zones. The zones defined were used as farm types; and adopted as different and unique sampling locations for respondents in the study. They were used to obtain diverse youth population segments of respondents with varied exposures, opportunities and experiences arising from different farming systems. The farm types indicated are typical of similar ones prevalent in the Kenyan highlands and are as follows: 1) Tea-dairy, 2) Tea – coffee, 3) Maize-pyrethrum or wheat, 4) Coffee-banana and, 5) Marginal-sugarcane farming systems. The later farm type is for example characterized by livestock extensive grazing systems, and cultivation of crops such as cassava, sweet potato, groundnuts, fruits like pawpaw, chewing sugarcane besides maize/beans that are the staple food in Kenya.

The school youth, were secondary school form four students registered for KSCE agriculture subject and were thus involved in implementing KCSE agriculture project practical offered for national examinations by the Kenya National Examination Council (KNEC) during their education (Nyang'au *et al.*, 2022). The youth were proportionately sampled from three school categories; extra-county, county and sub-counties in the study region. The school categories were spread in the five farm types adopted from Jaetzold *et al.* (2009) and the 3 types of learning institutions: (1) Extra county, (2) County, and (3) Sub-county schools. The study took on 30 schools as units of investigation, according to Mugenda & Mugenda (2003) who suggest 30 cases as the least that could be used if some form of statistical analysis is to be carried out on the data obtained. Thus, basing on the adopted units of 30 schools, the total population of 302 schools and the proportion of each category. proportionate stratified random sampling procedure was employed to obtain 19 sub-counties, 9 counties and 2 extra-county schools to participate in the research. However, for purposes of representation the researcher purposefully sampled

5 extra-county schools in order to have a representation of extra-county school from each farm type. Similarly stratified random sampling was applied to get the number of schools to be sampled from each farm type basing on the number of schools in each. Stratified random sampling procedure resulted in 8, 6, 5, 6 and 8 schools being drawn from; tea-dairy, maize-pyrethrum, tea-coffee, coffee-banana and marginal-sugarcane zone respectively (Nyang'au *et al.*, 2022). The Table in Krejcie & Morgan (1970) which summarizes the population sizes and recommends sample sizes to be adopted was used to arrive at a sample size of 361 from four KCSE agriculture youth from a population of 6,312 youth registered for 2019 KCSE agriculture subject examination. Proportionate stratified random sampling technique resulted in 74 school youth being sampled from extra-county category of schools, 109 youth from county and 178 from sub county schools. Using proportionate stratified random sampling, the following proportions of youth were sampled from each farm type: 86 school youth from tea-dairy, 58 from maize-pyrethrum, 52 were taken from tea-coffee farm type, 60 from coffee-banana area and 105 school youth were drawn from sugarcane chewing and crushing farm type totaling 361. At school level, simple random sampling procedure was used to select 15, 13 and 12 youth from extra-county, county and sub-county categories respectively to participate in the study from class lists provided by the agriculture teachers.

The out-of-school young people were purposefully sampled from youth groups spread across the five farm type zones of Kisii and Nyamira counties region, Kenya. The out-of -school youth were purposefully sampled from youth groups spread across the five farm type zones. These youths who had studied secondary school agriculture are out after completion of their education at that level. They lack formal employment and find themselves in rural areas where more than 75% of the population is engaged in agriculture for livelihood something typical of most African countries (Nyang'au *et al.*, 2022). The youth had therefore fallen back to the skills gained in secondary school agriculture to carry out farm-related activities for self-reliance. Using the table in Krejcie & Morgan (1970) which summarises the population sizes and sample sizes, and basing on a population of 280 out of school youth, the study adopted a sample size of 160 out- of-school youth. This population was purposefully obtained by finding out from adolescents registered with agricultural youth groups in the rural sub counties if they had studied agriculture subject in their secondary school education. Those who had studied agriculture were included in the list. Whereas it was not possible to stratify out -of-school youth according to the school category since they were no longer in school, information concerning the school category they had attended was captured in section A of the

interview instrument for data collection which had an item asking the youth to indicate the school they had attended. Stratified random sampling procedure was employed to sample 29 out-of-school youth from tea-dairy, 9 from maize-pyrethrum farm type, 32 youth from tea- coffee and coffee-banana each, and 58 out-of-school youth from sugarcane farm type.

The investigation adopted an ex-post facto research design and a cross sectional survey approach. According to Simon & Goes, (2013) ex-post facto method of research design is an investigation in which there is no interference from the researcher and in which it is not possible or acceptable to manipulate the characteristics of human participants. The researcher therefore did not create a treatment but examined the effects of a naturally occurring treatment after it had taken place (Cohen *et al.*, 2007). A cross-sectional survey approach was considered most convenient research tool in the investigation.

Data was collected using a questionnaire. The questionnaire had two likert rating scales; one coded from 1 to 10, that was used to measure the level of participation of youth in decision making on application of ICT to facilitate, and the level of implementation of agricultural programmes and markets. The second scale was coded, 1 to 5 and it was used to rate the strategies proposed to increase the level of participation of in and out of school youth in decision making on application of ICT to facilitate implementation of agricultural programmes and markets. In data collection process the questionnaire was left with the school agriculture teachers in charge of form four students after the school teacher had been briefed on the procedure of administering it. This was occasioned by the tight schedule in secondary schools as the form fours were preparing for the national examinations which were about to start (Nyang'au *et al.*, 2022). Five strategies were proposed and evaluated for increasing participation of in and out of school youth in decision making. These were ranked on a five-point rating scale, where: 1=Not Important; 2=Least important; 3=Important; 4=Very Important, 5=Extremely Important. The respondents were asked to tick [✓] the scales appropriately. The frequency of the respondents, who ticked the scale of 1 to 5, was then used to calculate a mean score for each individual strategy. Depending on the mean scores, the strategies were described as either not important if the average score was less than 1.50, least important if the mean rating was between 1.50 and 2.50, important if the mean rating of the factor fell between 2.50 and 3.50, while a factor whose mean score was between 3.50 and 4.50 was described as very important and extremely important if the mean rating was between 4.50 and 5.00.

The quantitative data collected was coded and entered into computer programme software, statistical package for social sciences (SPSS version 21). Data were analysed using descriptive and inferential statistics to answer the research objectives. Means, standard deviations and percentages were the descriptive statistics used. The following inferential statistics that were applied to test for significant differences: two tailed t-test, Dunn's; analysis of variance (ANOVA); followed with Tukey Post Hoc test. The test for any relationships among variables was done using, two-tailed Spearman correlation coefficient test, Pearson correlation and linear regression correlation coefficients. The inferential statistics were all set at 0.05 level of significance.

RESULTS AND DISCUSSION

Differences in the level of use of ICT between in and out of school youth in implementation of agricultural programmes.

Table 1: T-test on the differences on the level of use of ICT in implementation of agricultural programmes by in and out of school youth

Respondents	n	Participation mean score	(Std Dev.)	df	t-value	P - value
In school youth	361	5.950139	8.197507	287	1.968264	0.052002
Out of school youth	159	5.396226	9.20277			

Hypothesis Ho: which stated that there is non-significant difference in the participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets; tested at $p \leq 0.05$ level of significance is rejected. From the results, there is significant differences in the participation of 'in school and out of school' youth in decision making on use of ICT to facilitate implementation of agricultural programmes and markets.

Rating of strategies proposed to increase participation of out-of-school youth in decision making on use of ICT to facilitate implementation of agricultural programmes and markets

Results in Table 2 provides mean ratings of strategies proposed to increase participation of out-of-school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets. Results indicate that the five strategies proposed were ranked very important by out-of-school youth with means ratings of 3.5 - 4.5. The results imply that if all the proposed strategies are put in place

Result in Table 1 shows significant differences in the level of use of ICT by school youth ($M = 5.950139$, $SD = 8.197507$) and out-of-school youth ($M = 5.396226$, $SD = 9.20277$); $t(287) = 1.968264$, $p = 0.052002$ to facilitate implementation of agricultural programmes and markets. Therefore, being in or out of school affects the level of use of ICT for the purposes. School youth rated their use of ICT to facilitate implementation of programmes and markets as considerably higher than the out-of-school. The finding is within expectation given that school youth are KCSE candidates who might be using ICT much more as they search for solutions to use in smooth implementation of their agriculture project offered for examination to better their scores and grading.

out-of-school youth are likely to use ICT to facilitate implementation of agricultural programmes than is the case at present. Also, that the youth were in consensus that all the strategies would make it possible for youth and other farmers to sell their own produce by linking them to markets and e-extension services for real time results. The finding is in line with Bahaman *et al.* (2010) who indicate that networks and linkages among agripreneurs would improve implementation of agricultural programmes. That is likely to improve self-reliance in out-of-school youth. Probably because with ICTs even youth who do not have access to land and those who hate farming will find something to do in different nodes of the agricultural value chains by working from anywhere, anytime, using their phones, laptops etcetera. With ICT the youth are likely to connect farmers to local and outside markets and reduce post-harvest losses for profitability (Wawire *et al.*, 2017). The platforms would connect producers and consumers; also enable youth to share prices of various commodities in different markets, distribute useful extension information, and boost production and revenue for farmers.

Table 2: Mean ratings of strategies proposed to increase participation of out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets

No.	Strategies proposed to increase participation of youth in decision making on the use of ICT	Means	SD
1	Use ICTs to gather and share information on prices of commodities in different markets to avoid swindling of farmers by middlemen for profitability	3.75	1.245283
2	Linking farmers with traders, stockists and consumers to facilitate production of various agricultural chains on demand	4	0.930818
3	Online services like (e-extension and e-marketing) using ICT to make access to information easy and affordable at anytime and anywhere for real time results	3.81875	1.62103
4	Establishment and management of network for youth agri-preneurs to enable them to share experiences for efficiency in production and marketing	4.025	0.892453
5	Establish a digital infrastructure in rural areas to enable youth who are ICT knowledgeable create platforms and support youth farmers by sharing information	4.04375	1.073546

The e-markets would eliminate swindling by middlemen as brokers. The observation on this strategy is in line with Irungu *et al.* (2015), who note that with ICT tools youth are more likely to reap benefits since they could easily access markets on their own without the presence of middlemen. The e-extension information would also make operations more efficient than the conventional extension systems and thus the youth will get real-time solutions to agricultural problems.

Table 3 indicates that the differences in the ratings of the strategies proposed to increase participation of out-of-school youth in decision making on use of ICT to facilitate implementation of agriculture programmes and markets were significant ($F = 10.27573$, $p \leq 0.005$). The significant differences amongst the rating of strategies imply that although the youth rated all the strategies as being very important, it would appear that some strategies like 5 and 4 were more important than the others.

Table 3: Analysis of variance of ratings by out of school youth on strategies proposed to increase participation in decision making on use of ICT to facilitate agricultural programmes and markets

Source of Variation	Sum of Squares	df	Mean Square	F	p-value	F crit.
Between Groups	11.4575	4	2.864375	2.485087	0.042302	2.383132
Within Groups	916.3375	795	1.152626			
Total	927.795	799				

Strategy 5 scored highest mean of 4.04375 qualifying it as very important, followed by strategy 4 (Table 2). The strategy states that that establishment of a digital infrastructure in rural areas would enable youth who are ICT knowledgeable to come up with platforms to support them and other farmers through sharing of appropriate information that can boost production. Strategy 4 was on the need to establish and manage networks for youth agri-preneurs to enable them share experiences for efficiency in implementation and marketing. The sentiments in strategies number 5 and 4 agree with a recommendation by Mtega and Msungu (2013) who indicate that having ICT infrastructures in the rural areas would enable stakeholders in agriculture to share information more easily and cheaply thus increase productivity and agribusinesses. The implication is that ICT infrastructure will enable youth to create interactive platforms and networks for youth farmers to share information, experiences and

link to internal and external markets on their own. Youth are likely to facilitate connections to markets to reduce post-harvest losses and platforms for sharing experiences and information thus boosting revenue from implementation of agricultural programmes. They will be able to access online extension services and markets thereby bypassing brokers. The operations may be more efficient than the conventional systems and thus get real time solutions to agricultural problems. The implication of the result is that out-of-school youth were in agreement that the strategy of establishing a digital infrastructure in rural areas will make it possible to participate in the agricultural value chains because the activities involved are less labour intensive (Nyang'au, 2012). The finding is in line with Bahaman *et al.*, (2010) that networks and linkages among agri-preneurs would improve the implementation of agricultural programmes. The ICT is necessary for efficient

exchange of ideas and assured markets by linking farmers with traders, stockists and consumers. Velmurugan & Velmurugan (2013) indicate that ICTs can enable youth to get up-to-date market information and sell their products anytime and anywhere. For instance IICD (2013) observes that by use of m-Farm technology, young agripreneurs in western Kenya are making more money than when they sold their produce to brokers because they can directly connect to markets and sell at higher prices.

Relationship Between Level of Participation in Decision Making on use of ICT and Level of Implementation of Agricultural Programmes and Markets by out of School Youth

Linear regression correlation coefficient analysis on level of participation in decision-making in use of ICT and level of implementation of agricultural programmes and markets, by out-of-school youth

Table 4 on linear regression correlation show significant positive correlation ($R^2 = 0.751$, $p \leq 0.005$)

between the level of participation in decision making on use of ICT by out-of-school youth and the level of implementation of agricultural programs and markets. Table 5 confirms the relationships are statistically significant. The results as demonstrated in Figure 1 show that the level of implementation of agriculture programmes by out-of-school youth increases with an increase in the level of participation in decision-making on the use of ICT to facilitate agricultural programmes and markets. Whereas participation in decision-making on use of ICT by out-of-school youth accounts for 75.1%, increase the remaining 24.9% may be due to other factors. The result suggests that improved engagement in decision-making on implementation by out of school youth is more likely to increase involvement of young people in various nodes of the agricultural value chains. These include the use of ICTs like smart phones, computers and laptops to network or link farmers, to traders, consumers, stockist and extension services using social forums like whatsapp and facebook for purposes of boosting agricultural activities.

Table 4: Regression on influence of participation in decision-making on use of ICT to facilitate implementation of agricultural programs and markets by out-of-school youth

Regression Statistics	
Multiple R	0.866759
R Square	0.751271
Adjusted R Square	0.749697
Standard Error	1.446207
Observations	160

Table 5: Analysis of variance on relationship between level of participation in decision-making in use of ICT by out-of-school youth on level of implementation of agricultural programmes and markets.

Analysis of variance					
Source of variation	df	SS	MS	F	Significance F
Regression	1	998.1342	998.1342	477.23	0.00
Residual	158	330.4595	2.091516		
Total	159	1328.594			

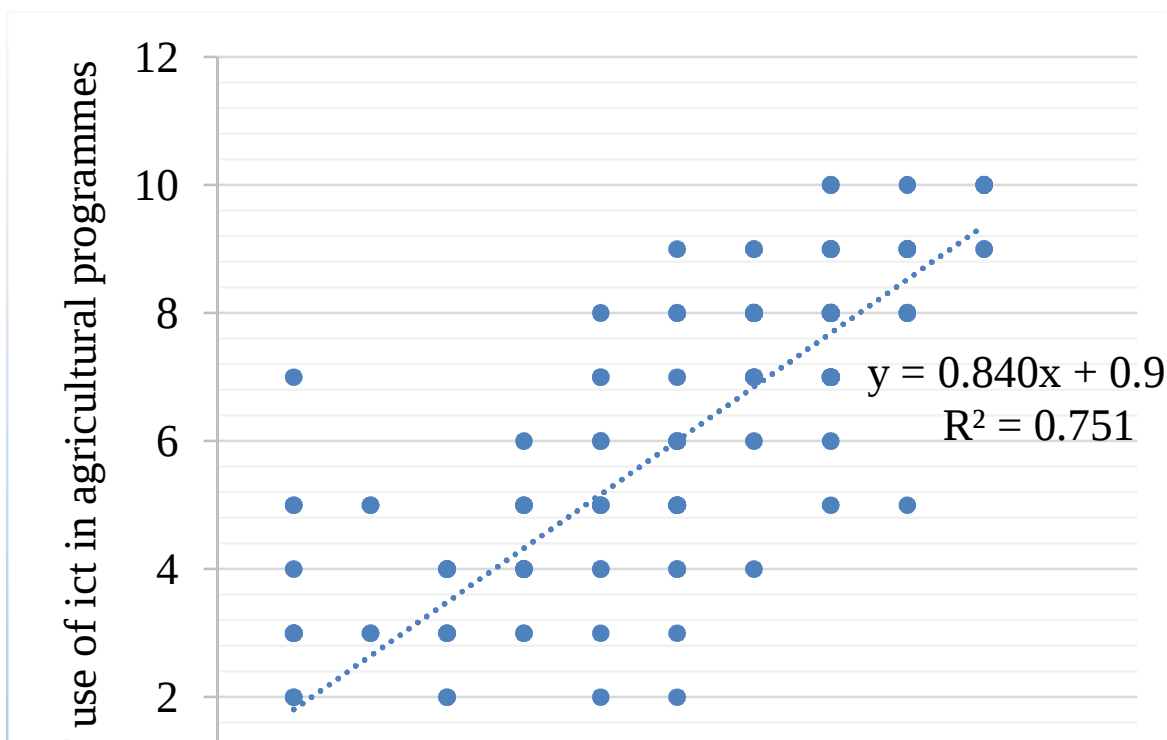


Figure 1: Scatter plot on the influence of participation in decision-making on use of ICT on level of implementation of agricultural programs and markets by out-of-school youth.

The findings in Figure 1 suggest that when youth are part and parcel of decision-making process of any activity that requires their involvement, they are likely to get motivated and implement it with enthusiasm because they will be putting their own perceived views into action or operation. This is unlike when decisions are made on their behalf and ideas passed to them to implement. The result is in line with Olaniyi (2018) who found that the use of mobile phones in agriculture had a significant positive effect on agricultural development an indication that use of ICT tools are likely to boost youth participation in the implementation of agricultural programmes due to easy access to information on modern production techniques and sharing of experiences.

CONCLUSIONS

Youth out-of-school participate less in decision making on use of ICT to facilitate the implementation of agricultural programmes and markets than adolescents in school, signifying a gap that needs to be filled. Out-of-school youth rated as very important all the five strategies proposed to enhance their participation in decision-making in the use of ICT to facilitate implementation of agricultural programmes and markets. Strategies 5 and 4 had significantly highest rating. There is a significant positive linear regression correlation between level of participation in decision-making on use of ICT by youth and level of

its application in the implementation of agricultural programmes and markets.

REFERENCES

- Bahaman, A., Jeffrey, L., Azril, H., & Jegak, U. (2010). Acceptance, Attitude and Knowledge Towards Agriculture Economic Activity between Rural and Urban Youth: The case of contract farming. *Journal of Applied Sciences*, 10(19), 2310–2315.
- Bhattacharjee, S., & Saravanan, R. (2013). Youth and ICTs for Agricultural Development. In: Narayana Gowda, K., Nataraju, M.S. and Veerabhdraiah, V., (2013) (Eds.). *Youth in Agriculture and Rural Development*. New India Publishing Agency, New Delhi, 1–17.
- Cohen, L., Manion, L., & Morrison, K. (2007). Book Reviews Research Methods in Education. *The Austr Alian Educational Researcher*, 2, 147–156.
- Dewey, Referred, O., & Yat-sen, S. (1911). *The Father of Modern China*. 11. https://www.onthewing.org/user/Edu_Dewey - Father of Modern Education.pdf
- GOK. (2017). *Kenya youth agribusiness strategy 2017 -2021: Positioning the Youth at the Forefront of Agricultural Growth and Transformation*.
- Ibrahim, M. (2015). *Agricultural Education and Development in Nigeria Beyond 2020*.

- Agricultural Education Knowledge Review*, 33(3).
- IICD. (2013). Youth, ICTs and Agriculture: Exploring how digital tools and skills influence the motivation of young farmers. In *Connect4Change* (Vol. 1).
- Irungu, K. R., Mbugua, D., & Muia, J. (2015). Information and Communication Technologies (ICTs) Attract Youth into Profitable Agriculture in Kenya. *East African Agricultural and Forestry Journal*, 81(1), 24–33.
<https://doi.org/10.1080/00128325.2015.1040645>
- Jaetzold, R., Schmidt, H., Hornetz, B., & Shisanya, C. (2009). *Farm Management Handbook of Kenya: Vol. II*.
- Kempe, R. H. (2012). Engaging the youth in Kenya: Empowerment, education, and employment. *International Journal of Adolescence and Youth*, 17(4), 221–236.
<https://doi.org/10.1080/02673843.2012.657657>
- Kiambi, D. (2018). The use of Information Communication and Technology in advancement of African agriculture. *African Journal of Agricultural Research*, 13(39), 2025–2036.
<https://doi.org/10.5897/AJAR2018.13300>
- Konyango, J. O., & Asienyo, B. O. (2015). Secondary school agriculture: Participatory Approaches to the Implementation of Secondary School Agriculture Curriculum in Kenya between 1959 and 2012. *International Journal of Scientific Research and Innovation Technology*, 2(1), 1–11.
- KREJCIE, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30, 607–610.
<https://doi.org/10.4324/9780203017852-23>
- Mugenda & Mugenda. (2003). *Research Methods: Quantitative and Qualitative Analysis. Nairobi, Kenya: African Centre for Technology Studies Press*, 4, 1–2.
- Nallusamy, A., Balasubramaniam, S., & Chellappan, S. K. (2015). Use of Information and Communication Technology (ICT). *International Journal of Agricultural Extension*, 03(02), 111–122.
- Nyang'au, M. K. (2012). *Agriculture Projects Offered For Examinations In Secondary Education* (p. 92). LAP Lambert Academic Publishing.
<https://doi.org/ASIN:3848412438>
- Nyang'au, M. K., Ochola, W. A., & Maobe, S. N. (2022). Student youth participation in decision making on implementation of school agriculture programme. *International Journal of Curriculum and Instruction*, 14(1), 226–242.
- Ogworu, T. E. (2013). *Critical Understanding of John Dewey 'S Progressive Theory: A Solution to the Problems Facing Current Educational System in*. 3(9), 42–50.
- Olaniyi, E. (2018). Digital Agriculture: Mobile Phones, Internet Agricultural Development in Africa. In *Actual Problems of Economics* (Issue 90359).
- Velmurugan, M. S., & Velmurugan, M. S. (2013). Consumers' Awareness, Perceived Ease of Use toward Information Technology Adoption in 3G Mobile Phones' Usages in India. *Asian Journal of Marketing*, January 2014, 1–23.
<https://doi.org/10.3923/ajm.2014.1.23>
- Wawire, A. W., Wangia, S. M., & Okello, J. J. (2017). Determinants of Use of Information and Communication Technologies in Agriculture: The Case of Kenya Agricultural Commodity Exchange in Bungoma County, Kenya. *Journal of Agricultural Science*, 9(3), 128–137.
<https://doi.org/10.5539/jas.v9n3p128>

Perceived effects of climate change on tomato production in selected local government areas of Ondo state, Nigeria

Aminu, O. O.

Department of Agricultural Economics and Extension, Olusegun Agagu University of Science and Technology, Ondo State, Nigeria

Correspondence details: funmiamiu83@gmail.com

ABSTRACT

The study examined the perceived effects of climate change on tomato production in selected Local Government Areas (LGAs) of Ondo State, Nigeria. A total of 126 tomato farmers were randomly sampled from six communities. Data were garnered using an interview schedule and were analysed using frequency, percentage, mean, and Pearson Product Moment Correlation. Tomato farmers were aged 39.56 ± 8.33 years, males (87.3%), married (54.8%), formally educated (82.6%), and had a household size of 6.02 ± 2.27 persons. Farming experience was 5.46 ± 3.53 years, farm size was 4.44 ± 3.28 acres, 54.0% cultivated local varieties, 46.0% cultivated improved varieties, and 61.1% had access to credit. The average quantity of tomatoes sold in 2022 was $23,860.56 \pm 8,812.12$ kg, and the average income from tomato sales was ₦ $6,445,269.84 \pm 2,393,836.26$. Major information sources were radio ($\bar{x}=1.54$), internet ($\bar{x}=1.54$), television ($\bar{x}=1.41$), and relations/family ($\bar{x}=1.39$). Farmers' knowledge of deforestation ($\bar{x}=1.56$), pesticide use ($\bar{x}=1.32$), soil erosion ($\bar{x}=1.31$), fertiliser use ($\bar{x}=1.25$), greenhouse gas emissions ($\bar{x}=1.25$), and temperature fluctuations ($\bar{x}=1.21$) as the major causes and effects of climate change was highest. Severe climate change effects include temperature fluctuations ($\bar{x}=1.56$), changes in soil fertility ($\bar{x}=1.26$), decreased fruit quality ($\bar{x}=1.18$), and changes in rainfall patterns ($\bar{x}=1.15$). There was a significant relationship between the quantity of tomatoes lost ($r=0.194$, $p=0.030$), information source ($r=0.336$, $p=0.000$), knowledge ($r=0.504$, $p=0.000$) and the perceived effects of climate change. Tomato farmers need government education programs on how to combat the various effects of climate change and improved access to climate change information.

Keywords: Climate change, Perceived effects, Tomato quantity, Information sources

INTRODUCTION

The menace of climate change continually threatens the sustainable development of socioeconomic activities and, more importantly, agricultural development and sustainability. Agriculture in Africa is rain-fed and the most vulnerable sector to climate change. The farm sector supplies food and raw materials to the industries, provides income and employment, and generates foreign earnings. This is crucial to the economy of any nation, particularly Nigeria. Despite the importance of the agricultural sector, it faces numerous challenges, including climate change, which affects farmers at every level of agricultural production on the farm.

Climate change connotes shifts in the frequency and magnitude of sporadic weather events. Climate refers to the average weather, in terms of both mean and variability, over a specific period and area (Baede *et al.*, 2018). Climate change can manifest in several ways including but not limited to changes in average climatic conditions, in such a way that an area can be drier or wetter, with changes in climatic variability like erratic rainfall, changes in the frequency and magnitude of extreme weather events, sunshine, temperature, relative humidity, and extreme drought. In Nigeria, shreds of evidence of climate change, including rising temperatures, irregular rainfall patterns, increasing sea levels, dwindling freshwater

supplies, flooding, land degradation, drought, desertification, increased extreme weather events, and a decline in biodiversity (Awiti, 2022; Okon *et al.*, 2021).

Hence, climate change is expected to seriously threaten Nigeria's environment, agricultural production and food security. The effects of climate change on farmers and agriculture, in particular, could be relatively more severe on crops if adaptive strategies are not in place to cushion the effects of the changes on farm crops. Climate change has been a topical issue in the sustainability of the environment as crop yield and production become very important to the economy and human livelihoods (Piya *et al.*, 2012). Agricultural production in Nigeria is weather-dependent, and climate variability and change have a direct effect, often an adverse influence on the quantity and quality of agricultural yield in Nigeria. A report by Raza *et al.* (2019) submits that climate change affects crop production through direct, indirect, and socio-economic effects.

Various crops are grown in the rural areas of Nigeria in a characteristic pattern that is responsive to local climatic conditions. Notably among the crops grown in Nigeria are fruit vegetables such as tomatoes. Tomato (*Lycopersicum esculentum*), being a vegetable, is in a group of specialised crops and is important economically from a health point of view. It

is an essential component of every Nigerian family meal and an important source of minerals, proteins, vitamins, and energy. According to Onyeneke *et al.* (2023), tomatoes are the main dietary source of the antioxidant lycopene, which has been linked to several health benefits, like a lower risk of heart disease and cancer. Tomato production is a good source of income and employment and a means of livelihood in the rural areas of Nigeria and even urban centres. One of the biggest challenges facing tomato farmers in rural areas has been the response of tomatoes to climate change. The production of tomatoes in rural areas suffers from diverse problems such as temperature fluctuations, irregular rainfall, topographic features, poor soil nutrients and other climatic conditions. The production of tomatoes is susceptible to climatic variations, which can adversely affect their production. Heavy rainfall and high humidity do great harm to the tomato plants.

According to Onyeneke *et al.* (2023), climate change effects such as changing temperatures adversely affect tomato yields both in the short and long runs. Likewise, Olubango & Alade (2018) established that climate variability affects the yield of tomatoes in Ondo State, Nigeria. The perspectives of tomato farmers on the effects of climate change on tomato production are crucial for agricultural growth, food security, and people's livelihood in Ondo State, Nigeria. It is important to empirically determine if tomato farmers had access to climate-related information to help in navigating climate-related challenges in tomato farming. This research added more insights to existing studies as it provided empirical evidence on the current effects of climate change experienced in tomato production in Ondo State, Nigeria. Hence, it stresses the importance of addressing the issue of climate change by developing strategies to mitigate the impact of climate change on tomato farming. This study specifically determined tomato farmers' personal and enterprise characteristics, income and quantity of tomato produced, sources of climate change information, and the knowledge of the causes and effects of climate change.

METHODOLOGY

The study was conducted in Ondo State, Nigeria. The state covers a land area of about 15,500 square kilometres and has GPS coordinates of 7° 6' 0.0180" N and 4° 50' 30.0984" E. The State has 18 Local Government Areas (LGAs) and is known for its fertile soil and favourable climate, which has made it an agricultural hub in the southwest region of Nigeria. The population for the study consists of tomato farmers in Ondo State, Nigeria.

Three local government areas (LGAs) namely Akure South, Owo and Ose LGAs were purposively selected based on the prominence of these LGAs in tomato farming activities. Two communities notable for tomato production were purposively selected in each LGA to make a total of six communities. Emure and Ago-Paanu communities were selected in Owo LGA, Ago-Ajayi and Ose-Oba communities in Ose LGA, Oda and Okearo communities in Akure South LGA. From the list of tomato farmers obtained from respective LGAs, 50% of tomato farmers were randomly sampled from Emure (20), Ago-Paanu (41), Ago-Ajayi (20), Ose-Oba (19), Oda (18) and Okearo (8) communities. A total of one hundred and twenty-six (126) tomato farmers were sampled for the study. Data was collected with the aid of a structured interview schedule.

The data on tomato production for the year 2022 was garnered as the quantity of tomatoes produced. The quantity of tomatoes produced was determined in crates and thereafter converted to the equivalent kilogram. A crate of tomatoes weighs an average of 35kg; this was used to compute the quantity of tomatoes produced for each farmer. The study determined the quantity of tomatoes harvested, quantity sold, quantity consumed, quantity given out, quantity not sold, and quantity lost for the year 2022. Tomato farmers indicated the price/crate of tomatoes sold in 2022, and this was used to compute the income realised from tomato production. The quantity of tomatoes not sold in this study simply referred to harvested tomatoes that are in good condition but have not yet been sold as of the time of data collection. The quantity of lost tomatoes refers to tomatoes that were not sold at the time of data collection as a result of pest and disease infestation, decay, theft, among others. These tomatoes were waste, unsellable and unusable. Climate change information sources were measured on a 3-point scale of always, sometimes and not at all, with scores of 2, 1 and 0 assigned, respectively. Tomato farmers' knowledge of the causes and effects of climate change was measured on a 3-point scale of to a larger extent, to a lesser extent and not a cause, with scores of 2, 1 and 0 assigned, respectively. The mean value for each item was computed and used to rank farmers' knowledge items. The perceived effects of climate change on tomato production were measured on a 3-point scale of major effect, minor effect and not an effect, with scores of 2, 1 and 0 assigned, respectively. The perceived effect score for each tomato farmer was computed. The minimum score was 12, and the maximum score was 26. The average perceived effect score was calculated and used to categorise tomato farmers as either perceiving the effects of climate change on tomato production to be high (for those with scores equal to or above the mean score) or low (for those with scores below the mean score). The mean value for each item was computed

and used to rank perceived effect items in order of severity. Descriptive statistics such as frequency, percentage and means were used for data analysis. The inferential statistics used for hypothesis testing was Pearson Product Moment Correlation.

