

RADIO AND THE ADOPTION OF HYBRID TOMATO BY SMALLHOLDER FARMER'S IN PLATEAU STATE

Emem Gabriel Paul

Department of Mass Communication, Nasarawa State University, Keffi.
Faculty of Social Sciences.
emem.paul4g@gmail.com

Abstract

This study examines the role of radio in the adoption of hybrid tomato farming by smallholder farmers in Plateau State. The research methodology adopted for this study was survey design. The population of this study was determined using the GIZ trained tomato farmers database in Plateau State with the total population of 2000 trained lead-farmers between 2020 to 2021 within 3 Local Government Areas which include Mustang Multipurpose Cooperative Society Gindiri, Longtel multipurpose cooperative Pankshih, and Kasspungyai multipurpose cooperative society, Kanam. A cluster sampling technique was adopted and each of the farmer cooperative groups had the total of 111 respondents representing their group giving the total sample size of 333 respondents. The finding of this study reveals that, Padma F1 hybrid tomato was introduced to the farmers through agricultural radio programmes on regular basis and strongly agreed to the relevance and sustainability of the radio programmes as the programme is usually informative and educative. More so, this study recommends more establishment of rural community radio to increase radio listenership and promotion of new agricultural innovations in rural communities through agricultural programme broadcast programmes.

Keywords: Smallholder farmers, Adoption, Hybrid Tomato Variety, PRTV.

Introduction

Universally, agricultural production is the leading contributing indicator towards the general sustainable livelihoods of the populace due to its significance in the provision of food, income for farmers, raw materials for industries, employments, and foreign exchange for the nation. According to the National Bureau of Statistics (2022), Nigeria's agriculture sector contributed 21.09 percent in the first quarter of 2022 and 27.55 percent to the nominal Gross Domestic Product (GDP) in the third quarter of 2022. Frankly, agriculture plays vital role at the centre of Nigeria economy and also doubles the role of being the major source of livelihood for the masses dwelling in rural communities in Nigeria. The farming sector alone in Nigeria employs about 70 percent of

the entire country's labour force as the smallholder farmers contributes 80 percent of the total food while 33 percent of the arable land is under cultivation for tomato production (National Bureau of Statistics 2022). In spite of the above importance of agriculture in terms of its contribution to the national economy and livelihood of rural dwellers, the arable land is still far from being fully exploited. However, the agricultural sector has been constrained by other factors such as poor communication, poor rural infrastructures, poor and inadequate inputs distribution and application, crop vulnerability to pests and diseases, high cost of farm inputs, low level of adoption of modern agricultural production practices and technologies that could have enhanced its production capacity

and contribution to the national economy as well as income of farmers (Adekunle, 2023).

Other similar agricultural inventions in advance countries such as China with the history of having the second largest irrigation demand in the world but still has drastically increased the input of chemical fertilisers in agricultural production and had produced 60 million tons of tomato in 2017 followed by India with 20 million tons in the same year. (World Population review.com and FAO, 2026). According to Yachin and Said (2020), Israel records the highest tomato yield of 300 tons per hectare to 50 tons globally. Comparing the above developments to Nigeria whose average yield per hectare is 4.2 metric tons which is the lowest when compared with other African countries like Kenya (23.7MT), South Africa (70.8MT) Ethiopia (6.2MT) and Egypt (4.6MT) (FAO,2023). Developing countries such as Nigeria could learn from Israel and China in achieving a result-oriented and sustainable agricultural innovation in Nigeria.

Tomato contributes to the daily required healthy balanced diet and is vitamins B and C, is rich in minerals, vitamins B and C, iron, phosphorus essential amino acids, sugar and dietary fibre. It is not only important as protective food and highly beneficial for the maintenance of health and prevention of disease, but also a source of livelihood for small scale farmers, food security of the people as well as foreign exchange earner for the national economy. Tomato can be consumed fresh or cooked and can be refined into purees, juice, canned and dried and also used in cosmetic products. Tomato is an important cash and industrial crop in Nigeria and other parts of the world. In Nigeria, areas of high production and concentration lie within the northern parts of the country namely Kano, Kaduna, Jigawa, Benue and Plateau State. In other to reduce the dependency on importation of food, in

2016, the government of President Muhammadu Buhari implemented a policy that banned the importation of food items that could be produced locally and tomato paste is in the list of banned items.

