Vol. 21, No. 2

ISSN 0189-7543

NIGERIAN JOURNAL OF RURAL SOCIOLOGY

A PUBLICATION OF THE RURAL SOCIOLOGICAL ASSOCIATION OF NIGERIA

ISSN 0189 - 7543

NIGERIAN JOURNAL OF RURAL SOCIOLOGY

Vol. 21 **No. 2** **DECEMBER 2021**

Published by:
The Nigerian Rural Sociological Association

Editorial Policy
The purpose of the Journal is to provide an avenue for fostering creativity, scholarship and scientific information in Rural Sociology, Agricultural Extension, Agricultural Economics, Human Ecology and other related disciplines. Attention is focused on agricultural and rural development. Priority will therefore be given to articles on rural society. The Journal will also accept methodological, theoretical, research or applied contributions in these areas. Opportunity is open to scientists and development experts within and outside the country to submit relevant papers for publication. The journal basically follows a peer reviewed process in its assessment of manuscripts.

INSTRUCTIONS TO CONTRIBUTORS

Manuscripts
Manuscripts submitted are not supposed to have been published or being considered for publication elsewhere. Papers should be between 3,000 and 5,000 words. Only electronic copy should be submitted; with 12 font size and Times New Roman font type and double line spaced. The TITLE of the paper should be followed by the names, initials and address(es) of the author(s). An ABSTRACT of about

150 words which reports the research problem, purpose, method, results and conclusion should be provided. Keywords consisting of four to five words should be provided after the abstract. Articles should be written in English only. Research papers, review articles, case studies, postgraduate projects are welcome. Submit to the Editor-in-Chief through the journal's website **http://www.journal.rusan.org.ng**

TABLES, FIGURES and Other illustrations should be numbered consecutively and located appropriately within texts after the point of first mention. However, authors should ensure that table does not spill over to the next page. REFERENCE AND LEGENDS TO ILLUSTRATIONS should be placed appropriately within the body of the paper and authors should ensure that they are in camera ready form. Guidelines on illustrations should follow the American Psychological Association [APA] Publication Style Manual.

FOOTNOTES should be avoided as much as possible. Acknowledgements should appear after Conclusion before the reference list.

REFERENCES should be cited within the text as follows: Abiodun (2009) found that ..... On the other hand, after stating the findings, the author's name and year of publication can be inserted; for example, income was positively correlated with educational attainment (Abiodun, 2009). The references should then appear in alphabetical order of the names of first authors in the list of references. For the reference list, the APA Publication Style Manual should be adopted. E.g. Abiodun, J. R. (2009) for single authored paper and Abiodun J. R. and Alabi, O. E. (2009) for double authored.

Reprints: These will be provided on request from authors.

TABLE OF CONTENT

THE CHALLENGES OF CRIME: A MENACE FOR RURAL AGRICULTURE

Olagoke, O. O., Adefalu, L. L., Aderinoye-Abdulwahab, S. A.
Department of Agricultural Extension and Rural Development, Faculty of Agriculture, University of Ilorin, Nigeria
Correspondence contact details: olamigoke16@yahoo.com

ABSTRACT
Crime is a menace that affects everyone, and it equally threatens national security. Crime becomes more worrisome when we consider its impact on the agricultural sector which provides food, employment and contributes significantly to national output. The immediate challenges of crime in agriculture include inhibition of production as occasioned by terrorism, kidnapping, banditry, cattle rustling, destruction of crops by herdsmen; while corruption and other crimes, albeit indirectly, also impact negatively on agriculture. The Nigerian government will need to address the trend of pervasive insecurity occasioned by crime in order to keep on track the national agenda of self-sufficiency in food production. This paper therefore examined the challenges posed by crime on rural agriculture. It dwelled on a theoretical review of literature relating to the crime discourse and submitted that the socio-economic implications of these crimes, especially on agriculture are grave. It is suggested that possible solution to tackle the crime perpetrated by all forms of anti-social activities of kidnapping, banditry and associated crimes will be to improve the living conditions for rural families while recommending a reorganization of the nation's security network.
Keywords: Banditry, Insecurity, Unemployment, Corruption, Food Production.

INTRODUCTION

Agriculture, though acknowledged as the bride of the Nigerian economy, has remained in the hands of rural resource-poor farmers who in spite of their misery of low productivity, still have to grapple with the menace of crimes especially in the rural areas. As aptly captured by Eneji, Babagario and Eneji (2019), the development of the agricultural sector is Nigeria's surest path to the achievement of growth and sustainable development, however, the wave of insecurity in the country portends great danger along this path to success. According to the Food and Agriculture Organization (FAO) (2018), agriculture remains the largest sector of the Nigerian economy, employing 36.5 percent of the entire labour force. The fact that farmers who produce the bulk of food crops that feed the nation live in rural areas puts premium on the need to fight the scourge of crimes to stop further decline of the already bad economic outlook of the rural communities.

Crime is a violation of law and order which heightens sense of insecurity and can frustrate hard work. Crime, though undesirable, is an inevitable phenomenon in human societies and existence (Durkheim, 1893). As declared by Iyer and Topalova (2014), one of the issues that hinder the development of the agricultural sector in developing countries is crime. It causes emotional and psychological pain regardless of the caliber of the person in question, erodes wealth and goodwill, damages infrastructure and discourages both domestic and foreign investments (Metu, Kalu & Maduka, 2018). Crime abounds in both urban settings and rural areas but of note is the seeming ineffectiveness of law enforcement agents and their disproportionate presence in the cities relative to the rural areas where more hands are employed in primary production. Crime has disrupted food production as farmers have had to abandon their farms and farming and there is no better time than now to address the menace of crime on rural agriculture.

This paper assessed the challenges of crime on rural agriculture in a bid to lay bare its effects on rural agricultural production. Specifically, the paper identified major crimes that affect agriculture, the causes, their effects on rural agriculture and made recommendations to address the challenges.

Theoretical concept

This paper viewed crime from the perspectives of the Broken Windows Theory and also leaned towards the Deterrence angle in the Rational Choice Theory.

Broken Windows Theory (BWT) and Rational Choice Theory (RCT)

The name Broken Windows was derived from an experiment conducted by Philip Zimbardo in 1969, he deliberately abandoned an automobile in a crime prone neighborhood where it remained untouched for long. Until he returned to smash a part of the automobile before several other damages were meted on it. The theory posited that big crimes are preceded by relatively smaller crimes that go unpunished and send signals of indifference and lack of enforcement of extant laws. As said by Okoli (2019), crime thrives in contexts where there's little deterrence. This implies that crime festers when unchecked until it becomes colossal and destroys everything in sight. While the BWT apparently blames the indifference of stakeholders for the proliferation of crimes, the deterrent perspective of the RCT stipulates that crime comes from an individual's rational choice after comparing cost and benefits of crime. People consciously choose crime and their choice is influenced by the same factors that shape appropriate behaviour (McCarthy & Chaudhary, 2014). The emphasis therefore is on community policing and zero tolerance for crimes

which sadly appears to be lacking in Nigeria so much so that rural agriculture is being affected.

METHODOLOGY

The historical research method was adopted for this paper. The sources of data for the review included journals, publications and books, and other contemporary sources that discussed challenges of crime on rural agriculture.

Causes of crime

The causes of crime are complex and interrelated. They include: low or lack of education, unemployment, poverty and economic deprivation, parental neglect, low self-esteem, boredom, alcohol and drug abuse among others.

Quality education is imperative in the survival of individuals. Unfortunately, little attention is given to education as there is paucity of quality schools and other social amenities that could help the youths develop their potentials; and this increases the number of school drop-outs who may end up as criminals in the society. According to the National Bureau of Statistics reports of February and March 2020, Nigeria's unemployment rate stood at about 23percent as at third quarter of 2018. This has correlations with the high rate of crime and criminality in both rural and urban areas (Ucha, 2010) as unemployment will result in poverty and poverty can fuel crime.

Poverty can limit education, bring low self-esteem and push victims to drug use. According to Maiyo and Jyoti (2011), poverty is not simply the absence of financial resources, it is also the lack of capability to function effectively in society. The level of poverty coupled with low level of education contribute to the high level of crimes such as *Boko Haram* invasions, cattle rustling, banditry, kidnapping, rape, militancy, unrests and other crimes that have suddenly become prevalent across all parts of the country.

Parental neglect is common with busy parents, broken homes with stranded children and polygamous homes where children become independent too early in life. According to Kauka (2018), the educational role played by the family unit is fading because parents have become too busy for their children. Economic pursuits have robbed parents of the responsibility of moral and religious education of their children. Economic hardships especially in third world countries are denying the parents of quality time with their children, while radical feminism and excessive belief in women's rights is creating an imbalanced and sometimes 'fatherless families' especially where full time housewifery is touted as idleness (Kauka, 2018). Many of the youths, out of boredom, have gone into drugs and this is also complicit in the increasing wave of crime in the society.

Major crimes and their effect on rural farmers

***Boko Haram* Insurgency:** The *Boko Haram* insurgency is more or less an umbrella crime with elements of banditry, kidnapping, rape, murder, arson and a host of other dastardly vices with dire consequences for peace and agricultural production. The insurgency has displaced more than 3 million persons across the nation and has rendered about three-hundred thousand people as refugees in the neighbouring countries (Lenshie & Yenda, 2016). Consequently, food and cash crop production have been hampered especially in southern Yobe, Borno and northern Adamawa States where land has been under-cultivated, harvests impaired, herds seized and crops destroyed.

In addition, there is also great difficulty in the distribution and marketing of farm produce. This is because commercially important roads have been sabotaged by militants, commuters have been ambushed, valuables stolen, and passengers killed. In Borno State, which is the epicenter of the menace, many of the youths hitherto engaged in agriculture have moved to the State capital for safety and for jobs such as motorcycle riding. Crimes have displaced many farmers from their communities and those who managed to stay have abandoned farming due to insecurity (Enobi & Johnson-Rokosu, 2016; Asiru, Agada & Kolade, 2018). This desertion has led to a significant drop in the population of indigenous farmers, increase in cost of farming and cost of farm implements (Babagana *et al*., 2018). Also, the Brookings Institution in Washington reported a 76% drop in the production of grains such as corn, cowpeas, rice, sorghum and millet in the northeast region in 2015 relative to the four years before 2009 (Kah, 2017). Clearly, the food sector is being stretched to the limits by the *Boko Haram* insurgency.

Kidnapping: Kidnapping is the act of taking people against their will sometimes for ransom, rituals or other motives. It is a heinous crime often deployed by insurgents and has potential for transforming into other felonious offenses, such as physical violence, rape and murder (Bello & Jamilu, 2017). The kidnap of the 250 students of a secondary school in Chibok, Bornu State in April 2014 heralded large scale abduction of people in Nigeria. In recent times, kidnapping has spread to all parts of the country and has ceased to be a problem limited to the rich. Poor people including farmers are now at risk especially with the new wave of kidnappings for money rituals. Kidnapping has become lucrative for unscrupulous criminals who abduct for ransom and has remained one of the greatest drawbacks to investment in Nigeria (Ngwama, 2014). It was recently reported on *AgroNigeria* News that members of the Poultry Association of Nigeria (PAN), Oyo State chapter, protested the series of kidnapping of farmers in the state by unknown armed men. The farmers further

lamented that kidnappings bring grave concerns as they now operate in distress and fear of being the next victim (Samuel, 2020).

The News Agency of Nigeria (NAN) in 2019, also revealed the frustrations of farmers who were unanimous that if governments failed to check the spate of kidnapping and banditry, food production in the Northwest region might be affected by as much as 50–70percent (Ekezie, 2019). The farmers who cannot afford personal securities like the rich are at the mercies of the criminals.

Herder-Farmer conflicts: the herdsmen and farmers' clashes in Nigeria have suddenly become more frequent probably as a result of the relative insecurity in the north and the increased migration of herdsmen down south in search of greener pasture for their herds. The farmer/herder conflict is a combination of the crime of trespass and wanton destruction of crops as animals are herded to graze freely on farmers' crops. There are allegations that the herdsmen are of Fulani extraction from both within and outside Nigeria, who have chosen to graze their animals on farmers' crops with impunity. The farmer-herder conflicts have also resulted into large scale displacement of people from their native lands. This has constituted hindrance to crop farming and cattle herding activities in the affected states, resulting to reduced productivity and rising food prices. Attacks and reprisal attacks have become more rampant with over 1,000 people reportedly killed between 2015 and the first quarter of 2019 (Chiluwa & Chiluwa, 2020). The loss of potential annual revenue from livestock and crops occasioned by violent farmer-herder conflicts in the North Central agricultural zone since 2016, is estimated to be about $14 billion (Mercy Corps, 2015).

Banditry: this is organized crime typically involving threat or use of violence. Bandits extort, rob, and kill people. Between 2014 and 2019, the degree of rural banditry in Zamfara State alone drew the attention of regional and national security agencies. Governor Abdulazeez Yari of Zamfara State reported in the Premium Times of 10th September 2018 that, 2,385 people have been killed, over 6,000 persons injured, while over 25,000 cattle were rustled and more than 3,000 hectares of arable land have been destroyed by the activities of the bandits in the last 8 years. Ekezie (2019) also reported the displacement of more than 10,000 households, mostly peasant farmers in Zamfara, while in Kebbi, the hub of rice farming in Nigeria, no fewer than 350 farmers had been forced to abandon their farms by the criminals. In Zamfara, the hotbed of banditry, the State chapter of Rice Farmers' Association of Nigeria (RIFAN) envisaged 50 percent reduction in rice and other farm produce in the forthcoming farming season because of the activities of these criminals (Ekezie, 2019).

Cattle rustling: cattle rustling is a criminal activity that is notably deployed by bandits. In most cases as it would appear, rustlers tended to act with glaring impunity (Aderinoye-Abdulwahab, Fasanya, Kareem & Dolapo, 2019) and this has had significant impact on the livelihood of rural farmers and the general economy of the nation. Commercial farms and traditional herders in Kaduna State reportedly lost over 7,000 cattle to rustlers in 2014 as reported by Ahmadu Suleiman, the chairman of the Kaduna chapter of Miyetti Allah Cattle Breeders Association (MACBA) (Bashir, 2014). According to Chiluwa and Chiluwa (2020), more than 64,750 cattle were stolen and at least 2,991 herders killed in states across the north-central zone in 2013, while 1,135 people were killed in Zamfara State alone between the years 2011 up until 2015. Members of the dreaded *Boko Haram* are now reportedly involved in cattle rustling, many livestock farmers including the non-nomadic ones are reportedly discouraged of rearing livestock because according to the farmers, the presence of herds of cattle is an added attraction for *Boko Haram* attacks (Babagana *et al.,* 2018).

Rape: rape is non-consensual sexual intercourse and it is regarded as a violent crime that dehumanizes the victims and devalues their sense of self-worth. An editorial of the Vanguard Newspaper, on the 18th of June 2020 declared that rape in Nigeria has become a crisis and a nationwide phenomenon with as many as 799 suspects arrested in 5 months (Okogba, 2020). Rape is a handy crime for insurgents, bandits, kidnappers and armed robbers and has become so rife that even farmers are not spared. Earlier on the 17th of August 2017, the same Newspaper had reported the rape of two women farmers on their farms in different incidents by suspected herdsmen in Akure. The rape of the women was protested by the Ondo State Youth Coalition (OSYC), and in their words 'herdsmen are trying to make farming impossible for our people who are now afraid to go to their farms' (Johnson, 2017). Rape may hamper the involvement of women in agriculture and this will adversely affect the 43% contribution to farm labour supply by women (FAO reports) especially in the area of weeding and harvesting.

Corruption: corruption is defined as dishonest or fraudulent conduct which typically involves bribery. In Nigeria, corruption is a central problem and the agricultural sector is not exempted (Ani, Olajide & Onyebuchi, 2019). Corruption may burden the farmers with costs such as higher prices of agricultural inputs and bribery in the distribution of subsidies (Anik & Bauer, 2016). Corruption in the form of embezzlement and misappropriation of funds have been identified as the reason for the failure of many previous agricultural intervention programmes in Nigeria (Ozoani, 2019). As observed by Nkombo (2018), corruption in agriculture can

have negative effects on credit availability, input supplies, subsidies and the development of agribusinesses. The author further reported that the Nigerian Government spent $5bn in four decades on farm input subsidies but only 11 percent of farmers received fertilizer, resulting in low yields and low profits (Nkombo, 2018). This underscores the way corruption can harm the agricultural sector and it puts pressure on the need to address it.

Suggested solutions to crime and criminality in Nigeria's agriculture

The primary responsibility of every government is the protection of lives and properties of her citizens. To combat crimes and criminality, the government at all levels should provide security to farmers in rural communities. Experts in agriculture agree that the progress made in the agricultural sector of the country, especially in food production may be eroded because of crime and criminality in rural areas (Musa, Shabu & Igbawua, 2014). The following measures among others, can help to address the issue of crime and criminality on the livelihood of rural families:

I. **Effective Policing:** is one of the ways to address the issue of crime and criminality in rural areas. Effective policing will be enhanced by expanding the capacity of security agencies through recruitments, training and retraining, provision of adequate tools and proper motivation of men of the security agencies. The security agencies need better and sophisticated communication equipment that will help them in detecting, preventing and controlling crimes (Metu *et al.,* 2018). The realization that the conventional police cannot do it alone has brought about regional security outfits like the *Amotekun* of the Southwest Region and the vigilante groups of other regions who are all expected to operate within the ambits of the law.

II. **Disarmament of herders and establishment of cattle ranches:** there is a need for the security agencies to organize a nation-wide disarmament of all unauthorized arm carriers especially indigenous herders and ethnic militia men. There is also a need to tighten security at our rather porous borders as, this will curtail the influx of foreign herders into Nigeria as recently suggested by Abdullahi Ganduje, the governor of Kano State. This will give respite to the rural farmers who are confronted by the armed herders. The Federal Government, in consultation with other stakeholders such as States, Local Governments, MACBA, Farmers' associations, host communities and security agencies, should establish ranches in keeping with best agricultural practices. This will require that the country keeps to the Maputo declaration of allocating a minimum of 10% of national budget to agriculture. Kah (2017) suggested immediate, well-targeted welfare packages for households whose livelihoods have been affected in the north-east region of Nigeria. This will deter indigent members of such households from joining criminal gangs.

III. **Provision of social amenities in rural areas:** there should be conscious effort at provision of the necessary infrastructure such as electricity, potable water, good roads, schools, basic health facilities, decent shelters and more importantly, create opportunities for economic development in the rural areas. This will ensure gainful employments for the hitherto idle youths, reduce rural-urban migration and reduce the lure for crime. Ngwama (2014) suggested an equitable distribution of national resources to promote national prosperity.

IV. **Job creation and poverty reduction:** poverty and unemployment are significant elements that may lure young adults into crime (Badiora, Okunola & Ojewale, 2016). According to Aliyu (2012), the *Boko Haram* momentum is sustained by the huge reservoir of vulnerable unemployed youths in the country. The author concluded that simple measures such as provision of gainful employment opportunities, reviving the economy, and addressing the lop-sided class structure in the country would go a long way in addressing this menace. In the same vein, Etim and Nwagboso (2019) made a case for youth empowerment that is not politicized, job creation, youths' re-orientation and resource control among others as ways to check criminality.

V**. Anti-corruption war and need to reform institutions in Nigeria:** there is a need to rejig the current war against corruption. This will require a strong will and concerted effort among the three arms of government. The executive arm must allow the independence of the anti-corruption agencies such as the EFCC and the ICPC, the legislative arm must work hard to block the loopholes in the constitution that are exploited by criminals while the judiciary needs drastic reforms to ensure speedy dispensation of justice.

CONCLUSION

The challenges faced by rural farmers as a result of insurgency, banditry, kidnapping, cattle rustling and other crimes are enormous. This is undeserved, given the strategic importance of the rural sector to the nation's economy. Hence, there is a dire need for concerned stakeholders and government to curb and tackle the enablers of crime which include: poverty, unemployment, corruption and the ineffectiveness of the institutions so as to make it unappealing. A healthy, prosperous and transparently managed agricultural sector that is shielded from niggling crimes guarantees enhanced productivity, improved livelihood of rural farmers, economic growth and most importantly better security.

REFERENCES

Aderinoye-Abdulwahab, S. A., Fasanya A. A., Kareem O. W. and Dolapo T. A., (2019).

Analysis of Cattle rustling Among Pastoralists in Niger State, Nigeria. *Journal of Agricultural Research and Development. Vol. 18 No. 1.* DOI: 10.4314/jard.v18i1.5

Aliyu, M. K. (2012). Trend Analysis of Poverty and Urban Crime in Nigeria since 1999. *International Journal of Arts and Commerce, 1(2), 113-128*

Ani, N. A., Olajide, B. R. & Onyebuchi, S. I. (2019). Coverage of Agricultural Related Corrupt Practices in the Nigerian Newspapers. *Nigerian Journal of Rural Sociology Vol.18, No. 2*

Anik, A. & Bauer S. (2016). Impact of Corruption on Farm Production and Profit. *Russian Journal of Agricultural and Socio-Economic Sciences, 2(14).* https://www.researchgate.net/publication/286262760.

Asiru, M. A., Agada I.G.& Kolade O., (2018). Impacts of Rice Importation on Nigeria's Economy: *Journal of Scientific Agriculture, 2: 71-75.* DOI: org/10.25081/jsa.2018.v2.901.

Babagana, M., Ismail M., Mohammed B.G., Dilala M.A., Hussaini I. & Zangoma I.M., (2018). Impacts of Boko Haram Insurgency on Agricultural Activities in Gujba Local Government Area, Yobe State, Nigeria. *International Journal of Contemporary Research and Review* ISSN 0976–4852. December, 2018|Volume 09|Issue 12|

Badiora, A., Okunola O. H. & Ojewale O. (2016). Crime Statistics in a Nigerian Traditional City: A Geographic Analysis. *Journal of Asian and African Studies 1–15 2014*. DOI: 10.1177/0021909614552917

Bashir, M. (2014), Hopes for an End to Cattle Theft. Daily Trust, 4thSeptember. Retrieved from: www.dailytrust.com.ng/daily/feature/33468-hopes-for-an-end-to-cattle-theft.

Bello, I. & Jamilu, M., (2017). An Analysis of the Causes and Consequences of Kidnapping in Nigeria. *International Association of African Researchers and Reviewers 2006-2017.* FRREV Vol. 11 (4), Serial No. 48, DOI: http://dx.doi.org/10.4314/afrrev.v11i4.11

Chiluwa I. & Chiluwa I. M., (2020). "Deadlier than Boko Haram": Representations of the Nigerian Herder-farmer Conflict in the Local and Foreign Press. *Article in Media War & Conflict.* Feb. 2020. DOI: 10.1177/1750635220902490

Durkheim, E. Theoretical Perspectives on Society. Chapter in: Introduction to Sociology. pp. 86–97. Available at: https://courses.lumenlearning.com/sociology/chapter/theoretical-perspectives-on-society/

Ekezie, C. (2019). Farmers Say Banditry, Kidnapping Wiping out Family Income in Northwest. NNN Nigeria News. Available at: https://nnn.com.ng/farmers-say-banditry-kidnapping-wiping-out-family-income-in-northwest/

Eneji, M. A., Babagario, B. & Eneji, A. G., (2019). The Effects of Insecurity on Agricultural Productivity in Nigeria: The Case Study of Gombe State. *Sumerianz Journal of Business Management and Marketing.* Vol. 2(6). pp. 59-69. Available at: https://www.sumerianz.com/pdf-files/sjbmm2 (6)59-69.pdf

Enobi, A. L. & Johnson-Rokosu, S.F., (2016). 'Terrorism Financing: The Socio-Economic and Political Implications of Boko Haram Insurgency in Lake Chad Basin'. *Academic Journal of Economic Studies* 2 (1): pp. 25–41.

Etim, E. & Nwagboso C., (2019). Identifying Major Causes, Effects and Approaches to Curbing Crimes in South-Western Nigeria. *International Journal of Scientific and Engineering Research* · Vol. 2(3). May-June 2019. ISSN: 2581-7175

Food and Agricultural Organization. (FAO), (2018). Small Family Farms Country Factsheet Nigeria FAO, 2018 19930EN/1/06.18. Retrieved from https://fscluster.org/sites/default/files/documents/i9930en1.pdf

Iyer, L. & Topalova, P. (2014). Poverty and Crime: Evidence from Rainfall and Trade Shocks in India. Harvard Business School. https://hbswk.hbs.edu/item/poverty-and-crime-evidence-from-rainfall-and-trade-shocks-in-india

Johnson, D. (2017). Herdsmen Took Turns to Rape Me in my Farm. Vanguard of Aug 17. Retrieved from: https://www.vanguardngr.com/2017/08/herdsmen-took-turns-rape-farm/

Kah, H. K. (2017). 'Boko Haram is Losing, but so is Food Production': Conflict and Food Insecurity in Nigeria and Cameroon Africa Development, Vol. XLII, No. 3. pp. 177-196. *Council for the Development of Social Science Research in Africa, 2017* (ISSN: 0850 3907)

Kauka, E. O. (2018), Family as Education Unit 4813. *Researchjournali's Journal of Education.* Vol. 6(12) December, 2018. ISSN 2347-8225

Lenshie, N. E. & Yenda, H. B., (2016). Boko Haram Insurgency, Internally Displaced Persons and Humanitarian Response in Northeast Nigeria. *The International Journal of*

Humanities & Social Studies (ISSN 2321 – 9203) Vol. 4(8).pp. 141-150. Available from: https://www.researchgate.net/publication/307582949

Maiyo, K. J. and Jyoti B. (2011). Education and Poverty, Relationship and Concerns. A Case for Kenya. Problems of Education in the 21st Century Volume 32, 2011 72-85

McCarthy, B. & Chaudhary A., (2014). Rational Choice Theory and Crime. Published as Chapter in Brunisma, D. and D. Weisburd (Eds) 2014. *Encyclopedia of Crime and Criminal Justice.* Springer. https://www.researchgate.net/publication/318983859

Mercy Corps. (2015). Economic costs of Conflict in Nigeria. https://www.mercycorps.org/research/economic-costs-conflict-nigeria.

Metu, A., Kalu C. & Maduka O., (2018). Analysis of Crime Rate and Economic Growth in Nigeria: The Institutional Challenges and Way Forward. *Journal of Economic Studies © 2018* Published by Department of Economics NAU, Awka. JES Vol. 15(1), 2018. Available at: https://ssrn.com/abstract=3386596

Musa, S. D., Shabu T. & Igbawua M. I., (2014). Resource Use Conflict between Farmers and Fulani Herdsmen in Guma Local Government Area of Benue State, Nigeria. Retrieved from: https://www.researchgate.net/publication/272510966_resource_use_conflict_between_farmers_and_fulani_herdsmen_in_Guma_local_government_area_of_Benue_state_Nigeria.

Ngwama, J. C., (2014). Kidnapping in Nigeria: An Emerging Social Crime and the Implications for the Labour Market. *International Journal of Humanities and Social Science. Vol. 4 No. 1; January2014*

Nkombo, N., (2018). Three Ways the African Union Can Fight Corruption in Agriculture, and Win**.** *FarmingFirst.* A global coalition for sustainable agricultural development. https://farmingfirst.org/2018/01/three-ways-the-african-union-can-fight-corruption-in-agriculture-and-win/

Okogba, E., (2020). Tackling Nigeria's Rape Crisis. Vanguard News Editorial. June 18, 2020. Available at https://www.vanguardngr.com/2020/06/tackling-nigerias-rape-crisis/

Okoli, C. A. I. (2019). What Can be Done to Fight Rural Banditry in Northern Nigeria? The Conversation. Retrieved from: https://theconversation.com/what-can-be-done-to-fight-rural-banditry-in-northern-nigeria-122776

Ozoani, S. E. (2019). Appraisal of Agricultural Programmes in Nigeria. *International Journal of Innovative Agriculture & Biology Research* 7(1):86-94, Jan.-Mar., 2019. Available at: https://seahipaj.org/journals-ci/mar-2019/IJIABR/full/IJIABR-M-10-2019.

Samuel, H. (2020). PAN: Group Protests Kidnapping of Farmers in Oyo, Calls for Urgent Intervention. *AgroNigeria News.* Available at: https://agronigeria.ng/2020/06/02/pan-group-protest

Ucha, C. (2010). Poverty in Nigeria: Some Dimensions and Contributing Factors. *Global Majority. E-Journal,* 1(1), pp. 46-56

ASSESSMENT OF THE USE OF AGRICULTURAL AND NON-FARM INCOME GENERATING SKILLS AMONG WOMEN FARMERS IN KADUNA STATE, NIGERIA

[1]Bidoli, T. D., [2]Abiyong, P. A. and [3]Mudiare, P. N.
[1]National Agricultural Extension and Research Liaison Services (NAERLS), Ahmadu Bello University, Zaria. Nigeria.
[2]Department of Agricultural Economics and Extension, Faculty of Agriculture, Kaduna State University (KASU), Kafanchan Campus, Nigeria.
[3]Department of Sociology, Faculty of Social Sciences, Ahmadu Bello University, Zaria. Nigeria.
Correspondence contact details: bidolitd@gmail.com; +234 803 284 6023

ABSTRACT
Despite women's contributions to agriculture and rural development in Nigeria, there are constraints militating against their use of skills for effective participation in agricultural and income generating activities. This paper assessed use of agricultural and non-farm income generating skills among women farmers in Kaduna State, Nigeria. Data were collected from purposively selected 160 women farmers that were exposed to agricultural and income generating skills development across three Senatorial Zones of Kaduna State. Data were analyzed using descriptive statistics, basically frequency, percentages and weighted means. Results reveal that 91.3% of women farmers were between the ages of 26-45 years; 95.0% had 1-7 years of experience; 98,8% were members of an association, while only 28.8% had extension contact. Common agricultural skills acquired were sheep and goat rearing (78.8%), local chicken production (75.0%) and post-harvest processing and marketing (52.5%). Other income generating skills were Jelly (vasellin) making (97.5%), soap/detergent (94.8%) and condiments/spices (51.3%). Weighted mean scores of women perceived satisfaction in the use of agricultural and income generating skills showed Jelly making (1st), Soap/detergent making (2nd), local chicken production (3rd), sheep/goat production (4th) and condiment/spices processing (5th) to be satisfactory. Ranked constraints of women in the use of skills revealed chemical spoilage (1st), pest/disease outbreak (2nd), high cost of materials (3rd), inadequate capital (4th) and poor product packaging (5th). Conclusion was that through their participation in income generating activities, women farmers in Kaduna State were actively contributing to their economic needs, those of their families and communities from farm and non-farm incomes. It was recommended that extension services and financial support be provided to women farmers.
Keywords: Agriculture, Income generation, Women Farmers, Nigeria.