RESULTS AND DISCUSSION

Personal characteristics of tomato farmers

Table 1 presents the distribution of the tomato farmers based on their personal characteristics. Most tomato farmers were male (87.3%), implying that tomato production in the study area was male-dominated. This result aligns with previous research by Obot *et al.* (2022), who found that males constitute the larger percentage of small-scale farmers in Anambra State, Nigeria. Most of the tomato farmers were less than 41 years in age (53.9.0%) with an average age of 39.56 ± 8.33 years, indicating that productive and active individuals dominate tomato production in the study area. This corroborates the findings of Obot & Obiekwe (2022) that young people of economically productive age dominated the agricultural activities in Akwa Ibom State, Nigeria. Over half of the tomato

farmers were married (54.8%), and 23.0% were singles. Similarly, Adeagbo, Ojo & Adetoro (2021) reported a high percentage of married farmers among smallholder farmers in Southwest, Nigeria. A significant proportion of the tomato farmers had completed primary (32.9%), secondary (29.4%), and tertiary (20.3%) education. This indicates that the majority of the tomato farmers are formally educated. Similarly, study by Olabanji *et al.* (2021) on smallholder farmers' perception and adaptation response to climate change found that most farmers had at least primary education. The average household size was 6.02 ± 2.27 years, with 53.2% having 5-7 members in their households. This was close to the average household size of 7.5 reported among tomato farmers in Nasarawa State, Nigeria (Onuk, Girei & Amfani-Joe, 2018). Tomato farmers were primarily crop farmers (26.2%), agro-dealers (23.0%), traders (17.5%), and livestock farmers (15.9%). The results imply that about 70.0% of the farmers engaged in tomato production as a secondary occupation or side hustle. This is at variance with Ngbede *et al.* (2021) who reported tomato production as the major occupation of smallholder tomato farmers sampled in Benue State, Nigeria.

Table 1: Distribution of tomato farmers based on their personal characteristics

Personal Characteristics	Frequency	Percentage	Mean $\pm$ S.D
Sex			
Male	110	87.3	
Female	16	12.7	
Age (years)			
< 31	25	19.8	
31-40	43	34.1	
41-50	49	38.9	39.56 ± 8.33
51-60	9	7.1	
Marital status			
Single	29	23.0	
Married	69	54.8	
Widowed/widower	5	4.0	
Divorced	9	7.1	
Separated	14	11.1	
Level of education			
No formal education	27	21.4	
Primary education	44	34.9	
Secondary education	37	29.4	
Tertiary education	18	14.3	
Household size			
2-4	30	23.8	
5-7	67	53.2	6.02 ± 2.27
> 7	29	23.0	
Primary occupation			
Crop farming	33	26.2	
Livestock farming	20	15.9	
Agro-dealer	29	23.0	
Trading	22	17.5	
Artisan	16	12.7	
Civil servant	6	4.8	

Source: Field survey, 2023

Enterprise characteristics of tomato farmers

The result in Table 2 shows the distribution of tomato farmers based on their enterprise characteristics. The average year of farming experience in tomato farming was 5.46 ± 3.53 years, with the majority having 2-5 years of experience. This implies that most of the tomato farmers are relatively new to tomato farming. Hence, adaptation to climate change may require tailored strategies and support for novice farmers. The tomato farming experience obtained in this study does not align with Ngbede *et al.* (2021), who reported majority have 11-15 years of experience (86.7%) in tomato production among smallholder tomato farmers sampled in Benue State, Nigeria. The average farm size was 5.07 ± 3.93 acres. Farm sizes could influence the feasibility and effectiveness of different climate adaptation approaches (Jha and Gupta, 2021). The average farm size cultivated for tomatoes was 4.44 ± 3.28 acres, indicating small farm holdings for tomato production in the study area. This aligns with Ngbede *et al.* (2021), who reported that tomatoes were cultivated on a small scale in Benue State, Nigeria. It was found that tomato farmers in the study area cultivate either a local variety (54.0%) or an improved variety (46.0%). The tomato species cultivated by farmers were cherry (30.2%), Roma (29.4%), beefsteak (19.8%), and plum tomatoes (18.3%). The diversity of tomato species grown may play a role in the resilience of tomato farming in the face of climate challenges, as different varieties may exhibit varying levels of tolerance to climate-related stressors. The tomato cropping system was mostly mixed cropping (70.6%), but 29.4% practiced sole cropping. This corroborates Ogunwande (2024) that mixed cropping is a common practice among small-scale farmers in

Nigeria. However, the result is at variance with Ddamulira *et al.* (2021) who reported that most tomato farmers (78.4%) sampled in Uganda use a sole cropping system.

Furthermore, most tomato farmers in the study area used irrigation for tomato cultivation. The irrigation types used were drip (27.0%), sprinkler (42.9%), and flood (18.3%) irrigation. This aligns with the submission of Danso-Abbeam *et al.* (2021) that smallholder farmers in Nigeria are increasingly using irrigation to address the negative effects of climate change. Similarly, Akinagbe & Irohibe (2014) reported that farmers tend to irrigate often as temperature increases. Most of the farmers cultivated tomatoes twice a year (65.9%), while some cultivated only once a year (34.1%). A large percentage of the farmers were members of farmers' groups or cooperatives (75.4%). Membership in farmers' groups or cooperatives is an avenue to be abreast of information on climate change. The major sources of labour were family (42.9%) and friends (29.4%). This indicates that a large proportion of the respondents used family labour for their farming activities. This does not align with the study of Ngbede *et al.* (2021) where most smallholder tomato farmers (78.3%) relied on the use of family members for their tomato production. The sources of land used for farming include bought land (20.6%), inherited land (19.8%), rented land (15.1%), family-owned land (23.0%), and communal land (12.7%). About 60.0% had access to credit from sources such as cooperatives (20.6%), non-governmental organisations (15.1%), friends (15.1%), microfinance (14.3%) and 'ajo' (10.3%). The marketing outlets used were farm gate (44.4%), rural market (34.9%), and urban market (19.0%).

Table 2: Distribution of tomato farmers based on their enterprise characteristics

Variables	Frequency	Percentage	Mean±SD
Tomato farming experience in years			
2-5	96	76.2	5.46±3.53
6-9	15	11.9	
> 9	15	11.9	
Tomato farm size(acres)			
1.00-4.00	84	66.7	4.44±3.28
4.01-8.00	34	27.0	
>8.00	8	6.3	
Variety of tomatoes cultivated			
Local variety	68	54.0	46.0
Improved variety	58	46.0	
Tomato species cultivated			
Cherry tomatoes	38	30.2	18.3
Roma tomatoes	37	29.4	
Beefsteak tomatoes	25	19.8	
Plum tomatoes	23	18.3	
Tomato cropping system			
Mixed cropping	89	70.6	29.4
Sole cropping	37	29.4	

Variables	Frequency	Percentage	Mean±SD
Irrigation type			
Drip irrigation	34	27.0	
Sprinkler irrigation	54	42.9	
Flood irrigation	23	18.3	
Number of times tomatoes are cultivated in a year			
Once	43	34.1	
Twice	83	65.9	
Membership in farmers' groups or Cooperatives	95	75.4	
Source of labour			
Family	54	42.9	
Friends	37	29.4	
Hired	25	19.8	
Sources of land			
Bought	26	20.6	
Inherited	25	19.8	
Rent	19	15.1	
Family	29	23.0	
Communal	16	12.7	
Gift	13	10.3	
Access to credit			
Yes	77	61.1	
Source of credit			
Personal savings	9	7.1	
Friends	19	15.1	
Family	3	2.4	
NGO	19	15.1	
A particular Individual	15	11.9	
Ajo	13	10.3	
Cooperative	26	20.6	
Microfinance	18	14.3	
Commercial bank	6	4.8	
Marketing outlets			
Farm gate	56	44.4	
Rural market	44	34.9	
Urban market	24	19.0	

Source: Field survey, 2023

Tomato production in 2022 and income realised

Table 3 shows that the average price per crate of tomato in 2022 was ₦9,444.44±202.21. The average quantity of tomatoes harvested was 713.42±252.310 crates (25,060.10±8,884.77 kg). The average quantity of tomatoes sold was 681.73±251.78 crates (23,860.56±8,812.12 kg). The result resonates with the role of market access and opportunities in influencing the quantity of tomatoes sold. The quantity of tomatoes sold can vary widely depending on factors such as market access and market demand. The average income realised from tomato production was ₦6,445,269.84±2,393,836.26. This suggests that tomato farmers in the study area engaged in substantial tomato sales. The result is at variance with the income levels obtained by Akingba *et al.* (2022) among crop farmers engaging in small-scale farming practices in Edo North, Edo State, Nigeria, where most of the farmers reportedly realised a monthly income of less than ₦61,000.00. The average quantity of tomatoes

consumed was 7.86±7.71 crates (275.20±269.83 kg). The average quantity consumed reflects the dietary importance of tomato among farmers. Tomatoes are a significant component of the local diet and are often consumed by farming households. The average quantity of tomatoes given out was 5.29±4.11 crates (183.93±142.74 kg). The practice of giving out tomatoes may be related to customary sharing among community people. The average quantity of unsold tomatoes was 32.15±116.85 crates (1125.36±1089.77 kg). The quantity of tomatoes that were yet to be sold could be attributed to various factors, including fresh harvest, market access, lack of storage facilities, and other market dynamics. The average quantity of tomatoes lost was 42.52±116.90 crates (1488.06±4091.50 kg). Tomato losses can be attributed to factors such as poor post-harvest handling, transportation-associated constraints, theft and other market conditions. The monetary value of the quantity of tomatoes lost was ₦394,067.46±376,520.98.

Table 3: Tomato production and income realised in 2022

Variables	N	Minimum	Maximum	Mean	Std. Dev
Price/Crate	126	9000	10000	9444.44	202.21
Crates					
Quantity harvested (in crates)	126	240	1340	713.42	252.31
Quantity sold (in crates)	126	200	1309	681.73	251.78
Quantity consumed (in crates)	124	1	40	7.86	7.71
Quantity given out (in crates)	75	1	20	5.29	4.11
Quantity not sold (in crates)	124	1	720	32.15	116.85
Quantity lost (in crates)	126	1	710	42.52	116.90
Kilograms					
Quantity harvested (in kg)	126	8400	46900	25060.10	8884.77
Quantity sold (in kg)	126	7000.00	45815.00	23860.56	8812.12
Quantity consumed (in kg)	124	35	1400	275.20	269.83
Quantity given out (in kg)	75	35	700	183.93	142.74
Quantity not sold (in kg)	124	35	25200	1125.36	1089.77
Quantity lost (in kg)	126	35	24850	1488.06	1091.50
Monetary value (₦)					
Quantity harvested (in naira)	126	2280000.00	12730000.00	6736468.25	2390978.43
Quantity sold (in naira)	126	1900000	12435500	6445269.84	2393836.26
Quantity consumed in naira	124	9500	360000	73516.13	70527.92
Quantity given out (in naira)	75	9500	190000	49660.00	38406.45
Quantity not sold (in nara)	124	9500	6840000	315479.84	276466.42
Quantity lost (in naira)	126	9500	6745000	394067.46	376520.98

Source: Field survey, 2023

Climate change information sources

Table 4 presents data on the sources of climate change information used by tomato farmers. Radio ($\bar{x}=1.54$) and the internet ($\bar{x}=1.54$) were the foremost sources of climate change information. This result underscores the significance of radio and internet devices as primary media for disseminating climate-related knowledge to rural communities. Similarly, Salisu, Danwanka & Hassan (2024) established the prominent use of radio among crop farmers in Bauchi State,

Nigeria. The use of the internet implies the increased use of mobile phones in sourcing climate change information. This is consistent with previous research that established increased use of mobile phones in accessing information among rural people (Salisu, Danwanka, & Hassan, 2024; Aker & Mbiti, 2010). The use of radio and the internet was followed by television ($\bar{x}=1.41$), relations/family ($\bar{x}=1.39$), social media ($\bar{x}=1.35$), and friends ($\bar{x}=1.33$).

Table 4: Distribution of the tomato farmers based on their climate change information sources

Sources of information	Mean	Std. Dev.	Rank
Radio	1.54	0.52	1 st
Internet (Email)	1.54	0.60	1 st
Television	1.41	0.58	2 nd
Relations/family	1.38	0.71	3 rd
Social media	1.35	0.60	4 th
Friends	1.33	0.58	5 th
Publications	1.14	0.77	6 th
International research organizations	1.06	0.85	7 th
Historical events	1.05	0.76	7 th
Government agricultural extension services	1.04	0.80	8 th
Newspaper	1.04	0.72	8 th
Agricultural weather apps	0.99	0.76	9 th
Local agricultural cooperatives/groups	0.98	0.79	10 th
Research institutions	0.97	0.77	11 th
Non-governmental organizations	0.91	0.81	12 th
Weather websites apps	0.86	0.77	13 th

Source: Field survey, 2023

Knowledge of the causes and effects of climate change

The result in Table 5 shows that tomato farmers' knowledge of deforestation ($\bar{x}=1.56$) as the cause of climate change was the highest. This implies a strong consensus among tomato farmers on the pivotal role of deforestation in driving climate change, underscoring the pressing need to tackle this issue within the country. This result aligns with Madaki *et al.* (2023) that most farmers knew the detrimental effects of deforestation on the environment and climate in Nigeria. Additionally, findings from this study reveal that tomato farmers had high knowledge that pesticide use ($\bar{x}=1.32$), fertiliser use ($\bar{x}=1.25$), and greenhouse gas emissions ($\bar{x}=1.25$) are parts of the causes of climate change. Also, tomato farmers had knowledge that soil erosion ($\bar{x}=1.31$) and temperature fluctuations ($\bar{x}=1.21$) are parts of climate change effects. These aforementioned variables were known by tomato farmers as major contributors and effects of

climate change, which decreases the fertility of soils, soil nutrients, water availability and crop yield. Tomato farmers' knowledge of the causes of climate change is a function of their awareness that the climate is changing. Tajudeen *et al.* (2022) affirm a high level of awareness of climate change among crop farmers in Lagos State, Nigeria. Their study also established that crop farmers agreed there had been changes in temperature, rainfall patterns, pest infestation, disease outbreaks, flooding, drought, and soil erosion due to climate change. Also, tomato farmers had knowledge that intensive farming practices ($\bar{x}=1.13$) contributed to climate change. This highlights the significance of agricultural practices in contributing to climate change. The result of this study aligns with the submission of the United States Environmental Protection Agency (2024) that the agriculture industry releases greenhouse gases into the atmosphere, which fuels climate change.

Table 5: Distribution of tomato farmers based on their knowledge of the causes and effects of climate change

Indicators	Mean	Std. Dev.	Rank
Causes			
Deforestation	1.56	0.65	1 st
Pesticide use	1.32	0.71	2 nd
Greenhouse gas emission	1.25	0.70	4 th
Fertiliser use	1.25	0.81	4 th
Intensive farming practices	1.13	0.78	4 th
Bush burning	1.13	0.83	4 th
Poor waste management	1.10	0.77	5 th
Industrial activities	1.09	0.74	6 th
Livestock emission	1.06	0.77	7 th
Natural processes	1.10	0.74	5 th
Effects			
Temperature fluctuations	1.21	0.81	3 rd
Soil erosion	1.31	0.74	3 rd
Heatwaves	1.06	0.85	7 th
Extreme weather event	0.90	0.70	8 th
Loss of biodiversity	0.89	0.75	9 th
Pollinator disruption	0.89	0.81	9 th

Source: Field survey, 2023

Perceived effects of climate change on tomato production

The results in Table 6 show that the most pronounced effect of climate change is fluctuations in temperature ($\bar{x}=1.56$). Findings from this study suggest that tomato farmers are increasingly concerned about the erratic temperature patterns affecting their crop yield. This result supports previous studies that established the negative effects of temperature variations on tomato production (Onyeneke *et al.* 2023; Ayankojo & Morgan, 2020). With climate change leading to more frequent and extreme temperature fluctuations, adaptation strategies such as improved crop varieties

and irrigation methods are essential to mitigate these impacts. Gowda *et al.* (2018) noted that changes in temperature and precipitation will also probably increase the frequency and range of weeds and insects. Tomato farmers attest that they experienced changes in soil fertility ($\bar{x}=1.26$) due to climate change. Soil fertility is a critical factor in agricultural productivity. Tomato farmers recognised the significance of preserving soil fertility in the face of climate change. Findings from this align with Tajudeen *et al.* (2022), who established that climate change effects such as decreased crop yield, reduced soil fertility, water scarcity, increasing soil erosion, and the spread of pests negatively affect crop productivity. Climate

change effects, such as poor fruit quality ($\bar{x}=1.18$), were attested to by most (74.7%) tomato farmers. Decreased fruit quality affects tomatoes' marketability and consumer satisfaction. Also, most of the tomato farmers experienced changes in rainfall patterns ($\bar{x}=1.15$), loss of genetic diversity ($\bar{x}=1.13$), shift in plant phenology ($\bar{x}=1.10$), altered nutrient availability ($\bar{x}=1.07$), increased frequency of extreme weather events ($\bar{x}=1.07$), pest and disease outbreak ($\bar{x}=1.06$), reduced crop yield ($\bar{x}=1.06$) and water scarcity ($\bar{x}=1.00$). Chukwuone & Amaechina (2021) also reported evidence of climate change among smallholder farmers, including delays in the onset of rains, too much rainfall, higher temperatures, and erratic rainfall patterns. The result of altered nutrient availability indicates the importance of nutrient management in sustainable tomato farming. Tomato farmers experienced a shift in plant phenology due to climate change. Plant phenology refers to the timing of plant development stages, and changes in phenology can impact crop yields. The loss of genetic diversity is a major climate change effect among tomato farmers. The result of this study aligns with the submission of the United States Environmental

Protection Agency (2024) that heavy rainfall is expected to occur more frequently due to climate change, which might be detrimental to crops by eroding soil and depleting soil nutrients. Also, the results of this study corroborate Akingba *et al.* (2022), who identified climate change effects on crop production to include poor quality and quantity of yield, washing away of valuable nutrients, increased disease outbreaks, frequent pest attacks and increased heat stress. Surprisingly, economic impacts ($\bar{x}=0.95$) were the least ranked perceived effect of climate change among tomato farmers. This aligns with a previous report in this study that established that some tomato farmers realised a good income from tomato sales. Nevertheless, some tomato farmers faced economic challenges due to climate change. Furthermore, the result in Table 7 shows that 54.8% of tomato farmers perceive the effects of climate change on tomato production to be low, while 45.2% perceive the effects to be high. The result implies that farmers experienced the effects of climate change on tomato production at varying degrees. Thus, the perception of these effects is not the same for farmers.

Table 6: Perceived effects of climate change on tomato production

Effects	Major Effect	Minor Effect	Not an Effect	Mean	Std. Dev.	Rank
Temperature fluctuations	63.5	29.4	7.1	1.56	0.63	1 st
Changes in soil fertility	46.0	34.1	19.8	1.26	0.77	2 nd
Decreased fruit quality	43.7	31.0	25.4	1.18	0.81	3 rd
Changes in rainfall patterns	36.5	42.1	21.4	1.15	0.75	4 th
Loss of genetic diversity	33.3	46.0	20.6	1.13	0.73	5 th
Shifts in plant phenology	37.3	34.9	27.8	1.10	0.80	6 th
Altered nutrient availability	34.1	38.9	27.0	1.07	0.78	7 th
Increased frequency of extreme weather events	31.7	43.7	24.6	1.07	0.75	7 th
Pest and diseases outbreak	33.3	38.9	27.8	1.06	0.78	8 th
Reduced crop yields	38.1	30.2	31.7	1.06	0.84	8 th
Water scarcity	31.7	36.5	31.7	1.00	0.80	9 th
Changes in growing seasons	34.1	30.2	35.7	0.98	0.84	10 th
Changes in CO ₂ concentrations	29.4	39.7	31.0	0.98	0.78	11 th
Shifts in weed distribution	30.2	35.7	34.1	0.96	0.80	12 th
Economic impacts	27.0	41.3	31.7	0.95	0.77	13 th

Source: Field survey, 2023

Table 7: Categorisation of tomato farmers based on the perceived effects of climate change on tomato production

Category	Frequency	Percent	Minimum	Maximum	Mean	SDev.
Low (12.00 - 16.51)	69	54.8	12.00	26.00	16.52	2.53
High (16.52 - 26.00)	57	45.2				

Source: Field survey, 2023

Hypotheses testing

Table 8 shows the results of the relationship between the quantity of tomatoes harvested, the quantity of tomatoes lost, the information source, knowledge, the

causes of climate change and perceived climate change effects. The results of the inferential statistics show that there was no significant relationship between the quantity of tomatoes produced and the perceived effects of climate change ($r=-0.080$,

$p=0.375$). However, a significant relationship exists between the quantity of tomatoes lost and the perceived effects of climate change on tomato production ($r=0.194$, $p=0.030$). The relationship was significant and in a positive direction, implying that tomato farmers who experienced increased loss of tomato fruits were those who perceived the effects of climate change on tomato production to be severe. The relationship between climate change information sources and the perceived effects of climate change on tomato production ($r=0.336$, $p=0.000$) was significant. The result indicates that tomato farmers who perceived

climate change effects on tomato production to be high were those who sought climate change information more. Also, a significant relationship exists between tomato farmers' knowledge of climate change and the perceived effects of climate change ($r=0.504$, $p=0.000$). The result indicates that as knowledge of climate change increases, the perceived effects of climate change increase. Thus, increased knowledge of tomato farmers does not translate to a reduction in the severity of the climate change effects experienced by tomato farmers.

Table 8: PPMC analysis between selected independent variables and climate change perceived effects

Variable	r-value	p-value	Decision
Quantity harvested	-0.080	0.375	Not Significant
Quantity of tomato lost and climate change effects	0.194*	0.030	Significant
Information source	0.336**	0.000	Significant
Knowledge of the causes of climate change	0.504**	0.000	Significant

*Significant at 5%; **Significant at 1%

Source: Field Survey, 2023

CONCLUSION AND RECOMMENDATIONS

Tomato farmers knew the various drivers of climate change. Climate change has various effects on tomato production in the study area. Temperature fluctuation was the most severe effect of climate change experienced by tomato farmers. Tomato farmers made a good income from tomato sales, even though the years of involvement in tomato production were few. The involvement of young people, especially males, was evident in the study area. The study concluded that tomato production can still be a thriving enterprise in the study area despite the effects of climate change. The study recommends that extension agents should promote and provide support for sustainable farming practices in tomato production. Government and NGOs should organise comprehensive climate education programs tailored to the specific needs of tomato farmers on how to combat the various effects of climate change in Ondo State, Nigeria. Also, there is a need for the government and NGOs to enhance timely access of tomato farmers to climate change information.

REFERENCES

- Adeagbo, O. A., Ojo, T. O., & Adetoro, A. A. (2021). Understanding the determinants of climate change adaptation strategies among smallholder maize farmers in South-west, Nigeria. *Heliyon*, 7(2), e06231. <https://doi.org/10.1016/j.heliyon.2021.e06231>
- Akingba, O. O., Olubanjo, O. O., Emeribe, C. N., Ibanga, O. A., & Alade, A. E. (2022). Perceived evidence of climate change and effects on smallholders' farming practices in Edo North, Edo State, Nigeria. *American Journal of Water Resources*, 10(2), 35-45. <https://doi.org/10.12691/ajwr-10-2-1>
- Akinagbe, O. M., & Irohibe, I. J. (2014). Agricultural adaptation strategies to climate change impacts in Africa: A review. *Bangladesh Journal of Agricultural Research*, 39(3), 407-418. <https://doi.org/10.3329/bjar.v39i3.21984>
- Awiti, A. O. (2022). Climate change and gender in Africa: A review of impact and gender-responsive solutions. *Frontiers in Climate*, 4, 895950. <https://doi.org/10.3389/fclim.2022.895950>
- Ayankajo, I. T., & Morgan, K. T. (2020). Increasing air temperatures and its effects on growth and productivity of tomato in South Florida. *Plants (Basel)*, 9(9), 1245. <https://doi.org/10.3390/plants9091245>
- Baede, A. P. M., Ahlonsou, E., Ding, Y., & Schimel, D. (2018). The climate system: An overview. *IPCC Special Report*. <https://www.ipcc.ch/site/assets/uploads/2018/03/TAR-01.pdf>
- Chukwuone, N. A., & Amaechina, E. C. (2021). Factors affecting climate change coping strategies used by smallholder farmers under root crop farming systems in derived savannah ecology zone of Nigeria. *Environmental Development*, 39, 100627.

- <https://doi.org/10.1016/j.envdev.2021.100627>
- Danso-Abbeam, G., Ojo, T. O., Baiyegunhi, L. J. S., & Ogundeji, A. A. (2021). Climate change adaptation strategies by smallholder farmers in Nigeria: Does non-farm employment play any role? *Heliyon*, 7, e07162. <https://doi.org/10.1016/j.heliyon.2021.e07162>
- Ddamulira, G., Isaac, O., Kiryowa, M., Akullo, R., Ajero, M., Logoose, M., Otim, A., Mundingotto, J., Matovu, M., & Ramathan, I. (2021). Practices and constraints of tomato production among smallholder farmers in Uganda. *African Journal of Food Agriculture Nutrition and Development*, 21(2), 17560-17580. <https://doi.org/10.18697/ajfand.97.19905>
- Gowda, P. H., Steiner, J. L., Grusak, M. A., Boggess, M. V., & Farrigan, T. (2018). Agriculture and rural communities. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (Reidmiller, D. R., Avery, C. W., Easterling, D. R., Kunkel, K. E., Lewis, K. L. M., Maycock, T. K., & Stewart, B. C. (Eds.), pp. 391-437). U.S. Global Change Research Program. <https://doi.org/10.7930/NCA4.2018.CH10>
- Jha, C. K., & Gupta, V. (2021). Farmers' perception and factors determining the adaptation decisions to cope with climate change: Evidence from rural India. *Environmental and Sustainability Indicators*, 10, 100112. <https://doi.org/10.1016/j.indic.2021.100112>
- Madaki, M. Y., Muench, S., Kaechele, H., & Bavorova, M. (2023). Climate change knowledge and perception among farming households in Nigeria. *Climate*, 11(6), 115. <https://doi.org/10.3390/cli11060115>
- Ngbede, S. O., Igbegwu, F. C., Nwankwo, E. N., & Okpara, S. C. (2021). Socio-economic characteristics and production constraints of smallholder tomato production in Benue State, Nigeria. *Nigerian Journal of Horticultural Science*, 26(1), 58-67. https://hortson.org.ng/images/Journals/2021Volume/Ngbede_et_al_2021_compressed.pdf
- Obot, A., & Obiekwe, N. (2022). Climate adaptive measures among smallholder farmers in Akwa Ibom State, Nigeria. *American Journal of Agricultural and Biological Sciences*, 17, 58-64. <https://thescipub.com/pdf/ajabssp.2022.58.64.pdf>
- Obot, A., Okeke, C., Precious, C., & Onuoha, F. (2022). Factors influencing the adoption of FARO-44 rice among smallholder farmers in Anambra State, Nigeria. *Canadian Journal of Agriculture and Crops*, 7(1), 30-37.
- Ogunwande, I. O. (2024). Factors affecting the adoption of cropping systems among arable crop farmers in Southwest Nigeria. *Nigerian Journal of Horticultural Science*, 28(1), 1-9. https://hortson.org.ng/images/Journals/2024Volume/Ogunwande_2024_compressed.pdf
- Okon, E. M., Falana, B. M., Solaja, S. O., Yakubu, S. O., Alabi, O. O., Okikiola, B. T., Awe, T. E., Adesina, B. T., Tokula, B. E., Kipchumba, A. K., & Edeme, A. B. (2021). Systematic review of climate change impact research in Nigeria: Implications for sustainable development. *Heliyon*, 7(9), e07941. <https://doi.org/10.1016/j.heliyon.2021.e07941>
- Olabanji, M. F., Davis, N., Ndarana, T., Kuhudzai, A. G., & Mahlobo, D. (2021). Assessment of smallholder farmers' perception and adaptation response to climate change in the Olifants catchment, South Africa. *South African Journal of Water and Climate Change*, 12(7), 3388-3403. <https://doi.org/10.2166/wcc.2021.138>
- Olubanjó, O. O., & Alade, A. E. (2018). Effect of climate variability on the yield of crops in Ondo State, Nigeria. *International Journal of Water Resources and Environmental Engineering*, 10(5), 54-63. <https://doi.org/10.5897/IJWREE2018.0783>
- Onuk, E. G., Girei, A. A., & Amfani-Joe, C. E. (2018). Determinants of microfinance accessibility among tomato farmers in Kokona Local Government Area of Nasarawa State, Nigeria. *International Journal of Horticulture, Agriculture and Food Science*, 2(2), 46-53. <https://dx.doi.org/10.22161/ijhaf.2.3.4>
- Onyeneke, R. U., Agyarko, F. F., Onyeneke, C. J., Osuji, E. E., Ibeneme, P. A., & Esfahani, I. J. (2023). How does climate change affect tomato and okra production? Evidence from Nigeria. *Plants*, 12, 3477. <https://doi.org/10.3390/plants12193477>
- Piya, L., Maharjan, K. L., & Joshi, N. P. (2012). Comparison of adaptive capacity and adaptation practices in response to climate change and extremes among the Chepang households in rural areas of Mid-Hills in Nepal. *Journal of International Development and Cooperation*, 18(4), 55-75. <https://www.academia.edu/29061227>
- Raza, A., Razzaq, A., Mehmood, S. S., Zou, X., Zhang, X., Lv, Y., & Xu, J. (2019). Impact of climate change on crops adaptation and strategies to tackle its outcome: A review. *Plants (Basel)*, 8(2), 34. <https://doi.org/10.3390/plants8020034>

- Salisu, A., Danwanka, H. A., & Hassan, A. B. (2024). Role of radio and mobile phone in disseminating agricultural information to crop farmers in the central zone of Bauchi State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 4(2), 20-32. <https://doi.org/10.59331/njaat.v4i2>
- Tajudeen, T. T., Omotayo, A., Ogundele, F. O., & Rathbun, L. C. (2022). The effect of climate change on food crop production in Lagos State. *Foods*, 11(24), 3987. <https://doi.org/10.3390/foods11243987>
- Ugonna, B. F. (2022). Knowledge and skills for accessing agricultural information by rural farmers in South-East Nigeria. *Sage Journals*, 47(2). <https://doi.org/10.1177/0340035220951>
- United States Environmental Protection Agency. (2024). Climate change impacts on agriculture and food supply. Retrieved from <https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply>

Transborder smuggling and youth participation in agriculture in Badagry local government area of Lagos state

¹Taiwo, A. M. and ²Hussain, L. A.

¹Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria

²Department of Agricultural Science Education, Lagos State University of Education, Lagos

Correspondence details: abioduntaiwo34@gmail.com, +2348038479746

ABSTRACT

The study focused on assessment of trans-border smuggling and youth participation in agriculture in Badagry Local Government Area of Lagos State. One hundred and six youth smugglers were selected using simple random sampling technique. Data were collected on respondents' socioeconomic characteristics, factors that enabled their involvement in smuggling, level of involvement in smuggling, agricultural activities available and level of participation in agricultural activities using structured questionnaire. Results revealed that 50.9% of the respondents were male, 69.8% were married, 32.1% were Yoruba, while 64.2% had between 7 and 12 years of formal education. Poverty (71.7%) was the most dominant factor responsible for the respondents' engagement in smuggling. Level of involvement in smuggling was high (77.4%) among respondents in the study area. Cultivation of crops ($\bar{x}=2.62$) was the most prominent agricultural activity in the study area in which they participated mostly ($\bar{x}=2.32$). Years of formal schooling ($\beta = 0.024$, $p = 0.012$), Poverty ($\beta = 0.16$, $p = 0.00$) and Level of involvement in smuggling ($\beta = -0.022$, $p = 0.001$) were significant determinants of respondents' involvement in agriculture. The study concluded there was a low participation of respondents in agricultural activities in the study area. The study recommended the need for targeted interventions, including economic empowerment programmes, improved access to agricultural resources and policy measures that discourage smuggling while promoting sustainable youth involvement in agriculture.

Keywords: Youth, Smuggling, Agricultural activities, Border trading

INTRODUCTION

Transborder smuggling, illicit movement of goods across national boundaries, presents significant challenges to economic development, trade regulation and security in Nigeria (Golub, 2015). Due to the country's extensive land and maritime borders, smuggling remains a persistent issue, undermining government revenue, disrupting local markets and affecting national economic stability (Fagge and Ibrahim, 2021). Youth play a crucial role in socioeconomic and political development. However, adverse social conditions have rendered some of them unproductive in nation-building (Ojo and Okunola, 2014). The persistent economic challenges in Nigeria, particularly widespread unemployment and underemployment, have compelled many youths to seek alternative means of survival outside the conventional pathways. One of such alternatives is engagement in criminal activities, notably economic crimes such as smuggling, which exploits the porous and less-secured national borders (Barau *et al.*, 2024).