Nowadays, access to education, information, knowledge, and communication plays vital roles in the individual and social life as well as human development and inclination towards growth. As a pre-requisite of knowledge, information, recognition and awareness are among the most efficient factors in reaching human development (Anosike, 2018). Radio is proven to be the most effective medium in promotion of agriculture and development projects in rural areas which can serve as the fastest and most impactful means of sensitization of tomato crop as it is a versatile and widely grown vegetable throughout the world (Akpabio, 2022).

Statement of the Problem

Undoubtedly, over 45% (750,000 metric tonnes) of tomatoes produced in Nigeria go to waste. The above estimated annual loss is a result of poor food supply chain management, price instability resulting from seasonal fluctuation in production and the supply preference of farmers and middle men to urban market than processors due to low farm gate Price (Ugonna,

Jolaoso & Onwualu, 2015). In the Federal Government's effort to encourage domestic production and processing of tomato paste, the government had introduced the Anchor Borrowers Programme (ABP) for tomato value chain through the Central Bank of Nigeria (CBN) with the aim to increase production and processing of tomato paste. This policy resulted into the establishment of five major tomato processing plants in Kano, Jigawa, Kaduna, Katsina and Kebbi states.

Nonetheless, with all the efforts put by the Federal Government there are still numerous challenges mitigating against the success. Given the importance on the centrality of tomato production to the livelihood of smallholder farmers in Plateau State, it becomes necessary to investigate radio programme on agricultural innovation and smallholder farmers adoption of this innovation especially the hybrid tomato in Plateau State because, more laudable initiatives by Non-Governmental Organizations (NGOs) and media organizations may not have succeeded due to several reasons which includes poor communication of the development messages and message not reaching the target audience.

Objectives of the Study

The aim of this work is to create awareness in the area of promoting agricultural innovations in rural areas through radio programmes. However, the specific objectives are the following:

1. To identify the variety of hybrid tomato introduced to the smallholder farmers in Plateau State through radio programmes.
2. To determine the frequency with which radio communicates hybrid tomato farming innovation to smallholder farmers in Plateau State.
3. To establish the relationship between radio programmes and smallholder farmers' knowledge and adoption of hybrid tomato farming innovation in Plateau State.
4. To examine the factors militating against Radio and the adoption of hybrid tomato farming by smallholder farmers' in Plateau State.

Theoretical Framework

This dissertation adopts the diffusion of innovation theory because is relevance on the subject of “radio and adoption of hybrid

tomato by smallholder farmers in Plateau State”. The Diffusion of Innovation theory was developed by E.M. Rogers in 1962. This theory explains how over time, an idea or product gains momentum and spreads through a specific population or social system. The diffusion of innovations theory describes the pattern and speed at which new ideas such as the adoption of hybrid tomato farming practices, or products spread through a population from one person to another. The main players in the theory are innovators, early adopters, late majority, late adopters and resisters Kaine (2011) in Asemah (2011).

Here, the early adopters could be likened to the selected groups of the smallholder tomato farmers which comprises of the group leaders who double as the lead farmers and opinion leaders in the farmers cooperative groups and are actively involved in the community. They serve as role models to the hybrid tomato intervention project. By their (early adopters) committed involvement, the early majority, late majority and late adopters will join in the process. Therefore, radio programmes on agricultural innovation for instance hybrid tomato farming can influence the formation of listeners (farmers) opinions on hybrid tomato farming.

According to Adeola and Adetunbi (2015), Young farmers are more knowledgeable about innovations because of their longer time horizon and their “attitude of confidence” with technologies (Adrian *et al.* 2005; Far and Rezaei-Moghaddam 2017). In Feder *et al.*, (1985), the adoption of innovations was constrained by limited farmer access to sufficient information regarding available agricultural technologies; inadequate cultural technologies and practices (Akudugu *et al.*, 2012 in Newton, Morara, Linda, Aslihan, and Mark, 2022). Adequate use of agricultural innovations

enhances the potential to raise agricultural productivity and improve the livelihoods of smallholder farmer households that rely on farm output for food and sustainable income (Newton *et al.*, 2022).