INTRODUCTION

Issues of women's participation in agriculture and rural development sector has dominated the interests of researchers and donor agencies across the globe because of the role women play in enhancing household livelihood activities. Fundamentally, it is believed that agricultural development must address gender issues in order to achieve significant impact in the reduction of hunger and poverty. This can be achieved if opportunities for women to participate in income generating activities, learning and decision-making processes continue to increase (Bill and Melinda Gates Foundation, 2008). Studies revealed that African women perform about 90% of the work of hoeing and weeding, processing of food crops; about 80% provide household water and fuel; 95% of the work of marketing food crops; about 80% of the work of food storage and transportation from the farm to the village; and 60% of harvesting (Quisumbing, Lynn, Hillary, Lawrence and Christies, 1995; Ademilua, Adeeko, Gbotoso, Akomolafe and Ishola, 2017). According to Lambrou and Piana (2006), women are faced with various roles in society including productive and reproductive engagements. Productive roles are those that women perform for generating income towards enhancing households' livelihood.

In Nigeria, despite the contributions of women to national agricultural production which enhances agricultural development, there are constraints militating against their use of skills for effective participation in agricultural and income generating activities. Studies have shown that in the effort to ensure household food supply and income, a substantial burden fall on women. Women particularly are responsible for processing, storing and preparing of family food (Olayiwole, 1984; Adewale, 2015). Rural women also fetch water and firewood for family use, in addition to being engaged as farm laborers as well as waged labors in other income generating activities. Furthermore, women are responsible for livestock and fisheries production, food processing and marketing to generate a substantial proportion and sometimes even all of their family needs. According to Auta (2004), women in Nigeria produce, process and market about 80% of food, run 70% of all small-scale enterprises and about 30% of all smallholder households are sustained by them. Besides working on farms, women in Nigeria as elsewhere in West Africa actively participate in non-agricultural activities such as crafts, tie and dye, weaving and spinning, food processing, retail trade and other home-based informal activities (Lawson, 2008). Thus, according to CTA (2014a), empowering and investing in rural women has been shown to

significantly increase productivity, reduce hunger and malnutrition and improve rural livelihoods for everyone. However, women in Nigeria today are excluded from certain occupational categories due to formal barriers such as lack of education, technical training, labor laws and trading customs and informal barriers such as traditional customs and religious practices, difficulty in combining domestic and other related farm and income generating activities. These barriers continue to hinder women entry into such important occupational categories (Lawson, 2008; Adewale, 2015). Furthermore, CTA (2014b) reported that because of cultural attitudes, discrimination and a lack of recognition for their role in food production, women enjoy limited to no benefits from extension and training in new crop varieties and technologies. Other studies have also stressed that extension and advisory services provision in the agricultural sector has been more often biased against rural women farmers as they often lack access and control over productive resources and technologies that are affordable and appropriate to their needs. Though the benefits of improving conditions for women are many, it is particularly believed that increasing their share of household income has broad benefits for improved rural livelihoods. The general objective of this paper was to assess the use of agricultural and income generating skills among women farmers. Specifically, the paper aimed to:

1. describe the socio-economic characteristics of women farmers;
2. identify the types of agricultural and income generating skills acquired;
3. ascertain the level of women farmers' satisfaction with the use of acquired skills and
4. identify constraints encountered by women farmers in the use of agricultural and income generating skills.

METHODOLOGY

The study was conducted in Kaduna State, Nigeria, which lies between latitude 11° 32' and 09° 02' north of the Equator and longitude 08° 50' and 06° 15' east of the prime meridian (Kaduna State Statistics Year Book, 1996). The State is made up of twenty-three (23) Local Government Areas (LGAs) delineated into three Senatorial zones with a population of about 6,113,503 million people in 2006 (NPC, 2006) and 470,000 farm families (APMEU and NAERLS, 1999). Based on these figures, the 2017 population was projected at about 8,471,559 people comprising of 644,013 farm families. The study population was women farmers who were exposed to agricultural and other income generating skill trainings across the three senatorial zones of Kaduna State by IITA/SARD-SC and NAERLS/WAAPP Projects. A multi-stage sampling procedure was adopted. The first stage used purposive selection of three Local Government Areas (LGAs) in three Zones of Kaduna Agricultural Development Project (KADP) namely: Giwa LGA from Maigana Zone, Birnin Gwari LGA from Birnin Gwari Zone and Jama'a LGA from Samaru Kataf Zone. These LGAs were selected because of their prominence in both farm and non-farm income generating activities and also the presence of skills training centers targeted at women. In the second stage, a total of 318 women farmers that had received both farm and non-farm income generating skill trainings were identified: Giwa LGA (160), Birnin Gwari LGA (60) and Jama'a LGA (98). Fifty percent (160) of the identified women farmers in each LGA were selected as samples for data collection using simple random sampling method. Structured questionnaire was administered through oral interview for data collection between the months of February and May 2017. Data were analyzed using frequencies, percentages and weighted mean scores. Women perception was measured using a 3-point Likert scale. Weighted mean score was calculated for each skill and compared with a standard mean score of 2.0. Thus, any skill with a weighted mean score equal or greater than 2.0 was accepted as satisfactory and hence a basis for the ranking of skills.

Operationalization of variables

Age: It was the chronological age of the respondents in completed number of years at the time of investigation. **Marital status:** Respondents were required to indicate if they are single, married, divorced or widowed. **Household size:** It was the total number of persons living in a household at the time of investigation. **Educational level:** It was the extent of formal education undergone by a respondent, captured as: No formal education, Qur'anic, Primary, Secondary and Tertiary education. **Primary occupation:** This is a respondents major livelihood activity, captured as farming, trading, civil servant and others (sewing, knitting). **Experience:** It was the number of years completed for farming or non-farm enterprises as at the time of research. This was measured in years of active participation in such activities. **Membership of association:** This was a respondent' membership of social groups as indicated by Yes or No. **Extension contact:** This indicates whether has any form of access to extension workers after receiving skill training as indicated by Yes or No. **Farm income generating skills:** This was captured as the skills in farming activities that women participate in which generate or earn income for them. **Non-farm generating skills:** These are the activities that the women carryout independent of their routine farm work that provide opportunities for additional income.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The socioeconomic profile of sampled women farmers (Tables 1a and b) reveals that majority (91.3%) were within the age bracket of 26-45 years. This implies that most women were in their more active ages. Age is thought to be associated with accumulation of skills, experience and assets thereby allowing women farmers to diversify into remunerative farm and non-farm activities (Suleiman, Olanrewaju and Abdul., 2015). Most (85.0%) of the sampled respondents were married. Since society bestows on married persons certain level of respect and responsibility, it is expected that most of the women farmers were responsible people in their communities. Nwakwasi, Nnadi, Matthews-Njoku, Adesope, Ifanyi-Obi and Njoku (2012), in an assessment of rural women's awareness of climate change reported that about 97% were married. Education and training help to unlock the natural talents and inherent enterprising qualities of individuals and enhance their abilities to understand and evaluate new production techniques (Nwaru, 2007). Women in the study area generally had low educational level as only 25.0% of them had either primary or secondary education and none had tertiary education compared to 68.8% that had Quranic education. This is in contrast with Nwakwasi et al., (2012) who reported about 72.0% of rural women to have attained both primary and secondary education. Abdulsalam, Yaro and Alobo (2010) observed that farmers' level of education is an important factor in determining their abilities to understand policies and programmes that affect farming and acceptance/adoption of agricultural innovations among other things. Lambrou and Piana (2006) observed that ability to adapt to change at the household level depends among other factors on low dependency ratio. Similarly, it has been argued that household size is associated with increased consumption expenditure which in turn reduces money that could be used for production purposes (Yildirim, 2011). In terms of household size, 72.5% of the women farmers had between 6-15 persons. This is in contrast with Ajah (2013), who reported that women farmers had household sizes of 4-6 persons; and Suleiman et al. (2015) who found out that 50% of respondents had household sizes ranging from 4-6 persons. However, in assessing the role of household members in Kolanut production in Ekiti State, Nigeria, Akinnagbe (2016) reported that about 91% of respondents' households contained between 6-15 persons.

Even though 67.5% of women reported farming as their primary occupation; 73.8% of them had 4-7 years of experience in farming or income generating activities. This implies that more women farmers had accumulated sufficient experiences which assist them in managing decisions for productive purposes. In their examination of gender roles in sustainable Palm Oil production in Imo State, Nigeria; Enwelu, Onyenkwo, Dimelu, and Nwaleiji (2016) found out that about 67% of the respondents had experiences ranging between 1-10 years.

Increasing rural women agricultural production and engaging in income generating activities could improve the quality of their livelihoods, thus the need for effective extension and advisory services (Mbo'o-Tchouawou and Colverson, 2014). Only 28.8% of women farmers had access to extension advice (Table 1). This may be due to the near dormant nature of public extension efforts being the main extension delivery system in Kaduna State. It has been reported that female have low access to extension information and technologies and have limited contact with extension; a situation which is more re-enforcing in Northern Nigeria where women cannot meet with male extension agents (Huber and Davis, 2017).

Membership of association enables farmers to solve agricultural problems such as inadequate/lack of capital, access to loans and high illiteracy levels. A total of 98.8% of the sampled respondents reported to be members of one kind of group or another. This implies that membership of groups/associations among women farmers in the study area is strong. In a study of the adoption of post-harvest technologies dissemination via women in agriculture programme in Akwa Ibom State, Nigreia, Umoh, Nkem and Ekanem (2015) reported 90% of respondents being members of associations. Ajah (2013) also reported 54% of women contact farmers were members of associations.

Table1a: Distribution of women farmers based on socio-economic characteristics (n=160)

Socioeconomic characteristics	Frequency
Age(years)	
15-25	2.5
26-35	65
36-45	26.3
46-55	5
56 and above	1.3
Marital Status	
Single	5
Married	85
Divorced	3.8
Widowed	6.3
No	1.3
Extension Contact	
Yes	28.8
No	71.3

Field Survey, 2017

Table1b: Distribution of women farmers based on socio-economic characteristics (n=160)

Socioeconomic Characteristics	Frequency
Educational Level	
No formal Education	6.3
Quranic	68.8
Primary	21.3
Secondary	3.8
Tertiary	0
Household Size (Number of persons)	
1-5	21.3
6-10	60
11-15	12.5
16-20	3.75
21-25	2.5
Experience (Years)	
1-3	21.3
4-7	73.3
8-10	5
Primary Occupation	
Farming	67.5
Trading	25
Civil servant	1.3
Others (sewing, knitting)	6.25
Membership of Association	
Yes	98.8
No	1.3

Field Survey, 2017

Acquired agricultural and non-farm income generating skills by women farmers

Table 2 presents the distribution of sampled women based on the agricultural and income generating skills acquired. Women reportedly acquired six agriculture related skills and four income generating skills. A total of 97.5% of women acquired skills in Jelly (Vaseline) making nd while 93,8% of the women learnt soap making. Also, 78.8% acquired skills in sheep and goat rearing and while 75.0% did in local chicken production. Other important skills acquired were post-harvest food processing and marketing (53%), condiments (spices) making (52%) and tie and dye (43%). This indicates that the most important income generating skills acquired in both farm and non-farm activities are mostly jelly/soap making and livestock production. The least skills acquired were in the areas of fish production (7.5%) and petty trading (10%). This finding is in contrast with Shuaibu, Akinola, Yusuf and Udo (2015) who found that the most important income generating activities to be trading (40%) and farming (17%). Ajani and Igbokwe (2012) also reported that women income activities were particularly common in petty trading as a result of low capital to start and operate.

Table 2: Distribution of Women farmers based on acquired agricultural and non-farm income generating skills (n=160).

Skill	Percentage*
Crop production	38.8
Post-harvest processing and marketing	52.5
Sheep and Goat rearing	78.8
Local chicken production	75
Fish production	7.5
Soap making	93.8
Jelly making	97.5
Condiments (Spices) making	51.3
Tie and Dye	42.5
Petty trading	10.0

***Multiple responses**
Field Survey, 2017

Perceived satisfaction in the use of agricultural and non-farm income generating skills

Table 3 presents a ranking of women perceived satisfaction in the use of agricultural and income generating skills. The result reveals that women were most satisfied with using Jelly (Vaseline) making (1st), Soap making (2nd) and Local chicken production skills. Other important and significant skills used and satisfied with were Sheep and Goat production (4th) and Condiments (Spices) making (5th). Tie and Dye and Fish production skills were not rated satisfactory implying that women were not satisfied with the use of those skills. Since most of the women's primary occupation was farming, it implies that women in the study area were more satisfied with using non-farm income generating skills during off-farming seasons.

Table 3: Distribution of women farmers based on perceived satisfaction in the use of agricultural and non-farm income generating skills (n=160).

Skill	Not satisfied	Partially satisfied	Fully satisfied	Weighted Mean Score	Ranking
Soap Making	3.8	10	86.2	2.8*	2nd
Jelly making	1.2	8.8	90	2.9*	1st
Condiments (Spices)	21.1	12.5	66.2	2.5*	5th
Tie and Dye	11.2	30	58.8	1.3	7th
Goat and Sheep production	12.5	12.5	75	2.6*	4th
Local Chicken production	7.5	16.2	76.2	2.7*	3rd
Fish production	41.2	33.8	25	1.8	6th

Mean Score=2.0
*** Significant**
Field Survey, 2017

Constraints in the use of agricultural and income generating skills by women farmers

Women constraints in the use of agricultural and income generating skills were assessed and ranked (Table 4). The most important constraints were chemical spoilage (1st), pest/disease outbreak (2nd), high cost of materials (3rd), inadequate capital (4th) and poor packaging of products (5th). The least constraints were low patronage and low self-confidence. Ajah (2013) observed that despite women' involvement in income generating activities both at the farm and non-farm levels, they have continued to attain low productivity and income; arising from the fact that women are faced with constraints that impede enhancement of their income generating capabilities. Shuaibu, et al. (2015) found inadequate capital (32%) and storage facilities (22%) and poor market (24%) as major constraints reported by women in their study. Onwurafor and Enwelu (2013) also reported limited capital as a constraint to their respondents.

Table 4: Distribution of women farmers based on constraints in the use of agricultural and non-farm income generating skills (n=160)

Constraint	Percentage *	Rank
Chemical Spoilage	35	1
Pest/Disease outbreak	31.3	2
High cost of materials	18.8	3
Inadequate capital	8.8	4
Poor packaging	6.9	5
Theft of livestock/fish	5.0	6
Inadequate/lack of fertilizer	5.0	7
Low self confidence	3.8	8
Low patronage	3.8	8

*** Multiple responses**
Field Survey, 2017

CONCLUSION

Even though women farmers experienced a number of constraints in the use of agricultural and non-farm income generating skills, the study established that women farmers were perceived to be satisfied in the use of agricultural and income generating skills for five out of the seven skills considered; indicating that women play vital roles in income generating processes both from the farm and non-farm activities. This implies that the participation of women in farm and non-farm income generating activities is indispensable and has a potential to ensure not only the survival of their individual families but for the maintenance of a wider livelihood system. Thus, it can be concluded that women farmers in Kaduna State were actively contributing to their economic needs, those of their families and communities through farm and non-farm incomes.

RECOMMENDATIONS

1. The major constraints of pest/diseases outbreaks and chemical spoilage, requires that Kaduna State Government should recruit and train female extension agents to improve extension and advisory services to women farmers. This will enhance women decision making abilities for addressing production constraints.
2. Since most of the women farmers are organized into groups, it is recommended that government, financial institutions and NGOs provide financial support to these women groups in the form of grants or revolving loans to address the challenges of inadequate capitals and high cost of materials.
3. Participation of women in both farm and non-farm income generating activities is indispensable, government policies towards agricultural development should not only be targeted to producing farmers (especially male farmers). Rather a more holistic policy should be involved that includes the whole value chain.

REFERENCES

Abdulsalam, Z; Yaro, A.M. and Alobo, A.J. (2010). Assessment of the Level of Awareness on Climate Change in some selected Local Government Areas of Jigawa State, Nigeria. In Nmadu et al. (Eds). Proceedings of the 11th Annual National Conference of the National Association Agricultural Economists held at Federal University of Technology, Minna, Niger State, Nigeria. 30th November-3rdDecember : 59-68.

Ademilua, O. S., Adeeko, A., Gbotoso, O. A., Akomolafe, A. M. and Ishola, O. O. (2017). Emerging Roles of Women in the National Food Security Campaign of the Federal Government of Nigeria: A Review. Continental Journal of Sustainable Development. 8(2):1-7. DOI: 10.5281/zenodo.998937 Accessed 5th December, 2017

Adewale, E. T. (2015). Assessment of Women Participation in Agricultural and Skill acquisition activities in two NAERLS Adopted Villages in Kaduna State, Nigeria. Unpublished Project Submitted in Partial Fulfillment of the Requirement for the Award of Higher National Diploma in Agricultural extension and Management. Department of Agricultural Extension and Management, Samaru College of Agriculture, Division of Agricultural Colleges, Ahmadu Bello University. 51pp.

Agricultural Project Monitoring and Evaluation Unit (APMEU) and National Agricultural Extension and Research Liaison Services (NAERLS) (1999). 1997/98 Dry Season Crop Performance Report, Kaduna, Nigeria.

Ajah, J. (2013). Factors Hindering the Participation of Women Farmers in Women in Agriculture Program in South Eastern Nigeria. In: "Transforming Nigerian Agriculture through Agricultural Extension". Proceedings of the 17th Annual National Conference of the Agricultural

Extension Society of Nigeria (AESON). 5-9 May :33-38.

Ajani, E.N. and Igbokwe, E.M. (2012). Promoting entrepreneurship and diversification as a strategy for climate change adaptation among rural women in Anambra State. Nigeria. Journal of Agricultural Extension. 16(2):61-71

Akinnagbe, O. M. (2016). Role of Household Members in Kolanut Production and Marketing in Ekiti State, Nigeria. Journal of Agricultural Extension. 20(2):44-58.

Auta, S. J. (2004). Performance of Women Groups in Agricultural Activities in Kaduna State. Unpulished Ph.D Thesis, Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria. Nigeria. 126pp.

Bill and Melinda Gates Foundation (2008). Gender Impact Strategy for Agricultural Development.

Technical Center for Agricultural and Rural Cooperation (CTA). (2014a). Revolutionizing Finance for Agr-Value Chains. Brussels Rural Development Briefings. A Series of Meetings on ACP-EU Development Issues. Briefing No. 35. Wageningen: CTA. 44pp.

Enwelu, I.A; Onyenkwo, D.U; Dimelu, M.N. and Nwaleiji, H.U. (2016). Gender Roles in Sustainable Palm Oil Production in Imo State, Nigeria. Journal of Agricultural Extension. 20(2):249-261.

Huber, S. and Davis, K. (2017). Nigeria: In-depth Assessment of Extension and Advisory Services. Developing Local Extension Capacity (DLEC) Project. 64pp.

Kaduna State Statistical Year Book, (1996). Kaduna state. Kaduna: Ministry of Finance and Economic Planning, Statistics and Research Development Edition.

Lambrou, Y. and Piana, G. (2006). Gender: The Missing Component of the Response to Climate change. USA. Food and Agricultural Organization.

Lawson, O. I. (2008). Female Labour Force Participation in Nigeria: Determinants and Trends. Oxford Business Conference Meeting, Oxford, United Kingdom. June 22-24.

Mbo'o-Tchouawou, M. and Colverson, K. (2014). Increasing access to agricultural extension and advisory services: How effective are new approaches in reaching women farmers in rural areas? Nairobi, Kenya. International Livestock Research Institute (ILRI). 13pp.

National Population Commission (2006). Report of the 2006 Census Final Results. Federal Republic of Nigeria Official Gazette. 96(2):30-31.

Nwakwasi, R.N; Nnadi, F.N; Matthews-Njoku, E.C; Adesope, O.M; Ifanyi-Obi, C.C. and Njoku, P.C. (2012). Assessment of Rural Women's Awareness of Climate Change Adaptation Strategies in Aboh-Mbaise Local Government Area, Imo State. In: "Agricultural Extension Strategies for Climate Change Adaptation". Proceedings of the 17th Annual National Conference of the Agricultural Society of Nigeria (AESON). 11-14 March : 272-280.

Nwaru, J.C. (2007). Gender and Relative Technical Efficiency in Smallholder Arable Crop Production in Abia State, Nigeria. Integrated Journal of Agriculture and Rural Development. 10(12):25-34.

Olayiwole, C.B. (1984). Women' Role in Agriculture and Economic Development in Africa: The Case of Nigeria. Paper presented at the Seventeenth Annual Seminar on Political Change and Development in Africa. Southern University, Baton Rouge, Lousiana. April 12 :1-11.

Onwurafor, E.U. and Enwelu, I.A. (2013). Rural Women Entrepreneurship in Agro-food processing in Enugu State, Nigeria. International Journal of Research in Applied, Natural and Social Sciences (IJRANSS).1(2):13-30.

Quisumbing, A; Lynn, R.B; Hillary, S.F; Lawrence, H. and Christies, P. (1995). Women: The key to food security. International Food Policy Research Institute (IFPRI), Washington DC.

Shuaibu, H; Akinola, M.O; Yusuf, H.O. and Udo, I.D. (2015). Income generating Activities among Rural Women in Ikot Ekpene Local Government Area, Akwa Ibom State, Nigeria.In: Agricultural Extension and Sustainable Family Farming in Nigeria. Proceedings of the 20th Annual National Conference of the Agricultural Society of Nigeria (AESON). 15th-17thMay : 102-112.

Suleiman, R; Olanrewaju, T.O. and Abudu, S. (2015). Socio-Economic Factors Affecting Goat Production among Rural Households in Kaduna South Local Government Area of Kaduna State, Nigeria. In: Agricultural Extension and Sustainable Family Farming in Nigeria. *Proceedings of the 20th Annual National Conference of the Agricultural Society of Nigeria (AESON)*. 15th-17thMay, 2015. Pp 180-190.

Technical Center for Agricultural and Rural Cooperation (CTA) (2014b). CTA Gender Strategy. Accessed at www.cta.int on 25th May 2016

Umoh, I.U; Nkem. K.K. and Ekanem, J.T. (2015). Adoption of Post-Harvest Technologies Disseminated via Women in Agriculture Program in Imo State, Nigeria: Issues in Extension Practices. In: Agricultural Extension and Sustainable Family Farming in Nigeria. Proceedings of the 20th Annual National Conference of the Agricultural Society of Nigeria (AESON). 15th-17th May: 34-45.

Yildirim, I. (2011). Comparative Profitability and Economic Efficiencies between Native and Culture-breed Cattle Fattening in Eastern Part of Turkey. Pakistan Journal of Biology Sciences. 9:1061-1067

STRESS MANAGEMENT STRATEGIES AMONG ARABLE CROP WOMEN FARMERS IN AYEDAADE LOCAL GOVERNMENT AREA OF OSUN STATE

[1]Adeniyi, R. T. and [2]Adebayo, O. O.
[1]Department of Agricultural Economics & Extension, Ajayi Crowther University, Oyo, Oyo state.
[2]Department of Agricultural Extension & Rural Development, Ladoke Akintola University of Technology, Ogbomoso, Oyo state.
Correspondence contact details: rt.adeniyi@acu.edu.ng; 08027640111

ABSTRACT
Stress is one of the challenges facing the agricultural sustainability of arable crop women farmers in developing nations hence, the need for coping mechanisms that will keep them in the enterprise. This study investigated stress management strategies, socioeconomic characteristics, types of farming activities, sources of stress among arable women farmers in Ayedaade Local Government Area of Osun State, using interview schedule. A three-stage sampling procedure was used to select 120 respondents. Data were analysed with descriptive (percentages, mean and weighted score) and inferential (Chi–square and PPMC) statistics at α0.05. Results show that the mean age and years of farming experience were 41.07 and 19.42 years respectively; with farm size of 1-2 hectares (67.5%). The farming activity mostly engaged in by the respondents was thinning (Weighted Mean (WM) 3.65). Respondents' sources of stress (domain basis) were financial (deciding when to sell -WM 2.0); weather (prolonged adverse weather -WM 2.43); work related (machinery breakdown -WM 2.3); health (long term health problem -WM 2.72); and other people (being under a lot of pressure -WM 2.13). The stress management strategies deployed included financial (prioritizing financial activities -WM 2.71); weather (seeking extension agent support -WM 3.0); work related (relaxation with family and friends -WM 2.56); health (taking balanced diet -WM 3.29); other people (talk about worries with family and friends -WM 2.56). Significant relationship existed between farmers' age (r = -0.582), marital status ($\chi 2$ = -56.50), household size (r = -0.523), farm size (r = -0.221), sources of labour ($\chi 2$=162.92), years of farming experience (r = -0.667) and stress management strategies. The prevailing stress coping strategies should be encouraged to sustain the arable women productivity.
Keywords: Sources of stress, farming activities, sustainable agriculture and stress coping strategies

INTRODUCTION

Stress is one of the challenges militating against the sustainable development of Agriculture in developing countries especially among the arable crop women farmers. Studies have shown that women's role in Agriculture cannot be over emphasised as they have been involved in the production of arable crops across the value chain; which is an indication that women are indispensable in food production circle (Amayo, Akidi, Esuruku, and Kaptui, 2021; Adeniyi and Yekinni, 2020). Added to this agricultural productive role is the reproductive responsibility of women (mother and wife) in their household. In addition, women of all ages (rural women inclusive) have been said to carry out several roles in their immediate communities. The women's traditional responsibility to their household includes being; a chief chef, a dry cleaner, a nurse and emotional care giver, family supporter and home makers among others (Cleveland Clinic, 2020 and World Bank Group, 2017). Furthermore, studies have made it known that arable women farmers are always busy all year round with differs livelihoods especially at the off season; though with the aim of meeting their home's financial engagements for the life essentials like food, clothing and shelter (World Bank Group, 2017). The above-mentioned routines of arable women in rural communities have been a necessity for the upkeep of their households especially for women who happens to be the bread winner. However, to carry out these tasks there is every possibility that women's wellbeing might have been psychologically or physiologically disturbed (Shutske, 2020 and Riti and Sankar, 2020).

Over the past years, the farming community, especially the arable farmers including women has been experiencing a high level of uncertainty, frustration and challenges like high fluctuation in prices of agricultural inputs, high interest rate on loans, breakdown of farm tools and implements, kidnapping, tension or emotional pain, climate change, farm land insecurity, poor marketing information, health dangers, poor flow of agricultural information and financial problems among others (Better health channels, 2019). However, with farming ranking as one of the nation's most stressful activities especially at the subsistence level where most rural women operate; and coupled with lots of daily home making activities/responsibilities they cannot shy away from, stress is inevitable for them (Olowogbon, Yoder, Fakayode, and Falola, 2019). Naturally, women are endowed with the ability to carry out two or more activities at a time (multitasking) which makes many rural women to work round the clock and may fail to take a brief moment to rest during the day. These set of the rural women might be faced with a lot of stress to cope with the tedious and time demanding arable farming and hence might have been over-laboured and might have starved some of the organs and systems of their body (Riti and Sankar, 2020 and Jean and Karbowski, 2020). Hence, these pressures might result into rural women's mental, psychology and emotional stress at a given period. However, the inability of rural

women to meet up with the traditional responsibility expected of them may likely create a feeling of frustration or not being fulfilled in them. These moods might be expressed in form of anger, depression, and nervousness among others. Being in such disposition for a longer period might result into several health challenges like raised blood pressure, changes in the response of immune system, increase rate of heart beat, inactiveness of digestive system and high sugar level among others (Shutske, 2020 and Bishopp, 2020). The continuous manifestation of the above may lead to constant experience of headache, pain in the chest, heart attack, stomach upset, stroke, sleeplessness, suicide among others. Conversely, the sources/causes of rural women's stress might be societal (conflicts), environmental (climate change, bad roads, unfavourable market prices, poor market for farm harvest), workplace and from the home (anger, frustrations) and could be physically (profuse sweating and difficult breathing), emotionally (panic and grief), cognitively (poor decision making and suspiciousness) and behaviorally (restlessness and loss of appetite) manifested (Better Health Channels, 2019).

In Nigeria today, Olowogbon *et al*, (2019) and Jean and Karbowski, (2020) asserts that the unstable economic situations of a nation may lead her citizen to be operating in a tensed environment (stress). Hence a lot of people including rural arable crop women would be looking for means to manage the stress with the motive of adjusting, escaping, avoiding, enduring, reducing or finding a lasting solution to a particular stressor or undesirable events around them. However, for rural arable women to be able put the stressors under control at a given period of time, there must be awareness, acceptance and control of sources or causes of stressor. Hence, this study ascertained the socioeconomic characteristics of the respondents, examined the types of farming activities engaged in by the respondents, sources of stress and respondents' stress management strategies. It was hypothesised that no significant relationship existed between selected socio-economic characteristics of the respondents and stress management strategies used.

METHODOLOGY

The study was conducted in Ayedaade Local Government Area of Osun State. The LGA is notable with large agricultural production of food crops and two major food market (Olufi and Gbongan central market) which engaged about 75.8% of women in the area (Adetunji, 2020). A three stage sampling procedure was employed to select respondents for this study. The first stage involved the simple random selection of two of the three district areas in the Local Government Area. The selected districts were Orile-Owu and Ode-Omu. The second stage involved the simple random selection of three villages from the selected districts. The selected villages in Orile owu district were Abinu Alakinde, Afonle and Aalagbede; while Aba Dorcas, Abewela and Awaye were selected from the Ode-Omu district. The third stage involved the simple random selection of 20 arable crop women Farmers in each of the selected villages, giving a sample size of 120 respondents. Data were collected using interview schedule; and analysed with descriptive (Percentages, weighted mean score and Rank) and inferential (PPMC) statistics at α0.05.

Respondents' socioeconomic characteristics were measured both on nominal (Marital status) and interval level (age, household size, farm size, and years of farming experience) as the case dictates. Ten types of possible farming activities such as thinning, seed treatment and weeding among others were measured using the scale of Never, Rarely, Often and Always with the response options of 0, 1, 2 and 3 respectively. Respondents' five possible domains of sources of stress (Financial stressor (FS), weather (WTHS) stressor, Health stressor (HS), Work related stressor (WKS) and Other People related stressor (OPS)) were measured using the scale of to a large extent, to a lesser extent and Not at all with the response scores of 2, 1 and 0 respectively. The respondents' five possible domains of Stress management strategies (Financial, weather, work related, health and other people) were captured using the response option of Never, Rarely, Often and Always with the score of 0, 1, 2 and 3 respectively

RESULTS AND DISCUSSION

Table 1 shows that 82.3% of the respondents were married with mean age and household size of 41.07 years and 5.73 persons respectively. Also, 65.5% of them do personally source found for their enterprise with mean years of farming experience and farm size been 17.92 years and 2.58 hectares respectively; while 56.7% of the respondents do employed hired labourer for their enterprises. This implies that the respondents were in their active age, living with their husbands and with a moderate family size. The respondents' source of found and mean farm size implies that their production was at subsistence level, though with the use of paid labourers probably with a motive to reduce stress (Adeniyi and Yekinni, 2020).