In many border communities, the pervasive nature of transborder smuggling presents a significant structural barrier to youth engagement in agricultural livelihoods (Wasima, 2025). Smuggling introduces a flood of illegally imported agricultural commodities; such as rice, maize, and poultry products into local markets, often at prices well below the cost of locally produced equivalents (Soon and Manning, 2018). This influx destabilizes market equilibrium and undermines local producers' capacity to compete fairly, creating a

disincentive for investment in agricultural activities. Young farmers, who typically lack substantial capital and are more risk-averse due to limited asset ownership, are disproportionately affected. The devaluation of their produce due to the price advantage held by smuggled goods leads to reduced income, heightened market unpredictability, and a general loss of trust in the agricultural value chain (Swinen, Olper, Vandeveld, 2021). As a consequence, many youths perceive agriculture as an economically insecure vocation, prompting them to disengage or abstain altogether from entering the sector. The long-term implications include not only a dwindling agricultural labour force but also the erosion of rural food systems, increased dependency on foreign imports, and the weakening of national food sovereignty. This situation is particularly acute in under-governed border areas, where regulatory enforcement is weak and smuggling flourishes with minimal deterrence, further deepening the crisis of agricultural underperformance and youth marginalization.

The allure of smuggling-related activities in border communities extends beyond economic disruption, presenting socio-developmental threats that redirect youth energy from agricultural engagement to illicit economies (Andreas, 2023). In contexts where poverty, unemployment, and weak state presence prevail, youths are particularly susceptible to recruitment into smuggling networks (Ojo and Okunola, 2014). These networks often serve as

conduits for broader criminal enterprises, including narcotics, arms, and human trafficking, and they offer short-term financial incentives that appear more lucrative than subsistence or commercial farming (Anagnostou and Doberstein, 2022). Participation in smuggling, however, alienates youth from the formal agricultural economy, not only by occupying their labour hours but also by reshaping their aspirations and socio-political affiliations. Over time, this shift contributes to the normalization of informal and illegal livelihoods, diminishing the perceived legitimacy and profitability of agricultural work. Furthermore, the attendant risks; such as exposure to violence, arrest, or death, impose psychological and physical costs that further deter reintegration into agricultural activities (Ninson and Brobbey, 2023). The systemic effects include deteriorating rural security, the breakdown of intergenerational knowledge transmission in farming communities, and increased volatility in borderland economies. Ultimately, youth involvement in smuggling accelerates the de-agrarianization of border regions, reinforcing cycles of insecurity, poverty, and underdevelopment (Bryceson, 2024). It becomes not merely a matter of lost labour, but of compromised rural futures

Trans-border communities serve as critical transit points for smuggled goods, including small arms, positioning them as strategic areas in national security considerations (Kehinde, 2019). Given their role as entry points for illicit goods, these regions attract individuals from diverse backgrounds and intentions, posing potential security risks. Despite the significance of this issue, existing research predominantly examines the economic impact of smuggling on the national economy (Gallien and Weigand, 2022) and the security threats posed by smuggling activities across the Nigeria borders (Bello *et al.*, 2025). These studies have largely overlooked the specific demographic groups involved in smuggling and the extent to which this illicit trade has stifled other viable and legitimate sources of livelihood like agriculture. Hence, this study addressed transborder smuggling and youth participation in agriculture in Badagry Local Government Area of Lagos state. Specifically, the objectives of the study were to;

1. describe the socioeconomic characteristics of respondents in the study area,
2. identify the factors that led respondents into smuggling in the study area,
3. ascertain the level of involvement of respondents in smuggling in the study area,
4. identify the agricultural activities available for respondents in the study area,
5. ascertain the level of participation of respondents in agricultural activities in the study area.

It is hypothesised that there is no significant contribution of independent variables to the level of participation in agriculture among respondents in the study area.

METHODOLOGY

The study was carried out in Badagry local government area, Lagos State, Nigeria. Badagry is a coastal town located on latitude 6.4316°N and longitude 2.8876°E. It is situated between Metropolitan Lagos and the border of the Republic of Benin at Seme. As of the preliminary 2006 census results, the municipality had a population of 241,093. The area is led by a traditional king, Akran De Wheno Aholu Menu – Toyi. The primary occupations of the people include fishing and farming, with some engaging in office work in the township areas of Badagry (Olusegun-Joseph, *et al.*, 2024). The target population of the study consisted of all the youth smugglers in Badagry Local Government. A snow-ball (non-probability) sampling technique was deployed to generate a sample frame of 157 youths who were actively involved in smuggling in the study area, 67.5% of the respondents were randomly selected from the sample frame, giving rise to one hundred and six (106) respondents for the study. The dependent variable of the study, level of participation of the respondents in agricultural activities was measured using a 9-point items comprising crop cultivation, piggery, fishery/aquaculture, horticulture, poultry production, snail rearing, cattle rearing, rearing of small ruminants and marketing of agricultural produce. Response options were on a 3-point scale of High, Moderate and Low with scores of 3, 2, 1 assigned respectively. Data were analysed using descriptive statistics such as frequency counts, percentages, means, standard deviations while the stated hypothesis of the study was tested using regression analysis.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of the respondents

Results in Table 1, indicates a near-equal representation, with male respondents comprising 50.9% and female respondents 49.1%. This finding suggests that smuggling activities in the study area are not gender-specific, as both males and females actively participated in the trade. This result agreed with Van Liempt (2011) who reported gender balancing in trafficking and smugglings acts. Majority (69.8%) of respondents were married, while 69.8% identified as Christians, reflecting the predominant religious affiliation within the study area. In terms of ethnic composition, a substantial proportion of respondents were Yoruba (32.1%), aligning with the geographical context of the study conducted in south western Nigeria. Additionally, individuals from the

Ogu (26.4%) and Igbo (20.8%) ethnic groups were also involved in trans-border smuggling, highlighting the multi-ethnic nature of smuggling activities in the region.

The mean number of years of formal schooling among respondents was 10.36 years, indicating relatively low educational attainment among the respondents. This finding aligns with the finding of Meinzen-Dick, *et al* (2011), who asserted that many countries in sub-

Saharan Africa experience low levels of education. Vocational training as alternative form of education emerged as a dominant form of skill acquisition, with 66.0% of respondents having undergone vocational training, whereas only 1.9% received adult education. The mean household size was approximately 6 individuals per household, indicating a moderately large family structure, which may influence economic decisions, including engagement in smuggling activities as a means of livelihood.

Table 1: Frequency distribution of respondents' socioeconomic characteristics (n=106)

Variables	Frequency	Percent	Mean	SD
Sex				
Male	54	50.9		
Female	52	49.1		
Marital status				
Single	24	22.6		
Married	74	69.8		
Widowed	8	7.5		
Religion				
Christianity	74	69.8		
Islam	28	26.4		
Traditional	4	3.8		
Tribe/ethnic group				
Hausa	6	5.7		
Igbo	22	20.8		
Yoruba	34	32.1		
Egun	10	9.4		
Ogu	28	26.4		
Togolese	6	5.7		
Number of years of formal schooling			10.36	3.77
≤ 6.00	24	22.6		
7.00 - 12.00	68	64.2		
13.00+	14	13.2		
Other forms of education				
Islamic	12	11.3		
Vocational	70	66		
Nomadic	16	15.1		
Adult	2	1.9		
Household size			5.87	1.66
≤ 4.00	22	20.8		
5.00 - 7.00	66	62.2		
8.00+	18	17.0		
Total	106	100		

Factors that led respondents into smuggling

From the results in Figure 1, leading factors that drove respondents into smuggling were poverty and the pursuit of high profits. The data reveals that 71.7% of the respondent's indicated poverty as the primary motivator, while 67.9% were driven by the potential for high profits. These results reveal the significant influence of economic desperation and the allure of financial gain in the decision to engage in smuggling. The high percentage of respondents driven by poverty

points to broader issues of socioeconomic inequality and lack of economic opportunities. The lure of high profits indicates that smuggling can be a highly lucrative enterprise compared to other available economic activities. This significant profit potential acts as a strong incentive for individuals to engage in smuggling, despite the risks involved. This finding aligns with that of Ojo and Okunola (2014) who reported poverty and unemployment as push factors for youth participation in smuggling.

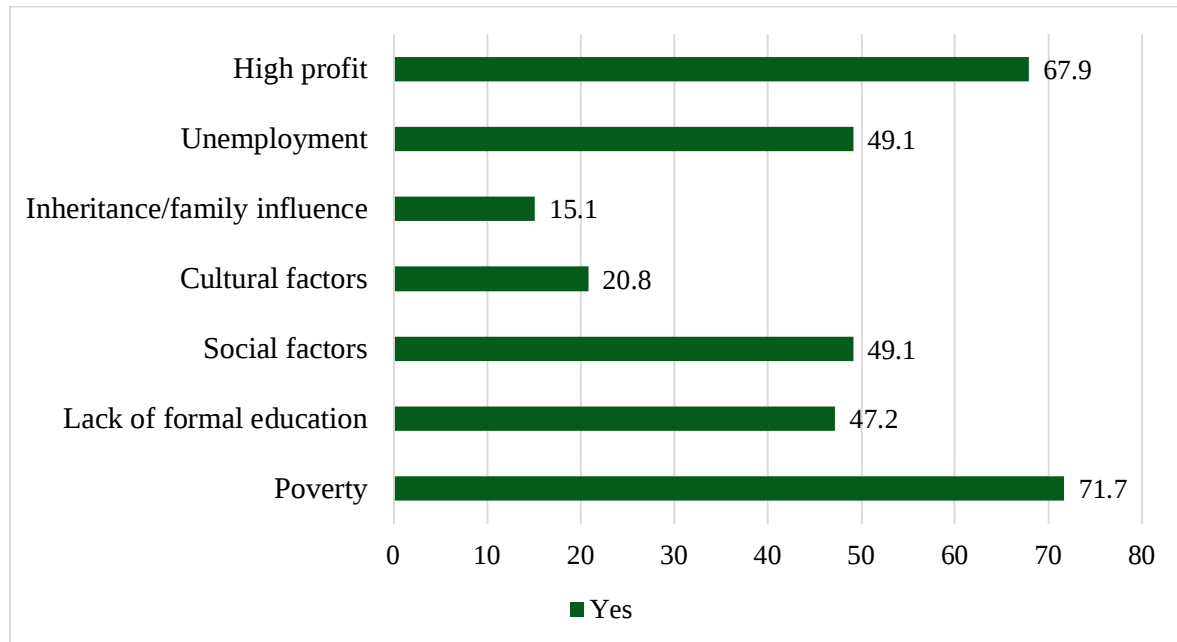


Figure 1: Factors that led Respondents into Smuggling

Respondents' involvement in smuggling in the study area

Results in Table 2 indicate that the highest levels of involvement in smuggling among respondents were in bags of rice ($\bar{x} = 3.00$), vegetable oil ($\bar{x} = 2.87$), and poultry products ($\bar{x} = 2.36$), suggesting these are the most commonly smuggled items, likely due to their high demand and profitability. Moderate participation was observed in clothing materials ($\bar{x} = 2.21$), fruits ($\bar{x} = 2.19$), manufactured canned food ($\bar{x} = 2.09$), and palm oil ($\bar{x} = 2.08$), which may reflect occasional or situational smuggling based on market needs. Lower participation levels were seen in wine ($\bar{x} = 1.89$) and shoes ($\bar{x} = 1.64$), indicating they are less prioritized for smuggling, possibly due to lesser demand. The

implication is that smuggling is driven by economic incentives and the need to meet local consumption demands, especially for staple and perishable goods, highlighting the need for improved border monitoring and local production support for essential commodities. This finding is in tandem with Golub (2015), who reported that shortage of staple foods encouraged involvement in smuggling in border communities. Table 3 revealed that there was high level (77.4%) of involvement in smuggling among respondents in the study area. This suggests that smuggling is a widespread and prevalent activity among the respondents, reflecting deep-rooted economic and social factors driving such behaviour

Table 2: Respondents' involvement in Smuggling in the Study Area

Items	High	Moderate	Low	Mean	SD
Bags of rice	80(75.5)	16(15.1)	10(9.4)	3.00	1.28
Vegetable oil	76(71.7)	19(17.9)	11(10.4)	2.87	1.31
Poultry products (e.g. chicken, turkey, etc.)	90(84.9)	11(10.4)	05(4.7)	2.36	1.25
Clothing Materials	50(47.2)	20(18.9)	36(33.9)	2.21	1.18
Wine	66(62.2)	14(13.2)	26(24.5)	1.89	1.13
Manufactured can food	45(42.5)	40(37.7)	21(19.8)	2.09	1.07
Fruits	87(82.1)	17(16.0)	02(1.9)	2.19	1.05
Shoes	65(61.3)	28(26.4)	13(12.3)	1.64	0.96
Palm oil	30(28.3)	31(29.2)	45(42.5)	2.08	1.18

Table 3: Categorisation of Respondents based on Level of Involvement in Smuggling

Level of participation in smuggling	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0.00 - 1.65)	24	22.6	0.00	3.30	1.73	0.83
High (1.66 – 3.30)	82	77.4				
Total	106	100.0				

Agricultural activities available to respondents

Against the grand mean (1.89), the agricultural activities mostly available to respondents were cultivation of crops (2.62), piggery (2.08), sheep and goat rearing (2.02) and poultry production (1.98). The higher mean score for crop cultivation (2.62) reflects its prominence in the local economy. This suggests that a significant portion of the population relies on agriculture, particularly crop farming. The mean scores for piggery (2.08), sheep and goat rearing

(2.02), and poultry farming indicate these activities are also integral to the local economy. Prominence of these agricultural activities suggests opportunities for diversification and value chain development. Processing of agricultural products, such as poultry processing, dairy products and meat processing, could create additional income streams and reduce dependency on smuggling. This finding is consistent with that of Auta *et al* (2010) who listed crop and animal enterprises among agricultural prospects for rural youth engagement.

Table 4: Distribution based on Agricultural Activities Available to the Respondents

Agricultural activities	Readily available	Moderately available	Not available	Mean	Std. d
Cultivation of crops	70(66)	32(30.2)	4(3.8)	2.62	0.56
Piggery	46(43.4)	22(20.8)	38(35.8)	2.08	0.89
Fishery/aquaculture	24(22.6)	42(39.6)	40(37.7)	1.85	0.77
Horticulture	22(20.8)	26(24.5)	58(54.7)	1.66	0.80
Poultry production	16(15.1)	72(67.9)	18(17)	1.98	0.57
Rearing of snails	10(9.4)	30(28.3)	66(62.3)	1.47	0.66
Cattle rearing	16(15.1)	28(26.4)	62(58.5)	1.57	0.74
Rearing of small ruminant (sheep and goat)	24(22.6)	60(56.6)	22(20.8)	2.02	0.66
Marketing /selling of agricultural produce	18(17)	46(43.4)	42(39.6)	1.77	0.72

Grand Mean = 1.89

Level of participation of respondents in agricultural activities

Results in Table 5 show the level of participation of the respondents in agricultural activities, the respondents participated mostly in cultivation of crops ($\bar{x}$ =2.32), poultry production ($\bar{x}$ =1.85) and piggery ($\bar{x}$ =1.79). There was moderate involvement in marketing/Selling of agricultural produce ($\bar{x}$ =1.74) and rearing of small ruminants ($\bar{x}$ =1.70), while horticulture ($\bar{x}$ =1.49) had least participation among

the respondents. This result suggests that respondents preferred crop cultivation, poultry and piggery, probably due to their economic viability. That fewer participation in horticulture demonstrates the fact that aesthetics is not a priority in the study area. However, result in Table 6 shows categorisation of respondents' level of participation in agriculture, majority (62.9%) of the respondents had a low level of participation in agricultural activities. This affirms youths in the study area are not interested in agriculture.

Table 5: Distribution of respondents based on their level of participation in agricultural activities

Agricultural activities	High	Moderate	Low	Mean	SD
Cultivation of crops	46(43.4)	48(45.3)	12(11.3)	2.32	0.67
Piggery	22(20.8)	40(37.7)	44(41.5)	1.79	0.76
Fishery/aquaculture	14(13.2)	28(26.4)	64(60.4)	1.53	0.72
Horticulture	10(9.4)	32(30.2)	64(60.4)	1.49	0.67
Poultry production	12(11.3)	66(62.3)	28(26.4)	1.85	0.60
Rearing of snails	12(11.3)	24(22.6)	70(66.1)	1.64	1.47
Cattle rearing	22(20.8)	18(17)	66(62.3)	1.58	0.81
Rearing of small ruminant (sheep and goat)	22(20.8)	30(28.3)	54(50.9)	1.70	0.79
Marketing /selling of agricultural produce	24(22.6)	30(28.3)	52(49.1)	1.74	0.81

Table 6: Categorisation of Respondents based on Level of Participation in Agricultural Activities

Level of participation	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0.0 - 2.0)	67	62.9	0.00	4.00	1.83	0.71
High (2.1- 4.0)	39	37.1				
Total	106	100.0				

Contribution of independent variables on their participation in agricultural activities

Results in Table 7 reveal that years of formal schooling ($\beta = 0.024$, $p = 0.012$) has a positive and significant effect on participation in agricultural activities. This implies that individuals with more education are more likely to be involved in agriculture, possibly due to better awareness of consequences of smuggling on individual and the national economy, skills, or the ability to adopt modern farming methods. Poverty ($\beta = 0.16$, $p = 0.00$) significantly increases participation in agriculture. This suggests that poor individuals in the study area engaged in agriculture out of necessity, using it as a livelihood strategy. Level of

involvement in Smuggling ($\beta = -0.022$, $p = 0.001$) has a significant but negative relationship with agricultural participation. This means that as the level of participation in smuggling increases, participation in agriculture tends to decrease. It may imply that involvement in smuggling activities diverts attention or resources away from agriculture. This finding agrees with Allen and Clawson (2018), who posited that increasing access to formal education may enhance participation in agriculture by equipping individuals with the knowledge and skills needed for modern farming and discouraging engagement in smuggling and other economic sabotaging endeavours. Additionally, addressing poverty and reducing incentives for smuggling could shift.

Table 7: Regression contribution of independent variables on their participation in agricultural activities

Variables	β	Std. Error	T	p-value	Decision
(Constant)	0.806	0.481	13.440	0.000	
Years of formal schooling	0.024	0.011	1.532	0.012	S
Household size	0.006	0.009	0.632	0.264	NS
High profit	0.112	0.010	1.888	0.121	NS
Unemployment	0.022	0.130	0.155	0.152	NS
Inheritance/family influence	-0.053	0.100	-0.230	0.431	NS
Cultural factors	0.082	0.012	2.044	0.113	NS
Social factors	-0.015	0.042	-0.484	0.427	NS
Lack of formal education	0.030	0.020	0.553	0.204	NS
Poverty	0.168	0.033	2.328	0.002	S
Involvement in smuggling	-0.022	0.003	3.151	0.001	S
Agricultural activities	0.033	0.026	1.429	0.140	NS
R square	0.147				
Adjusted R square	0.174				

S=Significant; NS= Not Significant Level of Significance = 0.05

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that, there was a low participation in agricultural activities in the study area, while the level of involvement in smuggling was high. Poverty was the major factor that led respondents into smuggling, while cultivation of crops was the major agricultural activity available to the respondents in the study area. The study therefore recommended that there is need for targeted interventions, including economic empowerment programmes, improved access to agricultural resources and policy measures that discourage smuggling while promoting sustainable youth involvement in agriculture.

REFERENCES

- Allen, E., & Clawson, L. (2018). Growing food and farming literacy. *Youth in Food*, 21.
- Anagnostou, M., & Doberstein, B. (2022). Illegal wildlife trade and other organised crime: A scoping review. *Ambio*, 51(7), 1615-1631.
- Andreas, P. (2023). How the State Made Smuggling and Smuggling Made the State. *Global Human Smuggling: Buying Freedom in a Retreating World*, 65.
- Auta, S. J., Abdullahi, Y. M., and Nasiru, M. (2010). Rural youths' participation in agriculture: prospects, challenges and the implications for policy in Nigeria. *Journal of agricultural education and extension*, 16(3), 297-307.
- Barau, D. S., Liman, A. N., and Abdul, A. M. (2024). Trans-border Management and National Security in Nigeria, 2015-2023.

- Bello, M. E., Alex, M. F. and Erinosh, T. (2025). The Economic Impact of Smuggling on the Socioeconomic Landscape of Ogun State. *Jalingo Journal of African Studies*. Vol. 14:6, 98-109.
- Bryceson, D. F. (2024). Rural labor, depeasantization, and deagrarianization. In *Handbook of African Economic Development* (pp. 345-358). Edward Elgar Publishing.
- Fagge, M. M., and Ibrahim, K. (2021). Trans-border crime and its implications on Nigeria's national security and sustainable development. *African Scholar Journal of African Sustainable Development*, 21(2), 173-188.
- Gallien, M., & Weigand, F. (2022). *The Routledge handbook of smuggling* (p. 484). Taylor & Francis.
- Golub, S. (2015). Informal cross-border trade and smuggling in Africa. In *Handbook on trade and development* (pp. 179-209). Edward Elgar Publishing.
- Kehinde, O. S. (2019). *Cross-Border Insurgency and The Coping Strategies of Border Communities in North-Eastern Nigeria* (Doctoral dissertation, Doctoral dissertation, University of KwaZulu-Natal, Pietermaritzburg, South Africa).
- Meinzen-Dick, R., Quisumbing, A., Behrman, J., Biermayr-Jenzano, P., Wilde, V., Noordeloos, M., ... and Beintema, N. (2011). *Engendering agricultural research, development and extension* (Vol. 176). Intl Food Policy Res Inst.
- Ninson, J., & Brobbey, M. K. (2023). Review on engaging the youth in agribusiness. *Cogent Social Sciences*, 9(1), 2193480.
- Ojo, M. O. D., and Okunola, R. A. (2014). Youth Involvement in Smuggling: Push and Pull Factors and Methods Involved. *International SAMANM Journal of Business and Social Sciences*, 2(4), 29-58.
- Olusegun-Joseph, T. S., Olusegun-Joseph, D. A., Fowora, M. A., Babalola, A. S., Rufai, M. A., Fasasi, K. A., and Adeleke, M. (2024). Animal Tungiasis in the endemic areas of Badagry Local Government Area of Lagos State, Southwestern Nigeria. *Zoologist (The)*, 25.
- Soon, J. M., & Manning, L. (2018). Food smuggling and trafficking: The key factors of influence. *Trends in food science & technology*, 81, 132-138.
- Swinnen, J., Olper, A., & Vandeveld, S. (2021). From unfair prices to unfair trading practices: Political economy, value chains and 21st century agri-food policy. *Agricultural Economics*, 52(5), 771-788.
- Van Liempt, I. (2011). Different geographies and experiences of 'assisted' types of migration: A gendered critique on the distinction between trafficking and smuggling. *Gender, place and culture*, 18(02), 179-193.
- Wasima, S. (2025). Cattle Smuggling Across the India-Bangladesh Borderlands: A Challenge for Border Management?. *Journal of Borderlands Studies*, 40(2), 457-475.

Determinants of poverty among coastal artisanal fishers in Lagos state, Nigeria

¹Oyetade, O. P. ²Olaoye, O.J., ³Ojebiyi, W. G., ³Oyebamiji, B. A., ¹Adekunle, T. O, ³Iskil-Ogunyomi, S.A and ¹Akintade, T. O.

¹Department of Aquaculture and Fisheries Management, Federal University of Agriculture, P. M. B. 2240, Abeokuta, Nigeria

²Agricultural Media Resources and Extension Centre, Federal University of Agriculture, P. M. B. 2240, Abeokuta, Nigeria

³Department of Agricultural Extension and Rural Development, Federal University of Agriculture, P. M. B. 2240, Abeokuta, Nigeria

Correspondence details: oyetadeop@funaab.edu.ng, +2347031849361

ABSTRACT

This study examined the determinants of poverty status among coastal artisanal fishers in Lagos State, Nigeria. Multi-stage sampling procedure was used in selecting 200 artisanal fishers from nine fishing communities. Data were collected using an interview schedule and analysed using descriptive and Ordinary Least Square Regression (OLS) analytical techniques. Majority of the respondents were married (79.0%) and had formal education (95.5%), with mean age of 35.00±8.55 years. The mean monthly income and household expenditure of the artisanal fishers were ₦163,810.00±110,347.12 and ₦89,276.57, respectively. The mean household size and income-earning members were 7±3.81 and 5±2.88 persons, respectively. More than half (52.2%) of the respondents were relatively poor. Constraints facing coastal artisanal fishing were high cost of fishing materials ($\bar{x}$ =1.93±.31), inadequate storage facilities ($\bar{x}$ = 1.93±.27), limited access to credit facilities ($\bar{x}$ = 1.88±.45), and low fish catch ($\bar{x}$ = 1.85±.36). Household size (β = -0.128), number of incomes earning members (β = 0.052), and total monthly household expenditure (β = 0.987) significantly influenced poverty among the respondents. The study concluded that poverty is prevalent among coastal artisanal fishers in Lagos State, Nigeria, and that poverty is influenced by household size, number of incomes earning members, and household expenditure. The study recommended that government and concerned stakeholders should collaborate to provide subsidies or microfinance schemes to reduce the cost burden of fishing materials for artisanal fishers.

INTRODUCTION

The World Bank (2020) defines poverty as the incapacity to achieve even the most basic living level. According to the United Nations Development Program - UNDP (2022), poverty can also be seen as a violation of human dignity and a denial of possibilities and choices and an intolerable deficiency in human well-being, encompasses both social and physiological dimensions of suffering. The failure to provide for fundamental material or biological needs, such as insufficient food, health, education, and housing, is physiological deprivation (World Bank, 2001). According to a recent Global Multidimensional Poverty Index 2023 published by United Nations Development Programme - UNDP and Oxford Poverty and Human Development Initiative - OPHI (2023), 1.1 billion out of 6.1 billion people from 110 developing countries are poor, implying that 18% of the population in developing countries live in acute multidimensional poverty. It is worrisome that close to half (534 million) of the poor live in sub-Saharan Africa. The report further indicated that nearly two-thirds and over one-third of the poor people live in middle- and low-income countries, respectively. According to World Bank April report of 2025, Nigeria is home to 19% of the extremely poor population in sub-Saharan Africa, the highest share across the region indicating that over 106 million

Nigerians live in extreme poverty (World bank report, 2025).

It is documented that the rural population is disproportionately affected by poverty globally as almost 84 percent of poor people live in the areas (UNDP and OPHI, 2023). According to UNDP (2022), multidimensional poverty is significantly more prevalent in rural areas of Nigeria, affecting 72% of the rural population compared to 42% in urban areas. Although approximately 70% of Nigerians live in rural regions, these areas are home to 80% of the nation's impoverished population. The intensity of poverty is also more pronounced in rural communities including fishing settlements where the poverty severity index stands at 42%, compared to 37% in urban areas. However, despite its resource wealth, Nigeria continues to grapple with widespread poverty. As of 2024, approximately 87 million Nigerians are estimated to be living below the poverty line, positioning the country as having the second-largest population of people in extreme poverty globally, after India (World Bank, 2024). The national poverty rate was projected to reach 38.9% in 2023. According to Lain *et al.* (2022), between 2009 and 2019, the number of impoverished individuals increased despite a decline in poverty rates. Regrettably, despite the region's importance to the Nigerian economy in terms of employment opportunities, meeting the non-food

needs of the majority of the nation's expanding population, generating income, and providing raw materials, rural communities are more susceptible to poverty and its effects. This is because rural areas, where most residents are crop farmers, fishers, hunters, and merchants of agricultural products and byproducts are where the primary production of food crops, cash crops, livestock, and aquatic species, including fish, begins. Millions depend on artisanal fisheries, especially in coastal areas like Lagos State, for their livelihoods (Ojebiyi *et al.*, 2023). Small-scale, traditional fishing methods typify these fisheries and are vital to this industry (FAO, 2016). Nevertheless, despite its importance, artisanal fishermen frequently encounter various difficulties, such as poverty, which compromises their socioeconomic security and feeds a vicious circle of susceptibility (Adeleke and Oloko-Oba, 2019).

The main source of income for residents in coastal areas is fishing and businesses related to fisheries. According to Ibrahim *et al.* (2009), a significant segment of Nigerian fishing households are subsistence small holders who primarily depend on the use of non-motorized boats and fishing nets as part of a traditional system marked by low capital investment, low technology, and labor-intensive practices. Despite the fact that artisanal fishing, in particular, accounts for the majority of agricultural produce in Nigeria, poverty is, ironically, most prevalent and severe in the country's rural areas (UNDP, 2022). Numerous integrated programs and policies have been developed to address poverty in all of its manifestations since the Nigerian government recognised the multi-sectoral and multi-dimensional nature of poverty. The National Accelerated Fish Production Project (NAFPP), the Integrated Rural Fisheries Development Project, the Fish Storage, Processing and Marketing Scheme, and the National Economic Empowerment and Development Strategy (NEEDS) are a few of these initiatives and programs (National Bureau of Statistics - NBS, 2005).

In Lagos State, Nigeria, poverty is still a major problem for artisanal coastal fishers. Despite their crucial role in the economy and food security, many of

these fishers are impoverished and unable to meet their basic needs (NBS, 2020). This paradox highlights the need for a nuanced understanding of the underlying factors perpetuating their socio-economic vulnerability, which makes it difficult to implement focused initiatives to improve their situation. The importance and efficacy of governmental interventions in alleviating poverty in developing nations have been significantly impacted by the interconnections between artisanal fishing households and poverty. Even though practically every household in coastal and riverine areas fishes. Artisanal fisheries have been associated with limited enhanced income and improved quality of life (Etim *et al.*, 2008). Studies on poverty in Nigeria and the worldwide fisheries industry are available, but few explicitly address the factors contributing to poverty among Lagos State's coastal artisanal fishers. Comprehending these factors is essential for formulating efficacious measures to mitigate poverty that are customised to the distinct socio-economic milieu of this population.

In view of this; the need to assess the current poverty situation among artisanal fishing households in coastal fishing communities of Lagos State becomes imperative. Specifically, the study described the socio-economic characteristics of fishing households, examined the fishing characteristics of the fishing households, determined the fishing household's monthly expenditure, assessed the poverty status of the fishing households, and determined the severity of constraints faced by the fishing households. The study tested if there are significant relationships between selected fishing characteristics and poverty among fishing households at significant levels of 5%.

METHODOLOGY

The study was carried out in Lagos State which has a coastline of 180km along the coast of the Atlantic Ocean, it therefore has 22.5 percent of Nigeria coastline and occupies an area of about 3,577 sq. km. land mass with about 786.94 sq. km. The state has marine, brackish and freshwater ecological zones with varying species that provide productive fishing opportunity for fishers (Figure 1).

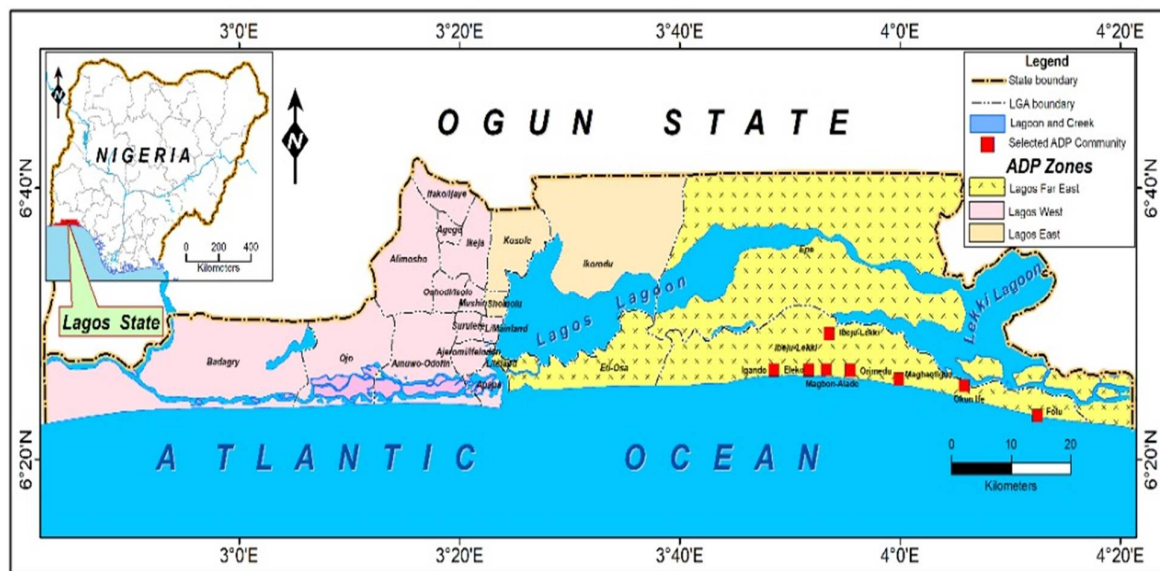


Figure 1: Map of the study areas

Source: Geography Department University of Ibadan

Sampling techniques and sample size

A multistage sampling procedure was used. At the first stage, one out of the three agricultural development programme zones were purposively selected due to high coastal fishing activities which is Far Eastern zone. At the second stage, nine fishing communities: Eleko (95); Ibeju-Lekki (150); Orimedu (200); Igando (77); Magbo-Alade (88); Magbotigun (100); Lekki (150); Folu (55) and Okun Ife (80) were purposively sampled from the selected zone due to highest concentration of fishers and intensity of fishing activities. From a sampling frame of 995 artisanal fishers in the selected communities, 20 percent was randomly selected: Eleko (19); Ibeju-Lekki (30); Orimedu (40); Igando (16); Magbo-Alade (18); Magbotigun (20); Lekki (30); Folu (11) and Okun Ife (16) in Stage 3 to give a total of 200 artisanal fishers which served as the sample size for this study. The sampling frame was obtained by compiling the list of fishers from the selected fishing communities with the help of agricultural development program extension personnel and research assistants in the study locations.