Literature Review

Under this segment, this study reviews related studies that have been done empirically by other scholars on radio usage in the communication of agricultural innovations in rural areas and farmers behaviour in the adoption of the new technologies.

Conceptual Clarifications

To build the premise for this study it is important to understand the concept of communication and its role in actualizing any developmental initiative.

The Concept of Communication

According to Turow (2016), Development communication is the use of communication to promote social development. Communication itself is not just an act it is also a process which includes the transfer of idea, knowledge, information, skills using words, symbols, pictures, figures, graphs or illustrations and through communication people can be organized for great societal undertaking. In agreement with Ojedele (2018), communication gives direction to project intervention and ensures different products, material and activities all ultimately work together to support each other towards a clear vision of change.

Therefore, a poorly informed community is a barrier to development. However, knowledge and information are of paramount importance for people to respond to the opportunities and challenges in their environment. Channels such as the use of interpersonal channels, traditional media, community media, training and skill building

activities in small groups), community-based channels (community radio and television) even the new media (WhatsApp, YouTube videos e.t.c). According to Anaeto and Solo-Anaeto (2010), the use of mix channels send mutually reinforcing messages.

The Concept of Development

Development in itself suggest advancement in the life of people or society. Andrew and Moemeka (2012), refer to development as a positive change for better from conditions such as social, economic, political, cultural and human that are no longer considered good enough for the goals and aspirations of the society to those that are most likely to meet those goals and aspirations.

Conceptualising Radio as Medium of Communication

Yahaya (2002) in Agbo *et al.*, (2010) posits that, radio is a major source of information for farmer among various types of mass media. Radio is portable, quite easy to operate and it transcends the barrier of illiteracy, time and space (Soola, 2002). Radio is resonance with being an indispensable medium for achieving development in view of the high illiteracy level of society. In developing country where the larger population live in rural areas mostly dominated by illiteracy and poverty, radio beats literacy barriers and also enhances the chances of getting development messages across to a wide segment of the population (Akpabio, 2022, Gokula, Bhargari and Hemmiage 2022 and Rajadurai 2020).

Concept of Hybrid Tomato

Tomato (*Solanum lycopersicum* L) is one of the most important vegetables worldwide. It is short duration crop, produces high yield and it is a cash crop for many countries including Nigeria. Tomato contributes to a healthy, well-balanced diet, as they are rich

in minerals, vitamins, essential amino acids, sugars, dietary fibres, vitamin B and C, iron and phosphorus. (Ugonna, Jolaoso & Onwualu, 2021). According to Ugonna *et al.*, hybrid tomato variety is intentionally cross-pollinating two different varieties of a tomato plant with the outcome being an offspring, contains the best traits of each of the parents and as a result become resistant to diseases and produce firm fruits that are consistent in size. Hybrid tomato seeds often produce much higher yields than open pollinated tomato seeds. In Nigeria, tomato could be grown both in wet and dry seasons.

The Smallholder Farmer

Smallholder farmers are subsistent farmers who cultivate small plots of land for family consumption and few cash crops employing mostly family labour. In essence, more than 80 percent of foods produced in Nigeria are from smallholder farmers. This makes the smallholder farmer the engine driving the agribusiness in Nigeria (Olayemi *et al.*, 2010 in Ugonna *et al.*, 2015).