Table 1: Selected socioeconomic characteristics of the respondents

Years	Frequency	Percentage	Mean
Age			
21-30 years	26	21.6	41.07± 9.32years
31-40 years	40	33.4	
41-50 years	42	34.9	
50 years and above	12	10.1	
Marital Status			
Married	99	82.5	
Single	10	8.3	
Separated	5	4.2	
Widowed	6	5	
Household size			
1-4	33	27.5	5.73 persons
5-8	72	60.0	
9 and above	15	12.5	
Years of farming experience			17.92±11.90
1-10 years	46	38.3	
11-20 years	27	22.4	
21-30 years	19	15.8	
Above 30	28	23.1	
Farm size (Hectares)			2.58 hectares
≤ 2	92	76.7	
3-4	13	10.9	
≥4	15	12.5	
Source of Labour			
Hired	68	56.7	
Family	30	25.0	
Self	22	18.3	
Source of credit			
Personal savings	78	65.0	
Cooperative society	29	24.2	
Bank loan	7	5.8	
Friends or family relations	6	5.0	
Total	**120**	**100.0**	

Source: Field Survey, 2019

Farming activities engaged in by the Respondents

Table 2 shows that the farming activity mostly engaged in by the respondents was thinning (WM=3.65) followed by application of pesticide (WM=2.53) while land clearing activity ranked last (WM=1.56). This implies that the most activity carried out by arable women was thinning as it was not stressful when compared with the land clearing exercise that was the least activity carried out by the respondents. This further indicates that the respondents were not stressed as per the farming activities they mostly carried out. This corroborates the assertion of Mkpado and Omowole (2020) that arable women do not always participate in the stressful farming activities.

Table 2: Farming activities engaged in by the respondents

Farming operation	WM	Rank
Thinning	3.65	1st
Pesticides application	2.53	2nd
Fertilizer Application	2.36	3rd
Seed treatment	2.33	4th
Storage	2.31	5th
Ridging	2.16	6th
Processing	2.11	7th
Weed Control	1.95	8th
Harvesting	1.63	9th
Land clearing	1.56	10th

Source: Field Survey, 2019

Sources of stress to the respondents

Result in Table 3 shows that the most FS source for the respondents was the ability to take decision on when to sell their farm produce (WM=2.00) while poor sale/low commodity price (WM=1.43) was the least. This implies that respondents' sales of arable produce at the right time is germane to their enterprise which might ease the stress of poor or low arable crop prices. The result of this study corroborates the findings of Adeniyi and Yekinni, (2020) that the decision-making abilities of rural women even on the issues that is personal to them is low hence, was a major stress to the respondents. The result in Table 3 further shows that the most common WTHS experienced by the respondents was prolonged bad weather that led to delay in carrying out farm operations for the arable crops especially harvesting (WM=2.43), followed by this was reduction in yield which might be because of the prolonged bad weather (WM=2.15) while the least in this domain was pest infestation (WM=1.57). This implies that climate change was a germane stressor to arable crop farmers as the food crops grown depends on sustainable weather for uptimum productivity, since decline in agricultural output brings discouragement to farmers in many countries including Nigeria (Olowogbon, et al 2019). This was in line with the position of United Nation (2019) that female farmers do suffer crop failure which brings about stress, leads to food and livelihood insecurity as adverse effect of bad weather.

In addition, Table 3 shows that breaking down of farm machinery at the critical period of need (WM=2.3) was ranked first among the work-related stress encountered by the respondents. Followed by this was keeping up with the new technology (WM=2.01) while the least work-related stressor was the respondents' long working hours (WM=1.0). This implies that farm mechanization of the arable women could be enhanced if the farm machinery is put in place in the study area and this will reduce their stress (Mkpado and Omowole, 2020 and United Nation, 2019). On health source of stress as revealed in Table 3, long term health problems was ranked first (WM=2.72), followed by insufficient access to health facilities (WM=2.14) while personal illness during major farm operation (WM=1.56) was the least ranked health stressor. This implies that health wellbeing of arable crop women farmers need adequate attention for continued productivity as health has been said to be wealth; and stress do result into health challenges among the farmers (Shutske,2020 and Riti and Sankar, 2020). Table 3 further shows that the most prominent source of stress experienced because of other people was being under pressure (WM=2.13); next to this was difficulty in being friendly with nuclear and extended family (WM=2.0) while poor housing condition (WM=1.40) was the least ranked in the domain. This implies that people around arable farmers are important to them in their day-to-day activities as they could be a contributory factor to their stress (Olowogbon *et al*, 2019).

Table 3: Distribution of respondents' sources of stress

Sources of stress	WM	Rank
A. Financial Stressor		
Deciding when to sell produce	2.00	1st
Meeting obligations and daily necessities	1.85	2nd
Difficulties in obtaining credit facilities	1.71	3rd
Rising expenses on input	1.70	4th
Insufficient regular cash flow	1.43	5th
Poor sale/low commodity price	1.41	6th
B. Weather Stressor		
Delay in farm operation such as harvesting	2.43	1st
Reduced yield	2.15	2nd
Seasonal outbreak of disease	2.0	3rd

Sources of stress	WM	Rank
Pest infestation	1.57	4th
C. Work related		
Machinery breakdown at critical point of need	2.3	1st
Keeping up with new technology	2.01	2nd
Scarcity of Input	1.86	3rd
Travelling long distances to farm and market	1.72	4th
Insufficient farm help when needed	1.57	5th
Long work hours	1.0	6th
D. Health		
Long term health problems	2.72	1st
Insufficient access to health services	2.14	2nd
Loss of energy and constant tiredness	2.12	3rd
Loss of appetite	1.87	4th
Farm accident and injuries	1.86	5th
Decision making on health Problems	1.72	6th
Personal illness during major farm operation	1.56	7th
E. Other people related		
Being under a lot of pressure	2.13	1st
Difficulty in being friendly with nuclear and extended families	2.00	2nd
Angry and Hostility towards friends	1.72	3rd
Conflict with spouse over spending priorities	1.43	4th
Poor housing conditions	1.40	5th

Source: Field Survey, 2019

Stress management strategies employed

Table 4 shows that on the financial stressor domain, prioritizing financial obligations (WM=2.17) ranked 1st with getting farm inputs on credit (WM=2.15) ranked 2nd while borrowing money for farm work (WM=0.72) was the least coping strategy used by the respondents. This implies that respondents do deduce means of coping with financial stress militating the success of their enterprise especially ploughing back their profit as indicated in Table 1. The weather stress management strategies employed by the respondents as revealed in Table 4 was seeking extension agent support (WM=3.00), followed by this was planting of cover crops to improve the fertility of the soil (WM=2.58) while the least strategy embarked on was to plant early maturing crops (WM=1.72). This implies that the extension agents do render timely services to the respondents and has been a way out of the weather-related stress encountered (Olowogbon *et al*, 2019). Table 4 further reveals the coping strategies embarked upon by the respondents on the health stressor. Listening to health talk on Radio (WM=3.29) ranked first, which was followed by eating of balanced meal (WM=2.72) while having access to sufficient sleep (WM=1.71) was the least health coping strategies used. This implies that the respondents did not take negligence of their health domain and that ICTs has been found so relevant in providing information that aid the respondents to be resilience against the health challenges they encountered. The first respondents' health coping strategy measure taken corroborates the assertion of Adeniyi and Yekinni, 2020 that the most accessible and utilised ICTs for information by the rural women is Radio. On stress encountered on the 'other people' that surrounds the respondents, the most effective strategy employed as shown in Table 4 was to talk out their worries with their families and friends (WM=2.56) while the second strategy put in place was to get off the farming activities in order to relaxed with families and friends (WM=2.14); with the least strategies employed been possessing the positive mind of better tomorrow (WM=1.43). This suggests that the respondents coping strategies of talking to someone was the principle of problem half shared is half solved for them to be relieved with stress associated with other people; they also have the mind of brighter future which has been a motivating factor for the respondents, however, the respondents needs to be encouraged to put up the habit of having enough sleep for sound health and mind rather than making it the least coping mechanism (Jean and Karbowski, 2020; Shutske, 2020; Cleveland clinic, 2020 and Better Health Channels, 2019).

Table 4: Stress Management Strategies employed by the Respondents

Stressor Management	Weighted Mean	Rank
A. Financial		
Prioritizing financial obligations	2.71	1st
Getting input on credit	2.15	2nd
Living within one's resources all the time	2.0	3rd
Selling crop before maturity	1.5	4th
Practice mixed cropping	1.56	5th
Selling produce on stand	1.57	6th
Get support from network of caring people	1.43	7th
Borrowing of money for farm work	0.72	8th
B. Weather		
Seeking extension agents support	3.00	1st
Planting of cover crop to support soil	2.58	2nd
Seeking social support from NGO	2.29	3rd
Early planting	1.85	4th
Listen to news for weather forecast	1.86	5th
Planting early maturing crop	1.72	6th
C. Work Related		
Spending time with family and friends	2.56	1st
Deliberately avoiding stressful situations	2.42	2nd
Take time for relaxation each day	2.28	3rd
Getting commercial vehicle to transport produce	2.24	4th
Seek support and advice from friend and co-worker	2.13	5th
Use of hired labourers	1.85	6th
D. Health		
Listening to health talk on Radio	3.29	1st
Eating balance diet	2.72	2nd
Attend health educational programs	2.57	3rd
Seeking medical support	2.42	4th
Choose a diet low in fat, saturated fat and cholesterol	2.35	5th
Report any symptoms of ill health to health professionals	2.28	6th
Get sufficient sleep	1.71	7th
E. Other People as stressor		
Talking out worries with families and friends	2.56	1st
Taking timeout of the farm work to be with families and friends	2.14	2nd
Seeking support from spouse	1.99	3rd
Attending educational program	2.58	3rd
Being religious	1.99	4th
Associating socially with colleagues	1.89	5th
Seeking support and advice from friends	1.70	6th
Seeking support and advice from community members	1.68	7th
Self-Control	1.57	8th
Positive mind towards the future	1.43	9th

Source: Field Survey 2019

Relationship between selected socioeconomic characteristics of the respondents and the stress management strategies

The result in Table 5 reveals that respondents' age (r = -0.582), household size (r = -0.523), marital status ($\chi 2$=-56.50) and year of farming experience (r= -0.667) had an inverse significant relationship with the stress management practices used by the respondents. This implies that the respondents' ability to cope and manage the stress encountered on daily basis is proportional to the respondents' age, smaller household size, and lower farming experience. This might be due to the higher youth's energy, understanding and skill to cope with stress than the elderly ones (Better Health Channels, 2019). Also, the result as well depicts that the lesser the household size, the lower the level of attention needed from a woman as a mother and wife in such home; as the married woman has a lot of activities to carry out as a wife, mother and in her livelihood, hence needs a lots of coping strategies against stress. That is, the non-married arable crop farmers have a better technique of coping with stress than the married (World Bank Group, 2017). However, there is no significant relationship between respondents' source of labour ($\chi 2$= 162.92)

and the stress management strategies. This implies that sources of labour used by the respondents do not pose any stress to them (easily available) and hence needs no copping mechanism. That is, the stress management strategies were independent of the source of labour. However, the study established (Table 1) that the respondents mostly used hired labour for their farming activities.

Table 5: Relationship between selected socioeconomic characteristics of the respondents and stress management strategies used

Variables	r-value	
Age	-0.58*	
Years of farming experience	-0.67*	
Household size	-0.52*	
Farm size	-0.22*	
Variables	**χ2 value**	**Df**
Marital status	-56.50*	1
Source of labour	162.92	2

*** Significant at P≤0.05)**
Source: Field survey, (2019)

CONCLUSION

The study concluded that women arable farmers have various stressors and do adjust and adapt to them with different coping mechanisms. The study further found out that some of the factors affecting the rate of stress experienced by the respondents were age, marital status, years of farming experience, number of persons in their household and the area of land cultivated. Hence, the study recommends that Women farmers should take brief time to rest during the day in order to avoid over working. Also, government and non-governmental organizations should endeavor to organize public enlightenment for young women in the rural communities for enhanced mental health through seminars, conferences, workshops and adequate communication system on the stress management strategies. However, the prevailing stress coping strategies employed by the respondents should be encouraged to sustain the arable women productivity.

REFERENCES

Adeniyi, R. T. and Yekinni, O. T., 2020. Factors affecting Rural Women Empowerment for Information and Communication Technologies use in Southwestern Nigeria. Proceedings of the 29th Annual Congress of the Rural Sociological Association of Nigeria (RuSAN) held at Land Mark University, Omu Aran, Kwara State between 12th - 16th October, 2020. Pp 115-119

Adetunji, M. A. 2020. Travel Behaviour of Women to Markets in Rural communities in Ayedaade Local Government Area of Osun State, Nigeria, Nigeria J. Asian Rural .studies, 4(2), 202-217. Accessed 8th February, 2022

Amayo, F., Akidi, I. L., Esuruku, R. S. and Kaptui, P. B. 2021. Farming methods and the livelihood outcomes of women in Eastern Uganda. *Journal of Agricultural Extension and Rural Development*. 3DDE08B67504 Vol.13 (3), pp. 182-191, July 2021 https://academicjournals.org/journal/JAERD/article-full-text/3DDE08B67504. Accessed October 1st, 2021

Better Health Channels. 2019. Rural issues - coping with stress https://www.betterhealth.vic.gov.au/health/healthyliving/rural-issues-coping-with-stress. October 3rd, 2021

Bishopp, T. 2020. Stress Management for Women in Agriculture. https://countryfolks.com/stress-management-for-women-in-agriculture/ accessed 8th Feb, 20222

Cleveland Clinic, 2020. Stress: Coping With Life's Stressors https://my.clevelandclinic.org/health/articles/6392-stress-coping-with-lifes-stressors. Accessed 11th February, 2022.

Jean, M and Karbowski, E. 2020. Working women, the backbone of family farms. Michigan State University Extension-Managing Farm Stress. June 23, 2020. https://www.canr.msu.edu/news/working-women-the-backbone-of-family-farms. Accessed 8th Feb, 20222

Mkpado, M. and Omowole, O. E. 2020. Coping strategies among female farmers in Ondo State, Nigeria during recent economic recession: What factors matter? DOI: 10.2478/ats-2020-0014. AGRICULTURA TROPICA ET SUBTROPICA, 53/3, 137–147, 2020. Accessed October 20th, 2021

Olowogbon, T. S., Yoder, A. M., Fakayode, S. B. and Falola, A. O. 2019. Taming Occupational Stress among Farmers in Developing Nations-Effects of Stress on Human Health, Hülya Çakmur, IntechOpen, DOI: 10.5772/intechopen.89898.

https://www.intechopen.com/chapters/69893. October 1st, 2021

Riti, C. and Sankar, K. A. 2020. Psychological Stress and Health Hazards of Farm Women: The Social Ecology and Inflicting Functions. Journal of Education, Society and Behavioural Science 33(4): 21-32, 2020; Article no.JESBS.53826 ISSN: 2456-981X https://www.journaljesbs.com/index.php/JESBS/article/view/30215/56695. October 11th, 2021

Shutske. 2020. Farm Stress & Decision-Making During Challenging Times - What causes stress for farmers and farm families? https://farms.extension.wisc.edu/articles/farm-stress-decision-making-during-challenging-times/ Accessed October 1st, 2021

United Nation. 2019. Climate-resilient farming model helps Indian women bounce back after drought. Department of Economics and social affairs news. https://www.un.org/development/desa/en/news/sustainable/women-farmers-good-practice.html. Accessed October 1st, 2021

World Bank Group. 2017. Women in Agriculture: The Agents of Change for the Global Food System https://www.worldbank.org/en/news/feature/2017/03/07/women-in-agriculture-the-agents-of-change-for-the-food-system. Accessed October, 20th, 2021

LESSONS FROM COMMUNITY-LED WATER, SANITATION AND HYGIENE INTERVENTIONS IN SELECTED RURAL SETTLEMENTS OF OYO STATE, NIGERIA

Fadairo, O. S. and Adelakun, O.
Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Nigeria
Correspondence contact details: dairom2@gmail.com

ABSTRACT
Sustainability of Water, Sanitation, and Hygiene (WASH) interventions require a paradigm shift from the supply-driven to community-led approach. Achieving this goal requires an understanding of local efforts and challenges faced in solving their WASH-related problems. This study addressed these concerns through a case study of two affected rural communities in Ibarapa East Local Government Area of Oyo State, Nigeria. Using eight focus group discussions with 92 male and female household heads, and key informants' interviews with four community leaders, the study examined existing WASH situation and the community-led WASH interventions in the study area. Information garnered was audio-recorded, transcribed, and analysed using thematic analysis. Predominant ethnic group in the communities was Yoruba. Most were poorer than the average person. A distant stream, rainwater, and one uncompleted well were the water sources available in study locations and all had poor water quality. Open defecation was common due to the lack of modern toilets or latrines. Starvation, neighbourhood conflict, migration, skipping bathing and meals were major challenges related to WASH. Annual dredging of stream, repair of road linking the communities to the stream, enactment of laws prohibiting open defecating, and partnership with a rural development non-governmental organisation for support were major community-led WASH interventions in the study areas. Rural people tend to require external triggers or support to achieve sustainable solutions to hygiene problems. Collective community action triggered by a sense of disgust for inappropriate behaviours offers a more sustainable solution to WASH challenges.
Keywords: Rural water projects, Self-help intervention, Sanitation and hygiene, Rural poverty.

INTRODUCTION

Poor sanitation has always been associated with Africa. Unfortunately, sanitation has not received the priority it deserves in most African countries (The Guardian, 2012; Walker and Logan, 2016). It appears as not widely recognized how good sanitation policies and practices can underpin socio-economic development and environmental protection. According to Ojo (2017), Nigeria is the worst country in Africa for sanitation access due to unavailability of water for drinking and for other purposes in many homes. Access to clean and safe water is therefore key to achieving proper sanitation and hygiene. Nigeria has made substantial progress in developing policies and strategies for water supply and sanitation service delivery but faces major challenges in translating these into action. Consequently, about 70 million people, out of a population of 171 million, lacked access to safe drinking water, and over 110 million lacked access to improved sanitation in 2013 (UNICEF, 2016).

Poor hygiene and sanitation have serious implications on human's health and socio-economic wellbeing with children paying the most price in lost lives, missed schooling, in disease, malnutrition and poverty. The aforementioned is occasioned by the transfer of bacteria, viruses and parasites found in human excreta which otherwise contaminate water resources, soil and food (WHO, 2008). Poor water supply, sanitation and personal and domestic hygiene ranked among the highest risk factors, being responsible for 5.3% of deaths and 6.8% of disease burden (Hutton, nd).

Sesay (2012) noted that the predisposing factors to disease outbreak especially in unhygienic areas include overcrowding, lack of sanitary excreta disposal facilities, high water-tables, lack of safe drinking water, poor food hygiene in markets (vendors and purchases), and inadequate solid waste disposal. These factors are more prominent and pronounced in both slum areas of the urban centres and most rural communities and hence, the dwellers suffer a greater incidence of malaria, diarrhoea outbreaks, and death. However, Nigeria Demographic and Health Survey (NPC, 2013) posited that across rural and urban areas, the WASH deprivation is about 1.5 times more in rural areas than urban areas. Unfortunately, Nigeria is ranked as one of the countries with more rural populace than urban [United Nations Population Division, 2017 cited by The Global Economy (n.d., Iruonagbe, 2009)]. This implies that more people are trapped in the water and sanitation poverty in this region when compared with the urban.

Improving water access, sanitation and hygiene situation in Nigeria requires more concerted efforts from various stakeholders than is currently being done. Sustainability of water, sanitation and hygiene interventions also require a paradigm shift from the supply driven to community-led approach which has been proven effective in most projects targeted at behavioural change among people (Im, and Rosenberg, 2015; Fadairo and Yahaya 2010). Thus, community-led approach therefore suggests that communities are allowed to steer their Water, Sanitation and Hygiene (WASH) development initiatives while the necessary support or assistance are provided by the government or other development agencies. Achieving this goal therefore requires an understanding of local efforts and

challenges faced in solving their WASH related problems. In this vein, pertinent questions need to be asked from affected communities in order to engender sustainable rural Water, Sanitation and Hygiene (rWASH) interventions. These include, how affected rural communities in Nigeria are responding to their WASH challenges and what kinds of help are needed to make their efforts effective? This study addressed these concerns through a case study of two affected communities in Ibarapa-East Local Government Area of Oyo state, Nigeria.

This paper reports the findings from the fieldwork targeted at the rWASH as a major challenge to sustainable rural development. The purpose of the study was to examine local efforts and challenges faced in solving WASH related problems in Oyo State, Nigeria. The specific objectives were to:

1. describe the existing water, sanitation, and hygiene situations/practices in the study area,
2. identify the social, environmental and health challenges faced by the rural people due to WASH situation,
3. investigate the community-led water, sanitation, and hygiene interventions in the study area; and
4. understand through collective community decision the kinds of support needed to enhance sanitation and hygiene within the rural settlements in study area.

METHODOLOGY

The study area is Ibarapa-East Local Government Area of Oyo State. The area is located within latitudes 70.15' N and 70.55' N and longitude 30E and 30.30' E. The study utilised a case study approach to fulfil its objectives. The phenomenon under study for the case was rWASH where the case were the sampled communities of Agele and Mogba in Ibarapa-East area of Oyo state. These communities were purposively selected for the study due to obvious conditions of water poverty which is thought to have implications for sanitation and hygiene of the people. In addition, previous studies have rated southwestern region of Nigeria as being the worst hit by the problem of open defecation (Federal Ministry of Water Resources, 2015) and Oyo State as one of the most fraught with problems of poor sanitation and hygiene in the region (The News, 2017). The population of the study comprised of all male and female household heads and community leaders in the sampled locations. Qualitative methods utilising focus group discussion and key informants' interviews were used for data collection. A short survey was carried out among the households in each of the locations to generate a pool of potential participants for focus group discussion as follows:

*"*Are you willing to participate in a 90-minute focus group discussion about water, sanitation and hygiene practices in your community?"

A total of 92 (47 female and 45 male) potential participants identified from the short survey were included in the study. Thus, eight focus group discussions comprising of 9-12 members per group were held in the study locations. Four community chiefs were purposively selected for in-depth interviews due to their prominent roles in communal governance and decision making. Focus group discussion/key informant interview guide prepared in English language and interpreted into Yoruba (local) language were used to facilitate discussion for data collection. These were backstopped with field observations. The facilitators for the focus group sessions utilised participatory tools such as pairwise ranking and problem tree analysis to elaborate collective participants position on topics discussed. The discussions which were done in the local language of the people (Yoruba) were audio taped in addition to notes that were taken. The audio recordings were later transcribed and analysed using thematic analysis. This involved coding responses into broad categories according to the interview questions. Codes were examined to identify related concepts and families of related themes were formed, creating a structure of issues that had a similar theme. In the results section, tables and figures generated from the use of participatory tools during focus group discussions were inserted. In addition, illustrative comments in quotes for the various themes were included in the narratives.

RESULTS AND DISCUSSION

Community characteristics

A combination of subjective measure and field observation were used to determine community characteristics such as ethnicity, religion and socio-economic status of the people. The predominant ethnic group in the communities was Yoruba representing about three-quarter of the population. Other residents were thinly spread among two ethnic minorities such as Fulani and Tiv including foreign migrants from the republic of Benin who migrated to the locations for farming purposes. This confirms the assertion that agriculture is a major attraction for migration into rural communities (Fadairo, Olutegbe and Eforuoku, 2018). More than half of the dwellers in the communities were Muslims and the rest practiced Christianity. In terms of socio-economic status, the participants adjudged most of the residents in the study area as poorer than the average person confirming the predominance of poverty in rural areas when compared with the urban (Proctor *et al*, 2015). Both communities explained they had received assistance in the past such as provision of an uncompleted well in Agele community in 2016 and health care support to contain the problem of guinea worm disease outbreak in Mogba community

in 2002. The participants explained that the well in Agele community was abandoned by the contractor after failing to reach water as at when expected. They argued that members of the community were not consulted in the process otherwise, they would have suggested a better location for the well which they were sure would have become successful. Apart from the failed well and health care support for guinea worm, the communities had not received any other assistance or intervention from the government or development agencies. This situation depicts the conditions of neglect most rural areas suffer in Nigeria and aligns with the positions of Anyanwu, (2013) and Omoniyi (2018). In addition, the story of a failed well project in Agele community further lends credence to the arguments for deliberate social inclusion of beneficiaries of development projects in planning and implementation process for sustainability to be guaranteed (Fadairo, 2017).

Existing WASH situation/practices in the study area

The impact of inadequate water, sanitation services and hygiene fall primarily on the poor (Pruss-Ustun, 2008). In this section, we probed into sources of water for various domestic purposes in the study area and their waste management/disposal practices. The available water sources for the communities were stream (*Opeke stream*), rain and well which was only partially functional. The stream which is located about 1-hour walking distance from the community was the mostly used and accessed water source by the people as rain does not fall all year round and the only available well never spring adequate water even during the wet season (Table 1). Most respondents fetched water from the stream for drinking, cooking and household chores all year round. They supplement with rain water and the little produced by the only well available during the wet season. However, they only use water from the stream for agricultural purposes during the wet season while they ration the available water from the stream for other domestic purposes during the dry season.

Table 1: Access to and use of water in Agele and Mogba communities

	Water Sources/Season					
	Well		**Rain**		**Stream**	
Water use for domestic/agriculture	**Wet season**	**Dry season**	**Wet season**	**Dry season**	**Wet season**	**Dry season**
Drinking	Yes	x	Yes	x	Yes	Yes
Cooking	Yes	x	Yes	x	Yes	Yes
Household chores such as washing and bathing	Yes	x	Yes	x	Yes	Yes
Agriculture	x	x	Yes	x	Yes	x

Agriculture which is the major livelihood of the people in the study area is seriously affected as a result of their poor access to sufficient water as farming activities are suspended during dry season in order to give priority for basic needs such as drinking and cooking. Participants noted that water availability worsens during dry season, as the stream usually dry up, leading to shortage and water crisis. One of the participants in the focus group discussion reported thus:

*"*There is nothing as disturbing as lack of water in this community. When we do not even have water to drink, how do you expect us to utilise the available one for agricultural purpose"

Another participant from Mogba community also explained how the difficulty of accessing water especially in the dry season had resulted in conflict between community members as follows:

"Fights usually occur between the Fulani herdsmen and the other ethnic groups in the community because the water is not usually enough for household and agricultural use, and the Fulani will want to feed their cattle with the limited water and so this caused quarrel in the community. At times, we use cutlass to chase the Fulani and their cattle''

In terms of quality of the water sources, observation reveals that both the well and stream water were in a poor condition for safe consumption. For instance, the well is uncovered predisposing the content to dirt and contamination by microorganisms. Also, the stream water is unclear and turbid. Unfortunately, no serious treatment procedures are undertaken to purify the water before use apart from occasional manual sedimentation and treatment with alum as explained by the respondents. Many noted that they drink the water directly. The high level of disparity between urban and rural areas in terms of maternal mortality, neonatal deaths, epidemic outbreak and spread (Ishaku et al, 2011) are not unlikely to be connected to the rural people's lack of access to basic needs of life among which is safe water (Alemu, 2017). Akpabio (2017) posited that a lineal and interlocking connection exists between water, sanitation, and diseases; and that water mediates the transmission of micro-organisms or parasites onto humans.

Furthermore, discussions on community's waste management practices reveals a connection between rural access to water and hygiene (Table 2). Participants in the focus group discussions indicated that they practice open defecation as neither latrine nor modern toilet was available in any of the

communities. The lack of latrine was not only due to financial constraints but also due to lack of water which is needed to run the facilities. This situation has a potentially negative effect on the people's health as the excreta could be washed off from the soil and carried during rainfall into the stream where drinking water is fetched. Open defecation results in a polluted environment in which diseases spread fast (WaterAid, 2016). World Health Organization (2011) also stated that poor management of human excreta creates a serious health risk associated with the potential contamination of local water sources. Agricultural wastes such as crop residue are left on the farmland to decompose while animal waste such as dung and droppings are also disposed in the open on the farmland. Household wastes are usually disposed on dumpsites and occasionally burned during dry season.

Table 2: Common waste management/disposal practices in Agele and Mogba communities

Waste type	Disposal methods			
	Water bodies such as river	Rainwater/ flood	Burning/ dumpsite	Bush
Human waste (excreta)	X	X	X	✓
Household waste	X	X	✓	X
Agricultural waste (crop residue, poultry dung)	X	X	X	✓

WASH related social, environmental and health challenges faced by Agele and Mogba communities

Problem tree analysis was conducted during the focus group discussions to ascertain the WASH related challenges faced in the communities. Respondents indicated the root causes of their WASH challenges to include lack of safe water, poor transportation, lack of sanitation facilities, poverty and inadequate government support. The effects of these are seen in major health challenges such as hunger/starvation, fever, blur sight, dizziness, ulcer, body rashes, skin diseases, stress and fatigue. Environmental effects include air and water pollution arising from unsafe waste disposal while social effects include neighbourhood conflict due to competition for scarce water resource, migration, skipping of bathing, meals and delay in washing of plates/clothes in order to manage water.

The women who are mostly involved in fetching water from the stream mentioned stress and fatigue resulting from the long-distance trek to the stream and back home as one of the challenges they face relating to their poor WASH situation. Delay in household meal preparation and occasional skipping of meals during dry season when water access becomes very difficult was also indicated by most of the men as one of the resulting challenges from lack of water in their communities. The combined effects of the stress/fatigue involved in search for water and skipping of meals have often resulted in cases of hunger, ulcer, aging, and conflicts with neighbours in the study area. There were also reports of temporary migration in extreme cases to the town in order to cushion the harsh effects of lack of water. Some of the participants at the focus group discussions were quoted as follows:

"There was a time I could not prepare meals for my children for two days, so I decided to beg for water from people on queue at the stream but on my way back, I began to feel dizzy, then I collapsed, and the water eventually spilled. I thank God there were people around to rescue me"

"The water situation especially in dry seasons is really distressing. We wear clothes repeatedly, even up to a week before washing. My household take turns in using dishes to eat and sometimes, we gather to eat from the same dish so as to minimize water use for washing dishes."

"We don't bath every day during dry season because we don't have access to water, so we skip bath by bathing at the interval of three days or more. At times, we stay a week without bathing and then go to town at the end of the week to have our bath and wash our clothes''

"The struggle for water during dry seasons usually leads to conflict. Our children sometimes fight with one another for water. There was a time when some families left this village to reside temporarily with relatives in town during dry season because of water scarcity"

Community-led WASH interventions in the study area and support needed for enhancement

Community-led interventions in study sites and lessons learned

Participants explained that they organise together every year during the peak of dry season to dredge the stream by scooping off excess sand from the surrounding in order to improve flow of water. This collective effort carried out annually has been helpful in reducing the scourge due to lack of water in these communities. Participants also explained that narrow foot-path access road linking the communities to the stream is constantly being maintained through communal effort. Participants' commitment and cooperation shown in the dredging of the stream and maintenance of the village-to-stream road compared with their more reserved

approach towards the supply-driven well project in the area amplifies the argument for community-led approach in development intervention in order to guarantee sustainability (Im and Rosenberg, 2015). It was obvious from the participants' responses that the well project was not owned by the people and consequently, no serious effort was channelled by the villagers to complete the project from the point at which it was abandoned. Members of the community only draw water from it during the rainy season when it only produces, and they afterward abandon it for their stream until the next wet season. It was garnered during the focus group discussion that the well project was started by a politician (probably for cheap political goal) who did not carry the people along as expected. Unfortunately, the project (well) was hastily completed without reaching the required depth necessary to produce water all year round. Thus, the well project that could have been a great relief from the water scourge experienced by the villagers has unfortunately left them without much difference on their water access and use.