Data were elicited using a validated and pretested interview schedule on the stated objectives. Fishers

were either visited in their homes or at the landing sites for data collection. The interview schedule was interpreted in the local language (Yoruba) of the respondents by the researcher to the fishers, and their responses were recorded in English language.

Household expenditure: This was measured at interval level with a list for estimating the spendings of the households monthly under the food and non-food items. The household expenditure was computed as the summation of food expenses and non-food expenses.

Poverty status: This was measured based on the classification of poor and non-poor households in relation to the level of their monthly per capita expenditure by each household monthly total per capita expenditure (Sanusi *et al.*, 2021). The monthly per capita expenditure is obtained by dividing the total household monthly expenditure by household size. Any household with a per capita expenditure lower than the mean per capita expenditure of the respondents is considered poor while those with higher per capita expenditure are categorized as non-poor (Sanusi *et al.*, 2021).

$$\text{Per Capita Expenditure (PCE)} = \frac{\text{Total Household monthly expenditure}}{\text{Household size}}$$

Constraints facing artisanal fishers: This was measured with a 16-item scale on a three response options of Major constraint, Minor constraint, and Not a constraint. The options are assigned scores of 2, 1 and 0, respectively. Mean values were computed and used in ranking the items in descending order of

severity such that items with mean values above the cut-off point (1.00) are considered as severe while those with values below the cut-off point are considered otherwise.

Data obtained from the survey were cleaned, coded and entered into the Statistical Package for Social Sciences (SPSS) version 21.0 for analysis. The data were subjected to descriptive (frequency counts, percentages, means) and inferential (Ordinary Least Square Multiple Regression) statistics. The regression analysis model was used to determine production by relating per capita household expenditure directly to exogenous asset endowment of the households.

RESULTS AND DISCUSSION

Socioeconomic characteristics of fishers

The socioeconomic characteristics of the fishers are presented in Table 1. It shows that 33.0% and 42.0% were within the age brackets of 21-30 years and 31-40 years, respectively. The mean age was 35.13 ± 8.55 years. According to the research findings, the average age of the artisanal fishing workforce in Lagos State indicates that most workers are in their prime working years. This demographic profile may impact several characteristics of poor status, such as generating income, taking care of the home, and obtaining social services. Salau and Olaleye (2020) posit that while younger fishers may encounter obstacles in relation to skill development and labor market engagement, older fishers may possess greater experience and expertise regarding fishing tactics. This result is consistent with that of Olaoye *et al.* (2012) and Olaoye *et al.* (2018), who discovered that fishers in Ogun Waterside were within the productive and economically active age range, potentially increasing fish catches and enhancing household and family livelihoods. This, however, ran counter to Baiyewu's (2020) findings, which indicated that younger people were less likely to fish and that older fishers were the ones who fished. This implies that while artisanal fishers are still active, their fish supply would be sustainable. More than half (53.5%) were Christians and 44.5% and 2.0% were Muslims and traditional worshipers, respectively. Majority (79.0%) of the fishers were married, and 19.5% were single. The distribution of fishers based on marital status revealed that married people dominated the fishing community. This suggests that the make-up of households and family dynamics may have a big impact on how poor coastal artisanal fishers are. Married fishers may have extra financial obligations, such as providing for dependents and covering home costs, which may have an impact on their financial security and susceptibility to poverty. Adelekan and Ojo (2018) posit that poverty consequences may arise from variations in household decision-making processes and resource allocation techniques between married and single fishers. Additionally, it implies that the fishers were accountable and that fishing gave them the ability to guarantee food security for their families. This supports Baiyewu's (2020) assertion

that marriage may catalyze taking up fishing as a means of meeting one's obligation to provide for the necessities of the household. According to Mafimisebi *et al.* (2016), married fishers likely pursued fishing to secure a reliable source of income to support their families. Table 1 also reveals that 39.0% of the fishers had a household size of 4-6 persons while 21.5% and 21.0% had household size ranging from 7-9 persons and >9 persons, respectively. The mean household size was approximately 7 ± 3.81 persons. Close to two-thirds (65.5%) of the fishers had 6-10 dependents with the mean household dependent being about 5 ± 2.88 persons. Due to the typically large family sizes within the fishing industry, it can be inferred that fishers tend to have a high number of dependents as well as multiple household income earners, underscoring the significant role of family composition in their socioeconomic dynamics. A large family implies that family members could support artisanal fishing for little or no labor expense. Additionally, fishers with larger households are more likely to be impoverished because of higher expenses. This is consistent with the claims made by Anyanwu (2013) that large households in Nigeria experience greater rates of poverty. The majority of fishers worked primarily as fishers, according to research findings, and various enterprises associated with fishing. This demonstrates how coastal populations rely on artisanal fishing for their economic sustenance. Many households along Lagos State's coastline rely heavily on fishing for employment, income, and food security, which supports local economies and preserves livelihoods (Olatunji and Mshelia, 2018; Olofin and Oladeji, 2019; Ojebiyi *et al.*, 2023). Majority (98.0%) were involved in fisheries related occupation. Table 1 also shows that the fishers' mean monthly income was N163, 810.00 $\pm$ 110,347.12. Majority (93.0%) of the fishers had 1-5 income earning household members. Also, Table 1 shows that more than half (54.0%) of the fishers had secondary education, 37.50% had primary education, while the remaining 4.5%, 3.0% and 1.00% had no formal education, tertiary education and religious education respectively. Table 1 also show that 55.0% of the fishers owned their residence, while 22.0% (had both owned and inherited residence) and 16.0% are inherited, while few (7.0%) rented their apartments. The study's findings showed that most fishers were classified as literate, and a larger percentage had completed at least secondary school, suggesting that fishing is also a source of livelihood for educated people. This will facilitate the implementation of various innovations and tactics in addition to better fishing technologies. The educational background of the fishers raises the possibility that human capital elements, including skill development and educational achievement, may impact the poverty condition of artisanal coastal fishers. According to Adeyanju and Olaniyan (2019), education improves fishers' ability to take up alternate

sources of income, obtain formal employment, and adjust to shifting market conditions and technological breakthroughs. According to earlier research (Onemolease and Oriakhi, 2011; Olaoye *et al.*, 2013; Tiarniyu *et al.*, 2015; Olaoye *et al.*, 2016), the adoption of technology by farmers positively correlates with

education. Additionally, Adeleke (2013) claimed that educated fishers would be more familiar with the fundamentals of fishing operations and would find it simpler to implement innovations from research institutes and extension agencies in order to increase output.

Table 1: Socioeconomic characteristics of respondents (n = 200)

Variables	Frequency	Percentage	Mean $\pm$ Std Dev
Age (years)			
≤ 20	5	2.5	35.13 $\pm$ 8.55
21 – 30	66	33.0	
31 – 40	84	42.0	
41 – 50	39	19.5	
>50	6	3.0	
Religion			
Christianity	107	53.5	
Islam	89	44.5	
Traditional	4	2.0	
Educational status			
No education	9	4.5	
Primary education	75	37.5	
Secondary education	108	54.0	
Tertiary education	6	3.0	
Religious education	2	1.0	
Marital status			
Married	158	79.0	
Single	39	19.5	
Divorced/ Separated	3	1.5	
Residential status			
Owned	110	55.0	
Inherited	32	16.0	
Owned/inherited	44	22.0	
Rented	14	7.0	
Household size (persons)			
1-3	37	18.5	7 $\pm$ 3.81
4-6	78	39.0	
7-9	42	21.0	
>9	43	21.5	
Number of household dependent			
1-5	131	65.5	5 $\pm$ 2.88
6-10	61	30.5	
11-15	8	4.0	
Primary occupation			
Fisheries related	196	98.0	
Non fisheries related	4	2.0	
Income primary occupation			
25001-50000	26	13.0	163,810.00 $\pm$ 110,347.12
50001-75000	13	6.5	
75001-100000	51	25.5	
>100000	110	55.0	
Number of incomes earning member			
1-5	186	93.0	2.15 $\pm$ 1.61
6-10	14	7.0	

Fishing characteristics of artisanal fishers

The fishing characteristics of artisanal fishers are presented in Table 2. It reveals that about half (51.0%) of the fishers engaged in fishing for 6-10 hours per day

with a mean working hours of 5.75 ± 1.51 . Half (50.0%) of the fishers had more than 15 years of fishing experience while 23.5% and 24.5% had 6-10 years and 11-15 years of experience, respectively. The mean year fishing experience was 18.4 ± 9.58 years. All the fishers engaged in fishing on a daily basis. Also, 41.5% of the fishers participated in fishing during the morning and night periods while 27.0% go fishing in the morning alone. Also, 37.5% of the fishers had been residing in the community for 11-20 years, 23.0% of the fishers resided for 1-10 years and 21-30 years, while 16.5% of the fishermen resided for more than 30 years, respectively. The mean year of residency was 20.30 ± 12.46 . The results also demonstrate the fishing industry's major contribution to Lagos State's local economy, which includes income generation, business

stimulation, and support for coastal communities' diversification of sources of income. The fishers' years of experience were noticeable, allowing them to exhibit a high degree of ability, wisdom, and tacit knowledge from years of experience on the water. Their vast experience makes them proficient in many fishing-related areas, such as resource management, fish behavior, navigation, and handling gear (Adeyanju and Olaniyan, 2019; Ajayi and Adesina, 2019). As a result, the fishers should be able to cover their home expenses. The survey results also showed that artisanal fishers engaged in fishing daily, with mornings being their most common time. This implies that fishing was preferably done in the morning by the fishers as this will enable them to know the direction of fishes for a better output (FAO, 2012).

Table 2: Distribution of artisanal fishers' fishing characteristics (n = 200)

Variables	Frequency	Percentage	Mean± Std Dev(SD)
Working hours/day			
1-5	98	49.0	5.75 ± 1.51
6-10	102	51.0	
Year of experience			
1-5	4	2.0	18.45 ± 9.56
6-10	47	23.5	
11-15	49	24.5	
>15	100	50.0	
How often do you fish?			
Daily	200	100	
Period of fishing			
Morning	36	18.0	20.30 ± 12.46
Afternoon	8	4.0	
Night	2	1.0	
Morning and afternoon	17	8.5	
Morning and night	83	41.5	
Morning, afternoon and night	54	27.0	
Year of residency			
1-10	46	23.0	20.30 ± 12.46
11-20	75	37.5	
21-30	46	23.0	
>30	33	16.5	

Household expenditure

Table 3 reveals that a total of N89,276.5±26,415.33 was the monthly total household expenditure of the sampled fishers with total food expenses accounting for 46.6%. On the other hand, non-food expenses accounted for 53.4% of the household monthly expenditure. The results further revealed that 17.0% and 16.2% were expended on clothing and education, respectively. The least expenditure was on housing and home maintenance. The fishers' average monthly earnings, though varied, was almost ₦164,000, more than the ₦30,000 minimum wage for Nigerian laborers. Different levels of adoption of new technologies and variations in fishing intensity could cause monthly income fluctuation. These results are

consistent with those of Baiyewu (2020), who found that artisanal fishers' high-income levels were caused by their nearly full-time commitment to fishing. According to Omitoyin and Fregene (2012), most of Lagos State's artisanal fishers made fishing their full-time job. Food items only made for roughly 47% of household expenses, meaning that non-food items accounted for more than half of household spending. The percentage of household spending on non-food goods can be used as a stand-in for gauging the standard of living and general well-being of Lagos State's artisanal fishing households. Increased spending on non-food products might be a reflection of easier access to consumer goods, infrastructure, and necessary services, which would improve living conditions, social welfare, and human development

outcomes in coastal areas (Adeyanju and Olaniyan, 2019). Due to the seasonal and erratic nature of fishing earnings, the difficulty in obtaining financial services, and the exposure to external risks like market volatility, climate change, and policy changes, artisanal fishing households may continue to be susceptible to economic shocks and fluctuations even

with their comparatively high expenditures on non-food items. Strategies for household resilience, like asset accumulation, savings, and unofficial insurance networks, may be crucial in preserving household well-being and acting as a buffer against fluctuations in income (Adelekan and Ojo, 2018; Salami and Daramola, 2021).

Table 3: Mean household expenditures per month (n= 200)

Items	Mean (N)	Std. Deviation	Percent of household expenditure
Staple food	32460.00	19963.35	36.4
Vegetables	5711.43	6429.29	6.4
Fruits	1008.33	722.076	1.1
Dairy	2418.53	2153.32	2.7
Total food expenditure	41598.29	21509.02	46.6
Non-food expenses (clothing)	15202.28	12882.48	17.0
Communication (Airtime)	7018.55	3228.27	7.9
Housing and Home maintenance (kerosene)	97.10	57.49	0.1
Social expenditure (Alms, offering and tithe)	3153.66	1635.29	3.5
Health	7760.47	3686.66	8.7
Education	14446.22	5000.75	16.2
Total non-food expenditure	47678.28	19201.49	53.4
Total	89,276.57	26415.33	

Source: Field survey (2021)

Poverty status of artisanal fishers

Figure 1 reveals that slightly above average (52.2%) were relatively poor, while 47.8% were relatively non-poor. The inability of households to meet basic requirements and obtain necessary services, as shown by food insecurity, substandard housing, poor healthcare, and low educational attainment, is reflected in poverty, according to Adeyanju and Olaniyan (2019). According to this survey, over half of the fishers were moderately impoverished. This discovery aligns with the findings of Oyetade *et al.* (2023a), who similarly revealed that over 50% of artisanal fishers in Ogun Waterside Local Government

Area were impoverished, suggesting that poverty is not limited to artisanal fishers in Lagos State. This implies that artisanal fishers are often impoverished. This emphasizes the socioeconomic difficulties that artisanal fishing communities encounter. The vulnerability of artisanal fishers to external shocks and pressures, such as market fluctuations, regulatory changes, environmental degradation, and climate variability, is reflected in their poverty. Although fishing is a source of income for coastal communities, it also carries dangers that can worsen poverty and reduce the resilience of households (Olatunji and Mshelia, 2018; Salau and Olaleye, 2020).

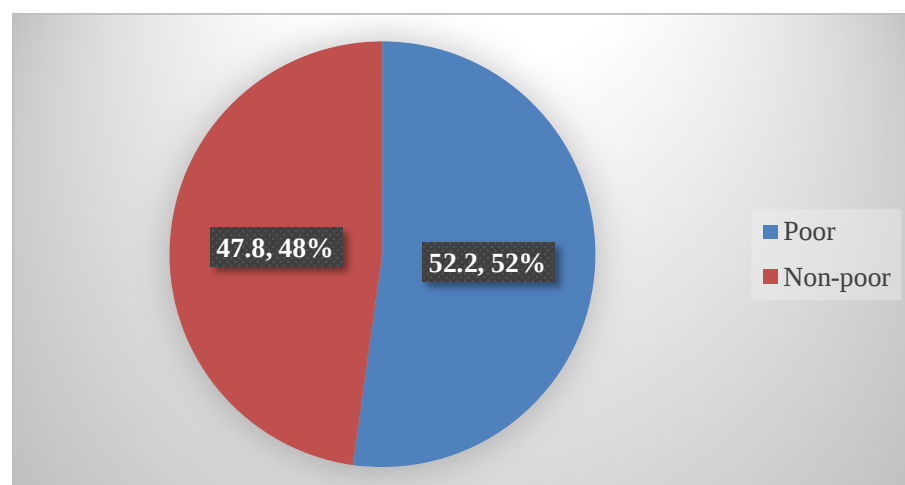


Figure 1: Distribution of artisanal fishers by poverty status

Constraints facing artisanal fishers

The severity of constraints facing Artisanal Fishers are presented in Table 4. The mean values presented in Table 4 revealed that high cost of fishing materials ($\bar{x}=1.93\pm.31$), inadequate storage facilities ($\bar{x} = 1.93\pm.27$), access to credit facilities ($\bar{x} = 1.88\pm.45$), fish storage ($\bar{x} = 1.88\pm.46$), low fish catch ($\bar{x} = 1.85\pm.36$), compass for navigation ($\bar{x} = 1.80\pm.40$), environmental influence - wave/cold ($\bar{x} = 1.75\pm.48$), gears and craft inefficiency ($\bar{x} = 1.51\pm.50$), tearing of nets by engine ($\bar{x} = 1.51\pm.50$), lack of communication network ($\bar{x} = 1.50\pm.50$), poor durability of fishing net ($\bar{x} = 1.42\pm.49$), inability to repair gears and crafts ($\bar{x} = 1.35\pm.48$), oil spillage ($\bar{x} = 1.33\pm.62$), and inadequate fishing materials ($\bar{x} = 1.26\pm.44$) were severe constraints facing artisanal fishing

While stealing of crafts, gears and catches ($\bar{x} = 0.74\pm.44$), and government policy ($\bar{x} = 0.71\pm.45$) were not severe constraints faced by artisanal fishers. However, fishers also considered lack of communication network ($\bar{x} = 1.50\pm.50$), inability to repair gears and crafts ($\bar{x} = 1.35\pm.48$), oil spillage ($\bar{x} = 1.33\pm.62$) and inadequate fishing materials ($\bar{x} = 1.26\pm.44$) as minor constraints.

The results showed that artisanal fishing has a variety of difficulties, including expensive equipment prices, subpar facilities, restricted loan availability, and low fish harvest. For artisanal fishers, the high expense of fishing supplies, such as equipment, boats, and gasoline, poses a major financial challenge. Previous submissions (Ajayi and Adesina, 2019; Olofin and Oladeji, 2019) state that financial limitations prevent investment in fishing technology and equipment, impacting the industry's productivity and profitability. Post-harvest losses and a decline in the market value of the catch may result from restricted access to suitable storage facilities for fish preservation. Artisanal fishing communities have food insecurity and unstable income due to inadequate storage infrastructure (Salau and Olaleye, 2020). In addition, investments in business expansion, equipment upgrades, and fishing operations are hampered by limited access to financial institutions. Fishers may find it difficult to obtain funding for boat purchases, equipment repairs, or value-added processing ventures, limiting their capacity to increase output and earnings (Adelekan and Ojo, 2018; Salami and Daramola, 2021). Oyetade *et al.* (2023b) also found limited access to finance, improved fisheries technologies and extension workers, and high cost of constructing fishing equipment as main challenges facing women fisher folks in Lagos State, Nigeria.

Table 4: Severity of constraints (n=200)

Variables	Major constraints	Minor constraints	Not a constraint	Mean $\pm$ SD	Rank
High cost of fishing materials	94.5	4.0	1.5	1.93 $\pm$.31	1 st
Inadequate storage facilities	93.5	6.0	0.5	1.93 $\pm$.27	1 st
Access to credit facilities	93.0	2.0	5.0	1.88 $\pm$.45	3 rd
Fish spoilage	92.5	2.5	5.0	1.88 $\pm$.46	3 rd
Low fish catch	84.5	15.5	0.0	1.85 $\pm$.36	5 th
Compass for navigation	79.5	20.5	0.0	1.80 $\pm$.40	6 th
Environmental influence (wave/cold)	76.5	21.5	2.0	1.75 $\pm$.48	7 th
Gears and craft inefficiency	51.0	49.0	0.0	1.51 $\pm$.50	8 th
Tearing of nets by engine	51.0	49.0	0.0	1.51 $\pm$.50	8 th
Lack of communication network	50.0	50.0	0.0	1.50 $\pm$.50	10 th
Poor durability of fishing materials	41.5	58.5	0.0	1.42 $\pm$.49	11 th
Inability to repair gears and crafts	34.5	65.5	0.0	1.35 $\pm$.48	12 th
Oil spillage	40.5	51.5	8.0	1.33 $\pm$.62	13 th
Inadequate fishing materials	26.0	74.0	0.0	1.26 $\pm$.44	14 th
Stealing of crafts, gears and catches	74.0	26.0	0.0	0.74 $\pm$.44	15 th
Government policy	71.0	29.0	0.0	0.71 $\pm$.45	16 th

Relationship between selected fishing characteristics and poverty status

Results on the relationship between the respondents' socio-economic characteristics and poverty status are presented in Table 5. Results show that household size ($\beta = -0.128$, $p \leq 0.01$), number of incomes earning household members ($\beta = 0.052$, $p \leq 0.05$), and total monthly household expenditure ($\beta = 0.987$, $p \leq 0.01$)

were significant determinants of poverty among fishers.

Fishing techniques that are not sustainable, habitat degradation, climate variability, and overfishing contribute to decreased fish capture levels. The long-term sustainability of artisanal fisheries is threatened by low fish availability, which also restricts fishers' revenue opportunities (Salau and Olaleye, 2020).

Findings further indicated that while household size had negative relationships, number of incomes earning household members and total monthly household expenditure had positive relationships with poverty among the fishers. The negative coefficient for household size suggests that among fishers, lower levels of poverty are related to larger household sizes. This finding can be explained by the idea of economies of scale within homes, even though it initially seems paradoxical. Larger households frequently benefit from pooled resources and collaborative contributions, which lowers per capita expenditures and lowers the incidence of poverty (Salau and Olaleye, 2020). A household that has more members that contribute to income generation is less likely to be impoverished, as indicated by the positive coefficient for the number of

income-earning persons. To lessen household vulnerability and increase socioeconomic resilience among fishers, this research highlights the significance of varied livelihood options and diverse revenue streams (Salami and Daramola, 2021). Also, there is a correlation between higher levels of expenditure and increased poverty among fishermen, as seen by the large positive coefficient for total monthly household expenditure. This is consistent with previous submissions (Adeyanju and Olaniyan, 2019; Olatunji and Mshelia, 2018) that households with higher spending can experience more financial strain and find it harder to meet their necessities, which could increase the likelihood that people will experience poverty.

Table 5: Socio economic determinant of poverty status (n= 200)

Variables	Unstandardized Coefficients B	Std. Error	Standardized Coefficients (β)	t	p-value
(Constant)	-4492.134	3489.542		-1.287	0.200
Age	-25.201	48.426	-0.008	-0.520	0.603
Income from fishing	-0.001	0.003	-0.005	-0.391	0.696
Household size	-895.863	258.211	-0.128	-3.470	0.001**
Number of household dependents	478.252	262.656	0.052	1.821	0.070
Number of incomes earning household member	858.648	336.530	0.052	2.551	0.012*
Years of experience	263.884	292.615	0.096	0.902	0.368
Years of residence	13.454	206.132	0.006	0.065	0.948
Working hours/day	700.576	1405.269	0.040	0.499	0.619
Total expenditure	.988	0.012	0.987	81.257	0.001**

R-square = 0.975; *and ** indicate significant determinants at 0.05 and 0.01 levels respectively

CONCLUSION AND RECOMMENDATIONS

This study concludes that poverty is prevalent among artisanal fishers, and they are faced with multifaceted constraints, including high cost of fishing materials, inadequate storage facilities, limited access to credit, post-harvest losses, low fish catch, and environmental influences. Household size, number of incomes earning members, total monthly household expenditure were determinants of poverty, among coastal artisanal fishers in Lagos State, Nigeria. Based on the findings of this study, the study recommended that: Extension agents, in collaboration with relevant government and non-governmental agencies should provide training, subsidies or microfinance schemes to reduce the cost burden of fishing materials for artisanal fishers.

REFERENCES

- Adelekan, B. A., and Ojo, F. O. (2018). Poverty among artisanal fisherfolks in Ondo State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 10(3), 64-74.
- Adeleke, M. A., and Oloko-Oba, K. (2019). "Assessment of Poverty Status among Artisanal Fisherfolks in Lagos State, Nigeria". *International Journal of Agricultural Extension and Rural Development Studies*, 6(1), 27-36.
- Adeleke, M. L. (2013). The socioeconomic characteristics of artisanal fisher folks in the coastal region of Ondo State, Nigeria. *Journal of Economics and Sustainable Development*, 4(2), 133-139.
- Adeyanju, O. M., and Olaniyan, A. M. (2019). Socio-Economic Characteristics and Poverty Status of Artisanal Fishermen in Lagos State, Nigeria. *International Journal of Agricultural Extension and Rural Development Studies*, 6(1), 63-74.
- Ajayi, O. E., and Adesina, S. O. (2019). Assessment of Socio-Economic Characteristics of Artisanal Fishermen in Lagos State, Nigeria. *Journal of Fisheries and Aquatic Science*, 14(1), 21-30.
- Anene, A., Ezeh, C. I. and Oputa, C. O. (2010). Resources use and efficiency of artisanal fishing in Oguta, Imo State, Nigeria. *Journal of Development and Agricultural Economics*, 2(3), 094-099.

- Anyanwu, J. C. (2013). The correlates of poverty in Nigeria and policy implications. *African Journal of Economic and Sustainable Development*, 2(1), 23-52.
- Baiyewu, A. K. (2020). *Effects of adoption of improved fishing technologies on profitability of artisanal fisheries in Epe and Ibeju Lekki, Lagos State, Nigeria*. MAF dissertation submitted to the Department of Aquaculture and Fisheries Management, Federal University of Agriculture, Abeokuta, Nigeria. 141p.
- Etim, N. A., Esu, B. B., Edet, G. E., Okon, S. and Solomon, I. P. (2008). *Poverty among peri-urban farming households: An estimation of its determinants*. In: Osakwe, I.I., Ekwu, L. G., Utobo, E. and Mbah, C.N. (Eds.), *Proceedings of 42nd Annual Conference of Agricultural Society of Nigeria* Eds. Ezike, held at Ebonyi state University, Abakaliki, pp: 877-880. 19-23 October, 2008
- Food and Agriculture Organization - FAO. (2012). *Small scale and artisanal fisheries: Key features of small scale and artisanal fishing*. Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations. 10p.
- Food and Agriculture Organization - FAO. (2016). "The State of World Fisheries and Aquaculture 2016". Food and Agriculture Organization of the United Nations. Rome.
- Foster, J. E., Greer, J and Thorbecke, E. (1984). A class of decomposable poverty measure. *Econometrica* 52, 761-766.
- Ibrahim, B. U., Auta, J. and Balogun, J. K. (2009). A survey of the artisanal fisheries of Kontagora Reservoir, Niger State, Nigeria. *Bayero Journal of Pure and Applied Sciences*, 2(1), 47-51.
- Lain, J., Schoch, M. and Vishwanath, T. (2022). Estimating a poverty trend for Nigeria between 2009 and 2019. Policy Research Working Paper 9974. <https://openknowledge.worldbank.org/server/api/core/bitstreams/a4b2fe8f-ea9c-5177-90eb-17eae238286c/content>.
- Mafimisebi, T. E., Famofo, T. A. and Mafimisebi, O. E. (2016). Awareness and utilisation of indigenous knowledge systems in artisanal and coastal fishing in Southwest, Nigeria. *ECAGRICULTURE*, 3(2), 614-632.
- National Bureau of Statistics - NBS. (2005). *Poverty profile for Nigeria - Annual report*. Federal Republic of Nigeria.
- National Bureau of Statistics - NBS. (2020). *Poverty and inequality in Nigeria 2019*. Abuja, Nigeria.
- Nigeria Embassy Germany. (2023) *About Nigeria*. Available at: <https://www.nigeriaembassygermany.org>. (Accessed: 6 February 2024)
- Ojebiyi, W. G., Ashimolowo, O.R., Olaoye, O. J., Abdulsalam-Saghir, P. B. and Soetan, O. J. (2023). Adaptation to climate change among artisanal fishers around Lekki Lagoon, Nigeria: A gender analysis. *Ghana Journal of Agricultural Science*, 58(2), 64-74.
- Olaoye, O. J., Akegbejo-Samsons, Y., Awotunde, J. M., Ezeri, G. N. O. and Ojebiyi, W. G. (2018). Adoption of improved fishing technologies among fisher folks in Ogun State, Nigeria. *Journal of Agriculture, Forestry and Fishery*, 17(2), 22-33.
- Olaoye, O. J., Ashley-Dejo, S. S., Fakoya, E. O., Ikeweinwe, N. B., Alegbeleye, W. O., Ashaolu, F. O. and Adelaja, O. A. (2013). Assessment of socio-economic analysis of fish farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research Aquaculture and Veterinary*, 13(9), 45-55.
- Olaoye, O. J., Idowu, A. A., Omoniyi, G. A., Akintayo, I. A., Odebiyi, O. C. and Fashina, A. O. (2012). Socioeconomic analysis of artisanal fisher folks in Ogun Waterside Local Government Area of Ogun State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Biology*, 12(4), 123-135.
- Olaoye, O.J., Ojebiyi, W.G., Opele, A.I. and Baiyewu, A.K. (2016). Socioeconomic analysis of small-scale fish farmers in Ilaro agricultural extension zone of Ogun State, Nigeria. *Journal of Agriculture, Forestry and Fisheries*, 15(2), 64-74.
- Olatunji, E. O. and Mshelia, E. I. (2018). Gender-Based Poverty and Livelihood Strategies among Fisher Households in Lagos State, Nigeria. *Journal of Agricultural Economics and Rural Development*, 1(1), 19-27.
- Olofin, O. P. and Oladeji, S. O. (2019). Socio-economic analysis of artisanal fisheries in Ibeju-Lekki coastal area of Lagos State, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology*, 32(3), 1-11.
- Omitoyin, S. A. and Fregene, B. T. (2012). Potential impact of climate change on livelihood and food security of artisanal fisher folks in Lagos State, Nigeria. *Journal of Agricultural Science*, 4(9), 20-30.
- Onemolease, E. A. and Oriakhi, H. O. 2011. Prospect and constraints of artisanal fishing in selected communities in Delta State, Nigeria. *Advance in Applied Science Research*, 2(6), 55-61.
- Oyetade, O. P., Bamidele, N. A., Ojebiyi, W. G., Oyebamiji, B. A., Olaitan, K. A., Olaoye, O. J., Akinde, A. O. and Ale, O. A. (2023). Economic analysis and poverty status of

- artisanal fishing household in Ogun Waterside Local Government Area of Ogun State. *AKSU Journal of Agriculture and Food Science*, 7(3), 115-127.
- Oyetade, O. P., Olaoye, O. J., Ojebiyi, W. G. and Idowu, I. F. (2023b). Assessment of women involvement in artisanal fishery enterprises in Lagos State, Nigeria. *Ghana Journal of Agricultural Science*, 58(2), 115-127.
- Salami, A. A. and Daramola, O. S. (2021). Determinants of Poverty among Artisanal Fishermen in Ondo State, Nigeria. *Journal of Agricultural Extension and Rural Development Studies*, 8(2), 39-50.
- Salau, S. A. and Olaleye, T. B. (2020). Socio-economic characteristics and poverty status among artisanal fisher households in Oyo State, Nigeria. *African Journal of Fisheries and Aquaculture*, 8(1), 156-166.
- Sanusi, W. A., Fanifosi, G. E., Oladayo, T. D., Otunola, O. B. and Ijila, O. J. (2021). "Comparative Analysis of Fadama III Beneficiaries and None-Beneficiaries' Poverty Status: A Foster, Greer, And Thorbecke Decomposition Approach," *International Journal of Food and Agricultural Economics (IJFAEC)*, 9(4)
- Tiamiyu S. A. Olaoye O. J., Ashimolowo O. R., Fakoya E. O. and Ojebiyi W. G. (2015). Benefits derived from National Fadama Development Project II by fish farmers in Lagos State, Nigeria. *International Journal of Fisheries and Aquaculture*, 7(4), 54-61
- UNDP and OPHI (2023). *Global multidimensional poverty index 2023: Understanding global poverty - Data for high impact action*. <https://hdr.undp.org/system/files/documents/hdp-document/2023mpireporten.pdf>.
- UNDP. (2022). Nigeria multidimensional poverty index (2022). <https://www.undp.org/nigeria/publications/nigeria-multidimensional-poverty-index-2022>.
- United Nations Department of Economic and Social Affairs - UNDESA. (2019). *World population prospects 2019: Highlights (ST/ESA/SER.A/423)*. New York: United Nations.
- World Bank (2024). The World Bank in Nigeria. <https://www.worldbank.org/en/country/nigeria/overview>. Accessed 2 April 2024.
- World Bank. (2001). *Poverty and hunger: Issues and options for food security in developing countries*. Washington, DC, USA
- World Bank. (2020). COVID-19 From the ground up: What the crisis means for Nigerians. <https://documents1.worldbank.org/curated/en/757201593465025800/pdf/COVID-19-From-the-Ground-Up-What-the-Crisis-Means-for-Nigerians.pdf>.
- World Bank. (2025). *Nigeria Poverty and Equity Brief: April 2025 (English)*. *Poverty and Equity Brief Washington, D.C.*: World Bank Group. <http://documents.worldbank.org/curated/en/099253204222517873>
- Worldometer. (2024). Nigeria population 2024. <https://www.worldometers.info/world-population/nigeria-population/>

Determinants of utilisation of digital financial services among rural farmers in IDO local government of Oyo state, Nigeria

Olutegbe, N. S., Afolabi, N. A., Fajumo, B. M.

Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria

Correspondence details: ns.olutegbe@ui.edu.ng

ABSTRACT

Digital financial services (DFS) have the potential to enhance financial inclusion among rural farmers, yet their utilisation remains limited due to socio-economic and infrastructural challenges. This study assessed the determinants of utilisation of DFS among rural farmers in Ido local government Oyo state. It specifically examined the socio-economic characteristics of rural farmers and their awareness, access, constraints to, and utilisation of digital financial services. Results revealed that the age, household size, farm size, and farm income were 35.98 ± 10.62 years, 5.57 ± 1.14 members, 4.65 ± 4.58 acres and ₦66,804.12 $\pm$ 41,377.24, respectively with a male majority (79.4%), being primarily farmers (80.4%) and had secondary education (45.4%). The rural farmers were aware of Point of Sales (POS) services (99.0%), USSD services (88.7%), and e-wallets (85.6%) among the available DFS. Access to USSD, e-wallets, and POS services was highest ($\bar{x} = 1.00$) among the DFS while the most utilised being POS services ($\bar{x} = 1.95$). Electricity supply ($\bar{x} = 4.01$) and internet connectivity ($\bar{x} = 2.45$) were significant constraints to utilisation. Respondents farm/enterprise income ($B = 0.93$), household size ($B = 2.10$), and awareness ($B = 2.35$) significantly influenced the DFS utilisation positively, while farm size ($B = -1.33$) and constraints ($B = -4.10$) were deterrents. The study recommends infrastructural improvements, financial literacy programmes, and policy reforms to enhance digital financial inclusion among rural farmers.

Keywords: Digital financial services, rural farmers, socio-economic factors, financial inclusion,

INTRODUCTION

Agriculture remains the backbone of rural economies, providing livelihoods for millions and contributing significantly to food security (Hasan *et al.*, 2023). In rural areas, farming is not just an economic activity but a way of life, deeply intertwined with local cultures and traditions. Despite its significance, agricultural productivity in many developing countries, including Nigeria, is constrained by limited access to financial resources (Adegbite & Machethe, 2020). Farmers require funds to invest in modern inputs, irrigation systems, and improved farming techniques. However, rural farmers often struggle to access formal financial services, which hinders their ability to expand their agricultural enterprises, for increase productivity, adopt climate-smart agricultural practices, and improve their overall livelihoods (Tay *et al.*, 2022 & Adegbite *et al.*, 2021). Access to financial services is crucial for agricultural development as it enables farmers to purchase inputs such as seeds, fertilisers, and machinery (Akpaeti & Archibong, 2022). Traditional financial institutions, including banks and cooperative societies, have historically played a role in providing loans and credit to farmers. However, stringent collateral requirements, high-interest rates, and bureaucratic bottlenecks often prevent smallholder farmers from accessing these services (Chinelo & Ayodeji, 2023). The lack of formal credit opportunities forces many farmers to rely on informal lenders who charge exorbitant interest rates, thereby deepening their financial burdens (Abbas & Song, 2020). As a result, many rural farmers continue to

operate at subsistence levels, unable to scale up their production or invest in value-added processes (Naika *et al.*, 2021). The limitations of conventional financial services highlight the urgent need for alternative financial mechanisms that can bridge the financing gap for rural farmers (Naika *et al.*, 2021).

Digital financial services (DFS) have emerged as a viable alternative to traditional financial systems, offering farmers the opportunity to access financial products through mobile banking, Point of sales, cryptocurrency, digital credit platforms, and electronic wallets (Anane & Nie, 2022). These services provide a more efficient and inclusive financial ecosystem, reducing the dependency on physical bank branches and simplifying the loan application process. Study by Hasan *et al.* (2023) and Akpaeti and Archibong (2022) suggest that DFS can improve farmers' access to credit, savings, and insurance, thereby fostering economic resilience. Additionally, digital platforms enable farmers to make transactions with ease, receive payments promptly, and access market information that can enhance their profitability (Mapiye *et al.*, 2023). The use of fintech solutions in agriculture is therefore an innovative approach to addressing financial exclusion among rural farmers (Adegbite *et al.*, 2021).

The adoption of digital financial services in Nigeria has gained momentum in recent years, driven by increased mobile phone penetration and government initiatives promoting financial inclusion (Benjamin & Foye, 2022). Fintech companies and telecommunications firms have introduced mobile

money services, digital credit facilities, and blockchain-based financial solutions tailored to the needs of farmers (Oyinbo *et al.*, 2022). According to Chinelo and Ayodeji (2023), leveraging digital technology has significantly enhanced financial inclusion among agripreneurs in Southern Nigeria. Similarly, Adegbite *et al.* (2021) emphasize that digital financial solutions are reshaping the financial landscape by offering flexible and accessible options for smallholder farmers. Despite these advancements, rural farmers still face several challenges in adopting these services. Issues such as poor digital literacy, lack of internet infrastructure, and concerns about transaction security hinder the widespread use of DFS in rural areas (Adeyemi *et al.*, 2023).

While digital financial services hold great potential, their effectiveness depends on farmers' awareness, access, and utilisation (Abdulai *et al.*, 2023). Many rural farmers remain unaware of the various digital financial products available to them or lack the requisite knowledge to navigate digital platforms (Tay *et al.*, 2022). As noted by Abdulai *et al.* (2023), awareness and training play a crucial role in increasing DFS adoption among smallholder farmers. Furthermore, access to digital services is often limited by factors such as inadequate network coverage and unreliable electricity supply in rural areas (Nwali *et al.*, 2022). Even when farmers gain access to these services, the extent to which they utilise them remains low due to fears of fraud, hidden charges, and technical difficulties (Akpaeti & Archibong, 2022). The gap between the availability of DFS and its actual utilisation underscores the need for targeted interventions aimed at educating farmers and improving the infrastructure necessary for seamless digital transactions (Adegbite & Machethe, 2020).

As agriculture remains a key driver of economic development in Nigeria, ensuring that farmers can effectively participate in the digital economy is essential for poverty alleviation and rural transformation (Adegbite *et al.*, 2021). Previous studies, such as those by Adeyemi *et al.* (2023) and Babajide *et al.* (2020), highlight the critical role of financial technology in bridging financial gaps among rural populations. However, this study is justified by

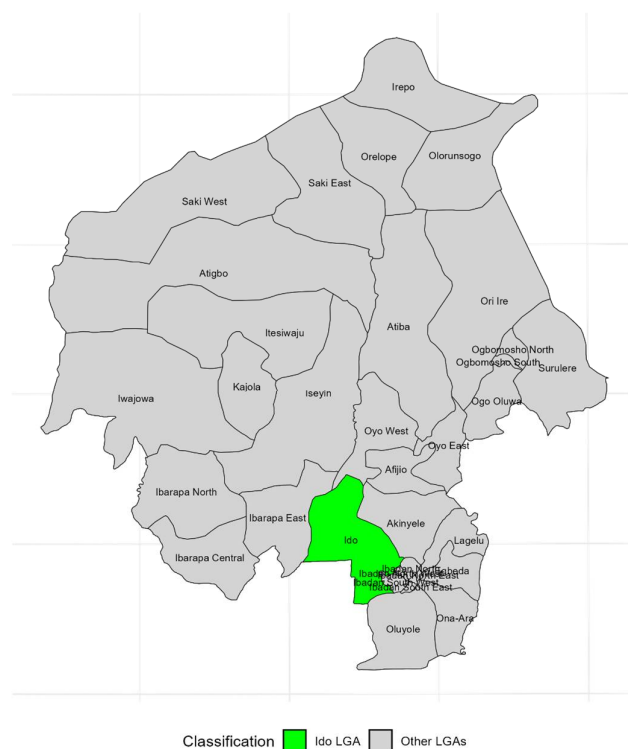
the need to understand the factors influencing rural farmers' access to and utilisation of digital financial services in Ido Local Government, also, there is limited empirical evidence on the specific challenges associated with DFS adoption among rural farmers in Ido Local Government (Abbas & Song, 2020). Against this backdrop, the study assessed the determinants of utilisation of digital financial services among rural farmers in Ido local government of Oyo state, Nigeria. Specifically, the objectives of the study were to;

1. assess the level of awareness of, access to and utilisation of digital financial services amongst the rural farmers.
2. identify the constraints to accessing digital financial services amongst the rural farmers;
3. model the utilisation of digital financial services among farmers using selected characteristics, level of awareness of digital financial services, access to digital financial services, and constraints to their usage

METHODOLOGY

This study was conducted in Ido local government area in Oyo state. It is an area of 986km² and a population of 103,261 based on 2006 census. Ido Local Government covers the area spanning Apata, Ijokodo, Omi-Adio, Akufo and Apete. Ido has the longitude of 134.161968 and the latitude of 34.266249. It shares boundaries with Oluyole, Ibarapa East, Akinyele, Ibadan South-West, and Ibadan North-West Local Governments in Oyo State and Odeda Local Government in Ogun State. The primary occupations of the people include fishing and farming, with some engaging in office work in the township areas. The population of the study were the rural farmers in the study area.

A total of 120 farmers were selected from a list of registered farmers in Ido Local Government Area of Oyo state using a simple random sampling method. The key variables measured include awareness, access, utilisation, and constraints to DFS. Awareness was measured by respondents' familiarity with different digital financial services.



Data collected on farmers selected socioeconomic characteristics such as age, sex, marital status, educational attainment in the study area. Respondents' awareness of available DFS was measured and coded as 1 for 'aware' and 0 for 'unaware'. Access to the available DFS was measured by whether respondents had access to each DFS with the option response 1 for 'yes' and 0 for 'no'. The respondents' utilisation of the DFS was measured based on the frequency of use, coded as 0 for 'never,' 1 for 'occasionally,' and 2 for 'always'. Respondents' Constraints were rated on a five-point scale of Very high (VH), High (H), Moderate (M), Low (L), Very Low (VL) with scores of 4, 3, 2, 1, 0 respectively and included items such as internet connectivity, distance, affordability, language barriers, trust, regulatory issues, and power supply.

Composite scores for awareness, access, and utilisation were obtained by summing responses across all DFS services listed for each variable. Higher composite scores indicate greater awareness, access, or utilisation of DFS. The constraint severity score was derived by summing up all indicated/rated constraints, such that the higher the constraint scores, the more the severity level of constraints to use of DFS. These composite scores were used to explore the determinants of digital financial service utilisation among rural farmers. Summarily, analysis explored the use of both descriptive and inferential statistics.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

Table 1 shows that, the mean age of the rural farmers was 35.98 ± 10.62 years, with a majority (54.6%) falling within the 31-40 years age range. This suggests that most farmers were in their productive years, which can positively influence the adoption of agricultural innovations. This aligns with Abbas and Song (2020), who noted that younger farmers are more receptive to digital services due to their familiarity with technology. The majority (79.4%) of the respondents were male, indicating a male-dominated farming sector. About 80.4% of the farmers were married, implying that most had family responsibilities, which may affect financial decision-making. Regarding education, 45.4% of respondents had secondary education, while 11.3% had no formal education, which could influence digital financial service adoption. This corroborates Abdulai *et al.* (2023), who found that educated farmers are more likely to engage with digital financial tools.

As shown in Table 1, Christianity was the predominant religion (67.0%), followed by Islam (33.0%). This implies that faith-based financial norms or religious institutions may influence attitudes toward financial transactions and the adoption of digital services, especially in areas where religious teachings affect interest or savings practices. The mean farm size was 4.65 ± 4.58 acres, with more than half (53.6%)

cultivating farms of 3 acres or less. This suggests smallholder farming dominance, which implies limited surplus production and potential financial vulnerability, making access to inclusive digital financial services essential for capital access and risk mitigation. The mean farm/enterprise income was ₦66,804.12±41,377.24, with only 32.0% earning above ₦100,000. This indicates income disparities and implies that low-income farmers may be financially excluded due to affordability issues or lack of documentation required for formal financial services. This aligns with Akinwale *et al.* (2023), who highlighted that farmers with higher incomes have greater access to digital financial platforms, reinforcing the digital divide based on income level. Table 1 reveals that the mean household size was 5.57±1.14 members, with most farmers (81.4%)

having 4–6 family members. This implies that household financial needs may be higher, potentially increasing demand for savings tools, credit access, and flexible remittance platforms. Oyinbo *et al.* (2020) observed that larger households require more financial planning, making digital financial services crucial for efficient household financial management in rural settings. Labor sources varied, with self-labour being the most common (84.5%), followed by family labour (71.1%) and hired labour (35.1%). This indicates strong dependence on personal and household effort and implies that limited capital may restrict labour outsourcing. Consequently, access to financial services that support credit, or labour-saving technologies could help ease labour constraints and enhance productivity.

Table 1: Socioeconomic characteristics of rural farmers

Variables	%	Mean	S.D.
Age		35.98	10.618
Less or equal to 20	12.4		
21-30	11.3		
31-40	54.6		
41-50	11.3		
>50	10.3		
Sex			
Male	79.4		
Female	20.6		
Marital status			
Single	19.6		
Married	80.4		
Educational attainment			
No formal education	11.3		
Primary education	22.7		
secondary education	45.4		
Religion			
Christianity	67.0		
Islam	33.0		
Farm/Enterprise size		4.65	4.58
Less or equal 3	53.6		
4-6	16.5		
7-9	5.2		
10-12	14.4		
>12	10.3		
Farm/Enterprise income		66804.12	41377.24
Less or equal 20000	16.5		
21000 to 40000	20.6		
41000-60000	25.8		
61000-80000	4.1		
81000-100000	1.0		
>100000	32.0		
Household/Family size			
Less or equal 3	2.1	5.57	1.136
4-6	81.4		
>6	16.5		
Source of labour			
Self	84.5		
Family	71.1		

Hired	35.1
-------	------

Source: Field survey, 2024

Awareness, access to and utilisation of digital financial services

Awareness of digital financial services

The findings in Table 2 indicate that awareness was highest for Point of Sales (POS) services (99.0%), followed closely by USSD services (88.7%) and e-wallets (85.6%). This suggests that these services are well known among rural farmers, likely due to their frequent use in financial transactions and ease of operation. The relatively high awareness of mobile banking (80.4%) and internet banking (81.4%) indicates that these services have also gained significant recognition, possibly through banking institutions' awareness campaigns. In contrast, awareness of microfinance platforms (16.5%) and cryptocurrency exchanges (18.6%) was the lowest, reflecting limited knowledge and exposure to these advanced financial tools. The low awareness of cryptocurrency may be due to its volatility and regulatory restrictions in Nigeria. This finding aligns with Abbas and Song (2020), who noted that rural farmers often lack awareness of sophisticated digital financial services due to inadequate digital literacy and limited formal financial education. Similarly, Abdulai *et al.*, (2023) observed that digital awareness among smallholder farmers in Africa is often limited to basic financial tools, with emerging fintech services remaining underutilised.

Access to digital financial services

As shown in Table 2, USSD services, e-wallets, and POS services ranked highest in access, each with a mean score ($\bar{x}$) of 1.00, suggesting that farmers could readily use these services. Internet banking ($\bar{x} = 0.72$) and mobile banking ($\bar{x} = 0.76$) also showed moderate accessibility, while online payment gateways ($\bar{x} = 0.13$) and microfinance platforms ($\bar{x} = 0.05$) had the lowest access levels. This indicates that while conventional digital financial tools are available, more advanced platforms remain difficult for farmers to access. This corroborates Naika *et al.* (2021), who highlighted that mobile-based services such as USSD and POS terminals are widely accessible to rural populations due to their ease of use and infrastructure compatibility.

Utilisation of digital financial services

The POS services ($\bar{x} = 1.95$) ranked highest in utilisation, followed by USSD services ($\bar{x} = 1.74$) and e-wallets ($\bar{x} = 1.47$), indicating that farmers actively use these services. Mobile banking ($\bar{x} = 1.22$) and internet banking ($\bar{x} = 0.95$) were also frequently utilised, while cryptocurrency exchange ($\bar{x} = 0.63$) and microfinance platforms ($\bar{x} = 0.68$) had the lowest utilisation rates. This suggests that farmers prefer simpler and widely available financial services over complex or less familiar platforms. This is in line with Soetan and Umukoro (2023), who reported that rural dwellers are more likely to use digital financial services that require minimal internet access and have direct applicability to their financial transactions.

Table 2: Awareness, access to and utilisation of digital financial services

Variables	Awareness		Access		Utilisation	
	%	Rank	Mean	Rank	Mean	Rank
Mobile Money	69.1	6 th	0.36	6 th	0.71	8 th
Internet Banking	81.4	4 th	0.72	5 th	0.95	5 th
Mobile Banking	80.4	5 th	0.76	4 th	1.22	4 th
Online Payment Gateways	59.8	7 th	0.13	8 th	0.78	6 th
Cryptocurrency Exchange	18.6	9 th	0.00	10 th	0.63	10 th
Microfinance Platforms	16.5	10 th	0.05	9 th	0.68	9 th
Remittance Services	28.9	8 th	0.14	7 th	0.76	7 th
E-wallets	85.6	3 rd	1.00	1 st	1.47	3 th
USSD services	88.7	2 nd	1.00	1 st	1.74	2 th
Point of Sales (POS)	99.0	1 st	1.00	1 st	1.95	1 th

Source: Field survey, 2024

Constraints to utilisation of digital financial services

Results in Table 3 highlight electricity power supply as the most significant constraint ($\bar{x} = 4.01$), underscoring the infrastructural deficits that hinder digital financial inclusion, particularly in rural areas where unreliable power supply limits access to

electronic financial services. Limited internet connectivity ($\bar{x} = 2.45$) also presents a major barrier, as many rural farmers struggle with weak network signals, making it difficult to carry out seamless transactions. Similarly, affordability and access to devices ($\bar{x} = 2.39$) remain a challenge, indicating that the cost of smartphones and internet-enabled gadgets prevents many from utilising digital financial services

effectively. These findings align with Abdulai *et al.* (2023) and Soetan and Umukoro (2023), who noted that infrastructural limitations and affordability significantly impact financial inclusion in rural areas. Trust and security concerns ($\bar{x} = 2.15$) further hinder adoption, as fears of fraud and cybercrime discourage rural users from fully embracing digital financial platforms. Naika *et al.*, (2021) and Akinwale *et al.* (2023) further emphasized the role of trust and literacy

in influencing the adoption of digital financial tools. Language and literacy barriers ($\bar{x} = 2.00$) also affect accessibility, particularly for those with limited formal education, as they may struggle to navigate digital banking interfaces. Regulatory barriers ($\bar{x} = 1.47$) and distance to financial service points ($\bar{x} = 1.39$) were the least significant, suggesting that policy frameworks and service availability have improved, though challenges remain.

Table 3: Constraints to utilisation of digital financial services

Variables	VL	L	M	H	VH	Mean
Regulatory Barriers	73.2	16.5	0.0	10.3	0.0	1.47
Distance to services	76.3	18.6	0.0	0.0	5.2	1.39
Affordability	40.2	24.7	10.3	5.2	19.6	2.39
Language and Literacy	67	4.1	0.0	19.6	9.3	2.00
Trust and Security Concerns	46.4	13.4	23.7	11.3	5.2	2.15
Limited internet connectivity	22.7	24.7	37.1	15.5	0.0	2.45
Electricity and Power Supply	5.2	11.3	1.0	42.3	40.2	4.01

Source: Field survey, 2024

Determinant of respondents' utilisation of digital financial services

Table 4 presents the factors influencing the utilisation of digital financial services among rural farmers, with an R-value of 0.74 and an adjusted R² of 0.52, indicating that 52% of the variation in utilisation is explained by the included factors. Farm/enterprise income had the highest positive influence ($B = 0.93$), suggesting that farmers with higher incomes are more likely to engage in digital transactions due to better financial capacity, aligning with Abdulai *et al.*, (2023), who noted that higher financial capability enhances digital financial adoption. Household size ($B = 2.10$) was also significant, implying that larger families may rely more on digital financial services for managing household expenses, corroborating Oyinbo *et al.*, (2020), who found that larger households require structured financial management. Awareness ($B = 2.35$) positively influenced utilisation, highlighting the role of financial literacy, consistent with Abdulai *et al.*, (2023), who emphasized that access to financial knowledge drives digital finance adoption. Conversely, age ($B = -0.22$) negatively affected

utilisation, suggesting that older farmers are less inclined to adopt digital financial services, aligning with Soetan and Umukoro (2023), who found that older individuals are generally more skeptical about financial technology. Farm size ($B = -1.33$) also had a negative impact, implying that larger farm owners might prefer traditional financial methods. Religion ($B = -6.66$) and sex ($B = -3.64$) significantly influenced utilisation, indicating that cultural and gender-related factors shape financial technology adoption. The negative coefficient for religion implies that certain religious affiliations may be associated with lower digital financial service utilisation, potentially due to doctrinal concerns, limited tailored services, or trust-related issues. This aligns with Oyinbo *et al.* (2020), who emphasized that socio-cultural factors influence digital financial engagement in rural settings. Access ($B = -4.10$) was another major constraint, suggesting that despite availability, farmers may face affordability issues, network limitations, or security concerns, consistent with Olatunji *et al.*, (2025) and Naika *et al.*, (2021), who identified infrastructure and trust issues as key barriers to digital finance adoption in rural areas.

Table 4: Determinants of respondents' utilisation of digital financial services

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	18.22	6.29		2.90	0.01*
Married	5.54	2.23	0.28	2.48	0.02*
Educated	5.43	3.35	-0.14	-1.02	0.31
Christianity	-6.66	1.67	-0.41	-4.00	0.00*
Sex – Female	-3.64	1.50	-0.19	-2.42	0.02*
Age	-0.22	0.11	-0.30	-2.08	0.04*
Farm size (in acres)	-1.33	0.27	-0.79	-4.86	0.00*
Farm/Enterprise income	0.00	0.00	0.93	6.85	0.00*
Household/Family Size	2.10	0.59	0.31	3.58	0.00*

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
Constraints	-0.39	0.21	-0.25	-1.86	0.07*
Awareness	2.35	0.47	0.77	4.96	0.00*
Access	-4.10	0.82	-0.80	-4.99	0.00*

R= 0.74, R²= 0.55, Adjusted R square= 0.52, *=Significant at p≤ 0.05

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it is concluded that while awareness of digital financial services is relatively high, access and utilisation remain constrained by infrastructural, economic, and socio-demographic factors. Socioeconomic characteristics such as income, household size, and awareness positively influence utilisation, whereas religion, farm size, and access constraints serve as major deterrents. It is therefore recommended that efforts should focus on expanding internet and electricity infrastructure, enhancing financial literacy programs, and promoting affordable digital access through subsidies or financing options. This responsibility should be jointly undertaken by the government (particularly the Ministries of Communication and Agriculture), telecom and fintech companies, rural financial institutions, and non-governmental organizations (NGOs). Policymakers should also address regulatory barriers and security concerns to build trust in digital transactions, ensuring greater financial inclusion, especially among rural populations.

REFERENCES

- Abbas, K. D., & Song, U. M. (2020). Accessibility and utilisation of electronic information resources for research activities in agricultural research institutes in Kaduna State, Nigeria. *Covenant Journal of Library and Information Science*. <https://journals.covenantuniversity.edu.ng/index.php/cjlis/article/view/2143/1162>
- Abdulai, A. R., Kc, K. B., & Fraser, E. (2023). What factors influence the likelihood of rural farmers' participation in digital agricultural services? Experience from smallholder digitalization in Northern Ghana. *Outlook on Agriculture*, 52(1), 57–66. <https://doi.org/10.1177/00307270221144641>
- Adebite, O. O., & Machethe, C. L. (2020). Bridging the financial inclusion gender gap in smallholder agriculture in Nigeria: An untapped potential for sustainable development. *World Development*, 127, 104755. <https://doi.org/10.1016/j.worlddev.2019.104755>
- Adebite, O. O., Machethe, C. L., & Anderson, C. L. (2021). Revisiting the measurement of financial inclusion of rural smallholder farmers in Nigeria. *Agricultural Finance Review*, 81(4), 554–567. <https://ideas.repec.org/a/eme/afrpps/afr-07-2020-0099.html>
- Adeyemi, S. O., Sennuga, S. O., Alabuja, F. O., & Bankole, O. L. (2023). Technology usage and awareness among smallholder farmers in Gwagwalada Area Council, Abuja, Nigeria. *Direct Research Journal of Agriculture and Food Science*, 11(3), 54–59. <https://www.ajol.info/index.php/drjafs/article/view/279177>
- Akinwale, J. A., Wole-Alo, F. I., & Oluwale, B. O. (2023). Digital platforms for linking agriculture investors with smallholder farmers in Nigeria. *Journal of Agricultural Extension*, 27(2), 65–72. <https://www.ajol.info/index.php/jae/article/view/245301>
- Akpaeti, A. J., & Archibong, M. N. (2022). Factors influencing the use of digital credit systems among farmers in Akwa Ibom State, Nigeria. *AKSU Journal of Agriculture and Food Sciences*, 6(3), 168–179. <https://www.aksuja.com.ng/viewpdf/articles/publications/d/53.pdf>
- Anane, I., & Nie, F. (2022). Determinant factors of digital financial services adoption and usage level: Empirical evidence from Ghana. *International Journal of Management Technology*, 9(1), 26–47. <https://ejournals.org/ijmt/vol-9-issue-1-2022/>
- Babajide, A. A., Oluwaseye, E. O., Lawal, A. I., & Isibor, A. A. (2020). Financial technology, financial inclusion and MSMEs financing in the south-west of Nigeria. *Academy of Entrepreneurship Journal*, 26(3), 1–17. <https://www.abacademies.org/abstract/financial-technology-financial-inclusion-and-msmes-financing-in-the-south-west-of-nigeria-9370.html>
- Benjamin, O. O., & Foye, V. O. (2022). Inclusion, organizational resilience, and sustainable development in Nigeria: The role of digital innovations. *Environmental Sciences Proceedings*, 15(1), 27. <https://doi.org/10.3390/environsciproc2022015027>

- Chinelo, U. V., & Ayodeji, E. P. (2023). Leveraging on digital technology for financial inclusion of women agripreneurs in Southern Nigeria. *F1000Research*, 11, 704. <https://f1000research.com/articles/11-704>
- Hasan, M., Noor, T., Gao, J., Usman, M., & Abedin, M. Z. (2023). Rural consumers' financial literacy and access to FinTech services. *Journal of the Knowledge Economy*, 14(2), 780–804. <https://doi.org/10.1007/s13132-022-00936-9>
- Mapiye, O., Makombe, G., Molotsi, A., Dzama, K., & Mapiye, C. (2023). Information and communication technologies (ICTs): The potential for enhancing the dissemination of agricultural information and services to smallholder farmers in sub-Saharan Africa. *Information Development*, 39(3), 638–658. <https://doi.org/10.1177/02666669211064847>
- Naika, M. B., Kudari, M., Devi, M. S., Sadhu, D. S., & Sunagar, S. (2021). Digital extension service: Quick way to deliver agricultural information to the farmers. In *Food technology disruptions* (pp. 285–323). Academic Press. <https://doi.org/10.1016/B978-0-12-821470-1.00006-9>
- Nwali, P. N., Lai-Solarin, W. I., Dyaji, L., & Nimzing, M. M. (2022). Evaluation of small-scale women farmers' utilisation of ICT in accessing agricultural information in Gwagwalada area council, Abuja, Nigeria. *Science and Technology*, 3(7), 8–15. <https://www.a2rsa.org/journal-article?article-number=6253439723D6F&category=5db480d7108c6>
- Olatunji, F., Sajuyigbe, A. S., Tella, R. A., Oke, O. D., Babalola, O. A., & Adebayo, W. (2025). Assessing the impact of financial service digitalization on SME businesses in Lagos, Nigeria. *Journal of Entrepreneurship and Business*, 6(1), 94–118. <https://journal.ubaya.ac.id/index.php/jerb/article/view/7212>
- Oyinbo, O., Chamberlin, J., & Maertens, M. (2020). Design of digital agricultural extension tools: Perspectives from extension agents in Nigeria. *Journal of Agricultural Economics*, 71(3), 798–815. <https://doi.org/10.1111/1477-9552.12371>
- Oyinbo, O., Chamberlin, J., Abdoulaye, T., & Maertens, M. (2022). Digital extension, price risk, and farm performance: Experimental evidence from Nigeria. *American Journal of Agricultural Economics*, 104(2), 831–852. <https://onlinelibrary.wiley.com/doi/10.1111/ajae.12242>
- Soetan, T. O., & Umukoro, O. S. (2023). Financial inclusion in rural and urban Nigeria: A quantitative and qualitative approach. *International Journal of Economics and Finance*, 15(11), 1–64. <https://ideas.repec.org/a/ibn/ijefaa/v15y2023i11p64.html>
- Tay, L. Y., Tai, H. T., & Tan, G. S. (2022). Digital financial inclusion: A gateway to sustainable development. *Heliyon*, 8(6), e09766. <https://doi.org/10.1016/j.heliyon.2022.e09766>

Effects of self-isolation policy on the psychosocial state (condition) of senior citizens in Nigeria, Pakistan and South Africa

¹Adebo G.M., ²Magsi H., ³Oluwatayo I.B. ⁴Adebo A.I.

¹Department of Agricultural Economics & Extension Services, Ekiti State University, Nigeria.

²Department of Agricultural Economics, Sindh Agriculture University Tandojam, Pakistan

³Department of Agricultural Economics and Agribusiness, University of Venda, South Africa

⁴Department of Social and Development Sciences, University Putra, Malaysia

Correspondence details: grace.adebo@eksu.edu.ng.

ABSTRACT

This study presents a cross-country comparison of the psychosocial effects of the COVID-19 self-isolation policy (SIP) on senior citizens in Nigeria, Pakistan, and South Africa. Specifically, it examines seniors' perceptions of self-isolation and its impact on their health, social interactions, attitudes, behaviours, and psychological well-being. A cross-sectional comparative design was employed using an online questionnaire adapted from Hughes' (2004) short-scale loneliness measure. Data were collected between June 6 and August 3, 2020, via social media platforms (WhatsApp, Facebook, Skype), with a total of 350 respondents selected through a multistage sampling procedure. Descriptive statistics and Analysis of Variance (ANOVA) were used for analysis. Results revealed that SIP was perceived as detrimental to seniors' health. The mean scores for Nigeria = 3.10; Pakistan = 3.08; South Africa = 3.05, causing anxiety, sleep disturbances, $\bar{x}$ = 3.37, 3.15, 3.64, reduced physical activity and social participation, $\bar{x}$ = 3.08, 3.18, 3.44, and negatively affecting mental and emotional well-being, $\bar{x}$ = 3.02, 3.05, 3.16. Fear of death was more pronounced in Pakistan, $\bar{x}$ = 3.53, and South Africa, $\bar{x}$ = 3.44, while loneliness was more reported in Nigeria, $\bar{x}$ = 3.08 and South Africa. Significant differences emerged across countries in experiences of fear ($F = 15.350$, $p < .001$), anxiety ($F = 6.265$, $p = .014$), and general psychosocial outcomes ($p < .01$), underscoring the influence of cultural, social, and policy contexts. The findings suggest the urgent need for culturally responsive mental health and social support strategies for elderly populations during public health emergencies.