Review of Related Literature

The effectiveness of radio in the promotion of rural agricultural innovations is rated as the most cost-effective means of building awareness, and supporting the adoption of new farming practices by small scale farmers for sustainable development in agriculture (Khan, Rahman and Uddin 2017 cited in Rajadurai 2022). Through agricultural programmes on radio farmers gather information and update their knowledge and skills on various kinds of agricultural activities (Badiruand Yekinni 2015 cited in Akpabio *et al.*, 2022). AMARC 1998 in Agbo *et al.*, 2010 refers to radio as the most accessible mass medium of mass communication in use and effective means of communication in countries where most people cannot read or write but can speak and listen. Its listenership is therefore much

broader than the readership of newspaper and television viewers particularly in developing countries. The above assertion has been given credence to the studies of several studies in Nigeria. Yahaya (2002) in Agbo (2010), posits that, radio is a major source of information for farmer among various types of mass media. Radio is portable, quite easy to operate and it transcends the barrier of illiteracy, time and space (Soola, 2002).

However, the use of local languages and rural radio to reach the rural farmers directly can be result driven and farm radio programmes around the globe have made impacts in terms of creating awareness among the farmers on modern farming system such as selection of seeds, marketing of the agricultural products, hybrid seeds and off-seasonal vegetables. (Akpabio, 2022 and Rajadurai, 2020).

The National Agricultural Innovation Policy (NATIP)

According to the Federal Ministry of Agriculture and Rural Development (FMARD) 2022, the National Agricultural Technology and Innovation Policy (NATIP) is to modernize the agricultural sector in line with the changing global food systems and supply chains. One of NATIPs strategy and policy is to strengthen the priority crops which include the tomato Value-Chain. Attention would be given to the value-chain development of tomato to eradicate the key constraints facing tomato value chain by involving active participation of states and local governments, smallholder farmers and private investors. The establishment of over 100 processing centers in remote communities across Nigeria, under the Green Imperatives Plan. NATIP will also ensure the development of clusters, rural nodal centers, rural cottage industries and the establishment of at least six Special Agro-industrial Processing Zones (SAPZs) (FMARD, 2022).

Review of Empirical Studies

Under this segment, this study reviews related studies that have been done empirically by other scholars on radio usage in the communication of agricultural innovations in rural areas and farmers behaviour in the adoption of the new technologies. Below are specific related existing literature reviewed.

The Usage of Radio and Television as Agricultural Knowledge Sources

The study by Mtega (2018), on the Usage of Radio and Television as Agricultural Knowledge Sources, a case study of farmers in Morogoro region of Tanzania indicated that a large percent respondents (farmers) who used television and radio as their sources of agricultural knowledge would rather listen and watch agricultural programmes at evenings and nights hours. The changes around agricultural production, scarcity of farming inputs, land, labour and capital are challenges often faced by rural farmers. Therefore, if farmers are able to have access to agricultural knowledge, they will be able to make rational decisions related to agricultural activities (Niragira 2011 and Schmidhuber, et al. 2009 as mentioned in Mtega (2018).

An assessment of use of radio in agricultural information dissemination, a case study of radio Benue in Nigeria by Okwu, Kuku and Aba (2007), shows that 66% of the respondents listened to Radio Benue agricultural programmes and a good proportion of the farmers had access to agricultural information through Radio Benue. The knowledge-gain of the listeners through radio agricultural programmes made impact on the knowledge-gain level of the target audience. The listeners indicated the various improved practices they gained knowledge of and found very useful as a

result of the radio agricultural programmes time of presentation.

Korie, Njeru, Mburu & Gitau (2023), on the assessment of factors influencing adoption of tomato post-harvest loss-reduction technologies in Kaduna state, Nigeria. In their research, 420 tomato farmers were selected for study in Kaduna State, Nigeria. The result of the field survey showed a 100% willingness of the farmers to adopt improve²/modern technologies. The study of Tafida and Ayuba (2020), analysed the adoption hybrid tomato varieties by smallholder farmers' in Kano River Irrigation Project (KRIP) in Kura, Bunkure and Garun Mallam. Tafida, (2020) *et al.*, findings result revealed that farming experience had positively influenced the farmers' adoption of UC82B improved tomato variety than any other variety and acceptance of new improved tomato varieties is conditioned by farmer perception and preferences.