While the idea here is not to rule out the importance of external trigger (such as individual donor or governments support) for eliciting a positive behavioural change towards WASH, the overarching argument however is that participatory approach should be embraced, and adequate efforts should be allowed to generate appropriate response from the people after triggering before support activities are implemented. This is consistent with the recommendations of Community Led Total Sanitation (CLTS) model of Kamal (Kar and Chambers, 2008) and the central argument of self-hep initiatives or development (Ebong et al, 2013).

Furthermore, key informants' interviews with some community chiefs also revealed that there are locally enshrined laws prohibiting dumping of refuse, defecating and bathing in and around the Opeke stream which serves as the major water source for the community. The community mobilisation and enactment of laws to safeguard their source of water are consistent with the "carrot and stick" response at the triggering stage of Community-Led Total Sanitation process as envisaged by Kar and Chambers (2008). We understand that the laws have been effective in reducing the extent of abuse of the water resource. It thus implies that if the necessary follow up and support activities are secured by the communities, achieving adequate hygiene and sanitation will become less difficult and sustainable. It is important to note that post-field follow up to the study sites reveal that the communities are now working with a local non-governmental organisation named Rural Nurture Initiative (RNI) to support their efforts.

Support needed to boost sanitation and hygiene efforts in study sites

The outcome of the pairwise priority ranking of supports needed by the communities to enhance sanitation and hygiene within their localities is presented in Table 3. The Table shows that the priority of the people was assistance to site a well or borehole in order to guarantee an easier access to water for domestic and agricultural purposes. This was followed by road and sanitation facilities such as toilet. However, respondents did not consider support in terms of building of schools and provision of agricultural loans as very urgent. A community chief in Mogba while emphasising on their priority for water support amongst other needs stated that:

'We don't need money or school; it is when our children are able to eat that they will be able to go to school. If the government should give us money, we will collect it and spend it but our water problem will still remain. Water is more important to us now than any other thing'.

For effective sanitation at any level, water must be available. This collective preference for support in the form provision of bore hole or well among the respondents even in the face of enticement of money (loan) which ranked least on their scale of preference, showed their willingness to adopt good sanitation practices if they have improved access to water. Perlman (2017) asserted that water plays crucial roles between hygiene and sanitation interlinkages. Similarly, Chipp et al (2011) noted that rural people are not oblivious of their challenges and needs, but only require support to solve their problems by themselves. Development practitioners should therefore understand that they cannot assume to know what the problems of the rural people are more than the people themselves. This further amplifies the need for consultation with the people and their involvement in designing and implementing development interventions targeted at their environment.

Table 3: Priority ranking of support needed in the study area to improve their WASH conditions

Needs	Rank
Loan	6th
Accessible road	2nd
Health care center	3rd
Borehole/well	1st
Primary school	5th
Sanitation facilities such as toilets	4th

Framework for understanding WASH challenges and community-led actions in the study area

Figure 1 presents a framework for understanding the WASH challenges and the community-led actions in the study area. Poor WASH facilities resulting from inadequate access to water and lack of toilet facilities had meted hardship conditions such as conflict on the villagers. In addition, poor hygiene behaviours such as open defecation also became common, worsening the hygiene conditions and general wellbeing of the people. Following these triggers, collective community action utilising the village level social capital led to the establishment of measures for shaming and discouraging poor hygiene behaviours. This positive village-level response to natural triggering resulted in a collaboration between the community and a non-governmental organisation (Rural Nurture Initiative-RNI). The combined effects of the collective community action and the external support from RNI or a local authority has the prospects of sustaining positive behavioural change. There are two major paths connecting community-led intervention and sustainable sanitation. First, community-led intervention can enhance hygiene-related behavioural interventions which can prove effective in eliciting improved knowledge and practices around water-sanitation-hygiene interrelationship. Second, community-led intervention can attract genuine governmental or non-governmental agency's support. The findings in this case study aligns with Bissong and Elliot (2014) study on social capital and improvements in health, environment and development.

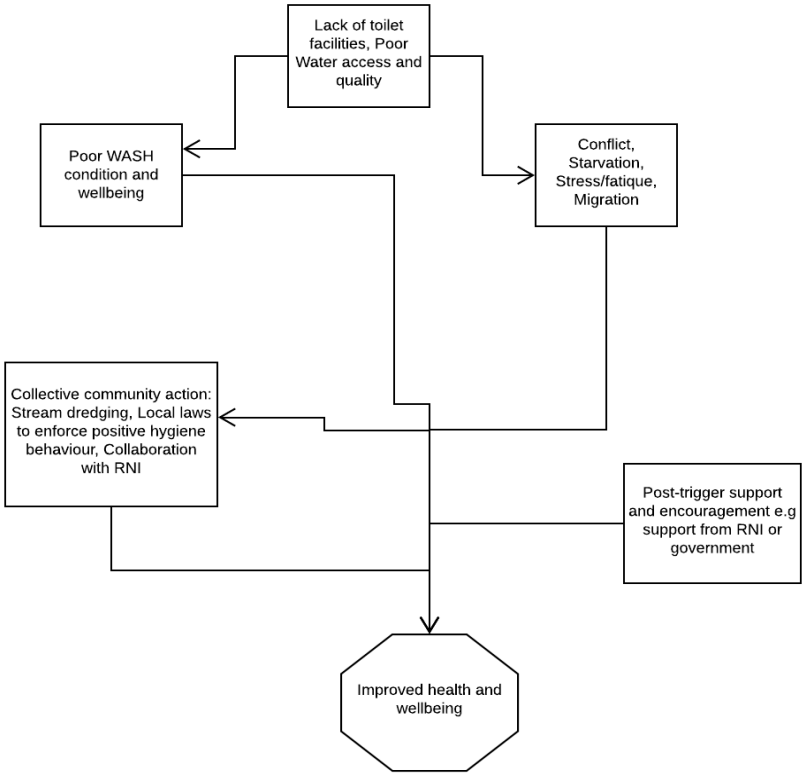

Figure 1: Framework on WASH challenges and community-led actions in the study area
Source: Authors

CONCLUSION AND RECOMMENDATIONS

Poor WASH condition in rural areas has implications for household food security, sustainable rural livelihoods, health and overall wellbeing of the people as access to water remains critical in achieving sanitation and hygiene in rural settlements. Nevertheless, the people are willing to adopt good sanitation practices if they have improved access to water combined with the right trigger. Mostly, people in the rural communities are aware of their WASH challenges but they exhibit varied levels of collective community action towards promoting self-help interventions, depending on the strength of their social capital. Therefore, rural capacities to effectively respond to their water and sanitation challenges could be weakened by widespread poverty, hence, they tend to require external trigger or support to achieve sustainable solutions. While external rWASH interventions could grant impetus to community-led efforts, their effectiveness however depends on the extent of social inclusion and involvement of the local beneficiaries from the project identification till completion. Furthermore, promoting community-led WASH efforts in rural areas requires that poverty alleviation initiatives that would ensure improved income generation and enhanced social capital are given priority attention in rural development efforts of the government. This will enhance rural populace capacity to form self-help groups and embark on community-led micro-projects that can have far reaching impacts on their wellbeing before external support which usually take a long time is secured.

REFERENCES

Akpabio, E. M. (2017). Water, sanitation, hygiene and public health: some fundamentals. *WASH Insights, 8pp*.

Alemu, A. M. (2017). To what extent does access to improved sanitation explain the observed differences in infant mortality in Africa? *African Journal of Primary Health Care and Family Medicine*, *9*(1), 1-9.

Anyanwu, J. C. (2013). The correlates of poverty in Nigeria and policy implications. *African Journal of Economic and Sustainable Development*, *2*(1), 23-52.

Chipp, C., Dewane, S., Brems, C., Johnson, M. E., Warner, T. D., & Roberts, L. W. (2011). "If only someone had told me…": lessons from rural providers. *The Journal of Rural Health*, *27*(1), 122-130.

Ebong, F., Otu, J., & Ogwumike, F. (2013). Self-help initiatives and the development of rural communities in Nigeria. *Research on Humanities and Social Sciences*, *3*(12), 2222-1719.

Fadairo, O.S. (2017) Climate change projects aren't working because communities are left out. The Conversation Newsletter. Retrieved December 7, 2018 from http://theconversation.com/climate-change-projects-arent-working-because-communities-are-left-out-71905

Fadairo O.S and Yahaya. M.K. (2010). Effectiveness of the CDD approach for facilitating grassroots development: lessons from the Local Empowerment and Environmental Management Project (LEEMP) in Nigeria. *The Nigerian Journal of Rural Extension and Development,* 3: 1-8.

Fadairo, O. S., Olutegbe, S., & Eforuoku, F. (2018). Agricultural Markets as Drivers of Rural-Urban Interdependence: Lessons from Selected Produce Assembly Markets in Oyo State, Nigeria. *Rural-Urban Linkages and Sustainable Development in Africa: Spears Media Press LLC, Denver*, 93-121.

Federal Ministry of Water Resources (2015) Nigeria Overview: Water, Sanitation and Hygiene. Retrieved November 18, 2018 from http://sanitationandwaterforall.org/wp-content/uploads/download-manager-files/2017%20Nigeria%20Overview_final.pdf

Hutton, Guy (2015). Health impact and economic cost of poor water and sanitation. *Water and Health*, Vol. I, 5p.

Harlin J., Kjellén. M, Tropp. H., Connor R., Talafré J., Peloffy K., Hasan E. and Dumont M. (2015). Poverty and social equity. The United Nations World Water Development Report 2015. Retrieved January 21, 2020 from www.unescap.org/sites/default/files/__WWDR-2015

Im, H., and Rosenberg, R. (2015). Building social capital through a peer-led community health workshop: A pilot with the Bhutanese refugee community. *Journal of Community Health*, 41(3), 509–517.

Ishaku H. T., Majid M.R., Ajayi A.P., and Haruna A. (2011). Water Supply Dilemma in Nigerian Rural Communities: Looking towards the Sky for an Answer. *Journal of Water Resource and Protection*, 3: 598-606.

Kar, K. and Chambers, R. (2008) *Handbook on Community-Led Total Sanitation*. Plan UK, London, UK

National Population Commission. (2013). *Nigeria demographic and health survey 2013*. National Population Commission, ICF International. Retrieved December 7, 2018

from https://ngfrepository.org.ng:8443/handle/123456789/3139

Ojo, J (2017). Reversing Nigeria's deplorable water and sanitation situation. Punch Newspapers, October 11.

Omoniyi, B. B. (2018). An examination of the causes of poverty on economic growth in Nigeria. *Africa's Public Service Delivery and Performance Review*, *6*(1), 1-10.

Proctor, B. D., Semega, J. L., & Kollar, M. A. (2016). Income and poverty in the United States: 2015. *US Census Bureau, Current Population Reports*, *14*.

Pruss-Ustun, A., & World Health Organization. (2008). *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. World Health Organization.

Sesay, Mustapha (2012). Poor sanitation and its consequence. Retrieved 18 January, 2020 from https://washjournalists.wordpress.com/2012/01/18/poor-sanitation-and-its-consequences/

The Guardian (2012) Water and sanitation still not top priorities for African governments. Retrieved October 12, 2019 from https://www.theguardian.com/global-development/2012/aug/30/water-sanitation-priorities-african-governments

The News (2017) Ibadan: Tale of a Dirty City. Retrieved October 10, 2018 from https://www.thenewsnigeria.com.ng/2017/02/ibadan-tale-of-a-dirty-city/

UNICEF (2014). Water sanitation and hygiene: the situation. Retrieved December 12, 2020 from https://www.unicef.org/nigeria/wes.html)

Walker, C. and Logan, C. (2016). Africa is failing to close the gap on providing water and sanitation. The Conversation Newsletter. Retrieved August 16, 2020 from http://theconversation.com/africa-is-failing-to-close-the-gap-on-providing-water-and-sanitation-58820

WaterAid (2016). Nigeria's sanitation crisis: 2016 World Toilet Day Nigeria supplement. Retrieved November 29, 2020 from URL *https://washmatters.wateraid.org/*

World Health Organization (2011). Disaster risk management for health: water, sanitation and hygiene. *Disaster Risk Management for Health Fact Sheets, Global Platform – May 2011 Cyclone, Luzon, Philippines, DOH/WHO.* Retrieved January 17, 2020 from *http://www.who.int/hac/events/drm_fact_sheet_wash.pdf*

LIVELIHOOD ACTIVITIES AMONG RURAL HOUSEHOLDS IN EMURE LOCAL GOVERNMENT AREA OF EKITI STATE

[1]Bamigboye, O. Tosin, [1]Adeniji, O. B., [1]Ogunjimi, S. I. and [2]Adara, C. T.
[13]Department of Agricultural Economics and Extension, Faculty of Agriculture, Federal University Oye Ekiti, Ekiti State.
[2]Agricultural and Rural Management Training Institute (ARMTI), Ilorin, Kwara State
Correspondence contact details: oluwaseun.bamigboye@fuoye.edu.ng

ABSTRACT
Income derived from non-farm activities by rural household serve to augment cash from sales of agricultural products. This article examined diversification into farm and non-farm activities among rural households in Emure local government area of Ekiti State. Multi-stage sampling procedure was used in selecting 240 rural farm households, but only 221 questionnaires were completed. Data collected were described using frequency distribution, percentages and mean. Results revealed that most sample households had low-income, with mean monthly income of ₦6,215.50 for farming and ₦2,475.50 for non-farm activities. Majority (62.90%) of the rural household engaged in farming with non-farm activities, 24.43% in farming activities only, while 12.67% were involved in only non-farm activities. Rural farm households were distributed into different types of activities (farm and non-farm) categorized into farming (production), manufacturing, sales, services and enterprise. Rural farm households made use of increasingly diverse combinations of resources and assets to meet up with their rising needs by seeking alternative sources of income through engagement in both farm and non-farm activities.
Keywords: Diversification, non-farm activities, rural household

INTRODUCTION

Farming and rural non-based activities still have untapped potential to generate employment opportunities for Africa's rising youth population (Food and Agricultural Organization, 2017). Although, most rural households are involved in the farm sector, the non-farm sector has grown significantly in recent decades, and its role in rural development has become increasingly important and it is gaining prominence in most developing economies due to the increasing inability of the farm sector to support rural livelihoods (Dary and Kuunibe 2012; Oseni and Winters, 2009). Farm households diversify to combine farm activities with non-farm activities in order to meet up with their arising needs and cater for their family welfare which is an important pathway towards livelihood sustainability by not depending on only one source of income. Diversification is the norm (Jinhong *et al.,* 2016) by which rural households engage in diverse means of livelihood, through which they combine various assets and resources for them to meet up with their basic needs, increase their standard of living and manage risks (Niehof, 2004). Observations show that in many areas, own crop production is no longer the main source of income of rural households (Awoyemi, 2011). Income derived from non-farm activities by rural households serve to augment cash from sales of their agricultural products. Lanjouw and Feder (2001) emphasized that diversification can stabilize incomes and alleviate rural poverty and government in developing countries have become increasingly interested in promoting increased output of diversification.

Non-farm activities according to Haggblade *et al.,* (1989) cited in Takeshima *et al.,* (2018) is defined as "all activities other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing" including "agro-industrial activities which store, process and market agricultural commodities". Nmeregini *et al.,* (2019) identified that non-farm income generating activities include all economic activities in rural areas aside agriculture, fishing, hunting and livestock. Rural household generate income from non-farm activities as part of their livelihood strategies to balance income shortfall (Agbarevo and Nmeregini, 2019).

The non-farm-sector has increased its share in both economy and employment in Nigeria. Recently, in 2014-2016, the Non-Farm-sector in Nigeria accounted for 79% of gross domestic product (GDP) (58% by the service sector, and 21% by the industry sector) (World Bank, 2018) and employed approximately 50% of the workforce (Groningen Growth and Development Center, 2018).

The purpose of this article is to find out if diversification to non-farm activities compliments the income accrued from agricultural production and improve the welfare of farm households in rural Nigeria. Therefore, the following questions about Nigeria's rural setting, more particularly, rural farming communities' household in Ekiti State, become essential. What are the farm and non-farm activities engaged by the respondents? What are the natures of activities diversified into by rural farm households? Do the non-farm activities generate higher income than sales of agricultural products?

METHODOLOGY

The study was carried out in Emure Local Government Area of Ekiti State. It is bounded to the north by Agbado Ekiti and Imesi Lasigidi, south by Owo, East by river Oyinmon and west by Orun and Ise Ekiti. Emure LGA was purposively selected because it is predominantly noted for agriculture.

The study area includes settlements such as Eporo, Oge, Owode, Ibeji, Ido Ope, Igbo Eku, Akeye, Kajola, Owosi Elemure, Odose camp, Edu camp, Ose, Oyimo. Igbo Aye, Alapoto, Ajebamidele, Okeseri, Adebayo, with Emure as the main town. In terms of tribal composition, majority of the people living in the study area are Yorubas, followed by a considerable number of Ibo and Idoma people, who can be purposely used for employment in agricultural activities. The major economic activity of the study area is predominantly farming. They grow food (yam, rice, cassava, plantain, and cocoyam) and cash crops (cocoa, kolanut, palm oil, coffee). Some also engage in *gari* processing, cassava flour processing, etc (Bamigboye *et al.,* 2019). There are 10 districts in the LGA namely- Odo Emure I (8 villages), Odo Emure II (5 villages), Odo Emure III (9 villages), Odo Emure IV (9 villages), Oke Emure 1 (10 villages), Oke Emure II (11 villages), Ida Mudu I (10 villages), Ida Mudu II (8 villages) and Ogbontioro I (15 villages) (Independent National Electoral Commission, INEC, 2015). The people of Emure Ekiti engage in agricultural- farming, hunting, agro-processing and non-agricultural activities- handcrafting, tailoring, mining, and trading among others as a means of livelihood.

Study population consisted of all the rural households in Emure LGA. Random selection method was used to select 240 rural farm households.

Multi-stage sampling was used in selecting the sample size. In the first stage, out of the 10 districts, 40% of the districts with highest villages were purposely selected namely-, Oke Emure 1 (10 villages), Oke Emure II (11 villages), Ida Mudu I (10 villages) and Ogbontioro I (15 villages). The second stage involved the selection of 50% of the villages- Oke Emure 1(5 villages), Oke Emure II (6 villages), Ida Mudu I (5 villages) and Ogbontioro I (8 villages), in total is 24 villages. The last stage is selecting ten (10) rural farming households from each of the villages. In total, 240 rural farm households were targeted, only 221 questionnaires were completed.

The engagement of household head in farm and non-farm activities with multiple responses was measured by assigning value=2 if any household head was into the listed activities and value 1= if any household head were not involved in the listed activities. The activities were divided into five categories (farming/production, manufacturing, sales, services and enterprises). Data collected were described using frequency distribution, percentages and mean.

RESULTS AND DISCUSSION

Engagement of rural households in livelihood activities

Table 1 shows that majority (70.59%) of the respondents engaged in crop production, 46.15% were agro-processors, while 31.67% were engaged animal production. This shows that crop production and processing of agricultural products was the major source of income in the study area. It is evident from this study that the rural households process cassava into garri, oil palm seed into palm oil/palm kernel cake. Table 1 also illustrated other occupations (non-farm) the rural households diversify into. Under manufacturing, 13.57% were engaged in tailoring; under sales, 6.79% were engaged in sales of agro-products like chemicals, seeds, poultry equipment, etc; under services, 22.17 were bricklayers; under enterprise, 5.88% were employed into private companies as casual workers, security, labourers, etc. This revealed that most of the households earn income from more than one source. This implies that the rural households were economically active in the non-farm activities to combine with farm activities in order to meet up with their arising needs and cater for their family welfare which is an important pathway towards livelihood sustainability by not depending on only one source of income.

Nature of activities diversified into by household heads

Results in Table 2 revealed that majority (62.90%) of the rural household engaged in farming with non-farm activities, 33.48% in farming activities only, while 12.67% were involved in only non-farm activities. This implies that majority of the rural household diversified into various activities both farming and non-farm-oriented economy which had enabled them to cope with their family needs. This corroborates Olanipekun and Kuponiyi (2010); Obinna and Onu (2017) who asserted that vast majority of rural families in Nigeria are basically practicing farmers who cannot meet their needs therefore, they diversity into non – farm income generating activities as coping strategy. Oladimeji, Abdulsalam and Abdullahi (2015); Olaoye, Idowu, Omoyinmi, Akintayo, Odebiyi and Fashina (2012) further stated that diversification as a strategy involves the attempt by individuals and households to find new ways to raise income and reduce risk.

Table 1: Engagement of rural households in livelihood activities

Occupation*	Frequency (n=221)	Percentage (%)
Farming (**Production)**		
Crop	156	70.59
Animal	70	31.67
Agro processors	102	46.15
Hunting	10	4.52
Forestry and logging	4	1.81
Manufacturing		
Carpentry	9	4.07
Tailor	30	13.57
Blacksmith	10	4.52
Welder	13	5.88
Sales		
Sales of car, bicycle, bike spare parts	10	4.52
Sales of agro-products	15	6.79
Services		
Weaving/ hairdressers	6	2.71
Housekeeper	8	3.62
Plumber	2	0.90
Religious worker	4	1.81
Bricklayer	49	22.17
Restaurant/bar dealers	13	5.88
Traditional midwives/healers	4	1.81
Enterprise		
Civil servant/ government workers	7	3.17
Private company	13	5.88

*Multiple responses

Table 2: Nature of activities diversified into by household heads

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

*Multiple responses

Income from farming and non-farm activities engaged by respondents

Result from Table 3 indicates that most sample households are of low-income (based on mean monthly income of ₦6,215.50 for farming and ₦2,475.50 for non-farm activities). The low earning suggests that majority of the non-farm activities engaged in, yielded low return on investment. However, this little income earned from non-farm activities were used to augment the amount spent on their agricultural production, cater for their family during the planting season when there is little or no agricultural produce to sell. Contrarily, Odoh, Nwibo, Eze and Igberi (2019) indicate that majority of households in Southeast Nigeria maintain a good income from non-farm activities.

Table 3: Income from farming and non-farm activities engaged by rural farm household

Type of income	Average monthly income
Monthly Farming income	₦6215.50
Monthly Non-farm income	₦2475.50

CONCLUSION

Rural farm household engage in diverse of livelihood activities to meet up with their arising needs and cater for their family welfare. They made use of increasingly various combinations of resources and assets by seeking alternative sources of income through engagement in non-farm activities. This income was used to augment the amount spent on their agricultural production, provide for their family during the planting season when there is little or no agricultural produce to sell.

REFERENCES

Agbarevo, M. N. B. and Nmeregini, D. C. (2019). Effect of non-farm income-generating activities on poverty reduction among rural households in Abia State, Nigeria. *International Journal of Agriculture and Research,* 2(1): 15 -25.

Awoyemi, T. T. (2011). Rural non-farm incomes and poverty reduction in Nigeria. African

Economic Research Consortium, AERC, Nairobi, January 2011

Bamigboye, O. T., Ogunjimi, S. I. and Adara, C. T. (2019). Constraints to activities of women agricultural cooperative societies in Emure Local Government Area of Ekiti State. *Nigerian Journal of Rural Sociology*, 19(*2*), 15-19

Dary, S. K. and Kuunibe, N. (2012). Participation in rural non-farm economic activities in Ghana. *American International Journal of Contemporary Research.* Vol 2(8), pp 154-161

Food and Agricultural Organisation, FAO (2017). Farming and rural non- farm activities can provide solutions to rising youth unemployment in Africa. FAO, New York 20 September

Groningen Growth and Development Center (GGDC). (2018). 10-Sector Database. Groningen, Netherlands: University of Groningen.

Haggblade, S., Hazell, P. and Brown, J. (1989). Farm–non-farm linkages in rural Sub-Saharan Africa. *World Development* 17 (8): 1173–1201.

Independent National Electoral Commission, INEC, (2015). Ekiti State directory of polling units. Revised January

Jinhong, W., Ruoxi, L., Wenxin, W., Zhongmei L. and Bizhen, C. (2016). Income diversification: A strategy for rural region risk management. *Sustainability*, 8, 1064, 1-12.

Lanjouw P. and Feder G. (2001). Rural non-farm activities and rural development: from experience towards strategy (English). *Rural strategy background paper;* no. 4. Washington, D.C, the World Bank

Niehof, A. (2004). The significance of diversification for rural livelihood systems. *Food Policy*, 29, 321-338.

Nmeregini, D. C., Nzeakor, F. C. and Ekweanya, N. M. (2019). Non-farm income generating activities of rural households in Abia State, Nigeria. *Journal of Agricultural Extension*, 23 (4), 48-57.

Obinna, L. O. and Onu, S. E. (2017). Contribution of rural women entrepreneurs in non-farm and off-farm enterprises of households' poverty reduction in Abia State. *Journal of Agricultural Extension,* 21(3), 143-151

Odoh, N. E., Nwibo, S. U., Eze, A. V. and Igberi, C. O. (2019). Farm and non-farm income diversification activities among rural householdes in Southeast, Nigeria. *Journal of Agricultural Extension*, 23 (2), 113-121

Oladimeji, Y. U., Abdulsalam, Z. and Abdullahi, A. N. (2015). Determinants of participation of rural farm household in non-farm activities in Kwara state, Nigeria: A paradigm of poverty alleviation. *Ethiopian Journal of Environmental Studies & Management.* Vol. 8(6), 635-649

Olanipekun, A. A. and Kuponiyi, F. A. (2010). The Contribution of Livelihood Diversification to Rural Households Welfare in Ogbomoso Agricultural Zone of Oyo State, Nigeria. *Nigeria Journal of Rural Sociology*, 11 (2), 18 – 26

Olaoye, O. J., Idowu, A. A., Omoyinmi, G. A. K., Akintayo, I. A., Odebiyi, O. C. and Fashina, A. O. (2012). Social economic analysis of artisanal fisher folks in Ogun water-side Local Government Areas of Ogun State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Biology,* 12(4): 8-22.

Oseni, G. and Winters, P. (2009). Rural nonfarm activities and agricultural crop production in Nigeria. *Agricultural Economics,* 40, 189-201

Takeshima, H., Amare, M. and Mavrotas, G. (2018). The role of agricultural productivity in non-farm activities in nigeria: Effects on sector orientation and factor intensity. International Food Policy Research Institute, IFPRI, Discussion Paper 01761, October

World Bank (2018). World Development Indicators. Washington, DC: World Bank

INDIGENOUS METHODS OF PREVENTING POST-HARVEST LOSSES OF MANGO FRUITS AMONG FARMERS IN BENUE STATE, NIGERIA

[1]Sambe, N., [2]Ikwuba, A. A. and [2]Sugh, E. T.
[1]Department of Sociology, University of Mkar, Mkar-Gboko, Nigeria
[2]Department of Sociology, Benue State University, Makurdi-Benue state
Correspondence contact details: ngutors@gmail.com; +2348058543839

ABSTRACT
Postharvest losses of mangoes are the bane of mango fruits farmers in Benue state. However scientific methods of preventing postharvest losses are not available to the farmers. These farmers therefore utilise indigenous methods to prevent these losses so as to enjoy the fruits of their labour. The objective of the study was to assess indigenous methods used in preventing postharvest losses of mango fruits among farmers in Benue state, Nigeria. Cluster sampling technique was used to select 400 farmers. Questionnaires and Key Informant Interviews (KII) were used to collect data. Quantitative data was analysed using percentages while qualitative data analysis involved transcription of responses of Key informants. Findings revealed that majority (24.9%) of farmers were 30-39 years while those who were 20-29 were the least (14.5%). Also, indigenous methods of preservation included open air (70.2%), Pit (12.4%), Hot water (9.1%), hut (8.3%) and potting methods. In general, the efficacy of the indigenous methods was rated moderately (60.9%). Harvesting the fruits in mature and unripe form prevented attacked from wasp and bats. The indigenous methods significantly prevented the quantitative losses (58.8%); maintained freshness of mangoes (8.8%) prevented shrinking (7.8%) and controlled attacks from insects and animals (7.2%) especially Peter and Local varieties. The methods were also found to have prevented postharvest losses of mangoes mainly for a period of 7 – 14 days (58.0%). Hot water method ensured longer shelf life than other methods but produced low quality fruits. It worked better on Peter variety. However, the methods contributed more towards ensuring quantitative losses rather than maintaining quality of the fruits. The study recommended for open air method for mass preservation of mangoes and adoption of potting method for ensuring of freshness of the fruits.
Keywords: Farmers, Indigenous methods, Mango fruits, post-harvest losses, and Tivland

INTRODUCTION

Mango (Mangifera indica. L) is one of the most important and valuable fruits in the world (Altendorf, 2017; FAOSTAT, 2016). However, the fruits seem to be vulnerable to high post-harvest losses (FAOSTAT, 2016). In Nigeria, these postharvest losses seem to be the bane of mango production. It has been reported that in Benue state, one of the highest producers of mango fruits in Nigeria, about 20 to 80 percent of mango fruits produced are subjected to post-harvest loss every year (State Ministry of Agriculture, 2015). The high post-harvest losses are because the fruit possesses a very short shelf life (Akimbamowo, 2013). As a result of the seasonality nature of mango, the fruits availability during the period of high season is always above demand which leads to low market value and high post-harvest losses (Maloba, Ambuko, Hutchinson, and Owuni, 2017). The high post-harvest losses of mango fruits have adverse effects on the income of the farmers who incur huge economic losses from mango fruits production (Agyapong, 2013).

Postharvest losses of mango fruits in developing countries are perceived to be prevented by predominant utilisation of indigenous methods of preservation (Agyapong, 2013). This is because scientific methods are not available to the farmers. The indigenous methods are based on local, traditional, non-western beliefs and customs and usually refer to as informal methods of preservation (Horsthemke, 2004). The methods may be expressed in the form of skills, craft, techniques, technologies, ideas, beliefs, values, norms, rituals, totems, plant species and animal breads. It is usually passed from one generation to another or from one person to another, through word of the mouth (Warren 1987; Risiro, Tshuma and Bhasikiti, 2013). Indigenous methods of preservation operate without direct inputs from formal and scientific institutions. These methods tend to suit the peculiar socio-economic and environmental conditions of peasant farmers in developing countries. The methods appear to be widely used by small holder farmers who are predominantly poor, with low educational attainment. The indigenous methods of preservation are easily compatible with farmers in terms of economic cost, application and use (Aluma 2005). Most local farmers in developing countries basically depend on this knowledge for decision making regarding their farm operations.

Mango farmers in developing countries appear to take advantage of the indigenous methods which utilises their knowledge, natural resources and physical environment. Indigenous methods such as sun drying techniques rely heavily on sunlight and creativity in processing to prevent their mango fruits from postharvest losses. This was basically through processing of the fruits into chips, powder and cakes and drying them in the sun. This method ensured that mango fruits' products were available to the farmers through the year while ensuring their income and available of the fruits throughout the year. Sun drying is utilised among the Khonda tribe in India (Baul, Dhal and Mukherjee, 2015). Farmers also tend to utilise natural cold air to prevent post-

harvest losses. They achieve this through spreading mango fruits under shade of trees and other cold environments such as local hut. The cold air was found to control substances in the fruits that facilitate decay (Agyapong, 2013; Weor, 2007). The practice of harvesting mango fruits at maturity but unripe stage is another indigenous practice of preventing post-harvest losses. Mango fruits which are fully ripe on the tree appear to soften and decay within few days. This practice seems to prevent the fruits from fully ripening on the tree as it gives farmers the opportunity to slow down the ripening process (Agyapong, 2013).