Keywords: Attitude, COVID-19, Emotion, Perception, Response, Self-isolation

INTRODUCTION

The global spread of COVID-19 had enormous consequences on health, lives, livelihoods, and the well-being of people worldwide (OECD, 2020; Cascella *et al.*, 2023). By May 2020, the COVID-19 pandemic had impacted 216 countries, resulting in a significant global mortality burden. While the acute phase of the pandemic has subsided in many regions, its lingering effects continue to be felt, with ongoing challenges in public health, economic recovery, and social equity. The effects of the COVID-19 pandemic on the global population are severe. Senior citizens/older adults (65 years and older) (Wong *et al.*, 2023) and people with underlying ailments are at greater risk if contracted due to the physiological changes accompanying ageing and potential underlying health conditions.

Consequently, public health authorities recommended prolonged self-isolation for elderly individuals to reduce their risk of infection and alleviate pressure on overburdened healthcare systems. Isolating the elderly may reduce transmission, which was necessary to delay the peak in cases and minimise the spread to high-risk groups (Centres for Disease Control and Prevention [CDC], 2020; World Health Organisation [WHO], 2020. However, scientific literature has documented the bidirectional and complex relationship between psychological issues and social

disconnectedness. Several researchers, like Kai *et al.* (2020), Santini *et al.* (2020), Seegert (2017), Klinenberg (2016), and Gerst-Emerson and Jayawardhana (2015), have shown that social isolation can lead to feelings of loneliness, fear, and/or negative self-esteem. These studies affirmed that social isolation among senior citizens has grave public health consequences due to their heightened risk of mental health problems, autoimmune, cardiovascular, and neurocognitive problems. Social isolation and loneliness were also positively correlated with mortality in the elderly population (Seegert, 2017). Thus, the feelings of loneliness might lead to the emergence of other diseases among senior citizens.

Also, one of the significant and effective factors for the physical and mental wellness of the elderly is social participation, a fundamental human right that could assist them in maintaining social order and improving their quality of life. The literature further suggests that feelings connected to and involved in social gatherings are important for mental and physical health. Moreover, social integration and support have protective effects on morbidity and mortality outcomes. Contrarily, social isolation is highlighted as a "growing health epidemic" among the elderly population (Seyfzadeh *et al.*, 2019; Seegert, 2017).

The COVID-19 pandemic exacerbated loneliness among the elderly by necessitating strict self-isolation

measures. There is no doubt that it will affect the psychosocial well-being of the seniors. Since the announcement of COVID-19, several studies have been carried out (Armitage and Nellums, 2020; Kai *et al.*, 2020; Santini *et al.*, 2020; Liu *et al.*, 2020; Yang *et al.*, 2020), with most of these giving general information on COVID-19, consequences, features, symptoms, prevention, and control in general and in China where the disease erupted. However, there is a dearth of information on the perceived effects of COVID-19 on the elderly's well-being across countries (Nigeria, Pakistan, and South Africa), hence, this study was to fill the gap in social welfare among old-age people in developing countries. Nigeria, Pakistan, and South Africa were deliberately selected for this study due to their shared characteristics as developing countries with similar socio-cultural dynamics, including strong family ties, community-centred living, and a high dependence of older adults on social networks for emotional and physical support. At the peak of the COVID-19 pandemic, these countries also faced comparable challenges such as fragile healthcare systems, limited social safety nets for the elderly, and stringent self-isolation measures that disrupted traditional caregiving structures. These commonalities made them suitable for a cross-country comparison of the psychosocial effects of the pandemic's isolation policies on senior citizens. Particularly, this article aimed to explore the socioeconomic characteristics of senior citizens and to find out the impact of self-isolation policies on senior citizens' psychology (attitude, behaviour, consciousness) in these countries.

METHODOLOGY

Nigeria is located in West Africa, bordered by Niger, Chad, Cameroon, and Benin, with maritime borders including Ghana and Equatorial Guinea. It comprises 36 states and the Federal Capital Territory (Abuja). With a population of about 236 million (Worldometer, 2025) and a land area of 910,770 km², Nigeria is religiously diverse and officially English-speaking. It has a mixed, emerging-market economy, ranked 27th globally by nominal GDP and 24th by purchasing power parity, with a GDP of USD 363.85 billion and 1.9% annual growth (World Bank, 2023).

Pakistan, in South Asia, is the fifth-most populous country with over 225 million people and an area of 881,913 km². Bordered by India, China, Afghanistan, and Iran, it has a coastline along the Arabian Sea. It comprises provinces like Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, and Gilgit Baltistan. The country has a semi-industrialized economy transitioning from agriculture to services (GoP, 2023).

South Africa, located at the southern tip of Africa, has a population of approximately 64.6 million

(Worldometer, 2025). Bordered by Namibia, Botswana, Zimbabwe, Mozambique, and Eswatini, it enjoys a temperate climate. With a diversified economy built on agriculture, mining, tourism, and services, South Africa has a GDP per capita of USD 13,687 and ranks 84th globally for ease of doing business (StatsSA, 2019).

All the senior citizens of the three countries (Nigeria, Pakistan, and South Africa), aged ranges from 60 years and above, constituted the population of the study. These people can be divided into three main groups: young-old (60-74 years), middle-old (75 to 84 years), and old-old (85 years and above) people.

A multistage purposive sampling procedure was employed for this study. The focus was on regions with a relatively higher concentration of literate elderly populations and significant exposure to the COVID-19 pandemic during the peak period.

Nigeria has six geopolitical zones: Northeast, North Central, Northwest, South-South, Southeast, and Southwest. The Southwest zone was purposively selected based on its higher literacy rates among senior citizens and better access to online communication platforms. Three states were randomly selected from the six states in the Southwest. Given data collection limitations and to ensure manageable fieldwork, an equal number of 50 senior citizens per state were sampled, totalling 150 respondents. While this approach was partly influenced by convenience, it ensured a balanced representation of urban and peri-urban elderly populations within the selected zone. The sampling frame was derived from local community associations and directories of senior citizens obtained through state Ministries of Health and Social Welfare.

In Pakistan, Sindh province was purposively chosen due to its high incidence of COVID-19 cases during the study period. Within Sindh, Karachi, Sukkur, Hyderabad, and Larkana were included based on the regional distribution of cases and accessibility. The sample distribution reflected the proportion of elderly COVID-19 patients across these cities: 90 from Karachi and 20 each from Sukkur, Hyderabad, and Larkana, resulting in 150 respondents. The sampling frame was obtained through collaboration with local health departments and elderly welfare organizations.

In South Africa, data were collected from Limpopo, Eastern Cape, and Northwest Province, chosen for their diverse socio-economic profiles and varying pandemic impacts. Initially, 50 senior citizens per province were targeted. However, due to low response rates and logistical challenges, the final sample included 20 respondents from Limpopo, and 15 each from Eastern Cape and Northwest Province, totalling

50 respondents. The sampling frame was based on lists provided by provincial Departments of Social Development and elderly care homes.

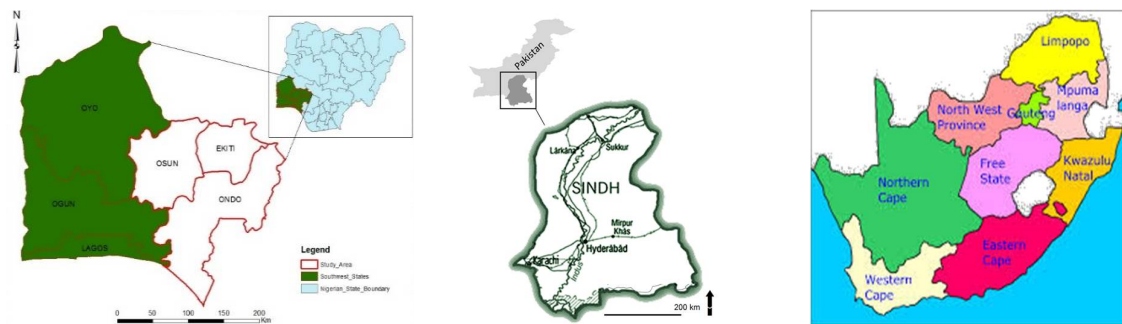
The use of a purposive multistage sampling approach was informed by the need to target regions with higher elderly population visibility, better internet accessibility, and significant COVID-19 exposure. While convenience influenced some selections, efforts were made to ensure that within these regions, the sample sizes reflected either proportional distributions (as in Pakistan) or operational feasibility (in Nigeria and South Africa). Incorporating official health and social welfare agencies for sampling frames added credibility and reliability to the respondent selection process.

The questionnaire was developed using an online survey tool (e.g., Google Forms) to facilitate data collection during the pandemic lockdowns. The survey link was shared directly with pre-identified

respondents through established social networks such as WhatsApp, Facebook, and email.

For Nigeria, the sampling frame was created in collaboration with state-level Ministries of Health and Social Welfare, elderly associations, and community-based organisations, which provided contact lists of literate senior citizens with internet access. Similarly, in Pakistan and South Africa, local health departments, elderly care homes, and welfare NGOs facilitated access to senior citizens by providing databases of potential respondents who met the study criteria.

These organisations also assisted in initial contact and follow-up reminders, ensuring the pre-identified elderly participants received the survey link and understood the study's purpose. Where necessary, family members or caregivers supported the seniors in completing the online questionnaire, ensuring inclusivity despite potential digital literacy barriers.



A: Study area from Nigeria

B: Study area from Pakistan

C: Study area from South Africa

Figure 1: Maps showing data collection regions of three countries.

The data for the study were collected through a detailed questionnaire. The questionnaire was developed following the short scale for measuring loneliness (Hughes, 2004) and social isolation among COVID-19 patients aged 60 and above by using multiple indicators (Cornwell and Waite, 2009). The instrument consists of open and closed-ended questions patterned after the study objectives. The questionnaire was developed with an online tool and disseminated through a link to the pre-identified respondents. The data collected were treated to acquire statistical inferences by using frequency, percentages, means, etc. the impact of SIP on psychosocial of senior citizen were measured on a five-point Likert-type scale (from Strongly Agree (SA) to Strongly Disagree (SD)) and Analysis of Variance (ANOVA) was used to show the difference(s) in the responses of the senior citizens to COVID-19 during their self-isolation across the study area.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results in Table 1 show that the mean age of senior citizens interviewed across Nigeria, Pakistan and South Africa were 66.2, 67.8 and 69.4 years, respectively, an indication that they were within the young old age group (Neugarten, 1974). More than half of the senior citizens from Nigeria (61.33 percent) and South Africa (58 percent) were female, while most of their counterparts from Pakistan were male. Most of the respondents from Nigeria practiced Christianity, while all the respondents interviewed in South Africa belonged to the Christian faith, and about 70.7 percent of respondents from Pakistan were Muslims. It could be said that although there were other religious practices in the three countries, the respondents were mainly within the Christian and Islamic religions. The marital status of the respondents shows that most of the respondents from Nigeria (60 percent) and

Pakistan (68 percent) were married with children, and only 34 percent of similar respondents were found from South Africa. Those elders who married but lived with others were about 22, 16.7, and 26 percent in Nigeria, Pakistan, and South Africa, respectively. The researchers found it concerning that a significant number of elderly individuals were not being cared for by their own children and were instead residing with non-relatives or in alternative living arrangements.

The average household size of respondents from Nigeria, Pakistan, and South Africa was 6.5, 8.2, and 6.0 persons, respectively. This suggests that senior citizens in Pakistan tend to live in relatively larger households, likely due to prevailing cultural norms and extended family structures that emphasize intergenerational cohabitation and familial caregiving responsibilities (Sathar & Kiani, 1998). According to Ataullahjan *et al.* (2022), large family sizes in developing countries like Pakistan form social capital for the family.

The results on educational attainment indicate that most senior citizens across the three countries had received one or more forms of formal education. Notably, a higher proportion of respondents from Nigeria (70.0%) and South Africa (50.0%) attained higher levels of education compared to their Pakistani counterparts (32.67%). This finding is consistent with

global education trends, where older adults in sub-Saharan Africa, particularly in countries like Nigeria and South Africa, tend to have higher literacy and educational levels than their counterparts in South Asia, such as Pakistan (UNESCO Institute for Statistics, 2019; National Population Commission [Nigeria] & ICF, 2019; Pakistan Bureau of Statistics, 2017).

The senior citizens cut across various occupations, although retired civil servants were higher among Nigerians (55.3 percent) and Pakistanis (44 percent). There were more traders (48 percent) among the South African senior citizens (48.0%) than among the Nigerian (12.0%) and Pakistani (16.0%) senior citizens. Also, the farmers were higher among the Nigerian respondents than in the two other countries. About 78 percent of the senior citizens in South Africa were still working even when they crossed retirement age and were involved in trade/business. The situation wasn't the same among the senior citizens in Nigeria and Pakistan. The results further show that more than 83 percent of the respondents lived within joint families or with guardians in all three countries. The strong family orientation commonly observed in developing countries often translates into close-knit household structures and shared caregiving responsibilities for elderly family members (Croll, 2006).

Table-1: Socio-economic characteristics of the respondents

Description		Unit	Nigeria (N=150)	Pakistan (N=150)	South Africa (N=50)
Average age		Years	66	68	69
Average family size		No.	6	8	6
Level of education	Adult Education	%	6.67	15.33	8.00
	Primary Education	%	12.00	17.33	24.00
	Secondary Education	%	11.33	34.67	18.00
	Tertiary Education	%	70.00	32.67	50.00
Gender	Male	%	48.67	70.67	44.00
	Female	%	51.33	29.33	56.00
Religion	Christianity	%	71.33	4.00	100.0
	Islam	%	22.00	85.33	0.00
	Others	%	6.67	10.67	0.00
Marital status	Married, alone	%	11.33	6.67	2.00
	Married, with children	%	60.00	68.00	34.00
	Married, but living with others	%	22.00	16.67	26.00
	Single, alone	%	3.33	3.33	14.00
	Single, with children	%	3.33	5.33	18.00
	Single, but living with others	%	0.00	0.00	6.00
Primary occupation	Farming	%	14.00	17.33	10.00
	Artisan	%	2.67	10.00	8.00
	Civil Servant (retired)	%	55.33	44.00	34.00
	Driving	%	4.00	8.00	0.00
	Hair Dressing	%	12.00	4.67	0.00
	Trading	%	12.00	16.00	48.00
Still working	Yes	%	46.0	43.33	78.0

Living in a joint family	%	83.33	86.00	92.00
--------------------------	---	-------	-------	-------

Source: Field survey, 2020.

Self-isolation and social networks

When considering Social Network Size and Psychosocial Well-being, the report in Table 2 shows that most of the elderly respondents in Nigeria (82.67%) and South Africa (76%) have very small social networks (1–4 people). Pakistan shows a relatively more diverse network size, 41.33% having 5–8 persons and 10.67% exceeding 12 persons. Berkman *et al.* (2000) emphasised that smaller social networks in older adults are associated with increased risks of depression, loneliness, and cognitive decline. The protective role of expansive networks is well documented. According to Cornwell & Waite (2009), older adults with limited social contacts experience more feelings of isolation and report lower life satisfaction. Litwin and Shiovitz-Ezra (2011) found that network diversity (not just size) significantly reduces loneliness and psychological distress among older adults. The larger and more diverse social networks observed in Pakistan may therefore serve as a psychosocial buffer during isolation.

Findings on the composition of social networks show that most seniors in South Africa (54%) and Nigeria (48%) depend on a broader network that includes children, relatives, and neighbours. Pakistan shows a higher proportion of seniors relying solely on children (24.67%) or friends and neighbours (18.67%), suggesting differences in cultural caregiving norms and support structures. In African settings, extended kinship structures play a critical role in elderly care

(Aboderin, 2004). Social connectedness with relatives and neighbours helps provide emotional and instrumental support during crises like pandemics. In Pakistan, Ali *et al.* (2020) observed that strong filial piety norms exist, but elderly care is increasingly shifting from extended to nuclear family systems, often isolating seniors in urban contexts. Harper (2014) emphasises that neighbourhood ties and proximity to kin are essential to mitigating the effects of isolation, particularly when digital communication options are limited.

In terms of the perception of neighbourhood safety, South African seniors reported the highest positive perception of neighbourhood safety (80% rate it as Good/Very Good/Excellent). In Nigeria, the majority also rate their neighbourhood as Good or Very Good (78.67%), though with fewer rating it as Excellent. Pakistan reflects concerns, with 34% rating neighbourhood safety as Poor. Stafford *et al.* (2007) found that perceived neighbourhood safety significantly influences the mental health of older people. Unsafe environments discourage outdoor activity and social contact, leading to increased isolation. In Pakistan, Khan *et al.* (2019) reported that elderly persons living in urban, low-income areas face more anxiety and depressive symptoms due to both isolation and insecurity. Cramm & Nieboer (2014) in South Africa highlighted that positive perceptions of neighbourhood safety were correlated with higher well-being and less loneliness among elderly populations.

Table 2. Percentage distribution of responses regarding social networking of the respondents

Questions		Nigeria (N=150)	Pakistan (N=150)	South Africa (N=50)
How many people are in your social network?	1 – 4	82.67	40.00	76.00
	5 – 8	16.00	41.33	22.00
	9 – 12	1.33	8.00	2.00
	More than 12	0.00	10.67	0.00
Who is in your social network?	Children only	6.67	24.67	14.00
	Children and relatives	38.00	18.00	22.00
	Children, relatives, and neighbours	48.00	34.00	54.00
	Friends and neighbours	5.33	18.67	4.00
	Members of religious bodies	2.00	4.67	6.00
How do you rate your neighbourhood safety status?	Excellent	2.00	4.00	12.00
	Very good	38.67	22.67	30.00
	Good	40.00	21.33	38.00
	Fair	17.33	18.00	14.00
	Poor	2.00	34.00	2.00

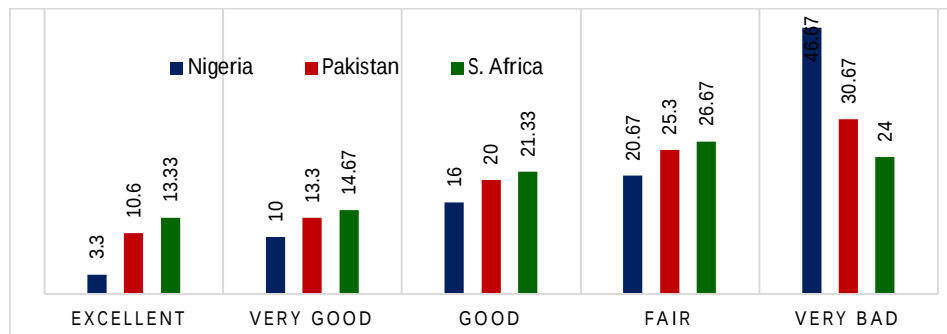


Figure 2: Responses to self-isolation policies by senior citizens across the countries

The results show that most of the respondents (Nigeria, 46.67%, Pakistan, 30.67% and South Africa, 24.9%) expressed their concerns that they were not satisfied with the self-isolation policy of COVID-19 in all three countries, where many of them thought very bad or fair (Figure 2). Given their strong family ties and dependence on social networks, respondents were deeply shocked by the isolating effect of SIP, especially when they contracted COVID-19. According to the WHO (2022a), 12.7 million people have died because of the COVID-19 pandemic, with 85% of those deaths occurring in low and middle-income countries. Most of these fatalities (83%) have involved elderly adults, some of whom, WHO claimed, were not counted. National Institute on Ageing (2019) opined that human beings are social creatures that depend on connections for thriving and survival; self-isolation defeats the ability to connect and deprives the elders of socialisation. Moreover, social isolation might result in cognitive decline, depression, and heart disease, which might necessitate considering the self-isolation policy as bad for the elderly. Holt-Lunstad *et al.* (2015) affirmed a high degree of association between loneliness and early mortality. They further added that stress levels and blood pressure were higher during loneliness, which may be considered as dangerous as obesity, blood pressure, and smoking.

Impact of self-isolation on the psychosocial states of the respondents

The data in Table 3 presents the perceptions and psychological impacts of the Self-Isolation Policy (SIP) among the elderly populations in Nigeria, Pakistan, and South Africa. The findings reveal variations in how the elderly across these countries experience and respond to SIP.

Firstly, the belief that “SIP is dangerous to one’s health” was relatively consistent across the three countries, with mean scores of 3.05 (Nigeria), 3.08 (Pakistan), and 3.10 (South Africa), indicating a generally moderate to high concern about the health risks associated with SIP. Pietrabissa and Simpson

(2020), Army (2019), and Rauschenberg *et al.* (2021) have shown that chronic social isolation increases the risk of mental health issues like depression, anxiety and substance abuse, as well as chronic conditions like high blood pressure, heart disease and diabetes. It also raises the risk of dementia in older adults (Valtorta & Hanratty, 2012; Nakou, *et al.*, 2025). The need for physical exercise among the elderly is always emphasized. Physical activity, according to the World Health Organization (2023), is a protective factor for noncommunicable diseases such as cardiovascular disease, stroke, diabetes, and some types of cancer. Schuch *et al.* (2016) and the WHO (2022a) associated physical exercise with improved mental health and a delay in the onset of dementia. and improved quality of life and well-being (Das and Horton, 2012; Wang *et al.*, 2021).

However, differences emerged in the statement “Self-isolation policy creates fear in me,” where Pakistan (Mean = 3.53) and South Africa (Mean = 3.44) reported higher levels of fear compared to Nigeria (Mean = 2.87). This suggests that the elderly in Pakistan and South Africa felt more psychologically threatened by SIP than their Nigerian counterparts.

Similarly, the perception that “Self-isolation hurts my mind, mood, and body” was slightly higher in South Africa (Mean = 3.16) than in Nigeria (Mean = 3.02) and Pakistan (Mean = 3.05). This indicates that South African elderly individuals experienced greater psychological and physical discomfort due to SIP. Most elders take pleasure in community meetings as they provide them the opportunity to bond with neighbours and friends. According to (RUSH, 2022), physical bond with loved ones enhances the release of oxytocin, which promotes happiness and calmness in individuals.

Interestingly, the statement “SIP does not affect me” had lower mean scores, particularly in South Africa (Mean = 2.48), suggesting that most elderly individuals did feel impacted by SIP. This trend was also observed in Nigeria (Mean = 2.85) and Pakistan

(Mean = 2.75), indicating a general consensus that SIP did affect their lives.

Feelings of loneliness due to SIP were notably higher in South Africa (Mean = 3.64) compared to Nigeria (Mean = 3.08) and Pakistan (Mean = 2.94). This suggests that the social isolation aspect of SIP was more strongly felt by the elderly in South Africa, possibly due to differences in family structures, community support, or social engagement patterns.

Regarding the positive impact of SIP, such as “SIP enables me to be full of energy,” mean scores were generally low across all three countries, with Nigeria at 2.71, Pakistan at 2.82, and South Africa at 2.56. This indicates that SIP was not perceived as an energising or beneficial experience by the elderly population.

Anxiety and sleep disorders were reported highest in South Africa (Mean = 3.64), followed by Nigeria

(Mean = 3.37) and Pakistan (Mean = 3.15), suggesting that SIP contributed to mental health challenges, particularly in South Africa.

Similarly, reduced physical activities and community participation were more pronounced in South Africa (Mean = 3.44) compared to Pakistan (Mean = 3.18) and Nigeria (Mean = 3.08). This reflects the restrictive impact of SIP on the elderly's mobility and social life.

Finally, the perception that “SIP can kill faster than COVID-19” was lowest in South Africa (Mean = 2.56), while Nigeria (Mean = 2.89) and Pakistan (Mean = 2.84) showed slightly higher agreement. This suggests that while the elderly feared SIP's psychological impacts, they still considered COVID-19 a more direct physical threat... As of 29 November 2022, the World Health Organization (2022a) reported a total of 638,175,811 confirmed cases of COVID-19 globally, including 6,612,970 associated deaths.

Table 3: Psychological impacts of self-isolation policy in the elderly population

	Nigeria		Pakistan		
	Total	Mean	Total	Mean	Mean
SIP is dangerous to one's health	458	3.05	462	3.08	3.1
Self-isolation policy creates fear in me	431	2.87	530	3.53	3.44
Self-isolation hurts my mind, mood and body	454	3.02	458	3.05	3.16
SIP does not affect me	428	2.85	413	2.75	2.48
I felt lonely with SIP	462	3.08	442	2.94	3.64
SIP enables me to be full of energy	401	2.71	423	2.82	2.56
Anxiety and sleep disorder	505	3.37	473	3.15	3.64
Reduced physical activities/ community participation	462	3.08	478	3.18	3.44
I think SIP can kill faster than COVID-19	434	2.89	426	2.84	2.56

Results of one-way analysis of variance

The results of the ANOVA analysis presented in Table 4 reveal significant differences in how respondents experienced the impacts of SIP across several psychological and physical factors. Specifically, there was a highly significant difference in fear levels between groups ($F = 15.350$, $p = .000$), indicating that SIP triggered varying levels of fear among different categories of respondents. Similarly, the impact of SIP on the mind, mood, and body was also significantly different across groups ($F = 14.421$, $p = .000$), suggesting that the psychological and emotional responses to SIP were not uniform.

Anxiety and sleep disorders showed a statistically significant difference between groups ($F = 6.265$, $p = 0.014$), although the effect size was smaller compared to other factors. This indicates that while SIP influenced anxiety and sleep patterns, the extent of this impact varied moderately among respondents. Additionally, reduced physical activities were found to

differ significantly between groups ($F = 12.602$, $p = 0.002$), pointing to diverse experiences in physical well-being and activity levels during the SIP period.

Lastly, respondents' overall response to SIP was significantly different across groups ($F = 10.337$, $p = 0.001$), implying that demographic or socio-economic factors might be responsible for these variations. These findings suggest that the effects of SIP are multifaceted, influencing individuals differently depending on their group characteristics, which may include factors such as age, gender, location, or socio-economic status.

The significant differences observed across all factors underscore the need for targeted interventions that consider these group-specific responses. Policymakers and mental health professionals should therefore design customized support mechanisms to address the varied psychological and physical challenges posed by SIP.

Table 4: ANOVA findings

Factors		Df	SS	MS	F	Sig.
Fear	Between Groups	1	1367.060	1373.070	15.350	.000**
	Within Groups	349	9082.91	90.754		
	Total	350	10 375.991			
SIP impacts the mind, mood and body	Between Groups	2	64.021	64.021	14.421	.000**
	Within Groups	348	475.006	4.430		
	Total	350	539.026			
Anxiety & sleep disorder	Between Groups	1	1.509	1.509	6.265	.014*
	Within Groups	344	25.411	.230		
	Total	345	27.910			
Reduced physical activities	Between Groups	1	3.536E-02	3.536E-02	12.602	.002**
	Within Groups	344	3.827	3.568E-02	19.607	.001**
	Total	345	3.853			
Response to SIP	Between Groups	1	249.009	249.009	10.337	.001**
	Within Groups	349	2415.982	21.963		
	Total	350	2664.991			

Field survey, 2020. [Df = Degree of freedom; ** Significance at $P \leq 0.01$; * Significance at $P \leq 0.05$]

CONCLUSION AND RECOMMENDATIONS

The study shows that senior citizens across Nigeria, Pakistan, and South Africa share similarities such as being largely literate, religious (mainly Christian or Muslim), and living in family-oriented households. However, differences emerged in gender composition, marital status, household size, and economic activity. Notably, more South African seniors remained economically active post-retirement, while larger household sizes and lower education levels were more common in Pakistan. These variations highlight the role of cultural and socioeconomic contexts in shaping the well-being of older adults during the pandemic.

The study revealed that elderly respondents in Nigeria and South Africa largely had small social networks, while those in Pakistan reported more diverse and larger networks, potentially offering better psychosocial support. Cultural caregiving norms differ, with African seniors relying on extended kin and community, while Pakistan shows a shift toward nuclear support systems. Perceptions of neighbourhood safety also varied, with South African seniors feeling the safest and Pakistani seniors reporting the most insecurity, factors that significantly affect social engagement and well-being.

A significant proportion of elderly respondents in Nigeria, Pakistan, and South Africa were dissatisfied with the COVID-19 self-isolation policy, primarily due to its disruption of vital social connections. The emotional toll of isolation was particularly severe in cultures with strong family and communal ties. Given

evidence linking social isolation to cognitive decline, depression, and increased mortality, self-isolation policies, while protective against infection, may have inadvertently harmed the psychosocial well-being of older adults.

The findings suggest a shared concern among elderly respondents in Nigeria, Pakistan, and South Africa about the negative health impacts of the Self-Isolation Policy (SIP). With moderate to high agreement that SIP is dangerous to health, the results align with existing evidence linking prolonged isolation to mental and physical health risks. The need for regular physical activity and social interaction remains critical for older adults' well-being, underscoring the importance of more inclusive public health strategies during pandemics.

The psychological impact of the Self-Isolation Policy (SIP) varied across the three countries, with elderly respondents in South Africa and Pakistan reporting greater fear, loneliness, and mental distress compared to those in Nigeria. SIP was generally perceived as harmful to mood, mind, and body, with little positive impact noted. Feelings of anxiety, reduced physical activity, and disrupted sleep were especially pronounced in South Africa. Despite recognizing the dangers of SIP, many still viewed COVID-19 as the greater threat, highlighting the complex balance between protecting physical health and preserving psychosocial well-being among older adults.

The ANOVA results reveal significant differences in how elderly respondents experienced the effects of the

Self-Isolation Policy (SIP), particularly in fear levels, psychological distress, physical activity, and sleep. These variations suggest that SIP's impact was not uniform, likely influenced by demographic or socio-economic factors.

The Self-Isolation Policy (SIP), while vital for curbing COVID-19 transmission, had profound negative impacts on the mental, emotional, and physical well-being of senior citizens—triggering fear, loneliness, anxiety, and reduced social and physical engagement across Nigeria, Pakistan, and South Africa.

The study recommends that the need to develop targeted mental health support and safe social engagement options to reduce loneliness among the elderly during isolation. Strengthen family and community care, especially in urban settings where traditional support is declining. Enhance culturally sensitive public health messaging to address fears and misconceptions. Promote inclusive policies that consider age, gender, and socio-economic factors for better elderly well-being.