Bola, Aziz and Aliou (2016), assessed the determinants of intensity of adoption of Improved Rice Varieties (IRVs) and the effect of market participation on farmers' welfare in Nigeria using the Tobit and Heckman two-stage models, respectively. A random selection of 600 rice farmers selected from three outstanding rice producing States in Nigeria. The work showed that the improvement in farmers' welfare is related to farmers acceptability and participation in the rice output markets as it revealed that smallholder farmers are not always showing participation in staple food markets despite their overall low market shares (Jayne et al. 2005 in Bola 2016). The results in of this finding also shows that the gender of a farmer had an influence on their willingness to adopt processing at 10% significance level. Male farmers showed more willingness to process their produce as compared to female farmers. This finding

resonates well with the observations by Asfaw and Admassie (2004), considering that men tend to have a higher access to information about new innovations than their female counterparts (Wilson & Getnet, 2011 in Bola 2016).

Isaiah, Frank and Blessing (2020), findings on smallholder farmers' perception on tomato (*solanum lycopersicum*) seedling technologies in the North West zone of Nigeria, sampled (195) producers of Tomato in Kano and Jigawa States. The results of the study revealed that 82% of the farmers used recycled seeds to produce seedlings, 59% made use of seedlings for planting with Plum tomato (UTC) as the common variety, 95% are interested in buying and selling seedlings, and 98% propagated their seeds in the open field.

Effect of farmers' in "Agric and You" agricultural radio broadcast of Inspiration FM 105.9 radio station on cassava production by Akpabio and Agbarevo, (2022). Their findings examined the effect of farmers' in "Agric and You" agricultural radio broadcast of Inspiration .FM 105.9 radio station on cassava production. Onyeagocha (2012) as cited by Akpabio et al., 2022, acknowledged that the rural dwellers contribute over 80% of Nigeria's food crops and livestock under unfavorable conditions.

N

$$n = \frac{N}{1 + N(e)^2}$$

(Taro Yamane formula 1967) n =
Sample size

1 = constant

N = number of people in the population

e = level of significance (allowable error)

Research Methodology

The survey research design is adopted in this study "Radio and the Adoption of Hybrid Tomato by Smallholder Farmers' in Plateau State" and questionnaires containing a list of close-ended questions with options to choose from were dully administered. The population of this study is the tomato farmers who are registered members of farmer cooperative groups and are beneficiaries of GIZ projects using the GIZ trained tomato farmers database of 2020 to 2021 with the total population of 2,000 farmers. This study also adopts a cluster sampling technique which gives an equal probability of choosing the respondents unbiasedly. 3 selected tomato farmers cooperatives groups from 3 Local Government Areas (LGA) are evenly represented. They are: Mustang Multipurpose Cooperative Society Gindiri 673, Longtel multipurpose cooperative Pankshih 671 and Kasspungyai multipurpose cooperative society, Kanam 656. A cluster sampling technique was adopted and each of the farmer cooperative groups were grouped into 5 clusters of 22 respondents with 1 cluster having 23 respondents which gives the total of 111 per cooperative group. The sample size for this study is statistically determined by Yamane (1967) statistical formula as illustrated below.

2000 population size allowing 5% margin sampling error with 95% confidence level

$$\text{Here, } n = \frac{2,000}{1 + 2,000(0.05)^2} = \frac{2,000}{1 + 2,000(0.05)^2}$$

$$n = \frac{2,000}{1 + 2,000(0.05)^2} = 333$$

Therefore, the sample size for this study is 333 respondents.

Each of the farmers group is divided into a cluster of 5 with a total of 22 respondents and 1 cluster having 23 respondents each. Hence, 111 copies of questionnaires were administered to each cooperative group and all the 333 copies of questionnaires administered were collated.

Presentation and Analysis of Data

This chapter focuses on the presentation of data gathered from the findings based on four specific objectives.

Table 1: Variety of hybrid tomato introduced to respondents

Name of hybrid tomato seeds	Frequency	Percentage
Platinum F1	0	0%
Padma F1	333	100%
Kilele	0	0%
Chibli	0	0%
Total	333	100%

Source: Field survey, 2023.