Studies on indigenous methods of post-harvest preservation of mango fruits had been conducted in the study area. Weor (2007) investigated some of the different harvesting methods and storage life of mango varieties stored hut in Gboko Local government Area, while Sambe, Ikwuba and Sugh (2019) investigated utilisation and challenges of indigenous methods of postharvest preservation of mango fruits among farmers in Tivland. The investigations ignored assessing the efficacy of the indigenous methods in controlling postharvest losses of mangoes in Tivland. Therefore, this study assessed the indigenous methods used by farmers to prevent postharvest loss of mango fruits in Benue state.

The specific objectives of the study were:

1. To identify the indigenous methods in controlling of post-harvest losses of mango fruits in the study area
2. To determine the efficacy of indigenous methods used in preventing postharvest losses of mango fruits

METHODOLOGY

Benue state is one of the states in the North-Central region of Nigeria. It is inhabited by Tiv, Idoma, Igede and Etulo. The state is predominantly an agrarian state; popularly famous for grown crops such as Mangoes, Oranges, yams, Cassava, rice, soya beans, groundnuts, and others. The Tiv people are the commercial producers of mango fruits.

The Tiv speaking area is bordered in the North by Nasarawa and Taraba States. In the East, the area shares boundary with Cross-River State and Cameroon. In the south it is bordered by Otukpo and Oju Local Government Areas, while in the West it is bordered by Apa and Agatu Local Government Areas. The vegetation of the area consists of rain forests which have tall trees and tall grasses that occupy both the western and southern fringes, while the Guinea savannah is found in the eastern and northern parts with mixed grasses and trees that are generally of average height (BNARDA, 2006; Our Benue Our Future, 2009).

Tiv farmers cultivate mango fruits in commercial quantities. In recent times, several varieties of mango are produced in the area including Local mango, Hindi, Julie, Peter, Ma Broken, Dubsha, John Bull, John Peter, Zill, John and Angbira. There is also evidence of production of most popular varieties in the international market such as Kent, Tommy Atkins, Haden and Keiths in the area. The fruit is also consumed massively by the local population (Nyishir 2004).

This study adopted a cross sectional survey design. To collect quantitative data, cluster sampling technique was used for selection of 400 farmers. Within this sampling technique, muti-stage sampling was used to selects respondents. Stage one involved a purposeful selection of Tivland out of Idoma land and Igede lands. This selection was based on fact that the area produces mangoes commercial quantities than the other areas in the state. Stage two, four local government areas (LGAs) were purposively selected out of 14 LGAs in Tivland. These were Kwande, Ushongo, Gboko and Buruku LGAs. This was based on geographical location and presence of highest proportions of mango farmers in the areas. In stage three, four council wards were purposefully selected in each of the LGAs, based on fact that the council wards produce mango fruits in commercial quantities compared to the other council wards. In Kwande, Usar, Kumakwagh, Tondov II and Liev I were selected and in Gboko, Yandev I, Mbapker, Igyorov and Mbavarakaa were selected. For Ushongo LGA, Ikov, Mbagwaza, Mbagba and Mbayegh were purposefully selected while Shorov, Binev, Mbaityough and Mbatirkyaa were selected in Buruku LGA. Stage four: the researcher went to each of the selected council wards (clusters) and obtained list of mango farmers associations from the officials. After the acquiring the list, the researchers systematically selected mango farmers on the list whose names were within the first even numbers required in each of the council wards. This done during peak periods of mango production to ensure that most of the farmers were contacted

In Kwande, 28 farmers were selected in each of the council ward, except Usar which had 29 farmers. In Gboko, 38 farmers were selected in Igyorov and Mbakper while 29 were selected in Yandev and Mbavarakaa. For Ushongo, 15 farmers were selected in Ikov and Mbagwaza while 14 farmers were selected in Mbagba and Mbayegh. In Buruku, 19 farmers were selected in all the council wards except Mbatirkyaa which had 18 farmers. In summary, Kwande and Gboko had 113 and 154 respondents while 58 and 75 respondents were selected in Ushongo and Buruku respectively.

For qualitative data, purposive sampling technique was used to select 84 key- informants. The key informants were the leaders of mango farmers associations in the various villages in the council wards. A maximum of 4 key informants in each of the council wards in the selected Local Government Areas. The selection process involved researcher

identifying the women and male leaders of fruits farmers associations or groups. After identification, the researcher employed the help of a trusted and respected person in the communities approached them and persuaded them to be part of the study.

The interview schedule was used to collect data. In the process of data collection, the researcher recruited and trained two research assistants who assisted him in the distribution of the questionnaires. After the completion of the training, the researcher and his assistants started administering the questionnaires. In each council ward, the researcher and his assistants personally asked questions from the questionnaire. Respondents responded to the questions while the researcher and his assistants filled in the questionnaires.

Key Informant interview was also held with leaders of mango farmers associations in each of the selected council wards. The processes involved the researcher visiting the informants on the scheduled time to conduct the interview. The language used in the interview was Tiv. Data gathering involved use of tape recorders, phones and notebooks and pen to capture the interviews.

For the data gathered through Questionnaire analysed using percentages while data gathered through Key Informant interviews was analysed by transcribing responses of the key informants.

Indigenous methods used in preventing postharvest losses - The researcher was aware of just two indigenous methods used in preventing postharvest losses. Therefore, farmers were asked to list the major indigenous methods used in preventing postharvest losses of mangoes. The farmers identified the methods by naming the methods. The variables were measured at nominal scale and were also categorised.

Efficacy of indigenous methods of preventing postharvest losses - Variables for measuring efficacy were categorised and measured at ordinal level. This was by rating efficacy the methods from High, Moderate and Low. Quality control sub-variables were measured at nominal level. These categories were quantity of fruits preserved, freshness, protection from insects and control shrivelling. The period of prevention of postharvest losses was also categorised and measured at nominal scale. The categories were below 7 days, 7-14 days and more than 14 days.

RESULTS AND DISCUSSION

Socio-demographic characteristics

Table 1 shows that majority of the respondents (24.9%) fall within the age range of 30-39 years while those in the range of 20-29 were the least with 14.5%. With regards to sex distribution of the respondents, males were found to be slightly the majority with 51.6%, while females were 48.4%, constituting the minority in the study. On marital status, married respondents constituted the bulk of the study with 56.0%, while respondents who were widowed had the least with 3.9%. Data on educational qualification revealed that respondents with tertiary education had highest percentage with 49.7%, while those with primary education were the least with 19.4%.

Table 1: Socio-demographic characteristics of mango farmers

Category	Frequency	Percentage
Age		
20-29	56	14.5
30-39	96	24.9
40-49	84	21.8
50-59	71	18.4
60+	79	20.5
Sex		
Male	199	51.6
Female	187	48.4
Total	386	100
Marital status		
Single	107	27.7
Married	216	56.0
Divorced	48	12.4
Widowed	15	3.9
Educational Qualification		
Non formal education	84	21.8
Primary	75	19.4
Secondary	135	35.0
Tertiary	192	49.7
Total	**386**	**100**

Source: Field survey, 2019

Indigenous methods used by farmers in preventing postharvest losses of mango fruits

Table 2 presented indigenous methods of post-harvest preservation of mango fruits in the study area. The table has shown that most 70.2% of the farmers preserved mango fruits using "open air method'. This was followed by 12.4% of the farmers who used "pit method" and 9.1% of them used "hot water method". Lastly, 8.3% of the farmers were found to have used "hut preservation method"

Majority of the key informants noted that, mangoes are usually preserved by open air, dug pits, hut and hot water and potting methods. One of the key informants said:

"...mangoes were preserved first harvesting the fruits in mature but unripe form and preserved. Then ashes is applied and stored in clay pots...but generally we use open air system where the fruits harvested in mature but ripe state and placed in open space where there is free flow of air...some farmers preserve mangoes in dug pits and traditional huts while other preserve the fruits by applying hot water on them..."

(Key informant Interview, 2019)

These findings have been corroborated by some studies. Lakshminarayana *et al.,* (1970) showed that mangoes were preserved by plucking them at mature but unripe stage. This is also consistent with studies by Akurugu *et al* (2016), which found that farmers preserved mango fruits by keeping them in a cool open aired environment after harvesting. Studies by Weor (2007) and Korir *et al* (2014), also found that local farmers preserved mango fruits in huts or barns. The process involved harvesting the fruits at semi ripe stage and heaping them on the floor in a hut or barns constructed wood and bushes. Furthermore, Agyapong (2013) revealed that farmers preserved mangoes by exposing them to cold air

Table 2: Indigenous Methods of preventing post-harvest losses of mango fruits farmers

Preservation Methods	Frequency	Percentage
Open air method	271	70.2
Pit method	48	12.4
Hot water method	35	9.1
Hut method	32	8.3
Total	**386**	**100**

Source: Field survey, 2019

Efficacy of Indigenous Methods in Control of Post-harvest Losses of Mango Fruits

In Table 3, the rating of the methods was based on their degree of efficacy, majority of the farmers, 60.9%, gave moderate rating, followed by 17.1% who rated the methods high, then 15.5% gave the methods low rating. Furthermore, 6.5% of the respondents did not respond to the question.

On quality control, majority 58.8% of the farmers revealed that they use indigenous methods to control deterioration of mangoes in large quantities, 8.8% of them used the methods to maintain freshness of the fruits, 7.8% of the farmers indicated using the methods to avoid shrinking of the fruits and 7.2% of them revealed utilising the methods to prevents the fruits from attacks by animals and insects. Still 17.4% of the farmers did not respond to the question.

On the period of preservation, the Table indicated that the indigenous methods are capable of preserving mango fruits from 7 to 14 days before they could start to spoil with majority 58.0% of the respondents attesting to this. This was followed by 16.6% of the respondents who affirmed that the methods could only preserve mangoes for a period of below 7 days and lastly 8.0% of the farmers acknowledged the methods could preserve the fruits for a period more than 14 days as 17.4% of the farmers did not respond to the question.

Most of the key informants agreed that prevention of postharvest losses in mangoes begin with harvesting the fruits at a mature but unripe stage. Washed or not washed with water depending on the variety and preserved in open air, hut, pit, hut or hot water.

A female key informant in Mbakper council ward in Gboko, Local Government Area further said:

...we preserve all varieties using open air method ...all varieties may be washed before preservation except, Julie and Hindi varieties...Julie tend to shrink when washed...Hindi become blackened from the out layer when washed with water....hot water method works on all varieties we produce except Hindi...hut method works more on Peter variety, but other varieties are also preserved in huts...Pit method works on all varieties particularly the Local variety ...Potting method is used on all the varieties and is effective in maintaining freshness of mango fruits...

(Key Informant Interview, 2019)

Another key informant in Usar Council ward in Kwande Local Government Area said:

...Practice of harvesting mangoes at mature and unripe stage is important...fully ripe mangoes are vulnerable to attacks by insects

such as wasps and bats...this practice prevents this occurrence...fully ripe varieties such as Peter will start to rot on the mouth as it is maturing and a fully ripe Peter will not give you the excellent taste compared the fruits which are harvested matured, unripe and preserved...Julie variety develops bumps inside the eatable tissue when it fully ripens on the tree...Hut and pit method also prevents insects such as wasp and other animals such as sheep, goats and cattle from eating the fruits...

The above findings corroborate Akurugu *et al* (2014) investigation which showed that mangoes harvested at mature but unripe (green) increased shelf stability and increased their fresh market life. Weor (2007) also found that indigenous method of storage of mango fruits especially Peter variety in environment such as hut "increased storability" of the fruits for a period of more than fifteen days after harvest. This seemed to suggest that hut storage had positive impact on preservation of the fruits since the storage life of mangoes is limited to 2–3 weeks even when scientific methods were used under favourable conditions (Yahia 1998a). Potting method was found to be effective preventing attacks from pests and animals. The method appears to be similar with use of chemical which is used to treat fungicides attacks in mango fruits. Fungicide known as Prochloraz is used in treating mangoes from fungicides infections (Cavelier, Pineau, and Prunier, 1994). However, efficacy and application of the fungicide is scientifically proven while the efficacy of application of ashes before potting is not yet determined scientifically.

Table 3: Efficacy of indigenous methods of preventing post-harvest losses of mangoes

Responses	Frequency	Percentage
Rating of Efficacy		
High	66	17.1
Moderate	235	60.9
Low	60	15.5
N/A	25	6.5
Total	386	100
Quality control		
Control decay in large Quantities	227	58.8
Maintain Freshness	34	8.8
Avoid Shrinking	30	7.8
Prevent attack by animals and insects	28	7.2
N/A	67	17.4
Total	386	100
Period of Prevention		
Below 7 days	64	16.6
7-14 days	224	58.0
More than 15 days	31	8.0
N/A	67	17.4
Total	386	100

Source: Field survey, 2019

CONCLUSION

The indigenous methods preventing postharvest losses of mango fruits included open air method, pit method, hot water method, hut preservation and potting method. The methods begin with harvesting of the mangoes at mature but unripe stage. The methods achieved moderate rating in their efficacy and preserved the fruits and prolonged shelf life mostly from 7 to 14 days. The indigenous methods main prevented the quantity of losses of mangoes rather than ensuring and maintaining quality of the fruits. Open air method guaranteed preservation of large quantities of fruits and was suitable for all mango varieties produced in the area. Pit preservation protected the fruits from being attacked by insects and animals while maintaining the quality of the fruits. It is used for preserving all varieties especially the Local cultivar. Hot water method appeared to slow down decaying process in the fruits while contributing less to ensuring quality of the fruits. The method worked for all varieties except Hindi variety but was more effective for preserving the Peter variety. Hut preservation increased quality of shelf life of the fruits, while also ensuring preservation on large quantities. The method was efficacious for storing all the varieties especially Peter and Local varieties. Potting method was found to have maintained freshness of the fruits. It was effective in preventing losses on all mangoes' varieties.

RECOMMENDATIONS

a. There is the need to develop open air method since it has been found to contribute to prevention of mass quantities

of mangoes. This should be responsibility of indigenous mango scientist in Nigeria.

b. To ensure qualitative preservation of mangoes, the farmers need to adopt potting method which appears to maintain quality of mangoes by ensuring freshness of the fruits. The Agricultural Extension Officers have a responsibility to ensure that farmers appropriate methods to reduce quantitative and qualitative losses in mango fruits.

c. The indigenous methods need to be scientifically tested in order to determine best conditions under which they can be utilised for improved efficacy of the methods.

REFERENCES

Agyapong, M. (2013) Evaluation Of The Post Harvest Handling Of Mango Fruit (Mangifera indica L.) IN The Akwapim-South, Dangme-West, Lower Manya And The Yilo Krobo Districts Of Ghana. Unpublished Thesis. Institute of Distance Learning, Department of Horticulture, Kwame Nkrumah University of Science and Technology

Akimbamowo, R. O. (2013) Some Challenges in the Mechanization of Mango Harvesting in Nigeria. *Proceeding of the Nigerian Institute of Agricultural Engineers*, vol 24

Aveno, J. L., and Orden, M. E. M. (2004). Hot water treatment of mango: A study of four export corporations in the Phillipines. 4 (1). ISSN: 1685-2044.

Akurugu, G. K., Olympio, N. S., Ninfaa. D. A., Karbo, E. Y. (2016) Evaluation of Post-harvest Handling and Marketing of Mango (*Mangifera Indica*) in Ghana; A Case Study of Northern Region, *Quest Journals Journal of Research in Agriculture and Animal Science* Volume 4 ~ Issue 5 (2016) pp: 04-09

Altendorf, S. (2016) Global Prospects For Major Tropical Fruits: Short-term outlook, challenges and opportunities in a vibrant global marketplace, Food Outlook: Special Feature, November, 2017

Aluma, J. R. (2005). Integration of Indigenous knowledge in agricultural and health development process in Uganda. *National Agricultural Research Organisation (NARO)*, Entebbe, Uganda.

Baul, A., Dhal, N. K, and Mukherjee, S. M. (2015) Indigenous Techniques of Mango (Mangifera Indica L.) Processing and Preservation in By the Khonda Tribes of Rayagada District, Odisha, *Indian Journal of Tropical Medicine Plants. Vol 15 (Dec, 2015)*

Benue State Government (2015) Our Collective Vision For A New Benue- "In God We Trust" Makurdi: Benue State Government.

Benue state Ministry of Agriculture (2015). *Annual Production and Post-harvest Losses of Fruits and Vegetable, Makurdi*: Benue state Ministry of Agriculture.

Benue State Agricultural and Rural Development Authority, (2006) *National Special Programme for Food Security in Benue State, Makurdi:* BNARDA.

Cavelier, N., Pineau, C., & Prunier, M. (1994). Characteristics of Pseudocercosporella herpotrichoides isolates resistant to prochloraz. Br. Crop Protection Conference. Monograph, 60.

FAOSTAT. (2016). *FAO Statistics, Food and Agriculture Organisation of the United Nations,* Rome, Italy. http://faostat.fao.org/

Horsthemke, K (2004) Indigenous Knowledge: Conceptions and misconceptions. *Journal of Education,* No. 32

Kay, J. S. and Pallas J. E. (1991) Postharvest Physiology of Perishable Plant Produce. University of Georgia, USA.

Korir, K., Mutwiwa, U., Kituu, G. M. and Sila, D. N. (2014) *Assessment of Post-harvest Challenges Of Mango Fruits In Upper Athi River Basin, Kenya*. Jomo Kenyatta University of Agriculture and technology. Annual Scientific Conference, 315

Maloba, S., Ambuko, J., Hutchinson, M., and Owuni, W. (2017) Offseason Flower Induction in Mango Fruits Using Ethephon and Potassium Nitrate. Journal of Agricultural Sciences. Vol 9 (9) pp 158-167

Mella, E. E. Kulindwa, K., Shechambo, F., Mesaki, S. (2007). *The integrated assessment of organic agriculture in Tanzania: policy options for promoting production and trading opportunities for organic agriculture*. from http://www.unepunctad.org/cbtf/publications/Integrated%20Assessment%20of%20the%20OA%20Sector%20in%20Tanzania.pdf. Retrieved May 21, 2020.

Nyishir, S. A. (2004). Mango variety production, marketing, and consumption among households in Benue State. PGD Thesis, Department of Agricultural Extension, University of Nigeria, Nsukka.

Risiro, J., Mashoko, D., Tshuma, D., T., and E., R. (2012). "Weather Forecasting and Indigenous Knowledge Systems in Chimanimani District of Manicaland, Zimbabwe." *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)* 3 (4): 561-566.

Sambe, N., Ikwuba, A.A., Sugh, E.T. (2019) Utilisation and Challenges of Indigenous Methods of Preservation of Mango Fruits in Tivland. Production Agriculture and Technology (PAT) Vol. 15 (2) pp. 91-101

Ugese, F. D., Iyango P. O. and Swem T. J (2012) Mango (*Mangifera Indica* L.) Fruit Production and Production Constraints in Gboko Local Government Area of Benue State. *Production and Agricultural Technology: June; 8 (1): 164 -174; ISSN: 0794-5213.*

Weor, D. U. (2007). Effects of Various Harvesting Methods and Storage Environments on the Storability of Peter Mango Fruits in Gboko, Benue State, Nigeria. *Journal. of Sustainable Development*

Wills, R. B. H., McGlasson, W. B., Graham, D., Lee, T. H. and Hall, E. G. (1989). Postharvest: An Introduction to the Physiology and Handling of Fruits and Vegetables, 3rd Edn Sidney: (NSW Univeristy Press.

Yahia, E. M. (1998a). *Post-harvest handling of mangoes. Technical Report. Agricultural Technology Utilisation and Transfer Project, Giza, Egypt*. http://www.atut.gov.eg. Accessed 04.04.2016

GENDER ASSESSMENT OF MIGRANTS' LIVELIHOOD CHOICE IN COCOA PRODUCING COMMUNITIES OF ONDO STATE, NIGERIA

Faborode, H. F. B. and Fakoyede, F. D.
Department of Agricultural Extension and Rural Development, Obafemi Awolowo University, Ile-Ife
Correspondence contact details: hfbfaborode@yahoo.com; 08039286506

ABSTRACT
Gender disaggregated data on migrant livelihood choice has been poorly documented despite the crucial role played in filling the critical labour gap created by youth outmigration from cocoa producing communities of Ondo state. The study assessed the male and female migrants' livelihood choice in Ondo state, Nigeria. Multi-stage sampling procedure was used to select 220 respondents and structured interview schedule was employed to obtain information on socioeconomic characteristics, choice of on farm, off farm and non-farm livelihood activities. Data were summarised using descriptive (percentages, mean and standard deviation) and inferential (t-test) statistics. Results revealed that 51.4 percent and 48.6 percent of the respondents were male and female with mean ages of 44.6 ±13.3 and 42.0±13.3 years respectively. The highest number of male (72.6%) were involved in 6 to 10 on-farm livelihood choices with cassava production (92.9%) being the specific choice. While (39.3%) of the female migrants were involved in one off-farm livelihood choice with agro processing (29.0%) being the specific off farm choice. Both genders had moderate level of livelihood choice and there was significant difference ($t= 1.988$; $p\leq 0.05$) between male and female overall choice. To achieve the social and economic aspirations of the male and female migrants, it is recommended that their livelihood options be expanded particularly in the area of off-farm and non-farm activities.
Keywords: Livelihood choice, Migrant farmers, Cocoa-producing communities

INTRODUCTION

The important roles played by migrants in the economy of farming communities in sub-Saharan Africa cannot be over emphasised. The movement of many rural youth in Nigeria to urban centres for better opportunities and its adverse effects on the structure and composition of rural population, agricultural labour force, local food production, agricultural exports and future economic surplus in agriculture has been reported (Osita-Njoku and Chikere, 2015; Mbah, Ezeano and Agada, 2016). However, more evidences continue to emerge on the movement of more people to rural communities from neighbouring rural areas or urban centres in search of new farmland, employment opportunities for engagement after retirement from civil service or seeking refuge from ethnic/religious crises (Carl LeVan, Hassan, Isumonah, Kwaja, Momale, Nwankwor, and Okenyodo 2018). Of particular interest is the attraction of migrants to the rural communities well known for cocoa production from various towns, cities and even countries seeking to explore the numerous opportunities which the crop has to offer (Rural Access and Agricultural Marketing Project, 2018).

Cocoa is a perennial tree crop that grows in humid, tropical forest areas, preferably in shaded areas where it is usually intercropped, most commonly with annual crops (Löwe, 2017). Despite its challenges internally and in the world market, cocoa is still the highest foreign exchange earning crop in Nigeria, with Ondo State having the largest production (National Bureau of Statistics, 2011). The cocoa sub-sector also offers many employment opportunities in production, marketing and processing of the commodity for local use and export (Akanni and Dada, 2012). The rural communities including those producing cocoa are characterised by aging population due to lack of youth interest in agriculture and preference for life in the urban centres.

The migrants play significant roles in cocoa production and engaged in diverse activities and enterprises (Ogbanje, Chidebelu and Nweze, 2014). This strategy known as livelihood diversification provide them with opportunities for livelihood choice to generate better income, improve their standard of living and help them cope with the risks associated with agricultural production (Farinde, Yusuf, Adisa, Faborode, Obatolu and Gowing, 2015).

Livelihood choice is an important determinant of the composition of labour market and consequently the growth and development prospects of any nation (Borodak and Piracha, 2011). Choices made freely enhance economic efficiency but those made due to discriminating opportunities may lead to low participation in economic activities (Nasir, 2005). Gender-based discrimination in livelihood choice has thus been implicated as detrimental to development. The livelihood choice in rural communities can be categorised into three namely, on-farm, off-farm and non-farm activities. Livelihood choice also known as occupational choice or work activity choice is the employment options that individuals can engage in to provide for their needs (Hartwig, 2018). On-farm agricultural activities especially in crop production are seasonal in many parts of Nigeria (Adesugba and Mavrotas, 2016). Off-farm activities are related to agriculture but take place outside the farm location; they include processing agricultural produce. Also, non-farm livelihood activities are any form of employment outside the agricultural sector in manufacturing or service sector irrespective of location, function or degree of processing involved (Bezu, Barrett and

Holden, 2014**).** It is also referred to as a silver bullet panacea for employment in rural households (Lambon-Quayefio, 2017).

Several empirical studies have examined migrants' livelihoods. The analysis of rural livelihood choice is intricate because it involves a complex web of activities and interactions (Rahman and Akter, 2014). The concept of livelihood choice has been operationalised in literature using several approaches. Nasir (2005) in the analysis of occupational choice in Pakistan used multi-nominal approach that individual choice is based on personalities, capabilities and more importantly, the norms and values of the society. Similarly, Yendaw, Tanle, and Kumi-Kyereme, (2019) analysed the livelihood activities of itinerant West African migrant traders in the Accra Metropolitan Area of Ghana while Adisa, Alao and Famakinwa (2016) described the livelihood patterns among migrant youths in rural communities of Osun State, Nigeria.

In spite of the crucial role played by male and female migrants in cocoa producing communities of Ondo state to fill the existing labour gap created by the outmigration of youth, limited gender disaggregated data exist on migrants' livelihood choice. The study described the socio-economic characteristics of migrants in the study area, examined the specific livelihood choices of male and female migrants and determined the overall level of livelihood choice of male and female migrants in the study area. It is on this premise that this paper focused on gender assessment of migrants' livelihood choice in cocoa producing communities of Ondo State with a view to promoting gender equity in livelihood opportunities for wealth creation.

METHODOLOGY

The research was carried out in Ondo state, Nigeria which lies in the rainforest zone and enjoys luxuriant vegetation in the south and sub-savannah forest in the north. Multi-stage sampling procedure was used to select the respondents, who are non-indigene and made a living in enterprises along the agricultural value chain. At the first stage, five Local Government Areas (LGAs) from the total number of eighteen in the state were purposively selected, based on high cocoa production. At the second stage, two communities were purposively selected from each of the selected LGAs based on the preponderance of cocoa production, to make a total of ten communities. At the third stage, twenty-two migrants were selected from each community using snowball technique to aid easy identification of 220 respondents. Using structured interview schedule, data were obtained from 113 and 107 male and female migrants respectively.

The dependent variable of the study is the livelihood choice of male and female migrants. The specific livelihood choice of male and female migrants were identified from three livelihood categories namely on-farm, off-farm and non-farm activities. It was measured by calculating the total livelihood choice score for each respondent from the three livelihood categories. Respondents indicated the livelihood activities of their choice and each of the choice was scored one. The total scores were added to obtain livelihood choice score of 22 (on-farm activities) + 5 (off-farm activities) + 23 (non-farm activities). The maximum obtainable score for the number of livelihood choice activities was 50 points while the minimum was one point. Using equal interval, the livelihood choice was categorised as low, moderate and high. Values lower than 16.33 was adjudged low, between 16.33 and 32.67 was moderate while above 32.67 was adjudged high.

Data were subjected to Statistical Package for the Social Sciences (SPSS) version 20. Descriptive (frequency, percentage, mean) and inferential (t-test) statistics were used to summarise and draw inferences.

RESULTS AND DISCUSSION

Socioeconomic characteristics migrants

Results in Table 1 show that 51.4 percent and 48.6 percent of the respondents were male and female respectively. The average household size of both male and female migrants was six people. Also, both male and female migrants had small mean farm size of two hectares which made them small holder farmers. This may be due to the migrants' traditional restriction of access to land. This infers that if necessary, interventions are not put in place to make land available to the migrants, their aspiration for economic gain may never be achieved.

Also, more female (65.4 %) than male (37.2 %) made monthly income of less than N 15,000 while the average monthly income for the male was N38,314.16. Evidently, both gender earned low income, but the female earned less. Gender differentiation in income has been reported in many literature (Olaniyi, 2018). Also, both male and female had preference for joint arable and tree crop production while the production of arable crop only was practiced by very few male (7.1%) and female (23.4%). The inference from this finding is that arable crops were used by tree crop farmers to complement their income especially at off-season period.

Further analysis showed that six information sources were identified by the respondents which include friends, local market and ODSADEP extension agents. Friends were the most preferred source of information by most (86.7%) male while majority (91.6%) of the female had preference for local market. The state extension service was ranked a distant third by both male and female. It thus infers that the migrants had preference for informal sources of information.

Table 1: Distribution of male and female migrants by socio-economic characteristics in cocoa producing communities

	Male (n =113)			Female (n =107)		
Variables	**Freq.**	**%**	**Mean±SD**	**Freq.**	**%**	**Mean±SD**
Sex	113	51.4		107	48.6	
Household size (people)						
<6	56	49.6		47	43.9	
6 – 10	46	40.7		55	51.4	
>10	11	9.7	6.19±3.25	5	4.7	6.4±2.7
Total farm size (hectares)						
<1	30	26.5		50	46.7	
1 – 2	35	31.0		32	29.9	
>2	48	42.5	2.2±0.8	25	23.4	1.8±0.8
Monthly income (N)						
<15,000	42	37.2		70	65.4	
16,000 – 40,000	28	24.8		18	16.8	
41,000 – 65,000	17	15.0		12	11.2	
65	9	8.0		5	4.7	
>60,000	17	15.0	38,314.16±34,113.81	2	1.9	20,633.96±17,264.14
Primary occupation						
Arable and tree production	72	63.7		40	37.4	
Arable production only	8	7.1		25	23.4	
Wage labour	25	22.1		3	2.8	
Agro-marketing	0	0.0		14	13.1	
Petty trading	1	0.9		8	7.5	
Agro-processing	1	0.9		7	6.5	
Others	5	4.5		17	9.3	
Information sources*						
Friends	98	86.7		96	89.7	
Local market	73	64.6		98	91.6	
ODSADEP extension agents	48	42.5		19	17.8	
Radio	27	23.9		9	8.4	
Employers		22	19.5		8	7.5
Others	33	29.2		7	6.5	

Freq. = Frequency; SD = Standard Deviation
*Multiple responses
Source: Field Survey, 2019

The results in Table 2 reveal that some (40.7 % and 42.1 %) male and female migrants were from the Southwestern part of the country while smaller proportions were from other parts of the country. The predominance of migrants from the Southwestern zone and the homogeneity of culture with the host communities can enhance their integration. Greater proportions (77.0 % and 64.5 %) of male and female migrants respectively attributed their migration to availability of employment opportunities in their host communities. These findings are in consonance with the findings by Agu, Orji and Onodugo (2017) which revealed that prospects of employment opportunities were the main reasons for migration in Nigeria. This infers that these reasons were germane to their economic development. Greater proportions of male (77.0%) and female (64.5%) migrants attributed their decision for migration to availability of employment opportunities. Other reasons for migration include agricultural land by 32.7 percent of male and marriage by 35.0 percent of female.