REFERENCES

- Armitage, R., & Nellums, L. B. (2020). COVID-19 and the consequences of isolating the elderly. *The Lancet Public Health*, 5(5), 256. [https://doi.org/10.1016/S2468-2667\(20\)30061-X](https://doi.org/10.1016/S2468-2667(20)30061-X)
- Army, N. (2019). The risks of social isolation. *Monitor on Psychology*, 50(5). <https://www.apa.org/monitor/2019/05/ce-corner-isolation>
- Ataullahjan, A., Vallianatos, H., & Mumta, Z. (2021). Violence and precarity: A neglected cause of large family sizes in Pakistan. *Global Public Health*, 17(5), 717–726.
- Cascella, M., Rajnik, M., Aleem, A., et al. (2023). Features, evaluation, and treatment of coronavirus (COVID-19) [Updated 2023 Jan 9]. In *StatPearls* [Internet]. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK554776/>
- Clarke, P. (2020). Symptoms of coronavirus. Centers for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>
- Cornwell, E. Y., & Waite, L. J. (2009). Measuring social isolation among older adults using multiple indicators from the NSHAP study. *Journal of Gerontology: Social Sciences*, 64B(S1), i38–i46.
- Das, P., & Horton, R. (2012). Rethinking our approach to physical activity. *The Lancet*, 380(9838), 189–190.
- Gerst-Emerson, K., & Jayawardhana, J. (2015). Loneliness as a public health issue: The impact of loneliness on health care utilisation among older adults. *American Journal of Public Health*, 105, 1013–1019.
- Government of Pakistan. (2023). *Pakistan Economic Survey 2022–2023*. Economic Advisor's Wing, Ministry of Finance, Islamabad.
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science*, 10(2), 227–237.
- Hughes, M. E. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, 26, 655–672.
- Klinenberg, E. (2016). Social isolation, loneliness, and living alone: Identifying the risks for public health. *American Journal of Public Health*, 106, 786–787.
- Liu, K., Chen, Y., Lin, R., & Han, K. (2020). Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. *Journal of Infection*, 80(6), e14–e18. <https://doi.org/10.1016/j.jinf.2020.03.005>
- National Institute on Ageing. (2019). Social isolation, loneliness in older people pose health risk. <https://www.nia.nih.gov/news/social-isolation-loneliness-older-people-pose-health-risks>
- Nieuwenhuijsen, E. R. (2009). Environments for healthy ageing: A critical review. *Maturitas*, 64(1), 14–19.
- Organisation for Economic Co-operation and Development. (2020). OECD policy responses to coronavirus (COVID-19): COVID-19: Protecting people and societies. <https://www.oecd.org/coronavirus/policy-responses/COVID-19-protecting-people-and-societies-e5c9de1a/>
- Pietrabissa, G., & Simpson, S. G. (2020). Psychological consequences of social isolation during COVID-19 outbreak. *Frontiers in Psychology*, 11, 2201.
- Rauschenberg, C., Schick, A., Goetzl, C., Roehr, S., Riedel-Heller, S. G., Koppe, G., Durstewitz, D., Krumm, S., & Reininghaus, U. (2021). Social isolation, mental health, and use of digital interventions in youth during the COVID-19 pandemic: A nationally representative survey. *European Psychiatry*, 64(1), e20. <https://doi.org/10.1192/j.eurpsy.2021.17>
- Santini, Z. I., Jose, P. E., York, C. E., Koyanagi, A., Nielsen, L., Hinrichsen, C., Meilstrup, C., Madsen, K. R., & Koushede, V. (2020). Social disconnectedness, perceived isolation,

- and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis. *The Lancet Public Health*, 5(1), e62–e70. [https://doi.org/10.1016/S2468-2667\(19\)30230-0](https://doi.org/10.1016/S2468-2667(19)30230-0)
- Schuch, F., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P., Reichert, T., Bagatini, N. C., Bgeginski, R., & Stubbs, B. (2017). Physical activity and sedentary behavior in people with major depressive disorder: A systematic review and meta-analysis. *Journal of Affective Disorders*, 210, 139–150.
- Seegert, L. (2017). Social isolation, loneliness negatively affect health for seniors. <https://healthjournalism.org/blog/2017/03/social-isolation-loneliness-negatively-affect-health-for-seniors/>
- Seyfzadeh, A., Haghighatian, M., & Mohajerani, A. (2019). Social isolation in the elderly: The neglected issue. *Iran Journal of Public Health*, 48(2), 365–366.
- Statistics South Africa. (2019). Yearly archives. <https://www.google.com/search?q=StatsSA%2C+2019&oq=StatsSA%2C+2019>
- Valtorta, N., & Hanratty, B. (2012). Loneliness, isolation and the health of older adults: Do we need a new research agenda? *Journal of the Royal Society of Medicine*, 105(12), 518–522. <https://doi.org/10.1258/jrsm.2012.120128>
- Wang, S., Liu, H. Y., Cheng, Y. C., & Su, C. H. (2021). Exercise dosage in reducing the risk of dementia development: Mode, duration, and intensity—a narrative review. *International Journal of Environmental Research and Public Health*, 18(24), 13331. <https://doi.org/10.3390/ijerph182413331>
- Wong, M. K., Brooks, D. J., Ikejezie, J., Gacic-Dobo, M., Dumolard, L., Nedelec, Y., Steulet, C., Kassamali, Z., Acma, A., Ajong, B. N., Adele, S., Allan, M., et al. (2023). COVID-19 mortality and progress toward vaccinating older adults—World Health Organization, worldwide, 2020–2022. *Morbidity and Mortality Weekly Report*, 72(5), 113–118. <https://doi.org/10.15585/mmwr.mm7205a1>
- World Bank. (2023). GDP current (US\$) Nigeria. <https://data.worldbank.org/indicator/NY.GD.P.MkTP.CD?locations=NG>
- World Health Organization. (2022a). Dementia. <https://www.who.int/news-room/fact-sheets/detail/dementia>
- World Health Organization. (2022b). Ageing and health: Key facts. <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
- World Health Organization. (2023). WHO coronavirus (COVID-19) dashboard. <https://COVID19.who.int/>
- Worldometer. (2025). Nigerian population 2025. <https://www.worldometers.info/world-population/nigeria-population/>
- Worldometers. (2025). South Africa population. <https://www.worldometers.info/world-population/south-africa-population/>
- Yang, Y., Lu, Q. B., Liu, M. J., Wang, Y. X., Zhang, A. R., Jalali, N., et al. (2020). Epidemiological and clinical features of the 2019 novel coronavirus outbreak in China. *medRxiv*. <https://doi.org/10.1101/2020.02.10.20021675>
- Zheng, Z., & Chen, H. (2020). Age sequences of the elderly's social network and its efficacies on well-being: An urban–rural comparison in China. *BMC Geriatrics*, 20, 372.

Adoption of pesticides safety practices among cucumber farmers in Giwa Local Government Area of Kaduna State, Nigeria

¹Ojo, I.H., ²Suleiman, R. and ³Alibaba, M.

¹Department of Agricultural Extension and Rural Development, College of Agriculture and Environmental Sciences, Faculty of Agriculture, Kaduna State University, Kaduna State-Nigeria.

²Department of Agricultural Extension and Rural Development, Ahmadu Bello University/Institute for Agricultural Research, Zaria, Kaduna State-Nigeria.

³Division of Agricultural Colleges, Ahmadu Bello University, Zaria, Kaduna State-Nigeria.

Correspondence details: ojoibukun342@gmail.com, +23408188580663

ABSTRACT

The study assessed pesticides safety practices adopted by cucumber farmers in Giwa Local Government Area of Kaduna state, Nigeria. The specific objectives were description of the socio-economic characteristics of the cucumber farmers, identification of safety practices adopted by the cucumber farmers and determination of factors that influence the adoption of safe pesticide practices. Multistage sampling procedure was used to select 144 cucumber farmers. Descriptive statistics such as frequency, percentage and mean were used to analyze socio-economic characteristics of the cucumber farmers. The use of safe pesticides practices was analyzed by adoption index while multiple regression analysis was used to establish the relationships between socio-economics characteristics of the cucumber farmers and adoption of safe pesticides practices. Most (88%) of the cucumber farmers had low level of education, while 52.9% of them had access to extension services. About 40.2% of them were trained but only 26% of the training content was on pesticides safety. The mean age, household size, household labour and farm size of the farmers were 32.24 years, 10 persons, 3 persons and 0.91ha, respectively. Majority (70.6%) of the cucumber farmers used inorganic pesticide. Result of regression analysis showed that years of inorganic pesticide usage ($r=0.009$), frequency of pesticides spray (0.004), education (0.138) and extension services ($r=1.908$) were significant and positive variables that influenced adoption of safe pesticides practices. Thus, the study recommended that routine training and educational programs focusing on pesticides safety practices should be conducted by the extension agents for the farmers in local languages.

Keywords: Adoption, Pesticide safety, Pre-harvest interval, Re-entry interval.

INTRODUCTION

Cucumber is a popular cultivated plant in the gourd family (Kaur and Sharma, 2022). It is an important vegetable that can be cultivated in various ecological zones of Nigeria. Its production cuts across the rainforest to the savannah zones of Nigeria with variation in production pattern and volume depending on the place. The five highest cucumber producing states in Nigeria are Plateau, Kaduna, Katsina, Kano and Benue. Others with high production potentials are Enugu, Ebonyi, Akwa Ibom, Oyo, Cross River, Rivers and Nassarawa (Bernard and Japhet, 2020). Cucumber can be grown year-round due to its short growing period and with farmers' access to supplemental irrigated water during the dry season, thus allowing for multiple harvests in a year. Godfrey *et al.*, (2023) reported that cucumber is an important vegetable grown in Nigeria in terms of production scale and consumption level.

Cucumbers are nutritious food with several health benefits such as rehydrating the body, regulating blood pressure, body weight management, cholesterol reduction, cancer prevention, bone health, diabetes cure and antioxidant activity (Bello *et al.*, 2014, Naganatha and Hartline, 2015, Kumar *et al.*, 2010). According to Uthpala *et al.*, (2020) cucumber contains 95% water. The high-water content makes the crop

refreshing and hydrating during hot weather. Hina *et al.*, (2024) opined that cucumbers are traditionally used to treat a variety of diseases, including high blood pressure, blood sugar issues, cancer, high cholesterol, kidney stones, constipation, Alzheimer's disease, eczema, hypertension, atherosclerosis, and diabetes-related problems. The cosmetics uses of cucumber was expressed by Shrivastava and Roy (2013), who stated that regular intake of cucumber can improve hair growth, soften skin texture, useful in skin problems, sunburn and for curing swelling under the eye.

Cucumber production in Nigeria is growing due to increased awareness of the health benefits as well as its skin care uses. This has progressively affected cucumber cultivation and increased outbreak of pests and diseases of this crop. In Nigeria, yield losses due to pests and diseases is aided by extreme temperatures, heavy rainfall and high humidity. Umeh and Ojiako (2018), pointed out that pests and diseases is one of the most serious constraints of cucumber production in Southwest Nigeria, while Arogundade *et al.*, (2020) revealed that more than 30 pests and diseases are known to contribute to cucumber yield losses across Africa. FAO (Food and Agricultural Organisation), (2019) revealed that about 40% of global crop production are lost to pests and diseases annually. The quest to meet production demand and to combat

production losses due to pests and diseases infestation resulted in the massive use of pesticides by farmers. Yousefi *et al.*, (2021), Hammood *et al.*, (2024), stated that pesticides are substances mostly used to control these harmful elements.

Pesticides are substances used to prevent or control and eliminate pests, insects, rodents, fungi, weeds and other unwanted organisms that affect plants growth (Einsiedel *et al.*, 2024). Globally, China, USA, Brazil, Argentina, Canada, Ukraine, France, Malaysia, Australia, Spain are the top ten pesticide consuming countries, while South Africa as the twenty-country listed in order of pesticide use (World Atlas, 2018). The annual net weight of pesticides used in Nigeria was 23,412.5 Mt, thus ranking Nigeria as the second largest pesticide user after South Africa (Hughes, 2021). Estimates of herbicides importation into West Africa doubled in five years, from 218,948 tons to 437,930 tons in 2015 and 2020, respectively (Boll, 2023). Nigeria alone imported 147,446 tons exceeding that of South Africa (87,403 tons) and North Africa (109,561 tons) in 2020 (Boll, 2023). Agmas and Adugna, (2020) cited that the extent of pesticides usage are declining in developed countries but it is on the increase in the developing countries because they are used for agricultural and public health purposes. Similarly, Riyaz *et al.*, (2021), stated that the use of synthetic pesticides in agriculture is steadily growing with pesticide residue levels in the environment (air, water, and soil) also increasing. United Nation Human Right Council (UNHRC), (2017), cited that 99% of the deaths associated with pesticides occur in developing countries, where only 25% of the pesticides produced worldwide is used due to intense and unsafe practices among others.

The benefits of pesticides in agricultural production have been widely promoted but many risks have been

reported with it use. The improper use and handling pose significant hazards to the environment, non-target species, farm workers, and consumers. Studies (Karunamoorthi *et al.*, 2012; Ojo, 2016; Adesuyi *et al.*, 2018) have shown that most small-scale farmers in Nigeria are ignorant about the health and environmental implications of the pesticides misuse, or regulatory rules that guides pesticide usage. As a result, they are unable to take requisite precautions to protect their health and the environment nor the use of necessary Personal Protective Equipment (PPE). This study therefore, assessed pesticides safety practices adopted by cucumber farmers in Giwa Local Government area. The specific objectives of the study were to: describe the socio-economic characteristics of the cucumber farmers in the study area; identify safety practices adopted by the cucumber farmers and determine factors that influence the adoption of safe pesticide practices among cucumber farmers in the study area.

METHODOLOGY

The study was conducted in Giwa Local Government area (LGA) of Kaduna State. It is located at latitude of 11°00.00 and 11°20'00N and longitude 7°00'00 and 7°40'00E and has a land area of 3, 350km². The Local government Area is located northwest of Zaria. It is bounded in the North by Katsina State and on the West and South by Birnin Gwari and Igabi Local Government areas of Kaduna State respectively. Giwa LGA is divided into 11 wards: Shika, Idasu, Kadaga, Danmahawayi, Kidandan, Galadimawa, Gangara, Giwa, Kakangi, Pan Hauya, and Yakawada (<https://www.eduweb.com.ng> > giwa-lga-wards-new-and...) (Figure 1). Agriculture is the dominant economic activities of the people. Some of the vegetables commonly grown in the area are cucumbers, onions, tomatoes and watermelon.

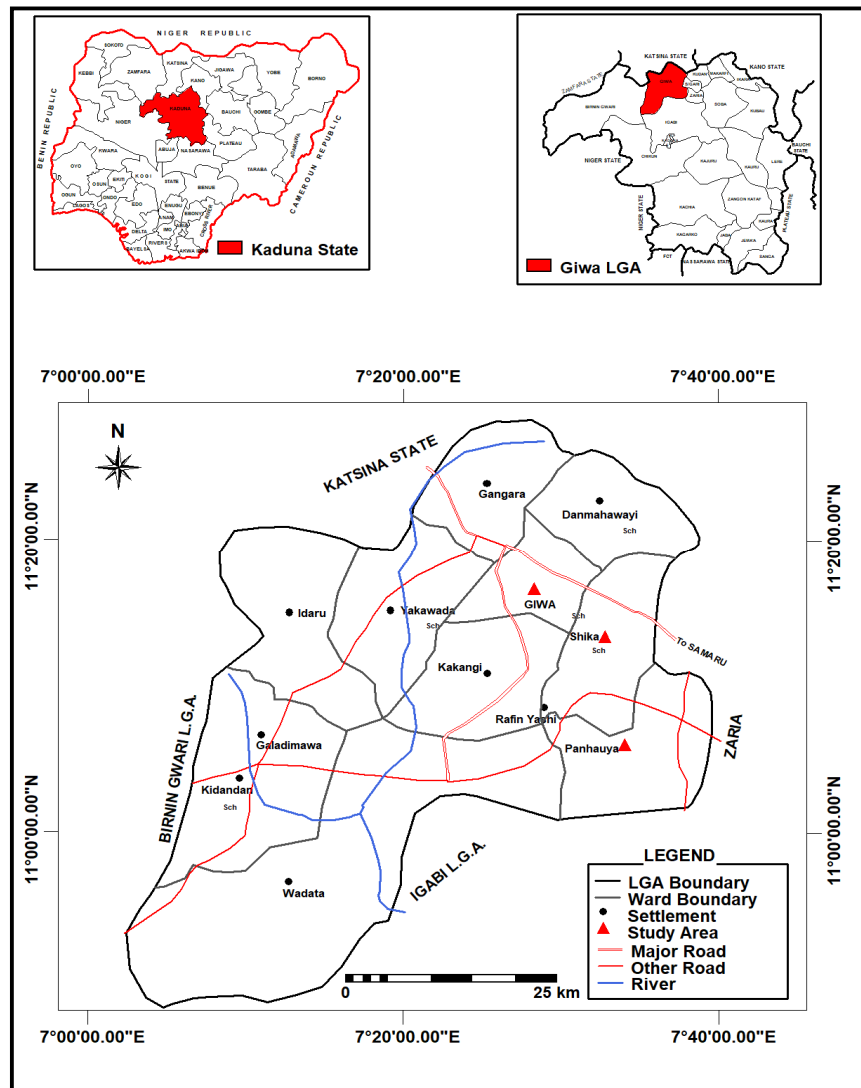


Figure 1: Map of Giwa local government showing the studied villages

Multistage sampling procedure was used for the study. The first stage involved purposive selection of Giwa LGA since agriculture is a major economic activity, with cucumber as a valuable crop grown. The second stage involved purposive selection of three wards in the LGA namely Shika, Giwa town, and Panhauya

based on high concentration of cucumber production among farmers in the wards. The final stage involved random selection of 60% of the cucumber farmers from the sampling frame which gave 144 cucumber farmers (Table 1).

Table 1: Summary of sample frame and size

LGA	Wards	Sample frame	Sample size
Giwa	Giwa Town	50	30
	Shika	150	90
	Panhauya	40	24
Total	3 wards	240	144

Source: Field Survey, 2024

Primary data were collected with the aid of questionnaire administered to 144 cucumber farmers, but 119 questionnaires were recovered from the cucumber farmers and used for the study. Analysis of data collected from the field was done using descriptive statistics such as frequency, percentage, mean, adoption index and multiple regression analysis.

Adoption of each of the safety practices was measured as Yes =1 or No =0. Furthermore, adoption index was constructed using adoption scores. Each safety practices was arbitrary assigned a score of 1. The total safety practices in this study were 16. Adoption index was calculated using adoption score which is the number of farmers that use each of the 16 safety practices to the total number of farmers studied. (Adapted from Gawde *et al.*, (2006).

$$\text{Adoption Index} = \frac{\text{Number of farmers using each of the 16 safety practices}}{\text{Total number of farmers used for the study}} \times 100$$

Based on the index, adoption was categorized as: High >50%; Moderate =50 and Low < 50%

The regression model specified thus:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + b_9 X_9 + e$$

e = error term, a = constant

b₁-b₉ = Regression coefficient

X₁ = Age (years)

X₂ = Education (years of schooling)

X₃ = Household size (number)

X₄ = Household labour (number)

X₅ = Farm size (hectares)

X₆ = Training (number of trainings received on pesticides)

X₇ = Access to extension services (number of extension services received on pesticides)

X₈ = Years of using inorganic pesticide

X₉ = Frequency of spraying (number)

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 2 presented the socioeconomic characteristics of the cucumber farmers. The age distribution showed that 47.0%, 37.8% and 14.2% of the cucumber farmers were within the age of 21-30 years, 31-40 years and 41-50 years respectively. A mean age of 32.24 years was obtained, indicating an active and young cucumber farming population in the study area (Table 2). Finding is similar with Ojeleye *et al.*, (2021) who reported a mean age of 39 years among cucumber farmers in Kadawa, Kano State. Investigation on household size and family labour used in cucumber production revealed a mean of 10 and 3 persons, respectively. The use of household labour for pesticide application without strict adherence to safety practices and non-use of PPE could be a potential health risk for the household members. Findings on farm size indicated that 54.6% of the cucumber farmers cultivated 1-2 hectare (ha) of farmland, with a mean of

0.91ha. It therefore, implies that cucumber farmers in the study area were small scale producers. This finding is supported by Ojeleye *et al.*, (2021) who reported a mean of 0.38ha as farm size put into cucumber production. Educationally, 45% and 43% of the cucumber farmers in the study area had primary and secondary education, respectively. Cumulatively, an overwhelming majority (88%) of the cucumber farmers had low level of education. This may affect the cucumber farmers' ability to read, understand and interpret safety instructions on pesticides label, hence their decision to adopt safe pesticide practices may be affected. The results in Table 2 also showed that 52.9% of the cucumber farmers did not have access to extension services. Extension workers are saddled with the responsibility of providing information, training among other services to farmers. Lack of access to extension services implied lack of effective extension services offered to pesticides users in the study area.

Findings on training showed that only 40.2% of the cucumber farmers had access to training (Table 2). Further investigation revealed that 20.7% of the cucumber farmers received training on pesticides related contents (Application (2%), usage (20%), handling (2%) and safety precaution (2%) (Table 2). The low pesticide related training content among the beneficiaries presents significant risks to the health of farmers, crops, the environment, the ecosystem on the long run, highlighting the need of training and education on pesticide safety among farmers in the study area.

Table 2: Socioeconomic characteristics of cucumber farmers

Socioeconomic characteristics	Classification	Frequency	Percentage	Mean
Age (years)	21-30	56	47	32.24
	31-40	46	37.8	
	41-50	17	14.2	
	Total	119	100	
Household size (number)	1-10	75	54.6	10.26
	11-20	49	41	
	21-30	4	3.4	
	31-60	1	1	
	Total	119	100	
Household labour (number)	1-5	103	86.6	2.92
	6-10	16	13.4	
	Total	119	100	
Farm size (hectare)	less than 1	53	44.5	0.91
	1-2	65	54.6	
	3-4	1	0.08	
	Total	119	100	
Educational level (years)	Primary	54	45	
	Secondary	51	43	
	Tertiary	1	1	
	Arabic	13	10.9	
	Total	119	100	
Access to extension services	Yes	63	52.9	
	No	56	47.1	
	Total	119	100	
Type of training received on:	Did not receive training	73	59.8	
	Production	19	16.2	
	Seedling	4	3.3	
	Pesticide application	2	1.6	
	Pesticide usage	20	15.9	
	How to handle pesticide	2	1.6	
	Safety precautions	2	1.6	
	Total	122*	100	

Source: Field survey, 2024

*Multiple responses

Pesticide use and awareness of safety practices

Results in Table 3 showed that 70.6% of the cucumber farmers used inorganic pesticides, 7.5% used organic, while 21.8% used both organic and inorganic pesticides on their farms. Finding is supported by Abubakar *et al.*, (2015), that 93.8% of the respondents applied pesticide along river Ngadda of Maiduguri area, Nigeria. Also, Okafoagu *et al.*, (2017) reported 65.3% pesticides use among farmers in Sokoto State. Frequency of applying pesticide per production cycle was investigated to determine farmer's extent of exposure to pesticide. A mean of 6.28 years was obtained (Table 3). Cucumber have short growing period and can be grown two or more times in a year. By implication, majority of the cucumber farmers will be expose to pesticide in multiples of 6 depending on the number of cultivations per year if safety precautions were not adhered to.

Years of using pesticide was investigated to assess the duration of farmers' exposure to pesticides.

Majority (85.5%) of the cucumber farmers had been using pesticides for about 1-10 years with a mean of 6.08 years (Table 3), yet, this majority (74.7%) did not wear PPE when spraying pesticides (Table 3). Farmers' non-use of PPE during pesticides handling and application implied that majority of the cucumber farmers were being exposed to pesticides risks and its hazards for about 6 years. Results in Table 3 showed that 93% of the cucumber farmers were aware of safe pesticide practices but majority of them did not wear PPE while spraying. This indicates an urgent need to educate farmers on safe pesticides practices.

Table 3: Distribution of the farmers based on pesticide use and awareness of safety practices

Variables	Grouping	Frequency	Percentage	Mean
Type of pesticide used	Organic	9	7.5	
	Inorganic	84	70.6	
	Both	26	21.8	
	Total	119	100	
Frequency of spraying (number)	1-5	65	54.6	6.28
	6-10	35	29.5	
	11-15	19	15.9	
	Total	119	100	
Years of using organic pesticide	1-10	102	85.5	6.08
	11-20	17	14.2	
	Total	119	100	
Wearing of PPE	Yes	30	25.2	
	No	89	74.7	
	Total	119	100	
Awareness of safe Pesticide practices	Yes	111	93.3	
	No	8	6.7	
	Total	119	100	

Source: Field survey, 2024

Adoption of safe pesticides practices

Findings on adoption of safe pesticide practices showed that 37.8% read and understood pesticide label instruction before use. About 25.2% and 17.6% understood pesticide label colours and knew the meaning of symbols on the pesticide containers. The range of 37.8%-17.6% is an indication of low adoption and invariably will determine how well the farmers will be able to put into practice the recommended safety precaution. Observation of re-entry intervals (restricted interval) and pre-harvest intervals was low as only 23.5% and 26.1% of the cucumber farmers observed these respectively. The implication is that pesticides residues and vapour level is still very unsafe both for the farmers and the consumers. A low percentage (23.5%) of the cucumber farmers reported complete wearing of PPE and ensured that it is in good condition and properly fitted. Another 27.7% and 29.4% of the cucumber farmers reported separate washing of PPE from other cloths and keeping of washed PPE separate from other cloths respectively (Table 3). It can therefore be inferred that less than 30% of cucumber farmers are not exposed to dermal pesticides poison such as skin irritation when PPE come in contact with the skin.

Findings further revealed that 40.3% of the cucumber farmers store pesticides in well-ventilated and secured place (out of bound) away from other people while 67.2% store pesticide away from food, water sources, and animals (Table 3). This finding is at variance with that of Kurui *et al.*, (2014) who found that most farmers stored pesticides either in stores together with

cereals or in living rooms. Result in Table 3 indicated that 35.3% of the cucumber farmers puncture and dispose pesticide container/pack by burying or burning. Finding by Kurui *et al.*, (2014) revealed that only 6% of the respondents disposed pesticides container by burying. Finding also showed that only minority (16.8%) of the cucumber farmers acknowledged that they do not allow non-sprayers in the farm during spraying. It can therefore be inferred that only few cucumber farmers observed the rule that people are not allowed to stay in the farm or it surrounding during pesticides spraying. This practice will predispose non sprayers to pesticide residues especially by inhalation, skin contact or through eyes. Finding is in line with Adesuyi *et al.*, (2018) that 60% of the respondents stayed within the farming environment between 30 minutes and 5 hours after pesticide application.

Result of high adoption of pesticides practices is presented in Table 3. About 68.9% of pesticides sprayers reported that they do not come in contact with family members until after clean up (wash hand, take bath with soap, water and change cloth) (Table 3). By implication the risk of spreading pesticides residues to family members by more of the cucumber farmers is less. Finding also showed that 79.8% of the cucumber farmers agreed that they don't eat/drink/smoke while applying pesticides thus decreasing the chances of oral pesticide ingestion (Table 3). This is in contrast with Oshingbade *et al.*, (2025) who affirmed poor hygiene and safety behaviour among 87.1% of the respondents, who have at some point drank/ate while handling pesticides,

Table 3: Distribution of the cucumber farmers according to safe pesticides practices adopted

Pesticide safety recommendations	Adoption	Percentage
Read and understand pesticide label instruction before use	45	37.8
Understand the meaning of pesticide label colours	30	25.2
Know the meaning of pesticide label symbols	21	17.6
Observe pesticide re-entry intervals (restricted entry interval)	28	23.5
Observe pesticide pre-harvest interval	31	26.1
Wear complete PPE	28	23.5
Wash PPE items separately	33	27.7
Keep PPE items separately from other cloths	35	29.4
Store pesticides in well a ventilated, secured and restricted place	48	40.3
Store pesticide away from food, water sources, animals, etc.	80	67.2
Proper disposal of pesticide container/pack (puncture, burnt or bury)	42	35.3
Non sprayers are not allowed in the farm during spraying.	20	16.8
Do not come in contact with people after spraying until after clean up	82	68.9
Eating/drinking/smoking while applying pesticides is not allowed	95	79.8
Mix pesticides in well-ventilated areas to reduce exposure.	98	82.4
Use tools like funnels or measuring devices to minimize spills/splash.	111	93.3
Pooled mean		43.4

Source: Field survey, 2024.

Mixing of pesticides in well-ventilated areas and the use of measuring tools to reduce exposure and minimize spillage were reported 82.4% and 93.3% of the cucumber farmers (Table 3). Further finding on the overall adoption of all the safety practices by the cucumber farmers shows a low adoption mean of 43.38%. The low adoption mean of safe pesticides application practices could have dire consequences on farmers' health and the environment. Finding on this lent credence to Kurui *et al.*, (2014) that most farmers rarely practiced safety precautions when handling, mixing and spraying chemicals.

Factors affecting adoption of safe pesticide practices

Result of the multiple regression analysis in Table 4 showed that years of inorganic pesticide usage, frequency of pesticides spray, education and extension services were explanatory variables that significantly influenced the adoption of safe pesticides practices among cucumber farmers in the study area. Years of inorganic pesticide usage ($r=0.009$) was significant at 1% level and positive. Implying that farmers that have been using inorganic pesticides for a long time adopted more safety practices than those that started using it not long.

Table 4: Multiple regression results of socio-economics characteristics and adoption

Variables	Regression coefficient	SE	T-value
Adoption (Y)	20.192	2.146	9.408
Age (X_1)	-0.163	0.115	-1.424
House size (X_2)	0.043	0.097	0.443
Education (X_3)	0.138	0.06	2.282**
Household labour (X_4)	0.306	0.195	1.567
Years of inorganic pesticide usage (X_5)	0.009	0.138	6.502***
Frequency of spraying (X_6)	0.004	0.188	2.131**
Farm size (X_7)	0.135	0.85	0.159
Training (X_8)	-0.516	0.857	-0.602
Extension services (X_9)	1.908	0.96	1.986*

*** $p < 0.001$ ** $p < 0.05$ * $p < 0.10$ $R = 0.804$ $R^2 = 0.647$ SE=Standard error

Source: Field survey, 2024

Frequency of pesticides spray (0.004) and education (0.138) were statistically significant at 5% level each and positive while extension services (1.908) was statistically significant at 10% level and positive. The positive influence of frequency of spray implied that farmers that spray pesticides frequently adopted more safety practices than those that spray occasionally. It

can also be inferred that the educated cucumber farmers adopted safe pesticide practices more than the non-educated ones. The positive influence of extension services to adoption implies that farmer's access to extension services enhanced the adoption of safe pesticides practices. These findings agree with Obulamah, *et al.*, (2022) report that education and

extension services were statistically significant to adoption of safe use of agrochemicals. The coefficient of multiple regression (R^2) was 0.647. This implies that about 64.7% of the variation observed in the adoption of safe pesticides practices were explained by the selected socio-economic characteristics of the cucumber farmers.

CONCLUSION AND RECOMMENDATIONS

The findings of this study established that cucumber farmers in the study area applied inorganic pesticides on their farms. They had low level of education, lacked access to extension services and very few of them received training on pesticide related content. Majority of the cucumber farmers were aware of safe pesticide practices but many of them did not adopt it (low adoption). Factors that positively influenced adoption of safe pesticide practices were years of inorganic pesticide usage, frequency of pesticide spray, education and extension services at varying levels. Based on findings of this study, the following recommendations were made:

- i. Routine training and educational programs focusing on pesticides safety should be conducted by extension agents for the farmers
- ii. Based on low educational level of majority of these farmers, improved access to information on pesticides safety practices through extension agents in local languages is suggested.
- iii. Organic farming should be encouraged among the farmers by the extension agents and other agencies/bodies that are involved in training farmers on crop protections.