This question on table 1 was designed to ascertain the variety of hybrid tomato introduced to the farmers through PRTV agricultural innovation programme. The data gathered revealed that all respondents were exposed to Padma F1 hybrid tomato variety.

Table 2: Frequency of respondent's listenership to radio programme of hybrid tomato farming innovation.

Frequency of radio listenership	Frequency	Percentage
Every week	191	57%
Monthly	107	32%
Very rare	19	6%
Not at all	16	5%

Total	333	100%
-------	-----	------

Source: Field survey, 2023.

The question in table 2 was designed to determine the frequency with which radio communicates hybrid tomato farming innovation to smallholder farmers in Plateau State. Out of 333 respondents 191(57%) respondents listen to the programmes on a weekly basis.

Table 3: Degree of respondent’s agreements on relevance of the radio programme on hybrid tomato farming on smallholder farmers.

Variable	Frequency	Percentage
Strongly agree	188	56%
Agree	142	43
Neutral	3	1%
Strongly disagree	0	0
Total	333	100%

Source: Field survey, 2023.

Table 4: Respondents view on the sustainability of radio programmes on hybrid tomato farming.

Variable	Frequency	Percentage
Strongly disagree	0	0
Disagree	0	0
Neither agree or disagree	0	0
Agree	26	8%
Strongly agree	307	92%
Total	333	100%

Source: Field survey, 2023.

The question on table 3 and 4 was established to ascertain the degree of respondent’s agreements on relevance and sustainability of the radio programme on hybrid tomato farming. Out of 333 respondents 188 (56%) respondents strongly agree to PRTV agricultural innovation programme relevance while 307 (92%) of respondents strongly agree to the programme sustainability.

Table 5: Problems observed by respondents in hybrid tomato farming

Variable	Frequency	Percentage
Difficulty in acquisition of inputs	94	28%
High cost of inputs	209	63%
No ready market for sales	23	7%
Low yield	0	0
No challenge recorded	7	2%
Total	333	100%

Source: Field survey, 2023.

Table 5 was established to examine the factors militating against Radio and the adoption of hybrid tomato farming by smallholder farmers' in Plateau State. As shown in the table above, the major challenge affecting majority 209 (63%) of respondents in the adoption of hybrid tomato farming is the high cost of inputs. Difficulty in acquisition of inputs is experience by 94 (28%) respondents.

Discussion of Findings

The finding revealed that all the respondents (100%) were exposed to Padma F1 hybrid tomato variety through PRTV agricultural innovation programme. As affirmed by Ugonna *et al.*, (2021), hybrid tomato is a relatively short duration crop which gives high yield, and it is economically attractive. This finding aligns with the study of Ogunbameru (2011), who observed that the number of farmers adopting recommended technology is often used as an indicator of the effectiveness of extension service. However, it is a presumption that farmers will adopt any improved and proven agricultural technology that is communicated to them. The result of this finding further agrees with the theory of diffusion of innovation. It describes the pattern and speed at which new ideas such as the adoption of hybrid tomato farming practices, or products

spread through a population from one person to another (Hornik 1988 in Momoh 2015).

This study also sought to find out the frequency of communication of hybrid tomato farming innovation by PRTV in Plateau State and it was revealed that PRTV air agricultural innovation programmes on a weekly basis because out of 333 respondents 191(57%) respondents listen to the programmes on a weekly basis. Radio is the most accessible mass medium of mass communication in use. It is a particularly effective means of communication in countries where most people cannot read or write but can speak and listen. Its listenership is therefore much broader than the readership of newspaper and television viewers particularly in developing countries (Akpabio, 2022, Gokula, Bhargari and Hemmiage 2022 and Rajadurai 2020). The above assertion has been given credence to the study of Anosike (2018) which posits

that, radio is a major source of information for farmer among various types of mass media and further agrees that radio is portable, quite easy to operate and it transcends the barrier of illiteracy, time and space. Radio makes a development process easy as it is an excellent medium for mobilization and capable of drawing the attention of diverse audience to new ideas, techniques, and latest information. In terms of attitudinal and opinion change, radio is used to encourage audience participation (Anosike, 2018).