Table 2: Distribution of male and female migrants by personal characteristics in cocoa-producing communities

Variables	Male (n = 113)		Female (n = 107)	
	Freq.	%	Freq.	%
Geopolitical zone				
Southwest	46	40.7	45	42.1
South South	40	35.4	34	31.8
North Central	14	12.4	18	16.8
Southeast	13	11.5	10	9.3
Favourable reasons for migrating				
Employment opportunities	87	77.0	69	64.5
Agricultural land	37	32.7	17	15.9
Marriage	0	0.0	38	35.0
Friends, families/relatives	12	10.6	6	5.6
Others	17	15.0	4	3.7
Unfavourable reasons for migration				
Lack of employment	39	34.5	27	25.2
Inadequate agricultural land	21	18.6	9	8.4
Family crisis	6	5.3	6	5.6
Lack of fund for business	6	5.3	1	0.9
Others	24			
Membership of organisation*				
Professional association	48	42.5	31	29.0
Cooperative societies	23	20.4	23	21.5
Indigene-based group	19	16.8	16	15.0
Religious association	12	10.6	9	8.4

The choice of on-farm livelihood activities of male and female migrants

Three categories (arable crop, tree crop and livestock production) of on-farm livelihood choice were identified by the respondents. The total number of specific on-farm livelihood choice was 22. Most male (72.6%) and female (56.1%) had 6 to10 specific livelihood choice with means of 6±1.8 and 5±2.3 respectively. Cassava, yam and maize were the leading arable crops grown by majority of the male (92.9%, 78.8 % and 73.5 %) and female (88.8 %, 72.9 % and 64.5 %). Cocoa was the only specific choice among the tree crops preferred by most male (90.3%) and female (63.6%).

These results revealed a major shift in rural household gender relations with changing roles produced by the changing economic opportunities in crop production. Based on the norms in rural communities, men were traditionally believed to be responsible for providing the household income and should grow 'cash' crops such as cocoa (Guendel, 2009), yam and maize. Cassava production was mainly for household consumption and a female crop which is fast becoming an economic crop and the male have gained more prominence in its production. The female may soon become irrelevant in its production if actions are not taken to ensure equity, bearing in mind the female's limited access to production resources.

With more equitable access to productive resources, the livelihood choice of both gender would increase, bridge the gender gap in rural household economy, enhance food security and rural development. Further analysis also revealed that livestock production was not a popular choice of both genders. Only very few (0.0% to 3.5%) male and female (0.0% to 0.9%) engaged in poultry, small ruminants, and pigs. This implies that livestock production remains an untapped potential in rural economy, most especially by the female who were known to have traditionally supplemented household income with backyard livestock production. (Sonaiya and Swan, 2004).

Table 3: Gender disaggregated data on migrants' choice of on-farm livelihood activities

Variables	Male			Female		
	Freq	%	Mean±SD	Freq	%	Mean±SD
On-farm livelihood activities (Number of choices) **						
≤ 5	25	22.1		41	38.3	
6 – 10	82	72.6		60	56.1	
>10	6	5.3	6±1.8	6	5.6	5±2.3
On-farm livelihood activities (Specific choice) *						
Arable crop production						
Cassava	105	92.9		95	88.8	
Yam	89	78.8		78	72.9	
Maize	83	73.5		69	64.5	
Cocoyam	56	49.6		40	37.4	
Vegetable	19	16.8		33	30.8	
Pepper	20	17.7		30	28.0	
Plantain	24	21.2		23	21.5	
Melon	14	13.1		23	21.5	
Sweet potato	7	6.2		5	4.7	
Pineapple	3	2.7		3	2.8	
Cowpea	1	0.9		0	0.0	
Tree crop production						
Cocoa	102	90.3		68	63.6	
Kolanut	46	40.7		36	33.6	
Oil palm	39	34.5		18	16.8	
Orange	23	20.4		11	10.3	
Cashew	8	7.1		8	7.5	
Coconut	3	2.7		2	1.9	
Pear	3	2.7		2	1.9	
Pawpaw	0	0.0		1	0.9	
Livestock production						
Poultry	4	3.5		1	0.9	
Small ruminants	2	1.8		0	0.0	
Pig	0	0.0		1	0.9	

Source: Field survey, 2019.
***** Multiple responses

The off-farm choices of male and female migrants

It is evident in Table 4 that the respondents engaged in five off-farm activities and only one choice was most preferred by 35.4 percent of male and 39.3 percent of female. On the specific choices, 29.2 percent male had preference for wage labour while 29.0 percent of female engaged in agro processing. The findings revealed that both male and female did not actively engage in off-farm livelihood activities. The inference from these findings is that many untapped potentials exist in off-farm livelihood activities that could enhance the economy of migrants' households.

Table 4: Gender disaggregated data on migrants' choice of off-farm livelihood activities

Variables	Male			Female		
	Freq	%	Mean ±SD	Freq	%	Mean ±SD
Off-farm livelihood activities (Number of choices) **						
1	40	35.4		42	39.3	
2	2	1.8		10	9.3	
3	1	0.9	0.4±0.6	2	1.8	0.6±0.7
Off-farm livelihood activities (Specific choices) *						
Wage labour	33	29.2		14	13.1	
Agro processing	6	5.3		31	29.0	
Agro marketing	2	1.8		22	20.6	
Lumbering	5	4.4		0	0.0	
Input supply	1	0.9		1	0.9	

Source: Field survey, 2019.
***** Multiple responses ****** Variables without values excluded

The non-farm livelihood choices of male and female migrants

Table 5 shows the highest numbers of male (27.4%) and female (37.4%) migrants engaging in only one non- farm choice. This implies that both male and female migrants mainly engaged in only one non-farm choice. Evidence on the choice of non-farm livelihood activities further revealed that only very few (6.2 %) male and female (16.8 %) engaged in petty trading as a livelihood choice followed by fewer male (0.9 %) and female (9.3 %) in tailoring. However, more female than male engaged in petty trading and tailoring. This also implies an untapped potential that could be used to bridge the existing gender gap in the economy of rural households.

Table 5: Gender disaggregated data on migrants' choice of non-farm livelihood activities

Variables	Male			Female		
	Freq.	%	Mean ±SD	Freq.	%	Mean ±SD
Non-farm livelihood activities (Number of choices) **						
1	31	27.4		40	37.4	
2	1	0.9	0.3±0.5	1	0.9	0.4±0.5
Non-farm livelihood activities (Specific choices) *						
Petty trading	7	6.2		18	16.8	
Tailoring	1	0.9		10	9.3	
Commercial motorcycling	5	4.4		0	0.0	
Food vendoring	0	0.0		3	2.8	
Hairdressing	0	0.0		3	2.8	
Bricklaying	3	2.7		0	0.0	
Teaching	2	1.8		1	0.9	
Commercial taxi driving	3	2.7		0	0.0	
Blacksmithing	2	1.8		0	0.0	
Welding	2	1.8		0	0.0	
Security personnel	2	1.8		0	0.0	
Nursing	0	0.0		2	1.9	
CHEW	0	0.0		1	0.9	
Phone sales/repair	1	0.9		0	0.0	
Barbing	1	0.9		0	0.0	
Carpentry	1	0.9		0	0.0	
Mechanic	1	0.9		0	0.0	
Basket weaving	1	0.9		0	0.0	
Soap making	0	0.0		1	0.9	
Admin staff (School)	1	0.9		0	0.0	
Glass work (Alumaco)	1	0.9		0	0.0	
Cloth weaving	0	0.0		1	0.9	

Source: Field survey, 2019.
***** Multiple responses

The difference between male and female migrants' livelihood choices

Figure 1 shows that about half of male (62.2%) and (60.5%) female migrants had moderate level of livelihood choice, while 31.6 percent of male and 34.9 percent of female had low level of livelihood choice. Only few (6.2%) male and (4.7%) female had high level of livelihood choice.

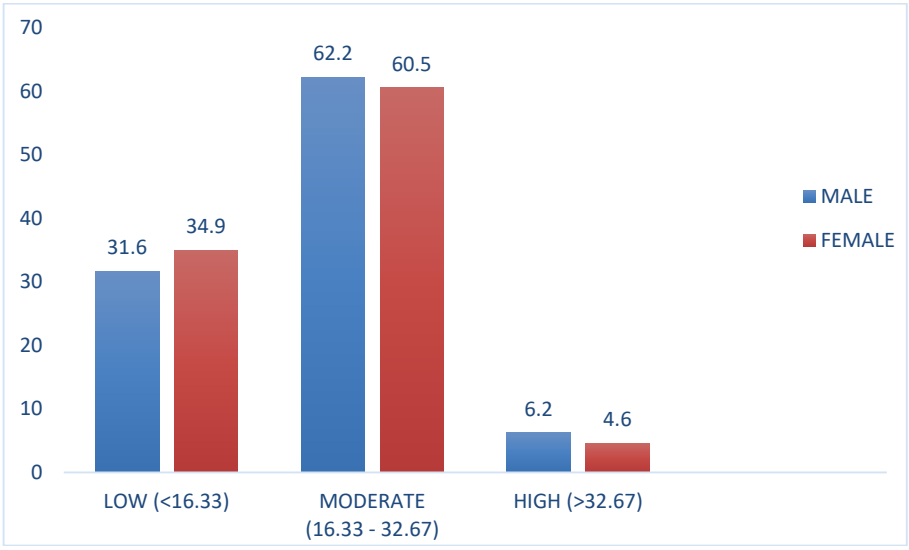

Figure 1: Overall level of livelihood choice between male and female migrants

The results of independent t-test analysis presented in Table 6 show significant difference (t= 1.988; p≤ 0.05) exist in overall livelihood choice of male and female migrants in the study area. This result supports the findings of Oyesola, Olujide, and Oladeji (2006) that significant difference exists in economic activities of male and female rural dwellers of Irewole Local Government Area, Osun state, Nigeria.

Table 6: Results of independent t-test analysis of overall livelihood choice of male and female migrants

	Levene's test for quality of variance		t-test for equality of means				
	F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean diff**	**SEM**
Migrants' livelihood choice	0.001	0.977	1.988	218	0.04	7.047	3.544

Level of significance = 0.05
SEM = Standard Error of the mean; Sig. = Significant level
Source: Field survey, 2019

CONCLUSION AND RECOMMENDATIONS

The male and female migrants in the study engaged in diverse livelihood activities (on-farm, off-farm and non-farm). However, there was over dependence by both male and female on on-farm activities with limited diversification into off-farm and non-farm activities. Generally, there was moderate level of overall livelihood choice of both male and female migrants although more male than female were involved in on-farm activities but the female were more involved in off-farm and non-farm activities. To achieve the social and economic aspirations of the male and female migrants, it is recommended that their livelihood options be expanded particularly in off-farm and non-farm activities. To this end, sensitisation and training intervention programmes based on gender needs should be embarked upon by government and non-governmental agencies to empower the migrants in off-farm and non-farm enterprises for the enhancement of gender equity in household economy.

REFERENCES

Adesugba, M. and Mavrotas, G. (2016). Youth employment, agricultural transformation, and rural labor dynamics in Nigeria. International Food Policy Research Institute (IFPRI) Discussion Paper 01579. Retrieved on Friday 6th December, 2019 from: https://ypard.net/sites/default/files/resources/1.pdf

Adisa, B. O., Alao, O. T. and Famakinwa, M. (2016). Livelihood pattern among migrant youths in rural communities in Osun State, Nigeria. *Annals of Child and Youth Studies*, *7*(2), 27-42.

Agu, C., Orji, A. and Onodugo, V. (2017). Migration motivation, migrant characteristics and migration outcomes in Nigeria: Evidence from survey data. *International Journal of Economic Research*, *14*(3), 11-27.

Akanni, K. A. and Dada, A. O. (2012). Analysis of labour-use patterns among small-holder cocoa farmers in South Western Nigeria.

Journal Agricultural Science Technology, *2*(1), 107-113.

Bezu, S., Barrett, C. B. and Holden, S. T. (2014). Activity choice in rural non-farm employment (RNFE): Survival versus accumulative strategy. Centre for Land Tenure Studies Working Paper 11/14, 1-37.

Borodak, D. and Piracha, M. (2011). Occupational choice of return migrants in Moldova. *Eastern European Economics*, *49*(4), 24-46.

Carl LeVan, A., Hassan, I., Isumonah, V., Kwaja, C., Momale, S., Nwankwor, C. and Okenyodo, K. (2018). Study on marginalized groups in the context of ID in Nigeria National Identification for Development (ID4D) Project. Retrieved on Saturday 19th October, 2019 from: http://documents.worldbank.org/curated/en/922031561717650301/Study-on-Marginalized-Groups-in-the-Context-of-ID-in-Nigeria-National-Identification-for-Development-ID4D-Project.docx

Eshetu, F. and Mekonnen, E. (2016). Determinants of off farm income diversification and its effect on rural household poverty in Gamo Gofa Zone, Southern Ethiopia. *Journal of Development and Agricultural Economics*, *8*(10), 215-227.

Farinde, A. J., Yusuf, O. J., Adisa, B. O., Faborode, M. O., Obatolu, V. A. and Gowing, J. W. (2015). Towards enhancing rural women livelihoods in Southwestern Nigeria: A case study of Development for Partnership in Higher Education Project (Delphe Project 643), Lesson from a Development Project for Partnership in Higher Education Project. *Humboldt International Journal of Gender, Agriculture and Development*, *1*(1), 61-77.

Guendel, S. (2009). What are "women's crops" and why? Retrieved on Friday 6th December, 2019 from: http://www.fao.org/gender/insights/detail/en/c/36003/

Hartwig, F. (2018). Livelihood choices of youth group members in Ethiopia: The role of gender, education and the youth group membership. A published Master's thesis from the School of Economics and Business, Norwegian University of Life Sciences, Norway.

Lambon-Quayefio, M. (2017). Non-farm enterprises and the rural youth employment challenge in Ghana. *Institute of Development Studies' Bulletin*, *48*(3).

Löwe, A. (2017). Creating opportunities for young people in Ghana's cocoa sector. Overseas Development Institute. Working Paper 511, 1-39.

Mbah, E. N., Ezeano, C. I. and Agada, M. O. (2016). Effects of rural-urban youth migration on farm families in Benue State, Nigeria. *International Journal of Agricultural Research, Innovation and Technology*, *6*(1), 14-20.

McCarthy, N. and Sun, Y. (2009). Participation by men and women in off-farm activities: An empirical analysis in Rural Northern Ghana. International Food Policy Research Institute (IFPRI) Discussion Paper 00852.

Nasir, Z.M. (2005). An analysis of occupational choice in Pakistan: A multinomial approach. *The Pakistan Development Review*, 44(1), 57-79.

National Bureau of Statistics (2011). National Agricultural Sample Survey (NASS). Retrieved on Friday 6th December, 2019 from: http://nigeria.countrystat.org/documents/detail/en/c/454834/

Ogbanje, C. E., Chidebelu, S., and Nweze, N. J. (2014). Off-farm diversification among small-scale farmers in North Central Nigeria. *Journal of Economics and Sustainable Development*, *5*(13), 136-144.

Olaniyi, J. O. (2018). Gender analysis of the perceived effects of urbanization on farm families' livelihood status in Osun State, Nigeria. An unpublished M.Phil. thesis from the Department of Agricultural Extension and Rural Development, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

Osita-Njoku, A. and Chikere, P. (2015). Rural-urban migration and the underdevelopment in selected rural communities in Imo State, Nigeria. *British Journal of Education, Society and Behavioural Science*, *10*(1), 1-10.

Oyesola, O. B., Olujide, M. G. and Oladeji, J. O. (2006). Economic activities of migrant rural dwellers in Irewole Area of Osun State, Nigeria. *Tropical Agricultural Research and Extension*, *9*, 43-52.

Sonaiya, E. B. and Swan, S. E. J. (2004). Small-scale Poultry Production. FAO Animal Production and Health Manual. Food and Agriculture Organization of the United Nations Rome.

Rahman, S. and Akter, S. (2014). Determinants of livelihood choices: An empirical analysis from Rural Bangladesh. *Journal of South Asian Development*, *9*(3) 287-308.

Rural Access and Agricultural Marketing Project (2018). Resettlement policy framework: Final report. Retrieved on Friday 18th October, 2019 from: http://documents.worldbank.org/curated/e

n/719701539158233686/RPF-for-RAAMP-Cleared.docx

Yendaw, E., Tanle, A. and Kumi-Kyereme, A. (2019). Analysis of livelihood activity amongst itinerant West African migrant traders in the Accra metropolitan area. *Journal of Global Entrepreneurship Research*, *9*(11), 1-21

RECORD KEEPING IN MICRO-LIVESTOCK FARM MANAGEMENT IN SOUTHWEST NIGERIA

Fadairo, A. O., Amusat, A. S. and Popoola, Y. A.
Institute of Agricultural Research and Training (IAR&T), Obafemi Awolowo University,
Moor plantation, Ibadan.
Correspondence contact details: anjolaorefadairo@gmail.com; 08036225908

ABSTRACT
Re-emerging micro-livestock diseases is a threat to food security among low-income earners in Africa and can be significantly curtailed with efficient farm record keeping. However, several factors mitigate comprehensible record keeping in micro livestock production in southwest Nigeria. This study identified factors associated with record keeping in biosecurity measures among micro-livestock farmers in Southwest Nigeria. This study sampled 81 grass-cutter and rabbit farmers in Ekiti, Oyo and Ogun States through a multi-stage sampling procedure. Data on personal characteristics of farmers, knowledge, constraints, and regularity of record keeping were obtained with the use of structured questionnaire. Results were presented in tables and chats while relationships among variables were determined with the use of Chi square. Total mean age of respondents was 45 years. Respondents were able to communicate in English (95.1%) and Yoruba (82.7%) respectively. Knowledge of pen liter disposal record was highest (74.1%) among farmers. Record on feed production and feeding ($\bar{x}$= 3.9) ranked highest while record of infection was lowest ($\bar{x}$=2.33) in micro-livestock farm management. Size of flock (χ= 9.25; $p < 0.05$), proficiencies in English ($\chi = 8.76$; $p < 0.05$) were significant variables in record keeping for biosecurity in micro-livestock farm management. The study recommends regular training on simple record keeping procedures that is convenient for both literate and non-literate livestock farmers in ensuring biosecurity.
Keyword: Micro-livestock, record-keeping, farm management, biosecurity,

INTRODUCTION

Prevalence of infectious animal diseases has posed a key challenge for global livestock production (Kompas, Nguyen and Ha, 2015) Biosecurity is a comprehensive infections management practices, and has a serious implication for farmers due to its dimensions of effectiveness (Mehmet, 2018). Occurrence and spread of animal diseases can be because of intrinsic weaknesses in management practices and extrinsic factors along the livestock production value chain and the environment (Oladele, Kolawole and Antwi, 2013). The increasing threat from mostly re-emerging livestock diseases in the past few years is of major concern to livestock protein availability especially in low-income households. According to Oladele *et al,* (2013) the re-occurring decimals of livestock disease outbreak effect is summarized in the physical, economic, social, health and psychological devastating impacts it has on immediate stakeholders in the livestock industry and the larger population as well. Kelly (2021) affirmed that the re-emerging, mostly zoonotic infectious diseases in livestock and human population is the consequence of demographic shifts in populations, climate change and food availability among others. Whatever is the causative factor, the increasing cases of protein malnutrition and decreasing food availability in households is a major concern for a sustainable development. A major source of protein in most households is animal protein which often are sourced from backyard livestock rearing. Micro livestock production is popular for the reason of food security among low-income households in Nigeria (Ogunniyi, Oluwafemi, and Adepoju, 2015) and will alleviate protein deficiency in most of the population in sub-saharan Africa (Asan 2013).

Micro-livestock is a term coined for species of livestock that are inherently small. These miniature animals are seldom considered in the broad picture of livestock development, but they seem to have a promising future, especially in developing nations or wherever land is scarce. Micro-livestock has been described as an asset in low-income households (Klapwijk, Schut, Van Asten, Vanlauwe, Giller, and Descheemaeker, 2020). Increased cases of food scarcity and obvious shortage in protein diet in Africa because of high vulnerability to climate change (Thompson, Berrang-Ford, and Ford, 2010), religious and ethnic crises, increase in human population has necessitated the rearing of micro-livestock by farmers. The numerous advantages of micro-livestock which include rapid reproduction rate which guarantee a readily acceptable meat on short time basis, relatively smaller pen size and little capital investment are a lot of encouragement to small holder farmers. These attributes make micro-livestock a significant contributory factor to food security in Africa households (Ogunniyi *et al,* 2015; Ali and Khan, 2013).

Micro livestock production has contributed significantly to animal diet and household income in Nigeria (Popoola, Banjoko, Kehinde, Olupona, Fayemiwo, Durotoye, Harry, and Omole, (2020). Raising of micro livestock by rural households is becoming popular due to the fact that the households have realized the need to diversify their source of income, thereby reducing the risk involved in depending on crop production as the main source of income. Such micro-livestock widely bred in Africa include grass-cutters, snails, rabbits, quail among others (Asan, 2013). These have been used as a replacement to conventional animal protein like

beef, pork and goat meat due to economic down-turn and increased awareness of importance (Ogunniyi *et al,* 2015).

The most common of the micro livestock in southwest Nigeria is the grass cutter and rabbit production (Popoola *et al,*2010) and are not left out in the incidences of emerging and recurring diseases such as cholera, diarrhea and mycotoxicosis which are caused by poor farm management. Such identified diseases affecting the micro livestock are posing a significant threat to its continued production especially among low-income household necessitating an efficient management system. Corroborating this opinion, Hernández-Jover, Gilmour, Schembri, Sysak, Holyoake, and Beilin, (2012) concluded that understanding of disease is an essential component of passive surveillance. Factors such as knowledge, beliefs, attitudes, and intentions influence individual's decision making for curtailing diseases among intending micro-livestock farmers. This position implies the high contributions of attitudinal issues and knowledge of effective livestock management is key to controlling diseases outbreak in livestock farms. Such management system includes record keeping. In Nigeria, most farmers do not attach a great deal of importance to record keeping in their farming operations, and only few literate farmers take pain to partially take record (Dudafa, 2013).

Regular monitoring of flock health and activities contributes enormously to the sustainability of flock with a low disease incidence (Alalade, Olorunfemi, Olaoye, Ladipo, and Yusuf, 2018). Grass-cutter and rabbit farming are profitable ventures in both rural and urban areas in southwest Nigeria. There has been concerted efforts by research institutes such as Institute of Agricultural Research and Training (IAR&T) at creating awareness on record keeping and biosecurity measures for livestock management in southwest Nigeria. However, how much do micro-livestock farmers know about biosecurity, what are possible challenges to biosecurity record keeping in grass cutter and rabbit farming and how does these affect record keeping in farm management biosecurity measures? This study hypothesized a relationship in the educational status, constraints faced and frequency of record keeping in micro-livestock farm management. Thus, concluding on factors that predisposes micro-livestock to emerging and re-emerging diseases.

Objectives of the study are;

1. Identify the personal characteristics of micro-livestock farmers
2. Determine the knowledge of biosecurity measures among micro-livestock farmers
3. Investigate the frequency of record keeping in micro-livestock farms
4. Identify major challenge to record keeping among micro-livestock farmers

METHODOLOGY

Multistage sampling procedure was used to identify grass cutter and rabbit farmers in the zone. The first stage involves a random selection of three states (Ogun, Oyo and Ekiti States) in Southwest Nigeria. The second stage is the purposive selection of two peri-urban Local Government Areas (LGAs) in each state, making a total of Six LGAs. The third stage involves a snowballing method to locate grass cutter and rabbit farmers in the sampled LGA. The study sampled all the contacted farmers. In all, 81 farmers comprising of 24, 35 and 22 micro-livestock farmers in Ogun, Oyo and Ekiti States respectively were sampled. Data on respondent's personal characteristics, knowledge of biosecurity measures and challenges of record keeping were collected with the use of questionnaire/interview schedule. The dependent variable is the regularity of keeping record for biosecurity purpose in micro-livestock farm management. This was categorized into production, disease control and disposal records and was measured on a 5-point scale of never, daily, weekly, monthly, and yearly basis. Data collected were summarized using percentages, frequencies and means and analyzed using Chi square and Pearson Product Moment Correlation (PPMC) in SPSS version 20.

RESULTS AND DISCUSSIONS

Personal characteristics

The personal characteristics of micro livestock farmers in Table 1 (a and b) shows that the mean age of micro livestock farmers in Southwest Nigeria was 45 years ± 10.4. There were farmers of less than age 35 years (22.2%) old and 16.0% were above 56 years old in the production of micro livestock in Southwest Nigeria. This result suggest that micro livestock production can be managed by any matured adult. It is possible to start in a small scale at an early age and expand in the process of time. The study found both male (55.6%) and female (44.4%) farmers in the micro-livestock production. Most respondents (72.8%) were married, 8.6% were single while 16.0% were widowed. Average household size of respondents was 5 people per household. Micro-livestock is not prohibited by any of the three religions in the study areas as all types of religion, Christianity (64.2%), Islam (28.4%) and traditional (7.4%) engaged in the production. Most respondents (82.7% and 95.1%) indicated high proficiencies in Yoruba and English Languages respectively. This implies a distinct ability to seek and receive relevant agricultural information in both languages. This is justified by the result of the educational level which shows that majority (64.2%) had university education at both undergraduate and post graduate level. Most respondents (69.2%) got the foundation stock from either open market or from friends and family. Most (56.8%) respondents were into small scale micro-livestock production

(less than 50 animals) with total average stock size of 76 animals. This implies that most farmers are either still experimenting the production, are constrained by one factor of production or have unfavourable opinion about the production.

Table 1a: Description of respondents' personal characteristics

Variables	Categories	Frequencies	Percentages
Sex	Female	36	44.4
	Male	45	55.6
Age (years)	< 35	18	22.2
Mean age 45years±10.4	36 – 45	24	29.6
	46 – 55	26	32.1
	Above 56 years	13	16.0
Education attainment	No education	5	6.2
	Primary	6	7.4
	Secondary	18	22.2
	University degree	42	51.9
	Post university degree	10	12.3
Marital status	Single	7	8.6
	Married	59	72.8
	Divorced	2	2.5
	Widowed	13	16.0
Religion	Christianity	52	64.2
	Islam	23	28.4
	Traditional	6	7.4

Table 1b: Description of respondents' personal characteristics

Variables	Categories	Frequencies	Percentages
Ability to read and write Yoruba	Yes	67	82.7
	No	12	14.8
Ability to read and write English	Yes	77	95.1
	No	4	4.9
Household size (In numbers)	1 – 5	48	59.3
Mean household size 5 people ± 2.7			
	6 – 10	26	32.1
	Above 10	7	8.6
Size of flock	≤ 50	46	56.8
Mean size is 76 ± 73.13	51 – 100	12	14.8
	101 – 150	16	19.8
	151 – 200	2	2.5
	Above 200	5	6.2
Attended Biosecurity training	Yes	25	30.9
	No	56	69.1
Awareness of biosecurity measures	Yes	46	56.8
	No	35	43.2

Knowledge of record keeping among micro-livestock farmers

Table 2 shows that the knowledge of pen liter used and disposed was highest (74.1%) among the farmers, record of footbath usage and maintenance was only known by 43.2% of the respondents while knowledge of general record keeping was indicated by 72.8%. High knowledge is expected from the respondents that had earlier indicated clear understanding of English and Yoruba languages (Table 1).

Knowledge is introduced by understanding of communication language thus, it is possible the respondents have had opportunities for trainings/workshops/lectures (as indicated in Table 1) or through other exposures like social media outlets on relevant micro-livestock biosecurity information that enhances their knowledge of salient issues in micro livestock production. However, lack of proper knowledge of 56.8%, 47.7% and 42.0% of the respondents on the use of footbath, of the need for proper and prescribed medication and approved sanitation of animals calls for concern. Factors that predispose livestock to diseases are highlighted in Minna-Eyovwunu, Akarue, and Emorere, (2019) as including proper medications and vaccination of animals. All these factors could have culminated into the result of the findings. Categorization of micro-livestock farmers according to mean responses shows that 53.1% had a high knowledge

of biosecurity measures. This high knowledge implies that many of the farmers already have information on biosecurity issues in their production process. However, ability to convert this knowledge to a disease-free pen depends on other factors that are considered in this research.

Table 2: Knowledge of record keeping among micro livestock farmers

Record keeping issues (negative statements rephrased)	Yes	No
Record of vaccination of healthy livestock is necessary at regular interval	67.9	32.1
Prescribed medication record is to maintain healthy pen	54.3	47.7
Changing of liters should be at regular time and recorded	67.9	32.1
Cull (remove) chronically infected animals is done to avoid pen infestation	61.7	38.3
Isolating sick animals is done immediately after diagnosis	70.4	29.6
Record of pen liter used per production in biosecurity measure	74.1	25.9
Footbath are for all scale micro-livestock production	43.2	56.8
Farm cleanliness not necessarily for external auditing	58.0	42.0
Record keeping for all production categories is good for a healthy farm	72.8	27.2
Record keeping should be discussed with every worker	61.7	38.3
Knowledge Category	Percentages	Mean SD
High (10.0 – 13.80)	53.1	13.80±2.5
Knowledge Category	46.9	

Respondents' frequency of record keeping in micro-livestock production

Table 3 shows the type of farm record keeping by respondents. The records are categorised into three (3) sub-set including production record, disease control record and disposal record (Sales/gift/mortality/consumption) for clarity of issues presented. The table shows that the highest frequency (43.2%) for any record kept by the micro livestock farmers was found in the disposal record category (monthly record of the numbers of animals sold) while the least (2.25% and 3.37%) records kept were daily livestock stocking and daily medication records respectively. The respondents were mainly into small scale production thus, daily activities such as medications and stocking might not be possible or might not be taken seriously. The table further shows that 32.1%, 28.4% and 28.4% of respondents never took any sanitation practices, infection and curling records respectively. These neglected records are relevant in micro-livestock biosecurity record keeping as it reflects little or no knowledge of disease control in micro-livestock management among the respondents (Minna-Eyovwunu *et al,* 2019). The mean responses for each of the record keeping items showed the highest mean for feeds purchasing and production record ($\bar{x}$= 3.19) followed by micro livestock feeding record ($\bar{x}$= 2.92). These two are under production record category. On the other hand, the least mean were type of infections ($\bar{x}$= 2.33) and sanitation practices record ($\bar{x}$= 2.39) both under disease control record. These results suggest that record keeping for biosecurity is not of utmost importance to the micro-livestock farmers. Thus, issues such as prevention of re-emerging diseases and new diseases/infections is not regarded as it should be. Asan (2013) opined that livestock are carefully tendered based on purpose of production. In line with this, most of the respondents might be keeping the livestock as a secondary livelihood option thus not requiring much investment of time and energy to ensure biosecurity.