REFERENCES

- Abubakar, M., Mala, M., Mumin, A., Zainab, T., & Fatima, A. (2015). Perception of environmental effect of pesticide use in vegetable production by farmers along River Ngadda of Maiduguri, Nigeria. *Journal of Agricultural and Environmental Science*, 4(1), 212. <https://doi.org/10.15640/jaes.v4n1a26>
- Adesuyi, A. A., Njoku, K. L., Akinola, M. O., & Nnodu, V. C. (2018). Pesticides related knowledge, attitude, and safety practices among small-scale vegetable farmers in lagoon wetland, Lagos, Nigeria. *Journal of Agriculture and Environment for International Development*, 112(1), 81-99. <https://doi.org/10.12895/jaeid.2018.697>
- Agmas, B., & Adugna, M. (2020). Attitude and practices of farmers with regards to pesticide use in North West Ethiopia. *Cogent Environmental Science*, 6, 1791462. <https://doi.org/10.1080/23311843.2020.1791462>
- Arogundade, O., Ajose, T., Mathew, J. O., & Osijo, I. A. (2020). Current and emerging pest and diseases of cucumber (*Cucumis sativus* L.) in Africa. *IntechOpen*, 1, 20. <https://doi.org/10.5772/intechopen.96692>
- Bello, M. O., Owoeye, G., Abdulhammed, M., & Yekeen, T. A. (2014). Characterisation of gourd fruit (*Cucurbitaceae*) for dietary values and anti-nutrition constituents. *Journal of Pharmaceutical and Biological Chemistry Sciences*, 6, 7575-7585.
- Bernard, N. O., & Japhet, J. Y. (2021). Soil and agronomic management for cucumber production in Nigeria. *IntechOpen*, 1-10. <https://doi.org/10.5772/intechopen.96087>
- Boll, H. S. (2023). Pesticide use in Africa: Increasing vulnerability. *Heinrich Böll Foundation*. Retrieved from <http://ng.boell.org/en/2023/04/19/pesticide-use-africa-increasing-vulnerable>
- Einsiedel, D., Sara-lena, W. S., Zujko, N., Pfeifer, Y., & Krupitzer, C. (2024). Investigating the correlation of analytical data on pesticide residues in fruits and vegetables with local climatic conditions. *Environmental Research*, 252, 118743. <https://doi.org/10.1016/j.envres.2024.118743>
- FAO. (2019). New standard to curb global spread of pests and diseases. *Food and Agriculture Organization of the United Nations*. Retrieved from <http://www.fao.org>
- Gawde, M. M., Chandge, M. S., & Shirdhankar, M. M. (2006). Adoption of improved aquaculture practices by shrimp farmers in South Konkan Region Maharashtra, India. *Journal of Agriculture and Social Research*, 6(2), 1-8.
- Godfrey, C., Onuwaa, G. W., & Cosmos, C. A. (2023). Analysis of profitability and cucumber productivity among smallholder farmers. *Food and Agriculture Economics Review*, 3(2), 28-31. Retrieved from <https://faer.com.my/archive/2faer2023/2faer2023-40-43.pdf>
- Hammood, M. A., Chamani, A., & Sobhanardakani, S. (2024). Health risk assessment of heavy metal exposure from indoor dust: A case study of residential buildings in Isfahan, Iran. *Environmental Health and Management Journal*, 11(1), 39-50.
- Hughes, I. U. (2021). Nigeria pesticide use profile. *Journal of Research in Weed Science*, 4(4), 257-263. <https://doi.org/10.26655/JRWEEDSCI.2021.4.1>

- Kaur, M., & Sharma, P. (2020). Recent advances in cucumber (*Cucumis sativus* L.). *Journal of Horticultural Science and Biotechnology*, 97(1), 3-23.
- Karunamoorthi, K., Mohammed, M., & Wassie, F. (2012). Knowledge and practices of farmers with reference to pesticide management: Implications for human health. *Archives of Environmental and Occupational Health*, 67, 109-116. <https://doi.org/10.1080/19338244.2011.598891>
- Kumar, D., Kumar, S., Singh, J., Narendre, R., Vashistha, B., & Singh, N. (2010). Free radical scavenging and analgesic activities of *Cucumis sativus* fruit extract. *Journal of Young Pharmacists*, 2, 365-368. <https://doi.org/10.4103/0975-1483.71627>
- Kurui, N. J., Gatebe, E., & Mburu, C. (2014). Evaluation of pesticide safety measures adopted by potato farmers in Chebiemit division, Elgeyo/Marakwet County, Kenya. *Journal of Agriculture and Social Technology*, 16(1), 23-35.
- Naganatha, S., & Hartline, R. (2015). Cucumber nutritional facts. *Journal of Vegetable Nutrition*, 15, 1419-1440.
- Obulamah, N. M., Emmanuel, N. M., Salau, S., Luka, E. G., & Umar, H. S. (2022). Factors affecting the adoption of agrochemical safety measures among crop farmers in the southern agricultural zone of Nasarawa. *Diyala Agricultural Science Journal*, 14(2), 165-174. <https://doi.org/10.52951/dasj.22140215>
- Ojeleye, O. A., Egwuma, H., Ali, A., & Suleiman, R. (2021). Profitability and constraints to dry-season cucumber cultivation by smallholder farmers in the Kadawa irrigation project, Kano State, Nigeria. *Abuja Journal of Agriculture and Environment*, 189-197. Retrieved from <https://www.ajae.ng>
- Ojo, J. (2016). Pesticides use and health in Nigeria. *Ifè Journal of Science*, 18(4), 981-991.
- Okafoagu, N., Oche, M., & Lawal, N. (2017). Pesticide use among farmers in Sokoto, North Western Nigeria: A descriptive study. *International Journal of Tropical Diseases and Health*, 24(3), 1-8. <https://doi.org/10.9734/IJTDH/2017/34922>
- Oshingbade, O. S., Moda, H. M., Akinsete, S. J., Adejumo, M., & Hassan, N. (2025). Determinants of safe pesticide handling and application among rural farmers. *International Journal of Environmental Research and Public Health*, 22, 211. <https://doi.org/10.3390/ijerph22020211>
- Riyaz, M., Shah, R. A., & Sivasankaran, K. (2021). Pesticide residues: Impacts on fauna and the environment. *Biodegradation Technology of Organic and Inorganic Pollutants*, 39-60. <https://doi.org/10.5772/intechopen.98379>
- Hina, J., Urooj, F., Aqsa, R., Shabbir, H., Shagufta, B., Muhammad, A. B., Hadiya, S., Muhammad, D., Muhammad, W., & Ayesha, S. (2024). Phytochemical, nutritional, and medicinal profile of *Cucumis sativus* L. (Cucumber). *Food Science and Engineering*, 5(2), 358-377. <https://doi.org/10.37256/fse.5220244795>
- Shrivastava, A., & Roy, S. (2013). Cucurbitaceae: An ethnomedicinally important vegetable family. *Journal of Medicinal Plants Studies*, 1(4), 16-20.
- Umeh, O. A., & Ojiako, F. O. (2018). Limitations of cucumber (*Cucumis sativus* L.) production for nutrition security in Southeast Nigeria. *International Journal of Agriculture and Rural Development*, 21(1), 3437-3443.
- UNHRC. (2017). Report of the special rapporteur on the right to food A/HRC/34/48. *United Nations*. Retrieved from <https://reliefweb.int/sites/reliefweb.int/files/resources/1701059.pdf>
- Uthpala, T. G. G., Marapana, R. A. U. J., Lakmini, K. P. C., & Wettimuny, D. C. (2020). Nutritional bioactive compounds and health benefits of fresh and processed cucumber (*Cucumis sativus* L.). *Sumerian Journal of Biotechnology*, 3(9), 75-82. <https://doi.org/10.13140/RG.2.2.17510.04161>
- World Atlas. (2018). Worldwide pesticide consumption. *World Atlas*. Retrieved from <https://www.worldatlas.com/articles/toppesticide-consuming-countries-of-the-world.html>
- Yousefi, F., Asadikaram, G., Karamouzian, S., Abolhassani, M., Moazed, V., & Nematollahi, M. H. (2021). MGMT methylation alterations in brain cancer following organochlorine pesticides exposure. *Environmental Health Engineering and Management Journal*, 8(1), 47-53. <http://eprints.kmu.ac.ir/id/eprint/3552>

Influence of Nigerian hip-pop music on perceived moral values of rural youth in Kosofe local government area of Lagos state

Adelakun, O. E. and Williams, O. S.

Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Nigeria

Correspondence details: flakyonline@yahoo.com, williamsys01@yahoo.com, +2347030716939

ABSTRACT

Music influences cultural and moral values, but recent trends in Nigerian popular music show an increase in explicit lyrics referencing drugs, sex, and violence. This shift may affect young listeners' morals, posing a threat to public discipline and social values. This study therefore investigated the influence of hip-hop music on the moral values of rural youth. Using multistage sampling procedure 120 respondents were sampled for the study. Data were collected through structured questionnaires and were analysed using frequency, percentages, Chi-square and PPMC. The findings show that most respondents were male (55.0%), single (86.7%), Christians (70.8%) and more than half were students (52.5%) with secondary education (63.3%) and mean age of 20.3 ± 5 . Also, the majority were from monogamous family (73.3%) with mean household size of 5.8 ± 3 . The level of exposure to Hip pop music was high (53.3%) and the most preferred song was Davido Assurance (1.44). Preference of music was based on the beats. Attitude towards hip-hop music was favourable (53.3%). Interactions with friends ranked highest (1.60) as the source of the hip-hop music. The perceived moral value was low (56.7%). There was significant relationship between parents' occupation, interaction with friends and perceived moral values ($X^2=8.615$, $p<0.05$). Also, there existed a significant relationship between level of exposure of the youth toward hip-hop music and their perceived moral values ($r = 0.202$, $p<0.05$). The study concluded that the perceived moral values of youth in the study area was low. It is recommended that National Broadcasting Commission check and regulate lyrical contents and the broadcasting of any music in the country.

Keywords: Music exposure, Moral values, Rural youth.

INTRODUCTION

From time immemorial, the quest for moral principle is an intrinsic phenomenon which makes social life governable and blissful. As such, every person, irrespective of age, colour, sex or social standing is subject to the dictates of the moral principle. This is because the concept of morality serves a holistic function as it is the bedrock upon which the edifice of a truly righteous and egalitarian society rests (Obasola, 2015). The problem of decline in public morality and national discipline in Nigeria is very alarming; every sphere of life is not spared by this cankerworm which has eaten deep into every facet of the society.

According to Obasola (2015), the greatest problem facing the nation today is the problem of identification of values as this seems to have changed thereby affecting the beliefs and attitudes of youths. Behavioural patterns and the various vices prevalent in communities among Nigerian youths today is worrisome therefore, there is no gainsaying that there is decadence and low level of morality in Nigeria (Ogunrinde, 2016). Many of contemporary popular music as we have it today in Nigeria communicate vulgarity and coarseness to the listeners and this poses a lot of negative effects on the attitude of the youths. Musicians employ indecent words to attract the youth thus creating negative influence. According to Ajijola *et al.*, (2024) hip-hop lyrics and music videos often promote themes of materialism, rebellion, and explicit

content, which could influence the moral perceptions of young listeners.

Contemporary pop music has undoubtedly had its greatest impact on Nigerian youths as they look for role models and individuals to pattern their lives after. Unfortunately, the role models they find in the world of contemporary popular music do not always serve as the best models to follow. Furthermore, the trend towards more dangerous lyrics is culminating today in Nigerian Contemporary popular music and this presents a real threat to the physical health, emotional well-being of especially vulnerable children and adolescents (Ogunrinde, 2016). According to Okpokwasili (2020) one of the most pressing issues is the rise of dangerous lyrics, which often glorify violence, substance abuse, and hypersexuality and exposure to such content can lead to desensitization, making harmful behaviours seem acceptable. Music which exalts sexual immoralities, rebellion against parents, murder, suicide, homosexuality, booze, lust, selfishness, self-glorification, worldly pride, et cetera has dominated the present contemporary popular music of Nigeria. Lyrics have become more explicit in their references to drugs, sex and violence, which may produce significant changes in behaviours and attitudes in young listeners (Abiodun, 2017).

The impact of these themes is particularly worrisome for vulnerable children and adolescents, who are still developing their moral compass. Studies suggest that continuous exposure to negative music content can

contribute to aggressive behaviour, emotional instability, and risky decision-making (Okpokwasili, 2020). Furthermore, the visual representation of pop music, including music videos that feature provocative imagery and unrealistic lifestyles, reinforces these messages, shaping youth perceptions of success and relationships.

Rural youth are not exempted from the influence of hip-hop music, although rural communities in Nigeria often uphold traditional moral values, emphasizing respect, communal living, and cultural heritage. However, the increasing exposure of rural youth to hip-hop music through mobile devices, social media, and satellite television has introduced new perspectives that may challenge these values.

Despite the popularity of hip-hop music, there is limited empirical research on its specific influence on the moral values of rural youth. It is on this basis that the study investigated the influence of Nigerian hip-pop music on perceived moral values of rural youths in Agboyi community of Lagos state. The study specifically ascertains the personal characteristics of the respondents in the study area, determined the level of exposure of respondents to hip pop music, identified their preferred hip pop music, assessed their attitude towards hip pop music, determine the source of Hip pop music and examined the perceived standard of moral values among the respondent in study area.

The study stated this hypothesis that there is no significant relationship between the the level of exposure of respondents to hip hop music and perceived moral values.

METHODOLOGY

The study was carried out in Kosofe Local Government Area of Lagos State. Kosofe is located at the Northern part of Lagos State. It is bounded by (3) other Local Governments namely: Ikeja, Ikorodu and Somolu. It also shares a boundary with Ogun State.

Multistage sampling procedure was employed for the study. Kosofe LG is made up of 5 LCDAs; Agboyi-Ketu, Agbado/Oke-Odo, Ikosi-Isheri, Ejigbo, and Isolo, 20% of the LCDA was selected to give 1 LCDA (Agboyi Ketu). Agboyi Ketu comprises of three communities i.e Agboyi 1, Agboyi 2 and Agboyi 3 all the three communities were sampled for the study. Snowball technique was used to compile list of respondents from each community and simple random sampling was employed in selecting 50% of youth from the compiled list to give a total of 120 respondents for the study.

Exposure of respondents to hip pop music was measured by presenting respondents with statements describing actions related to listening to hip-hop music

and were asked to indicate the extent they engage in each activity with response options of to larger extent, to a lesser extent and not at all. The response options were scored as 2,1, and 0 respectively. Mean was generated and was used to categorize exposure into high or low.

Preferred hip pop music of the respondents: A list of trending hip hop songs was provided, and respondents were asked to choose their most preferred, preferred and not preferred songs. The response options were assigned scores of 2,1, and 0 respectively.

Attitude of youth towards Hip pop music in the study area: Respondents were asked to indicate their level of agreement with a list of negatively and positively worded statements with response options Strongly agree, Agree, Undecided, Disagree and Strongly disagree. With scores of 5, 4,3,2,1 respectively for positive statements and reversed order for negative statements. Mean was generated and was used to categorize attitude into favourable and unfavourable.

Sources of Hip pop music: A list of sources of hip pop music was presented to respondents such as Internet, Friends, TV etc. from which the respondents were asked to indicate the frequency of accessing those sources with response options of always, rarely and never, with assigned scores of 2, 1, and 0 respectively.

Perceived moral values of the youths: A list of statements on moral values were presented to the respondents with response option of Strongly agree, Agree, Undecided, Disagree and Strongly disagree. With scores of 5,4,3,2,1 respectively. Mean was generated and was used to categorize into high and low perceived moral values.

RESULTS AND DISCUSSIONS

Personal characteristics

Table 1 shows that 45.8% of the respondents were less than 18 years of age, 23.3% were between 18 and 22 years. Also, 15.8% were between 23 and 27 years while 15.0% were above 27 years old. The mean age of 20.3 ± 5 implies that most of the respondents were still very much in their youthful years, and this could influence their interest listening to hip hop music. Gbogi (2016) found that Nigerian hip-hop music plays a significant role in shaping youth subcultures, with young individuals frequently engaging with the genre as part of their identity formation. Also, 55.0% of the respondents were male while 45.0% were female as revealed in Table 1 young boys may have greater exposure to hip-hop music, which could influence their attitudes and moral perceptions differently than women. As regards religion, Table 1 shows that majority (70.8%) of the respondents were Christians, 24.2% were Muslims while a very low percentage

(5.0%) were practicing traditional religion. Furthermore, majority (63.3%) of the respondents had secondary education, level of educational might positively influence their desired interest towards hip pop music.

On type of school attended, Table 1 shows that majority (76.7%) of the respondents attended public schools while 23.3% attended private schools. In public schools, the level of exposure of students to hip hop music tends to be heightened than in private schools as asserted by Ogunrinade (2016) that the impact of music is instantly visible in many public

schools in Nigeria. The result on family type in Table 1 reveals that majority (73.3%) of the respondents were from monogamy family while 26.7% o were from polygamy. The family type from which youths come could influence their interest of listening to hip pop music as their home trainings, family beliefs, values and religions differ among them. Jackson (2018) opined that family background significantly affects how teenagers interpret hip-hop lyrics, influencing whether they focus on beats or lyrical content. Also 60.8% had interaction with friends which could influence their exposure to Nigerian hip-hop music.

Table 1 Distribution of respondents based on personal characteristics

Variables	Frequency	Percentage	Mean	SD
Age (Years)		20.3	5	
<18	55	45.8		
18-22	28	23.3		
23-27	19	15.8		
>27	18	15.0		
Sex				
Male	66	55.0		
Female	54	45.0		
Religion				
Christianity	85	70.8		
Islam	29	24.2		
Traditional	6	5.0		
Educational level				
No formal education	5	4.2		
Primary education	21	17.5		
Secondary education	76	63.3		
Tertiary education	18	15.0		
Type of school attended				
Public	92	76.7		
Private	28	23.3		
Family type				
Mono	88	73.3		
Polygamy	32	26.7		
Interaction with friends				
Always	73	60.8		
Once a while	47	39.2		

Sources of hip-hop music

On source of hip hop music, Table 2 shows that friends (1.60) ranked 1st of the sources that rural youths obtain hip hop music. This could be as a result of interactions that exist among the rural youths. This is followed by

television (1.52)and parties (1.23) that ranked 2nd and 3rd. However, internet with lowest mean (1.10) ranked 5th as the source of hip hop music for rural youth. This could be adjudged to easy transference of music through bluetooth, sender or flash share which do bot require use of data.

Table 2 Distribution of respondents based on source of hip-hop music

Sources	Always	Rarely	Never	Mean	Rank
Internet	50 (41.7)	32 (26.7)	38 (31.7)	1.10	5 th
Friends	82 (68.3)	29 (24.2)	9 (7.5)	1.60	1 st
Radio channel	47 (39.2)	52 (43.3)	21 (17.5)	1.21	4 th
Television	73 (60.8)	38 (31.7)	9 (7.5)	1.53	2 nd
Parties	58 (48.3)	32 (26.7)	30 (25.0)	1.23	3 rd
Clubs	43 (35.8)	20 (16.7)	57 (47.5)	0.88	6 th

Exposure of respondents to hip-hop music

The result in Table 3 reveals that majority of the respondents to a large extent learnt their dancing styles from the hip hop music (60.0%), loved to sing along when hip hop music is being played (64.2%), repeatedly play their favourite hip hop music (66.7%) and loved to talk about the artiste of their favourite

(60.0%). The result in Table 4 further shows a high level (53.3%) of exposure to hip hop music. This could be because most of the hip hop music are accessible through digital tools such as mobile phones using different social media platforms. Hesmondhalgh & Meijer (2018) asserts that digital tools have increased the mobility of consuming music and possibility of sharing it. .

Table 3 Distribution of respondents based on level of exposure of respondents to hip-hop music

Statements	To a larger extent	To a lesser extent	Not at all
Listening to hip hop music taught me the slangs i know	52 (43.3)	43 (35.8)	25 (20.8)
The dancing styles i know are from the hip hop music	72 (60.0)	33 (27.5)	15 (12.5)
I love to sing along when hip hop music is being played	77 (64.2)	27 (22.5)	16 (13.3)
I listen to radio stations that plays this hip hop music often	60 (50.0)	38 (31.7)	22 (18.3)
I often download the hip hop music that ranks among the top first five	58 (48.3)	40 (33.3)	22 (18.3)
I repeatedly play my favourite hip hop music	80 (66.7)	31 (25.8)	9 (7.5)
I know the radio stations that plays hip hop music	50 (41.7)	40 (33.3)	30 (25.0)
I love to talk about the artiste of my favourite	72 (60.0)	31 (25.8)	17 (14.2)
The artiste of my favourite hip hop music influenced my sense of dressing	48 (40.0)	25 (20.8)	47 (39.2)
I prefer hip hop music to other genres of music	49 (40.8)	45 (37.5)	26 (21.7)

Table 4 Categorisation of respondents based on level of exposure of respondents on Hip-hop music

Level of exposure	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0-13.1)	56	46.7	0	20	13.2	4.8
High (13.2-20)	64	53.3				
Total	120	100.0				

Preferred hip-hop music of the rural youths

Results in Table 5 show that Davido- assurance with highest mean of 1.44 ranked 1st as the most preferred hip hop music listened to by the respondents, this suggests a preference for themes of love and luxury often associated with his music This was followed by Olamide- 'science students' with mean of 1.37 and ranked 2nd reflecting the appeal of energetic, street-

inspired lyrics while Adekunle gold - 'iree'(1.36) ranked 3rd suggesting interest in motivational and reflective songs. While motivational songs like "Ire" encourage positive moral values, the popularity of songs with explicit or controversial lyrics, such as "Science Students," may indicate an increasing exposure to drugs and street influence, potentially shaping youth perceptions and behaviours.

Table 5 Distribution of respondents based on preferred hip-hop music of the rural youths

Preferred pop music	Most preferred	Preferred	Not preferred	Mean	Rank
Tiwasalvage/reminsence/slimcase codeine diet	55 (45.8)	36 (30.0)	29 (24.2)	1.21	11 th
Reminsence- 'amani problem	32 (26.7)	37 (30.8)	51 (42.5)	0.84	16 th
Olamide - 'motigbana'	66 (55.0)	23 (19.2)	31 (25.8)	1.29	5 th
Wizkid- 'soco'	68 (56.7)	27 (22.5)	25 (20.8)	1.35	4 th
Mr real- 'legbegbe'	51 (42.5)	40 (33.3)	29 (24.2)	1.18	12 th
Adekunle gold - 'iree'	66 (55.0)	31 (25.8)	23 (19.2)	1.36	3 rd
Brymo - 'arambe'	36 (30.0)	38 (31.7)	46 (38.3)	0.91	17 th
Darey art alade; 'gbadura fun mi'	61 (50.8)	25 (20.8)	34 (28.3)	1.23	10 th
Cobhamsasuquo- 'ordinary people'	29 (24.2)	31 (25.8)	60 (50.0)	0.74	19 th
J.martins- 'cool temper'	29 (24.2)	33 (27.5)	58 (48.3)	0.76	18 th
Timidakolo- 'iyawo mi'	55 (45.8)	31 (25.8)	34 (28.3)	1.17	13 th
Slim case- 'is a goal'	62 (51.7)	30 (25.0)	28 (23.3)	1.28	6 th
Tuface- 'african queen'	48 (40.0)	29 (24.2)	43 (35.8)	1.04	15 th
Obiwon- 'pick it up'	18 (15.0)	27 (22.5)	75 (62.5)	0.52	20 th
Kiss daniel- 'yeba'	60 (50.0)	32 (26.7)	28 (23.3)	1.27	7 th
Davido- 'assurance'	72 (60.0)	29 (24.2)	19 (15.8)	1.44	1 st
Davido- 'skelewu'	58 (48.3)	34 (28.3)	28 (23.3)	1.25	9 th

Small doctor- 'penalty'	52 (43.3)	31 (25.8)	37 (30.8)	1.13	14 th
Olamide- 'science students'	68 (56.7)	28 (23.3)	24 (20.0)	1.37	2 nd
Idowest ft. slimcase- 'shepeteri'	60 (50.0)	31 (25.8)	29 (24.2)	1.26	8 th

Reasons for preference of hip hop music

Table 6 reveals that majority of the respondents preferred certain type of music due to the beats, melody and the artist while very few were concerned about the lyrics. Olamide- 'science students' was preferred because of the beats (84.2%), as well as Idowest ft. slimcase- 'shepeteri' (84.2%). Also 79.2% preferred Davido 'skelewu' and small doctor 'penalty' songs because of the beats. Out of 20 songs listed in the preference for hip pop music, most of the youth

tend to love fast beat songs without paying attention to the lyrics. Nzinga & Medin (2018) affirms that rhythm and melody play a significant role in emotional stimulation, often overshadowing lyrical meaning. Since lyrical content is often overlooked, youth may unintentionally absorb messages related to substance use, street culture, or aggressive behavior embedded in some songs. As a result of this, they may be more susceptible to unconscious influences on values and attitudes

Table 6 Distribution of respondents based on reasons for respondents preference of hip-hop music

Preferred pop music	Reasons			
	Beats	Melody	Lyrics	Artiste
Tiwa salvage/reminiscence/slimcase codeine diet	89 (74.2)	82 (68.3)	47 (39.2)	57 (47.5)
Reminiscence- 'amani problem	78 (65.0)	71 (59.2)	43 (35.8)	62 (51.7)
Olamide - 'motigbana'	87 (72.5)	86 (71.7)	46 (38.3)	59 (49.2)
Wizkid- 'soco'	91 (75.8)	78 (65.0)	44 (36.7)	74 (61.7)
Mr real- 'legbegbe'	86 (71.1)	77 (64.2)	46 (38.3)	60 (50.0)
Adekunle gold - 'iree'	74 (61.7)	85 (70.8)	49 (40.8)	75 (62.5)
Brymo - 'arambe'	73 (60.8)	69 (57.5)	39 (32.5)	50 (41.7)
Darey art alade; 'gbadura fun mi'	73 (60.8)	83 (69.2)	58 (48.3)	68 (56.7)
Cobhamsasuquo- 'ordinary people'	66 (55.0)	70 (58.3)	53 (44.2)	61 (50.8)
J.martins- 'cool temper'	76 (63.3)	68 (56.7)	43 (35.8)	52 (43.3)
Timidakolo- 'iyawo mi'	73 (60.8)	84 (70.0)	67 (55.8)	68 (56.7)
Slim case- 'is a goal'	88 (73.3)	74 (61.7)	38 (31.7)	67 (55.8)
Tuface- 'african queen'	75 (62.5)	77 (64.2)	50 (41.7)	64 (53.3)
Obiwon- 'pick it up'	69 (57.5)	66 (55.0)	50 (41.7)	57 (47.5)
Kiss daniel- 'yeba'	93 (77.5)	83 (69.2)	45 (37.5)	73 (60.8)
Davido- 'assurance'	92 (76.7)	85 (70.8)	43 (35.8)	79 (65.8)
Davido- 'skelewu'	95 (79.2)	73 (60.8)	35 (29.2)	79 (65.8)
Small doctor- 'penalty'	95 (79.2)	69 (57.5)	39 (32.5)	77 (64.2)
Olamide- 'science students'	101 (84.2)	75 (62.5)	46 (38.3)	83 (69.2)
Idowest ft. slimcase- 'shepeteri'	101 (84.2)	78 (65.0)	45 (37.5)	86 (71.7)

*Multiple response

Attitude of the youth towards pop music

Result in Table 7 shows that more than half of the respondents (53.3%) had favourable attitude towards hip hop music while 46.7% had unfavorable attitude. This implies that most of the rural youths enjoyed listening to the hip hop music with or without negative lyrics. A favorable attitude toward hip-hop music may

lead to greater exposure to it, which can influence young people's beliefs and behaviors. If the dominant lyrical content promotes self-expression, resilience, and social awareness, it can have positive moral implications. However, if young people are exposed to music that magnify risky behavior or derogatory language, there is a risk of internalizing negative values that could shape values and behaviour.

Table 7: Distribution of respondents based on level of attitude of the youth towards pop music

Level of attitude	Frequency	Percentage	Minimum	Maximum	Mean	SD
Unfavourable (21-46.5)	56	46.7	21	69	46.6	7.4
Favourable (46.6-69)	64	53.3				
Total	120	100.0				

Perceived standard moral values

Result in Table 8 shows that majority of the respondents agreed that hip hop dance trend influences immoral dance style amongst youths (66.6%), hip hop

music videos propagate alcoholism as an acceptable behavior (55.9%), youths have taken to different hair styles that do not spell modesty as seen on hip hop musicians and their music video (72.5%) and 69.2% agreed that tattoos and piercings have been promoted amongst the youth because they are seen on musicians and music videos. Furthermore the result in Table 9 shows that perceived standard moral value was low among 56.7% of the respondents. This suggests that the hip hop music listened to by the rural youths had influence on their moral values. Music has the power to culturally, morally, and emotionally influence the

society. Ajijola *et al.* (2024) found that continuous exposure to hip hop music can lead to moral decline. According to Haunga (2016). Musicians are known to be carriers of influence and most of their song lyrics centers on sex, drugs and violence which has negative influence on listeners particularly youth. Exposure to negative issues such as sex, drugs can lead to unacceptable moral values and positive influence such as hard work, love, respect, patience, hope and perseverance can lead to acceptable moral values to our society.

Table 8 Distribution of respondents based on perceived standard moral values

Perception statements	SA	A	U	D	SD
1. Hip hop dance trend influences immoral dance style amongst youths	46(38.3)	34(28.3)	17(14.2)	6(5.0)	17(14.2)
2. Dance style influence participation in parties and clubs and therefore brings about morally unacceptable behaviours	45 (5.8)	34(28.3)	20(16.7)	7(5.8)	14(11.7)
3. Hip hop music videos propagate alcoholism as an acceptable behavior	38(31.7)	29(24.2)	27(22.5)	11(9.2)	15(12.5)
4. Youths have taken to different hair styles that do not spell modesty as seen on hip hop musicians and their music video	47(39.2)	40(33.3)	15(12.5)	5(4.2)	13(10.8)
5. Tattoos and piercings have promoted amongst the youth because they are seen on musicians and videos vixens	54(45.0)	29(24.2)	11(9.2)	14(11.7)	12(10.0)
6. Hip hop music breeds immorality	34(28.3)	38(31.7)	22(18.3)	8(6.7)	18(15.0)
7. Nudity and indecent dressing is propagated by hip music song lyrics and music videos	51(42.5)	29(24.2)	20(16.7)	8(6.7)	12(10.0)
8. Youths have embraced sagging habits which is a common feature amongst the trending hip hop artistes	53(44.2)	31(25.8)	12(10.0)	9(7.5)	15(12.5)
9. Half nude dress culture by the youth is what they see in the musical videos of their favourites artiste	46(38.3)	37(30.8)	12(10.0)	5(4.2)	20(16.7)
10. Youth spend more on hard drinks as they initiate their favourite artiste who like showing off with alcohol in their musical videos	44(36.7)	30(25.0)	16(13.3)	7(5.8)	23(19.2)

Table 9 Distribution of respondents based on level of perceived standards of moral values

Level of moral values	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (12-37.0)	68	56.7	12	50	37.1	8.3
High (37.1-50)	52	43.3				
Total	120	100.0				

Pearson correlation analysis between the level of exposure towards hip-hop music and perceived standard moral values

Result in Table 10 shows that there was a significant correlation between level of exposure of the youth towards hip hop music ($r=0.202$, $p<0.05$) and their

perceived moral values.. This implies that level of exposure towards hip hop music has an influence on the perceived moral values of the rural youths. This means that the more the rural youths listened to the hip hop music, the more they get used to the messages passed across in the music which could negatively influence their lifestyles and behaviour.

Table 10: Result of Pearson correlation analysis between the level of exposure towards hip-hop music and moral values

Variable	r value	p value	Decision
Level of exposure	0.202	0.027	Significant

CONCLUSION AND RECOMMENDATIONS

The study concluded that most of the respondents were young, male, single, averagely educated. Their preference for hip pop music was based mainly on the beats. The youth in the study area showed a positive attitude towards hip pop music. It was discovered that through interactions with friends and use of mobile phones has been identified as the major sources of hip pop music. Their perceived standard moral values were identified to be low among the youth in the study area.

Based on these conclusions, it is recommended that;

1. Artistes should serve as positive role models for the youth through their lifestyles, dress code and lyrics in their song.
2. The entertainment industry as well as artistes should produce videos with more positive themes about relationships, peace, respect, love, drug avoidance, non-violent conflict resolution, sexual abstinence, pregnancy prevention and avoidance of promiscuity.
3. National Broadcasting Commission (NBC) should check and regulate lyrical content, production and the broadcasting of any music

REFERENCE

- Abiodun, F. (2017). Music preference and the issues of social challenges among Nigerian youth: Implications for moral development. *Accelerando: Belgrade Journal of Music and Dance*, 2(6), 34-46.
- Ajijola, B. A., Luqman, S. A., & Ayuba, O. B. (2024). Perceived influence of hip-hop musical videos on moral conducts among Kwara State Polytechnic students, Ilorin, Nigeria. *International Journal of Library Science and Educational Research*, 3(8). Retrieved from <https://cambridgeresearchpub.com/ijlser/article/view/184>
- Gbogi, M. T. (2016). Language, identity, and urban youth subculture: Nigerian hip-hop music as an exemplar. *Pragmatics*, 26(2), 171-195. <https://doi.org/10.1075/prag.26.2.01tos>
- Haung, B. (2016). What kind of impact does our music really make on society? *Sonicbids Blog*. Retrieved from <http://blog.sonicbids.com/what-kind-of-impact-does-our-music-really-make-on-society>
- Hesmondhalgh, D., & Meier, L. M. (2018). What the digitalisation of music tells us about capitalism, culture, and the power of the information technology sector. *Information, Communication & Society*, 21(11), 1555-1570. <https://doi.org/10.1080/1369118X.2017.1340498>
- Jackson, N. (2018). What influence and effects does rap music have on teens today? Retrieved from <https://howtoadult.com/certain-music-genres-affect-teens-17466.html>
- Nzinga, K. L., & Medin, D. L. (2018). The moral priorities of rap listeners. *Journal of Cognition and Culture*, 18(3-4), 312-342. <https://doi.org/10.1163/15685373-12340033>
- Obasola, K. E. (2015). A critical analysis of the role of moral values as a catalyst for social and political development among people in Nigeria. *Asia Pacific Journal of Multidisciplinary Research*, 3(1), 78-89.
- Ogunrinade, D. O. (2016). Contemporary Nigerian popular music: A menace to national development. *Journal of Arts & Humanities*, 5(1), 57-69. Retrieved from <http://www.theartsjournal.org/index.php/site/index>
- Okpokwasili, C. R. (2020). Influence of popular music lyrics and videos on youth's social life: Nigeria in perspective. *The Pedagogue: Festschrift In Honour Of Professor Chukwuemeka Eleazar Mbanugo*, 1(1).