Table 3: Distribution of micro livestock farmers according to frequency of record keeping

Management type	Daily	Weekly	Monthly	Yearly	Never	Mean
Production record						
Livestock stocking	2.5	13.6	43.2	22.2	18.5	2.59
Feeds purchases/production	22.2	17.3	30.9	16.0	13.6	3.19
Livestock feeding	6.2	29.6	30.9	17.3	16.0	2.92
Disease control record						
Medications	3.7	27.2	29.6	19.8	19.8	2.75
Sick or culled livestock	7.4	18.5	27.2	18.5	28.4	2.58
Type of infections	9.9	6.2	19.8	35.8	28.4	2.33
Sanitation practices	12.3	9.9	14.8	30.9	32.1	2.39
Mortality	12.3	9.9	28.4	28.4	21.0	2.64
Disposal record						
Number of animals sold	12.3	13.6	43.2	9.9	21.0	2.86
Number of animals slaughtered	9.9	13.6	27.2	23.5	25.9	2.58
Number of animals gifted	11.1	4.9	38.3	19.8	25.9	2.55

Challenges of record keeping among micro livestock farmers

Table 4 shows that constraint that was least severe by most (64.2%) respondents was bulkiness of record books. No trust in the feed labelling was only indicated by 38.3% of respondents as moderate severe while 30.9% (Most severe) were already weary of keeping biosecurity records. The mean item by item response of challenges faced by micro-livestock farmers shows weariness of record keeping ($\bar{x}$= 1.85) as the most severe challenge to biosecurity record keeping by the respondents. This was followed by lack of knowledge (not aware of the importance of record keeping as a biosecurity measure - $\bar{x}$= 1.78) and unscheduled medication periods ($\bar{x}$= 1.76). However, the least ranked constraint was the bulkiness of record book. This results suggest the familiarization of respondents with books of large sizes and volumes thus record book was not posing any meaningful challenge to keeping biosecurity record. Furthermore, many factors could culminate to weariness of farmers in micro-livestock biosecurity record keeping. Such factors could be no formal requirement of previous records or it has no effect in curtailing new diseases. Whichever factor that contributed to the weariness in micro-livestock record keeping can be addressed by necessary biosecurity campaigns.

Table 4: Challenges of Record keeping in micro-livestock management

Issues of record keeping	Less Severe	More severe	Most severe	Mean	Rank
Weariness of record keeping	45.7	23.5	30.9	1.85	1st
Not aware of the importance	44.4	32.1	23.4	1.78	2nd
Medication at unplanned period	50.6	22.2	27.2	1.76	3rd
Medication not regulated	50.6	24.7	24.7	1.74	4th
Low literacy level	45.7	35.8	18.5	1.72	5th
Lack of information record	54.3	24.7	21.0	1.67	6th
Diet composition not in feed labelling	49.4	38.3	12.3	1.63	7th
Livestock too many for record	60.5	18.5	21.0	1.60	8th
Pilfering/ straying	58.0	33.3	8.6	1.51	9th
Record books too bulky to keep	64.2	23.5	12.3	1.48	10th

Relationships of variables with the frequency of record keeping

The test of association in Table 5(a) shows a significant relationship between frequency of record keeping and other variables such as the size of flock (r= 0.316; p <0.005) and knowledge of record keeping (r= 0.429; p <0.005). The result suggests that the more the number of micro livestock in farm, the higher the frequency of record keeping. This implies that farmers with large size of farm are more careful to keep records of farm activities than the small-scale farmers. Ishola, Kadiri, and Aminu (2020) noted the importance of knowledge in maintaining production record.

Similarly, in Table 5(b) for the non-parametric tool, variables like the ability to communicate in English (χ = 8.463; p < 0.005), the type of micro-livestock (χ = 4.315; p < 0.005) and exposure to training on biosecurity measures in livestock production (χ = 9.767; p < 0.005) were significant variables to record keeping. Furthermore, the significance of abilities to read and write English language to record keeping for biosecurity is an indication that extension messages on biosecurity are disseminated in English language not wholly accessible to non-English literate. Ogunjimi *et al*, (2012) and Ishola *et al,* (2020) identified formal education training as one of the factors that influences production of micro-livestock.

In line with these findings, it could be affirmed that micro-livestock farmers that keep records are literate and mostly produce in a relatively medium to large scale. These results amplify the relevance of knowledge to record keeping in micro-livestock production. Such knowledge can be acquired though exposure to formal curriculum education or attendance of regular training.

Table 5(a): Correlation of variables with frequency of record keeping in micro-livestock production

Variable	N	r	P
Age	81	0.081	0.474
Size of flock	81	0.316	0.043*
Challenges of record keeping	81	-0.158	0.158
Household size	81	0.052	0.642
Knowledge of record keeping	81	0.429	0.000*

Table 5(b): Test of associations (Chi-square) between variables and the frequency of record keeping in micro-livestock production

Variable	df	χ	P
Sex	1	0.159	0.823
Exposure to training	1	3.761	0.045*
Communicating English	1	4.761	0.048*
Communicating Yoruba	1	7.067	0.029*
Religion	2	3.176	0,204
Micro-livestock type	1	4.315	0.032*
Education status	4	8.795	0.066

CONCLUSION AND RECOMMENDATIONS

This study found that micro-livestock farmers in southwest Nigeria had above secondary school education and had attended relevant training on biosecurity. Knowledge of biosecurity was high and the record of medications was the highest record kept by farmers. Micro livestock farmers kept more of production record than disease control records. Majority were into small scale production but are weary of record keeping. Awareness of biosecurity measure, previous exposure to training, challenges to record keeping and Knowledge were major factors that influenced frequencies of record keeping among micro-livestock farmers. This study advocates better campaign strategy from research institutes and concerned institutions on record keeping in micro livestock production to improve measures of biosecurity. Extension information on biosecurity measures should target all categories of farmers; either literate and non-literate, and specifically, small scale micro livestock farmers should be trained on record keeping as a measure of biosecurity.

REFERENCES

Alalade, O. A, Olorunfemi, O. D., Olaoye, I. J., Ladipo, T. O. and Yusuf, A. (2018). Assessment of Factors Influencing Biosecurity Measures Employed by Livestock Farmers in Selected LGAs of Kwara State, Nigeria. *Journal of Science, Technology, Mathematics and Education (JOSTMED),* 14 (2): 90 - 100.

Ali, A. and Khan, M. A. (2013). Livestock Ownership in ensuring rural household food security in Pakistan. *Journal of Animal and Plant Science,* 23 (1): 313 – 318.

Asan, N. (2013). Promoting micro livestock farming to enhance animal product supply in sub Saharan Africa. *Scientific Journal of Biological Sciences*, 2 (12): 232 – 243. https://doi.org/10.14196/sjbs.v2i12.1063

Dudafa, U. J. (2013). Record Keeping Among Small scale Farmers in Nigeria: Problems and Prospects. *International Journal of Scientific Research in Education*, 6(2), 214-220. Retrieved on 6th January 2020 from http://www.ijsre.com

Hernández-Jover, M., Gilmour, J., Schembri, N., Sysak, T., Holyoake, P. K., Beilin, R., (2012). Use of stakeholder analysis to inform risk communication and extension strategies for improved biosecurity amongst small-scale pig producers. *Preventions in Veterinary Medicine,* 104:258–70. http://doi.org/10.1016/j.prevetmed.2011.12.006

Ishola, T. A., Kadiri, T. S., and Aminu, O. O. (2020). Perceived Factors Influencing Choice of Farm Records and Accounting among Youth Poultry Farmers in Lagos State, Nigeria. International Journal of Scientific Research in Educational Studies and Social Development (IJSRESSD), 4 (1): 189 – 199.

Kelly, A. M. (2005). Veterinary Medicine in the 21st Century: The Challenge of Biosecurity. *Institute for Laboratory Animal Research (ILAR) Journal*, 46 (1): 62–64, https://doi.org/10.1093/ilar.46.1.62.

Klapwijk, C. J., Schut, M., Van Asten, P. J. A., Vanlauwe, B., Giller, K. E., Descheemaeker, K. (2020). Micro-livestock in smallholder farming systems: the role, challenges and opportunities for cavies in South Kivu, Eastern DR Congo. *Tropical Animal Health Production Journal,* 52(3):1167-1177. https://doi.org/10.1007/s11250-019-02112-9. PMID: 31758384; PMCID: PMC7190603.

Kompas, T., Nguyen, H. T. M. and Ha, P. V. (2015). Food and biosecurity: livestock production and towards a world free of foot-and-mouth disease. *Food Security,* 7: 291–302. https://doi.org/10.1007/s12571-015-0436-y

Mehmet, F. C. (2018). Farm Level Biosecurity: Challenges and Suggestions. *Dairy and Veterinary Science Journal*, 7 (5): 555722. http://doi.org/10.19080/JDVS.2018.07.555722

Minna-Eyovwunu, D., Akarue, B. O. and Emorere, S. J. (2019). Effective Record Keeping and Poultry Management in Udu and Okpe Local Government Areas of Delta State,

Nigeria. *International Journal of Innovative Agriculture & Biology Research* 7(1):31-38,

Ogunniyi, L. T., Oluwafemi, Z. O. and Adepoju, A. A. (2015). Mini-Livestock Farming as a Strategy for Food Security in Oyo State of Nigeria. *Journal of Agriculture and Sustainability*, 7 (2): 171-186. ISSN 2201-4357.

Oladele, O. I., Kolawole, A. E. and Antwi, M. A. (2013). Knowledge of Biosecurity among Livestock Farmers along Border Villages of South Africa and Botswana. *Asian Journal of Animal and Veterinary Advances*, 8 (7): 874 – 884, https://doi.org/10.3923/ajava.2013.874.884

Popoola, Y. A., Banjoko, O. J., Kehinde, A. S., Olupona, J. A., Fayemiwo, J. O., Durotoye, E. S., Harry, B. A. and Omole, A. J. (2020): Biosecurity and Disease management in Micro-livestock in Hamzat R. A. and Osunkeye O. J. edts *Green choice publications* ISBN 978-070-186-9.

Thompson, H. E., Berrang-Ford, L., and Ford, J. D. (2010). Climate Change and Food Security in Sub-Saharan Africa: A Systematic Literature Review. *Sustainability*, 2, 2719-2733; http://doi.org/10.3390/su2082719

ASSESSMENT OF BARTER SYSTEM AMONG FISH TRADERS IN IMAKUN-OMI, OGUN STATE, NIGERIA

[1]Olaoye, O. J., [2] Ojebiyi, W. G. and [3]Opatoyinbo, T. P.
[1]Agricultural Media Resources and Extension Centre, Federal University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria
[2]Department of Agricultural Extension and Rural Development, Federal University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria
[3]Department of Aquaculture and Fisheries Management, Federal University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria
Correspondence contact details: oluwagbemiga2013@gmail.com; 08067768470

ABSTRACT
This study assessed barter system among fish traders around Imakun-Omi, Ogun State, Nigeria. A two-stage sampling procedure elicited both qualitative and quantitative data from six key informants and 60 fish traders within Ajebo market at two consecutive market days. Data on socio-economic characteristics, trading characteristics, commodities exchanged for fish, motivators of barter trading, and challenges facing the barter system were collected using interview guide and checklist (for in-depth interviews with key informants). The data were subjected to descriptive statistics. Results revealed that majority were married (95.0%), female (90.0%), had secondary education (71.7%), fish traders (93.3%), and had household size of 6-10 persons (70.0%). The mean years of trading experience of the participants was 17.48±4.37 years. Money (100.0%) and food commodities (93.3%) were the mediums of exchange used within the market. The most exchanged food commodities were cassava grain (75.0%), plantain (66.7%), and cocoyam (55.0%). Scarcity of some commodities at the market (81.7%), and lack of storage facilities (56.7%) were the most severe challenges facing barter trading in Ajebo market. The study concluded that fish traders within Imakun Omi and environs still practice barter trading. It was recommended that all stakeholders provide adequate storage facilities for farmers and traders engaging in barter system.
Keywords: Ajebo market, Barter trading, Fish market, Food commodities, Legal tender

INTRODUCTION

The barter system was the mainstay of the economies of developing countries for several years before the advent of money. The system involved the exchange of goods and services for other goods and/or services. However, it is faced with three serious drawbacks: the problems of 'double coincidence of wants, unstandardized unit of measurement, and divisibility of goods (Adofu, Adofu & Muhammed 2013). With the advancement in science and technology came the introduction of money as an alternative medium of exchange which overcame the setbacks associated with the barter system (Das, 2015). The use of money has made transactions much more accessible and more straightforward as people are paid for their goods and services rendered with a common medium of exchange (money) which they can use to purchase goods or pay for services they want.

Despite the numerous advantages that the use of money has over the barter system in trading today's economy, it seems that the barter system has not been wholly jettisoned as some communities/markets still engage in the exchange of goods and services instead of money. The few markets still practicing the barter system include the Bagana barter market in Omala Local Government of Kogi State, North Central Nigeria; Esuk Mba market in Akpabuyo Local Government Area of Cross River State, South Southern Nigeria; and Ajebo market in Imakun Omi community, Ogun Waterside Local Government Area of Ogun State; South-Western Nigeria (Adofu et al. 2013; News Agency of Nigeria 2019; BBC News Africa 2021). About half to three-quarters of the length of the Ogun Waterside local government is surrounded by water extending from Lagos state (Olaoye, Idowu, Omoyinmi, Akintayo, Odebiyi & Fasina 2012; Olaoye, Ojebiyi, Olalekan, Abdulsalami & Opele 2019). Hence, fishing and other fisheries-related activities such as processing and marketing constitute the predominant source of income to the area's inhabitants. Therefore, fish becomes a vital trade commodity in the area.

As a medium of exchange, the barter system was only known to the younger generations theoretically in textbooks with no practical experience. Therefore, the existence of some barter markets is an opportunity to better understand the system as it occurs in Imakun Omi community located at Ijebu waterside, Ogun waterside LGA, Ogun State, Southwest, Nigeria. Like in any other community, some of the residents engage in fishing but do not engage in the production of agricultural commodities, and vice versa. For instance, fishers in riverine areas do not produce cassava grains, yam, cocoyam, etc but need these products without making use of money.

Since most of the transactions of the residents are mainly concerning agricultural commodities, there may not be too much need to make use of money. Fish is an essential component of the diets/meals in every fishing and non-fishing household and a good source of good quality

proteins and vitamins. So, fish is either sold in exchange for money or exchanged for other essential food commodities. Hence this study assessed the system of barter among fish traders around Makun Omi, Ogun state, Nigeria. The specific objectives were to describe barter fish trading in Ajebo market, describe the socio-economic characteristics of the participants at the market, assess the trading characteristics of the respondents, identify the commodities exchanged for fish, identify the motivators of the barter system, and the challenges facing the practice of barter system in the market.

METHODOLOGY

This study was carried out among barter fish traders in Ajebo market in Makun Omi Community, a town in Ogun Waterside Local Government Area of Ogun State. The barter trading system in the area started a long time ago when some travellers from Edo, Ondo and Lagos State passing through the lagoon water of Ogun waterside got stranded at Imakun Omi community. Ajebo market holds every nine (9) days from evening till midnight. Money and barter system were preferred means of trading in the market. Qualitative and quantitative data were collected from fish traders using a checklist and interview guide. The checklist was used to obtain qualitative data during in-depth interviews with key informants.

A two-stage sampling procedure was used to select the respondents, with the first stage being the purposive selection of Ajebo market as the only market in Ogun Waterside where barter trading still takes place. The second stage involved the purposive sampling traders within the market whose transactions involved exchanging fish for other food commodities such as plantain, cassava grain (garri), banana, etc. Sixty traders were sampled from the same market at two consecutive market days. The *Baba Oja* and *Iyaloja* as well as four other aged persons who had been trading in Ajebo market for at least 35 years were purposively selected to serve as key informants in this study. Their selection was guided by extension personnel within the area.

Commodities exchanged for fish were measured on a nominal level with Yes or No responses to ascertain the food commodities (cassava grain, plantain, cocoyam, coconut, yam, palm oil, and cassava flour) that were exchanged for fish by the respondents within the markets. A 9-item nominal scale with Yes or No response options was used to measure the motivators of the barter system. In contrast, the challenges facing the barter system was measured with an 8-item scale on 4-point Likert-type response options of Very severe, Slightly severe, Not severe and Not a challenge with assigned scores of 3, 2, 1 and 0, respectively. Mean values were calculated for each of the items, and the items were then ranked in order of severity. Items with a mean score of at least 1.50 were considered to be severe challenges, while those with lower mean scores were considered otherwise.

Qualitative data from the key informants were transcribed into English and reported verbatim, while the quantitative data were subjected to descriptive statistics (frequency, percentage, mean and standard deviation). The results were presented in frequency tables and charts.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 reveals that the highest proportion (43.3%) of the participants was within 41-50 years, with a mean age of 46.36±11.42 years. This indicated that the participants were in the age range of 31-60 years, implying that although the participants were still within the active working population of the country, they are aging. According to Omoare, Fakoya, Abiona and Oyediran (2013), people within the economically active population constitute a tremendous labour force for fishery enterprise as they are expected to be good managers of limited available resources as possessing the capability to withstand rigours associated with the trade. Olaoye et al. (2019) also characterized women fish merchants in Ogun Waterside LGA of Ogun State with old age. By implication, barter trading in the area may become extinct as it was in most other parts of the country if care is not taken to hand over the practice to younger generations. Findings from previous studies (Akinrotimi, Cliffe & Ibemere 2011; Cliffe & Akinrotimi 2013; Anyim, Odoemelam & Okorie 2021) contradicted the current finding on observed decreasing trends in participation as women advanced in age.

It reveals further that the majority of the participants were married (95.0%) and female (90.0%). This means that women were more active in barter trading, probably as a result of their direct involvement in the processing and related postharvest activities of agricultural produce in order to ensure that food is in stock for household consumption. Adeoye, Oke, Eniola & Jatto (2020) also reported that more women than men were involved in marketing and other postharvest fisheries activities.

Also, the practice of barter trading by married persons could be as a result of their maturity in terms of age and the responsibility inherent with marriage. The dominance of married women could be linked to the likelihood of their husbands being fishermen who require women's assistance with respect to all postharvest activities in order to meet family obligations. This view was shared by Anyim et al. (2021), who opined that married women's involvement in fisheries activities was to assist their husbands in enhancing their livelihoods. While only 23.3% of the participants completed primary school, 71.7% had secondary education. This implies that educated persons practicing barter trading could

translate to sustainable improvement in the barter system. This agrees with Olaoye (2010), who asserted that education is a good determinant of technology adoption. Almost all (93.3%) of the participants were fish traders. This implies the significant roles of women in fishing in line with the views of Rajagopalan (2012), who observed that women play significant roles in the processing and preservation of fisheries products.

The highest proportion (70.0%) of the participants had the household size of 6-10 persons with a mean household size of 8±3 persons is an indication of relatively large family size which characterized rural settings. This supports the findings of Olaoye et al. (2019), which also reported a large household size among women fish merchants. It was further revealed that 40.0 percent and 23.3 percents were the Ijebus and the Ikales. Others are the Images (18.3%), Ijaws (11.7%), Ibos (1.7%) and Irobos (5.0%). The results indicated that the participants were from different parts of the country and corroborates the submission of the Baba Oja during an in-depth interview that *"People come from different parts of the country including Ondo, Epe, Ibeju-Lekki, Ode Omi, Ijebu Ode, Edo and Delta to exchange their goods for ours, especially our fish".*

Table 1: Distribution of participants by socio-economic characteristics

Socio-economic variables	Frequency	Percentage	Mean/modal category
Age (years)			
31-40	22	36.7	46.36±11.42 years
41-50	26	43.3	
51-60	12	20.0	
Sex			
Male	6	10.0	Female
Female	54	90.0	
Marital status			
Married	57	95.0	Married
Widowed	3	5.0	
Level of education			
Complete primary education	14	23.3	Complete secondary
Incomplete secondary education	3	5.0	education
Complete secondary education	43	71.7	
Occupations			
Fish trading	56	93.3	
Fish processing	19	31.7	Fish trading
Fishing	4	6.7	
Petty trading	16	26.7	
Artisans	16	26.7	
Farming	4	6.7	
Household size (persons)			
1-5	14	23.3	
6-10	42	70.0	8±3 persons
>10	4	6.7	
Tribes			
Ijebu	24	40.0	
Ikale	14	23.3	Ijebu
Ilaje	11	18.3	
Ijaw	7	11.7	
Ibo	1	1.7	
Irobo	3	5.0	

Trading characteristics/practices

Results in Table 2 reveal that 60.0 percent of the respondents had 11-20 years of trading experience with mean trading experience being 17.48±4.37 years. This means that the traders already had substantial experience in trading. They are expected to have a deeper understanding of trading involving both money and goods. All (100.0%) participants declared that mutual agreement was the primary modus operandi in barter trading. Fish used for barter trading were from either the traders' spouses or purchased from fishermen implying that the traders would have gotten the fish in fresh form and need to subject the fish to postharvest preservative and processing measures in order to extend the shelf-life and improve the quality of the fish to be exchanged.

Higher proportions of the participants sourced fish used in barter trading from their spouses (76.7%) and purchased from fishers

(65.0%). When asked about the problems encountered in the barter system, Alhaji Musiliudeen observed that *"Ero (trade by barter) has no particular problem per se because both parties will see the goods involved and only engage in the transaction based on mutual understanding. There is no secrecy in the process, and it is not done in proxy".*

Table 2: Barter trading practices among the respondents

Practices	Frequency	Percentage	Mean/modal category
Trading experience (years)			
1-10	11	18.3	
11-20	36	60.0	17.48±4.37 years
21-30	13	21.7	
Modus operandi			
Mutual agreement	60	100.0	Mutual agreement
Measurement	0	0.0	
Source of fish			
Purchased from fishermen	39	65.0	Obtained from spouse
Obtained from spouse	46	76.7	
Self-fishing	11	18.3	
Medium of exchange			
Food commodities	56	93.3	Money
Money	60	100.0	
Services	8	13.3	
Kind of fish exchanged			
Herring (Sawa)	36	60.0	
Bonga (Agbodo)	6	10.0	Herring (Sawa)
Kugbe	19	31.7	
Tilapia (Epiya)	19	31.7	

Money (100.0%) and food commodities (93.3%) were the means of exchange among the respondents. This implies that Ajebo market is practically engaged in a mixed economy as money could be used in exchange for goods and services. In contrast, food commodities were exchanged for other food commodities, including fish. This was buttressed by the statement of Chief Mrs. Farinde Comfort that *"All the people you see in the market know what money is and how useful it is; even that small child (pointing to a crawling girl of about 7-9 months) knows what money is. We do our businesses with money also, but we don't accept money when we prefer to exchange food commodities with another directly".*

Highest proportion (60.0%) usually exchanged Herring fish called '*Sawa'* with other goods. This could imply that Herring fish was the most consumed fish species within Makun-Omi community and environs based on abundance and processing of fish catch. This corroborates previous findings (Olaoye et al. 2012; Olaoye et al. 2015; Ojebiyi 2019; Abdul, Oguntuase, Adekoya, Braide & Odulate 2019) which reported the abundance of the species within Ogun waterside and nearby lagoons.

Commodities exchanged for fish

The different commodities exchanged with fish are presented in Figure 1. It shows that three-quarters (75.0%) of the participants exchanged cassava grain with fish. Other commodities commonly exchanged are plantain (66.7%), cocoyam (55.0%), coconut (41.7%), yam (40.0%), palm oil (31.7%), and cassava flour (26.7%). This implies that fish is commonly exchanged for the major agricultural products within Ogun State. According to the Ministry of Finance (2016), garri, fish, rubber, rice and maize are the major agricultural products in Ogun State.

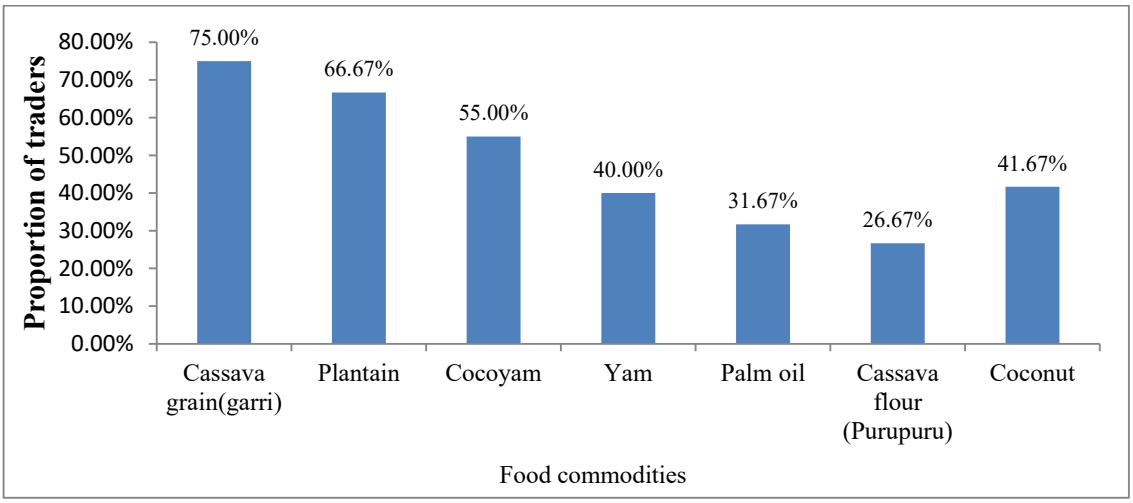

Figure 1: Common commodities exchanged with fish

Motivators of barter system

Figure 2 reveals that all (100.0%) of the participants indicated mutual benefits as a motivating factor of barter trading. This was followed by conservation of cash (96.7%), higher values of commodities exchanged with fish than money value (91.7%), increased food prices (75.0%) and urgency in the need for other food commodities (63.3%). However, none (0.0%) of the participants indicated awareness of money as a medium of exchange as a motivating factor for their involvement in barter trading. Adofu et al. (2013) also reported that traders in Bagana Market, Kogi State claimed that their practice of the barter system was not a result of a lack of awareness of money as a medium of exchange.

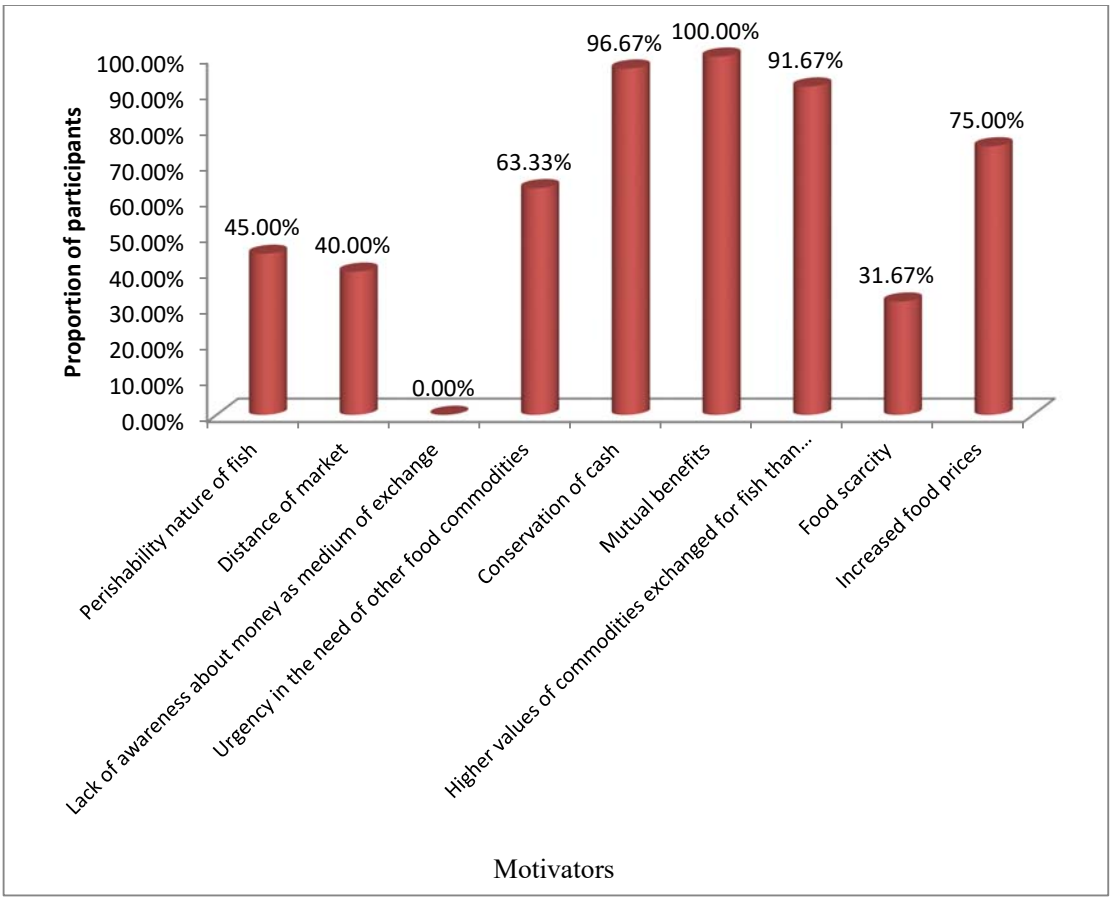

Figure 2: Distribution of participants by motivators of barter trading

According to one of the key informants, Mr. Aborode, *"the most important thing that encourages barter trading is the mutual benefits that both parties gain from the process. The two parties are satisfied at the end of the day" and "at times, we just need to reserve the little cash we have for other goods that we may want to get from far distances like Lagos and Abuja."*

Challenges in barter trading

Results in Table 3 reveal that the highest proportions of the participants considered lack of standard exchange rate (70.0%), lack of storage facilities for perishable commodities (56.7%), and scarcity of some commodities at the market (81.7%) as very severe challenges while difficulty in the transportation of commodities (63.3%) was considered as a slightly severe challenge in barter trading. The mean level of severity ranged from 0.55±0.376 for the indivisibility of commodity to 2.73±0.241 for the scarcity of some food commodities at the market. The findings indicated that the scarcity of some commodities at the market, lack of storage facilities for perishable commodities, lack of standard exchange rate, and difficulty in the transportation of commodities were the most severe challenges faced in barter trading.

Table 3: Percentage distribution of respondents by challenges facing barter trading

Challenges	Level of severity				Mean ± Std.	Ranking
	Very severe	Slightly severe	Not severe	Not a challenge		
Double coincidence of wants	0.0	8.3	83.3	8.3	1.00±0.376	5th
Lack of standard exchange rate	70.0	6.7	11.7	11.7	2.35±1.478	3rd
Indivisibility of commodity	0.0	3.3	48.3	48.3	0.55±0.376	8th
Bulkiness of commodity	3.3	11.7	51.7	33.3	0.85±0.137	7th
Lack of storage facilities for perishable commodities	56.7	38.3	1.7	3.3	2.48±0.651	2nd
Absence of exchange partner	3.3	5.0	68.3	23.3	0.88±0.435	6th
Difficulty in transportation of commodities	31.7	63.3	0.0	5.0	2.22±0.548	4th
Scarcity of some commodities at the market	81.7	10.0	8.3	0.0	2.73±0.241	1st

Figures in parentheses are expressed as percentage

CONCLUSION

It was observed that despite the awareness of money as a universal medium of exchange, fish traders within Imakun Omi and environs still practice trade by barter in this 21st Century. Based on the findings, the study recommends that the government and other stakeholders should provide storage facilities for agricultural produce, which is highly perishable; and that the market authorities are encouraged to devise a means for standardizing the measures for the different produce.

REFERENCES

Abdul, W. O., Oguntuase, K. E., Adekoya, E. O., Braide, A. F. and Odulate D. O. (2019). Environmental parameters and the dynamics of fish resources in Lekki Lagoon, South-west, Nigeria. *Applied Tropical Agriculture, 24*(1), 126-135.

Adeoye, A.S., Oke, O.O., Eniola, O. and Jatto, K.A. (2020). Assessment of gender roles in fish farming activities among rural farmers in Afijio Local Government Area of Oyo State, Nigeria. *Nigerian Agricultural Journal, 51*(2): 406-412.

Adofu, I., Adofu, O. and Muhammed, I. (2013). Barter system in a modern Nigeria Society, A Case Study of Bagana Barter Market in Omala Local Government Area of Kogi State. *Open Research Journal of Business Administration and Management, 1*: 1-6.

Akinrotimi, O. A., Cliffe, P. T. and Ibemere, I. F. (2011). Integration of rural aquaculture in small scale farming in Niger-Delta region of Nigeria. *Global Approaches to Extension Practice: A Journal of Agricultural Extension 7*(1):43-48.

Anyim, C. O., Odoemelam, L. E. and Okorie, N. U. (2021). Women participation in fish processing and packaging in rural communities of Delta State, Nigeria. *Journal of Agricultural Extension and Rural Development, 13*(1): 34-43.

BBC News Africa (2021). Nigeria: The community that trades by barter instead of money. Published on 27 April, 2021 and retrieved from www.bbc.com on March 16, 2022.

Cliffe, P. T. and Akinrotimi, O. A. (2013). *The role of women in fishery activities in some coastal communities of Rivers State, Nigeria*. Proceedings of 28th FISON Annual Conference, Nov. 25-30, 2013.

Das, A. (2015). Money as a medium of exchange: Then and now: Can technology be a facilitator of exchange? *Global Journal of Management and Business Research: Economics and Commerce, 15*(11): 39-44.

Ministry of Finance. (2016). Report of baseline study on lagoon fishing in Ogun state: Case study of Iwopin, Agbalegiyo, Ebute-Oni and Makun-Omi communities. *Improving livelihood of sea fishermen in Ogun State*. 52p.

News Agency of Nigeria (2019). Cross River community where trade by barter still thrives. Retrieved from www.punchng.com on March 16, 2022.

Ojebiyi, W. G. (2019). *Gender analysis of artisanal fisher folks' vulnerability to climate change in Lekki Lagoon, Southwest, Nigeria.* PhD Thesis. Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta, Nigeria. 307p.

Olaoye, O. J. (2010). Dynamics of the adoption process of improved fisheries technologies in Lagos and Ogun States, Nigeria. A Ph.D. thesis in the Department of Aquaculture and Fisheries Management, University of Agriculture, Abeokuta, Ogun State, Nigeria. 337pp

Olaoye, O. J., Idowu, A. A., Omoyinmi, G. A. K., Akintayo, I. A., Odebiyi, O. C. and Fasina, A. O. (2012). Socio-economic 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., Olalekan, T. O., Abdulsalami, S. A. and Opele, I. A. (2019). Contribution of women fish merchants in artisanal fisheries development in Ogun Waterside Local Government Area, Ogun State. *Nigerian Journal of Fisheries, 16*(2): 1729-1736.

Olaoye, O. J., Oluwalana, E. O., Ojebiyi, W. G., Ogunremi, J. B. and Badmus, F. O. (2015). Profitability analysis of riverine artisanal fish processors in Ogun waterside Local Government Area of Ogun State.*Ibadan Journal of Agricultural Research,* 11(2): 87-98.

Omoare, A. M., Fakoya, E. O., Abiona, B. G. and Oyediran, W. O. (2013). Fish Marketing: A panacea towards sustainable agriculture in Ogun State, Nigeria.*International Journal of Biological, Biomolecular, Agricultural, Food and Biotechnological Engineering, 7*(7): 262-266.

Rajagopalan, R. (2012). *An evaluation of the roles of women in fishing communities of Dakar, the Lapetite Cote and Saloum.* In: N. Biswas (Ed.). Yemaya (ICSF's Newsletter on Gender and Fisheries) 40: 11

LISTENERSHIP OF BAMBOU 89.3 FM AGRICULTURAL BROADCASTS AMONG RURAL FARMERS IN FARANAH PREFECTURE OF GUINEA CONAKRY

Badiru, I. O., Bangaly, T. and Ladigbolu, T. A.
Department of Agricultural Extension and Rural Development, Faculty of Agriculture, University of Ibadan, Ibadan, Nigeria
Correspondence contact details: adejojutemitope@gmail.com; bodebadru@gmail.com

ABSTRACT
To boost Guinean agriculture that is undermined by inadequate infrastructure, untimely or lack of information, inaccessibility to extension services and technologies, Bambou FM produced some agricultural programmes targeting rural farmers. This study investigated the listenership of these agricultural broadcasts by rural farmers. A two-stage sampling procedure was used in selecting 143 rural farmers in Faranah prefecture, Guinea Conakry. Data were collected on respondents' listening pattern, perception about agricultural broadcasts and constraints to listening to agricultural information on Bambou FM. It also tested for relationships between rural farmers' perception, constraints and listenership of agricultural broadcast on Bambou Fm. Data were collected with the aid of interview schedule and analysed using frequency counts, percentages and PPMC at α0.05. Majority (76.9%) always listened to agricultural broadcast on Bambou FM via mobile phones (59.4%), at home (58.7%) while 43.6% spent more than 3 hours daily listening. They frequently listened (86.7%) to agricultural broadcasts "L'Emission Interactive des Producteurs" {EIP} with a high (54.5%) level of listenership. Perception of the agricultural broadcasts was favourable (56.6%) and irregular power supply (86.0%) was the major constraint limiting listenership of agricultural broadcasts on Bambou FM. Perception of the agricultural broadcast ($r = 0.174$) and constraints to listening and accessing information ($r = 0.058$) were significantly related to listenership of the broadcast. Conclusively, agricultural broadcasts on Bambou FM enjoyed wide listenership among rural farmers of Faranah prefecture, still sustainability is key, therefore, rural infrastructure need to be improved on by government while development communicators need to target listeners' primetime and avoid repetition.
Keywords: Guinea Conakry, Listenership, Bambou FM, Agricultural broadcast, Rural farmers

INTRODUCTION

Guinean agriculture has potentials to create sustainable jobs, ensure food self-sufficiency of the population of over 10 million people, to generate significant export earnings (particularly through cash crops) and to pave way for profitable and valuable investments (Infoasaid (2011). Yet it is heavily dependent on importations of staple foods, especially rice. The reasons are evident in the fact that these potentials are yet to be fully materialised. Guinean agricultural production is still insufficient for consumption of the populace aside exportation, therefore each year, the government invests so much money to import food items. Farmers largely practice subsistence agriculture, growing small plots of land to feed their families and very little for sales. Subsistence production on the other hand, inadequate infrastructure, lack of information, lack of access to agricultural extension services and technologies all undermine the potentiality of Guinean agriculture, (FAO 2009). Agriculture has always been a highly knowledge-intensive sector requiring continuous information flow. Farmers' quest for authentic, credible and usable information both from established systems and traditional practices is ever increasing in this fluctuating global environment, to operate efficiently and compete economically. The rapid changes happening around with World Trade Organisation/globalisation, uncontrolled urbanisation, uncertainty in climate change, discerning consumer segment and continued farm crisis emphasise the importance of timely, appropriate and need based information and knowledge to meet myriads of developmental challenges. Although, the Guinean government in its efforts towards agricultural development in recent years has invested heavily in agriculture by purchasing agricultural inputs to boost agricultural production, however, this cannot be fully achieved without investment on agricultural extension services.

Effective extension, education and communication services are one of the key strategies to alleviate these challenges, to sustaining agricultural growth, strengthening food security and combating hunger and malnutrition. Agricultural extension is the vehicle or system for delivering useful information to farmers and assisting farmers to develop requisite knowledge, skills and attitudes making use of various information technologies. In recent times, advances in Information and Communication Technologies (ICTs) are revolutionizing agriculture extension by offering various technological options such as television, radio, internet and mobile phones of which radio stands out among others for generations. Historically, radio has been part of the old information and communication technologies as opposed to new technologies such as computers, cell phones and the internet (AMARC, 2015). Radio is everywhere, with at least seventy-five percent (75%) of the households in developing countries having access to radio (EFA Global Monitoring Report, 2012). According to the EFA Global Monitoring Report, (2012), the Central Intelligence Agency (CIA) submitted that there are about four hundred and forty (440,000) radio stations worldwide. Hence, it has become part of the people's lifestyle

for a long time and plays a huge role in human development. It can also be used for the mobilisation of the populace for propagating political, social, economic and agricultural agenda for national development, (UNESCO, 2007). Probably because radio listeners use and relate to radio in a very different way when compared to other media.

Radio is the most common medium for disseminating information to the public and the dominant form of mass communication in Guinea. There are about 23 community stations run by Guinean government called Radio Rurale with at least 17 private radio stations established across Guinea since 2006. One of such is Bambou 89.3 FM in Faranah Guinea. The Guinean women's rights NGO Coalition Nationale de Guinee pour les Droits et la Citoyennete des Femmes (CONAG-DCF) (the National Coalition of Guinea for Women's Rights and Citizenship) runs this community radio station in Faranah in south central Guinea. Since inception the station has aired numerous broadcasts raging from women's programme, children's programme, education, entertainment, social as well as agricultural programmes. However, the diverse socio-cultural backgrounds, poor infrastructure, low levels of literacy, linguistic barriers, tight government's control of the media, geographical remoteness widespread poverty, and differential incentives make the task of information dissemination on radio challenging.

Listenership of a particular radio can be viewed in several ways; from coverage of that radio station, frequency of listening to broadcast from such radio station and listening pattern. All these coupled with type of broadcast contents and programme formats will all enhance listenership. As listeners; adults, old, young, male and female tend to be loyal to their favourite stations provided these enhancers are put in place anytime they tune in to the station (Ismaila, 2013). Importantly, listening to such radio programme while doing other tasks (farming, driving, chores, housework) either on their own or in the presence of other people is an added advantage, (Radio Advertising Bureau, 2013). However, it is noteworthy that although citizens may listen to radio as a group, they usually have their own personal opinions which may or may not be shared with other people. Ladigbolu, Ladele and Badiru, (2014) affirmed that people will listen to a radio station or radio programme that has good content to offer, and their interest will be aroused by presenting the programmes using different formats. In the same vein, it is expected that agricultural broadcasts aired on Bambou 89.3 FM be well received among the listeners, rural farmers. This would enable the farmers to continue to listen to the programmes, if they are beneficial and, in the formats, enticing and fascinating to them. This possibly explains why individuals have preferences amongst the radio stations as well as radio broadcasts at their disposal.

Several studies have been carried out to assess the development of Guinean agriculture but none of them mentioned the involvement of community radio in the development process, (Nadège 2016). Therefore, in order to effectively study the role of community radios in the development of agriculture in Guinea, there is need for baseline information on the listenership of existing agricultural programmes. Hence, this study investigated the listenership of Bambou 89.3 FM agricultural broadcasts among rural farmers in Faranah Prefecture, Guinea Conakry. It is in this context that this study attempted to answer the following research questions which translated to the specific objectives:

1. What is the listening pattern to agricultural broadcasts on Bambou FM by rural farmers'?
2. What is the frequency of listening to the agricultural broadcast on Bambou FM by the respondents'?
3. What is the perception of rural farmers about agricultural broadcasts on Bambou FM?
4. What are the constraints to listening and accessing agricultural information on Bambou FM?
5. What is the relationship between rural farmers' perception and listenership of agricultural broadcasts on Bambou FM?
6. What is the relationship between rural farmers' constraints to listening to agricultural information and listenership of agricultural broadcasts on Bambou Fm?

METHODOLOGY

Prefecture of Faranah in Guinea Conakry was the study area, located between 10° 02' and 10° 10' North latitude; 10° 42' and 11° 50' West longitude at an average altitude of 340m (Figure 1). It covers an area of 13,000 km² for a population of 211,115 inhabitants. There are eleven rural communities (Banian, Bendou, Hèrèmakono, Nialya, Songoya, Tiro, Tindö, Marella, Passaya, Sandénia, and Kobikörö) with an urban community. The relief of Faranah is little varied and is presented as a vast monotonous plateau, cut by large plains and dotted with hills. The city of Faranah homes several quarters, mosques and two radio stations, a government radio station that operates throughout the day and community radio station that has a shorter operating time (Ly, 2017). Bambou Fm is the community owned radio station. There are three major agricultural programmes on the radio station, namely, Interactive Emission of the Producer (EIP) Broadcast, Emission of Vegetable Crops (EVC) Broadcast and Dispute between Farmers and Major Breeders Broadcast.

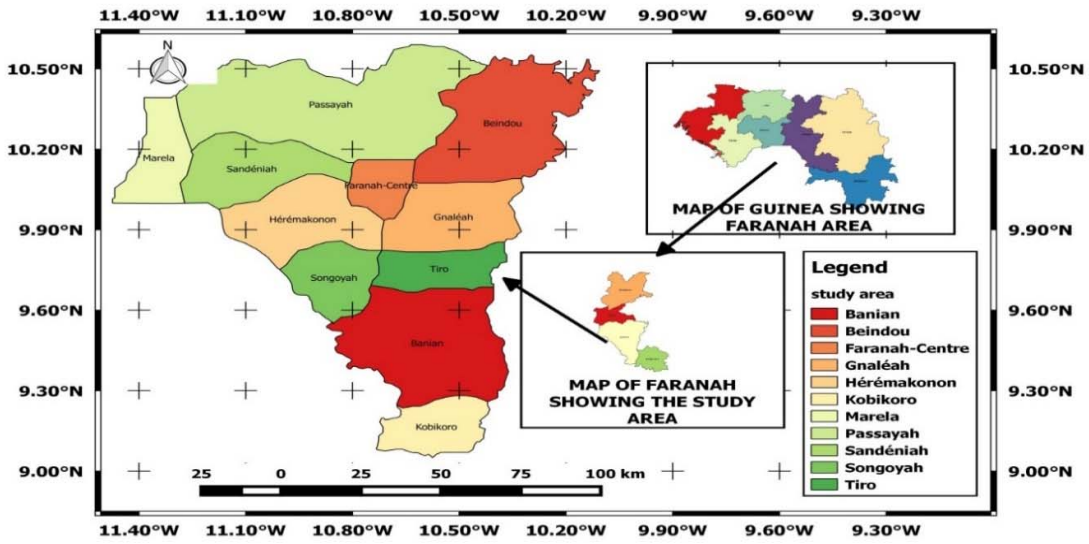

Figure 1: Map of Faranah showing the study location

The study population of this study comprised all farmers from all agricultural groups in Faranah prefecture. They were selected using a two-stage sampling procedure. At first, fifty percent of 10 agricultural groups in Faranah prefecture were randomly selected to give a total of five groups using simple random sampling technique. There are a total number of 1,650 registered farmers from all the selected agricultural groups. In the second stage, 10% each of registered farmers from each of the selected group were randomly selected using simple random sampling technique. Based on the list of registered farmers, 41, 35, 32, 31 and 26 registered farmers (from the five selected groups) were sampled to give a total sample size of 165. However, 143 copies of the questionnaire were retrieved from the respondents making it a recovery rate of 88.6%.

Data were collected on respondents' listening pattern, listening frequency and extent of listening to agricultural broadcast on Bambou FM. Also, data were obtained on perception of agricultural broadcasts on Bambou FM as well as constraints to listening and accessing agricultural information on the station. The relationship between rural farmers' perception, constraints and listenership of agricultural broadcast on Bambou FM was also tested. A well-structured interview schedule and questionnaire were used as instruments to collect data from the respondents based on their literacy level.

To measure rural farmers' listening pattern to agricultural broadcasts on Bambou FM, respondents were asked to attempt several questions to indicate if they actually listen to both Bambou FM and the agricultural broadcasts. To state the way, medium, place and time of listening to the broadcast. Response options were provided based on the rendition and level of measurement of the questions asked, scores were assigned accordingly to the response options. Respondents' frequency of listening to the agricultural broadcast on Bambou FM was assessed to determine the regularity at which respondent listen to the three major programmes. Respondents were asked to state how often they listen to the individual agricultural broadcast on Bambou FM. Response options of 'Always', 'Rarely' and 'Never' were provided and scores of 2, 1 and 0 were assigned respectively. Mean and standard deviation scores were determined for each of the agricultural broadcast to identify the broadcast with highest listening frequency in term of regularity. Meanwhile, level of listenership of agricultural broadcasts on Bambou FM was derived from listening pattern and frequency of listening to agricultural broadcasts on Bambou FM. First off, all the three variables; listening pattern and frequency of listening to agricultural broadcasts on Bambou FM were standardized using the Z scores. The minimum and maximum scores obtained were 1 and 9, respectively. A mean score of 5.3±2.3 was also obtained and used to categorise level of listenership as low (<5.3) and high (≥5.3). Then the indices generated were categorised into high and low level of listenership of agricultural broadcasts on Bambou FM, using mean as the benchmark.

Six perception statements consisting of both positive and negative items were woven around, benefits derived from the content, programme formats, feedback mechanisms, presentation language and time. Respondents were provided with response options of 'Strongly Agree' (SA), 'Agree' (A), 'Undecided' (U), 'Disagree' (D) and 'Strongly Disagree' (SD). The same questions and response options were presented for all the three agricultural broadcast on Bambou FM individually.

Scores of 5, 4, 3, 2 and 1 were assigned for positively worded statements, while the reverse was the case for negatively worded statements. The minimum and maximum scores obtained were 43 and 76, respectively. A composite score of perception index was calculated while, mean score of 61.7±6.3 was obtained and used to categorise respondents into unfavourable (<61.7) and favourable perception (≥61.7)

To measure respondents' constraints to listening and accessing agricultural information on Bambou FM. A list of ten constraint items were provided with response options of 'Yes or No' while scores of 1 and 0 were assigned respectively. The percentage distribution was used to rank each of the constraints in order of severity. Each item was pooled to generate a composite score of constraints index which was used to test the hypothesis.

Data retrieved were analysed with the aid of descriptive statistics tools (percentages, mean and frequency distribution) while Pearson Product Moment Correlation (PPMC) was used for inferential statistics at α0.05.

RESULTS AND DISCUSSION

Table 1 reveals that majority of the respondents (99.3%) listened to Bambou FM and agricultural programmes on the station respectively. A larger percentage (59.4%) of the respondents indicated that they listened via mobile phones, 35.7% through radio sets, while 4.9 % listened through transistor both radio and mobile phones. This implies and confirms that radio, an old form of transmitting and receiving message is still in use, especially now that it can be accessed on mobile phones. Farmers can easily obtain useful information about agricultural issues, problems and its usage, market price, weather conditions, pest and disease management strategies for the development of agriculture. This result is consistent with the findings of Sousa, Nicolay and Home (2016) who posited that rural farmers in Mali accessed radio and video programs via mobile phones.

Results in Table 1 also show that 43.6% of the respondents spent more than 3 hours weekly listening to agricultural programmes on Bambou FM with 39.2% spending 3 hours and only 15.4% spent 2 hours on a weekly basis listening to agricultural programmes being aired on Bambou FM. While more than half (58.7%) of the respondents listened to agricultural programmes on Bambou FM in their respective homes, 29.4% listened both at home and workplace and just 11.9% listened in their workplace. This indicates the flexibility, immediacy, immense potential and capacity of the radio to put out the programmes that caters for the needs of rural masses regardless of their locations.

Table 1: Distribution of rural farmers' listening pattern to agricultural broadcasts on Bambou Fm

Variable	Categories	Frequency	Percentage
Do you listen to Bambou FM?	Yes	142	99.3
	No	1	0.7
Medium of listening to Bambou FM?	I listen on mobile phone	85	59.4
	I listen on transistor radio	51	35.7
	I listen on both gadgets	7	4.9
Do you listen to agric programmes on Bambou FM	Yes	142	99.3
	No	1	0.7
Time spent per day listening to agric. broadcast on Bambou FM	1 hour	3	2.1
	2 hours	22	15.4
	3 hours	56	39.2
	More than 3 hours	62	43.6
Place of listening to agric. Programmes	At home	84	58.7
	At work	17	11.9
	Anywhere	42	29.4
Total		**143**	**100**

On frequency of listening to agricultural programmes transmitted on Bambou FM, Table 2 reveals that "L'Emission Interactive des Producteurs" (Interactive Emission of the Producer Broadcast) {EIP} was the most frequently listened to programme with a mean score of 1.86±0.74. This is immediately followed by "Emission des Cultures Vervieres" (Emission of Vegetable Crops Broadcast) {ECV} (1.52±0.74) and Dispute between Farmers and Major Breeders Broadcast (0.72±0.77). Similarly, on the extent of listenership of agricultural programme as revealed in Table 3 EIP broadcast was to a larger extent listened to among the three programmes with a mean score of 2.30±0.67. This was closely followed by ECV (1.91±1.04) and Dispute between Farmers and Major Breeders broadcasts (0.72±0.77). The implications of these results could be attributed to so many factors such as programme formats and content of the broadcast. Specifically, it could be directed at the feedback obtained by listeners to EIP broadcast due to its encompassing nature particularly when calls are made in such live broadcast.

Table 2: Distribution of respondents by frequency of listening to agricultural programmes on Bambou Fm

Frequency of listening	Always (Above half time)	Rarely (A little less than half time)	Never	Mean±SD
Interactive Emission of the Producer (EIP) Broadcast	86.7	12.6	0.7	1.86±0.74
Emission of Vegetable Crops (EVC) Broadcast	67.1	18.2	14.7	1.52±0.74
Dispute between Farmers and Major Breeders Broadcast	19.6	32.1	48.3	0.72±0.77

Source: Field survey, 2019

Generally on listenership, Table 3 shows that more than half (54.5%) of the respondents recorded a high level of listenership of agricultural programmes on Bambou FM. This further reiterates that farmers really listened to agricultural programmes on Bambou FM in Guinea. This could probably be because of the wide coverage or benefits farmers derived from these agricultural broadcasts. This finding corroborates earlier work by Yahaya and Badiru (2002) who reported a high rate of listenership of radio broadcast among rural dwellers in Southwestern, Nigeria.

Table 3: Distribution of respondents by level of listenership to agricultural programmes on Bambou FM

Level of listenership	Freq.	%	Minimum value	Maximum value	Mean
Low (1.0-5.2)	65	45.5	1	9	5.3±2.3
High (5.3-9.0)	78	54.5			

Source: Field survey, 2019

Table 4 reveals that 86.0% of the respondents reported irregular power supply as a major challenge to accessing agricultural programmes on Bambou FM. The problem of irregular power could affect access to information on radio broadcast, especially in a situation where farmers derive radio facility from their radio set using electricity or listen via mobile phones. In such instances, farmers may not have the ability of to get their phones charged nor use the electric radio, therefore hindering listening. This finding aligns with Syeda (2018) that the problem of erratic power supply often hinders farmers' access to agricultural programmes aired via radio. Other challenges limiting farmers' access to agricultural broadcast on Bambou FM are adverse broadcast time (53.8%) and repetition of subject matter (50.3%) as well as lack of knowledge of resource person on subject matter (45.5%). However, language barrier (22.4%) and poor signal (14.7%) were the least constraints in the study area. This suggests that farmers in this study get clear transmission of agricultural programmes and understand the information transmitted via the radio.

Table 4: Distribution rural famers based on constraints to listening and accessing agricultural information on Bambou Fm

Constraints	Percentage	Rank
Irregular power supply	86.0	1st
Adverse broadcast time	53.8	2nd
Repetition of subjects or monotony	50.3	3rd
Lack of knowledge of resource persons on the subject matter	45.5	4th
Unnecessary interludes	44.1	5th
Unpleasant voice of the presenter	43.4	6th
Irrelevant topics to the season of current agricultural activities	39.9	7th
Low opportunity for feedback	35.0	8th
Language barrier	22.4	9th
Poor signal	14.7	10th

Source: Field survey, 2019

Table 5 reveals that majority (51.0%) of listeners of Dispute between Farmers and Major Breeders broadcast strongly agreed that agricultural programme of the radio station provides them with enormous benefits they need for their works on the farm. In the same vein, a high percentage (44.8%) of listeners of EVC broadcast strongly agreed that time of broadcast was not conducive. More than half (56.6%) of EIP broadcast listeners agreed strongly that the programme has good feedback mechanism. This could probably explain why EIP broadcast was

the most frequently listened to programme among the three.

Overall, majority (56.6%) of the farmers had a favourable perception about the agricultural programmes on Bambou FM. It can be inferred from this finding that farmers in Faranah prefecture had more favourable disposition to agricultural programme on EIP.

Table 5: Distribution of rural farmers' perception about agricultural broadcasts on Bambou FM

Perception statements	SA	A	U	D	SD
Dispute between Farmers and Major Breeders Broadcast					
The agricultural programme of the radio station provides me with enormous benefits needed for my work on the farm	51.0	32.9	9.8	2.1	4.2
The programme is usually presented in an interesting way (formats)	30.8	2.8	4.9	16.8	19.6
The time of broadcast of the program is not conducive to listening.	40.6	34.3	14.0	6.3	4.9
The language of presentation of the programmme must be in our official language	6.3	4.9	7.7	30.8	50.3
The program does not provide me with the information I need for my farm work	14.0	14.0	3.5	21.7	46.9
The programme has good feedback mechanism	28.0	18.2	3.5	25.9	24.5
Emission of Vegetable Crops (EVC) Broadcast					
The agricultural programme of the radio station provides me with enormous benefits needed for my work on the farm	21.0	22.4	18.2	15.4	23.1
The programme is usually presented in an interesting way (formats)	8.4	6.3	10.5	26.6	48.3
The time of broadcast of the programme is not conducive to listening.	44.8	31.5	11.9	2.1	9.8
The language of presentation of the programme must be in our official language	39.8	21.7	10.5	15.4	12.6
The programme does not provide me with the information I needed for my farm work	34.3	16.1	9.1	11.9	28.7
The programme has good feedback mechanism	29.4	20.3	3.5	24.5	22.4
Interactive Emission of the Producer (EIP) Broadcast					
The agricultural programme of the radio station provides me with enormous benefits needed for my work on the farm	29.4	35.7	16.1	5.6	13.3
The programme is usually presented in an interesting way (formats)	23.8	25.2	14.0	7.7	29.4
The time of broadcast of the programme is not conducive to listening.	28.7	17.5	13.3	23.1	17.5
The language of presentation of the programme must be in our official language	9.1	9.1	2.1	9.8	69.9
The programme does not provide me with the information I needed for my farm work	46.2	37.8	4.9	4.2	7.0
The programme has good feedback mechanism	56.6	35.7	2.1	2.8	2.8
Overal perception	**Freq.**	**%**	**Min. value**	**Max. value**	**Mean**
Unfavourable (38-55.1)	62	43.4	38	70	55.2±6.2
Favourable (55.2-70.0)	81	56.6			

Results in Table 6 shows that respondents' perception of agricultural programmes on Bambou FM was significantly related to level of listenership ($r = 0.174$, $p = 0.037$) at 0.05 level. However, there was no significant relationship between respondents' constraints to accessing agricultural programmes on Bambou FM and their level of listenership of agricultural programmes ($r = 0.058$, $p>0.491$) on Bambou FM. The positive correlation between respondents' perception of agricultural programme on Bambou FM and level of listenership implies that the more favourable disposed respondents are towards these programmes, the more they will listen to agricultural programmes on Bambou FM. This could probably be due to the fact that these programmes are related to their farm enterprise, hence the benefits derived was much and ultimately stimulating their level of listenership consistently. The non-significant correlation implies that the constraints faced by respondents in accessing agricultural program on Bambou FM does not reduce their level of listenership significantly. It could be that farmers in the study area device means or measure to get rid of challenges that may hinder them from listening to agricultural programmes on the station. However, this does not mean that the challenges must not be checked because very severe constraints could pose a problem in the future.

Table 6: Relationship between rural farmers' perception, constraints to listening and accessing and agricultural information and listenership of agricultural broadcasts on Bambou Fm

Variables	r	p-value
Perception*listenership	0.174	0.037***
Constraints*listenership	0.058	0.491

Source: Field survey, 2019 *** Significant

CONCLUSION AND RECOMMENDATIONS

The study found that most of the respondents listened to Bambou FM and agricultural broadcasts on the station. Most of them listened to the programme via their mobile phones and transistor radio sets. Most had a favourable perception of agricultural programmes aired on Bambou FM as it provided them with the information needed and good the needed feedback. This further reflected in a high level of listenership of agricultural programmes on Bambou FM. However, irregular power supply, adverse broadcast time and repetition of subject matters were major constraints limiting farmers' listening and accessing agricultural information on the station.

Therefore, since listenership was high, it is crucial that corporate bodies, government and non-governmental agencies make information readily, timely and accessible to farmers using radio. Sponsorship of agricultural programmes on radio is also important for sustenance of these progarmmes. Farming households in Guinea accessed radio mostly as their major source of information for technologies adoption. "Emission des Cultures Vervieres" (Emission of Vegetable Crops broadcast) {ECV} and Dispute between Farmers and Major Breeders broadcast should be reviewed and repackage in a similar way that "L'Emission Interactive des Producteurs" (Interactive Emission of the Producer Broadcast) {EIP} was to enhance listenership. Listenership of agricultural programmes can also be enhanced by addressing the issues of irregular power supply, adverse broadcast time and repetition of subject matters.

REFERENCES

EFA Global Monitoring Report, (2012). Youth and skills: Putting education to work. 1-480. https://reliefweb.int/sites/reliefweb.int/files/resources/218003e%20%281%29.pdf

FAO (2009). Integrated Production and Pest Management Program in Africa.http://www.fao.org/agriculture/ippm/projects/guinea/fr/

Infoasaid (2011) Guinea Media and telecommunications landscape guide. 1-69. https://reliefweb.int/sites/reliefweb.int/files/resources/guinea_media_landscape_guide_updated_300811.pdf

Ismaila, D. M. (2013). *Youth radio listening habits and station preferences in Nigeria*. Lagos: John West Publications Limited.

Ladigbolu, T. A., Ladele, A. A. and Badiru, I. O. (2014). Listeners' perception of enlightenment programmes of University community radio. *Nigerian Journal of Rural Sociology* 15 (1); 142-150.

Ly, S. (2017). What are the effects of Ebola on the health system and on cooperation in the sector in the Republic of Guinea?

Nadège, (2016). *Dynamics of agrarian systems and the future of family farming in Guinea*. French Development Agency (ADF). France, Paris. 133p.

Radio Advertising Bureau (2013). Retrieved from http://www.rab.com.

Sousa, F., Nicolay, G., and Home, R. (2016). Information technology as a tool for Agricultural Extension and farmer to farmer exchange: A case study of Mobile phone video use in Mali. *International Journal of Education and Development using Information and Communication Technology* (IJEDICT). 12 (3):19-36

Syeda, T. S. (2018). Role of Radio and Television in Agricultural Development. A Seminar paper presented in the Department of Agricultural Extension and Rural Development. Bangabandhu Sheikh Mujibur Rahman Agricultural University. Pp1-31.

UNESCO (2007). Media, *Development and Eradication of Poverty*, Paris: UNESCO

World Association of Community Radio Broadcasters (AMARC) (2015). What is community radio https://amarc.radio/what-is-community-radio/

Yahaya, M. K., and Badiru, O. I. (2002). Measuring the impacting on farmers of agricultural radio and television programmes in Southwest Nigeria. *Journal of Applied Communications* (Florida), 86(3), 24–36