Furthermore, it was revealed in this study that the relationship between radio programmes and smallholder farmers' knowledge and adoption of hybrid tomato farming innovation was cordial as 56% of the respondents agree to the relevance of sustainable broadcast of agricultural innovation programme on radio. 73% of the respondents find the language of communication on radio programme to be simple and clear to their understanding. On degree of respondent's agreements on relevance of the radio programme on hybrid tomato farming on smallholder farmers, 56% of respondents strongly agree to the relevance of radio programme on hybrid tomato farming and 43% of respondents agreed. Participatory communication is the use of free and open dialogue among stakeholders, and to marginalized groups, time and space to express their concerns, to define their own needs, to set goals, and to act on them. Within the context of effective development communication, participatory communication becomes indispensable (Akpabio, 2022).

This further agrees with the study of Anaeto et al., (2008), participation is necessary in order to share information, knowledge, trust, commitment and right attitude in planning and implementing development programmes. In addition, this

findings show the problems observed by respondents in hybrid tomato farming as 63% indicated the high cost of inputs and 28% identified the difficulty in acquisition of inputs while 67% of the respondents agreed to the suitability of the airing time of the programme on radio.

Conclusion and Recommendation

This study concludes that radio (PRTV) impacted and influenced the smallholder tomato farmers participation in adoption of hybrid tomato farming innovation through their weekly broadcast of agricultural innovation programmes in Plateau State. So therefore, based on this findings and conclusions, the researcher recommends more establishment of rural community radio to increase radio listenership and promotion of new agricultural innovations in rural communities, rural community radio stations should increase the frequency of agricultural programme broadcast, rural radio programmes should be made participatory and agricultural programmes on radio should be more participatory and engaging to sustain farmers' listenership and cost of hybrid tomato seeds/seedlings and the general economy cost of producing hybrid tomato should be subsidized and made available for more farmers.

References

- Adeola, R. G. And Adetunbi, S. I. (2015). Farmers' Perception of Sustainable Agriculture in South-Western Nigeria: Implications for Rural Economy. Department of Agricultural Extension and Rural Development, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. *International Journal of Applied Agricultural and Apicultural Research*. (1&2): 86-92,
- Agbo, B., Ojobor, C.E., & Ezinwa, C. (2010). *Issue in Development Communication*: Enugu, Nig: John Jacob's Classic Publishers Ltd.
- Anaeto, S.G. & Anaeto, M.S. (2010). *Development Communication: Principle & Practice*. Ibadan: Stiring-Horden Publishers.
- Asemah, E.S. (2011). *Selected Mass Media Theme*. Jos: University Press.
- Bola, A. Awotide, I., Aziz A. Karimov, & Aliou, D. (2016). Analysis of Factors Influencing Tomato Farmers' Willingness to Adopt Innovative Timing Approaches for Management of Climate Change Effects in Taita Taveta County, Kenya. Department of Agricultural Economics University of Nairobi.
- Federal Ministry of Agriculture and Rural Development (FMARD) (2022-2027) National Agricultural Technology and Policy (NATIP). Abuja: Yetomka Ventures.
- Folarin, B. (1998). *Theories of Mass Communication: An Introductory Text*. Lagos: Sterling (Nig) Ltd.
- Isaiah, G. Frank, O., Blessing, M. (2020). Smallholder Farmers' Perception on Tomato (*Solanum Lycopersicum*) Seedling Technologies In The North West Zone Of Nigeria. Syngenta Foundation for Sustainable Agriculture-Nigeria.
- Mefalopulos, P. & Kamlongera, C. (2002). Participatory Communication Strategy Design. SADC/FAO Harare, Zimbabwe.
- Moemeka, A. A. (2012). *Development Communication In Action: Building Understanding and Creating Participation*. New York, Oxford: University Press of America Inc.
- Momoh, Y. O. (2012). Impact of Agricultural Services and Training Centre (ASTC) Project Tomato Farmers' Livelihood in Plateau State, Nigeria.
- National Bureau of Statistics (2022). Socio-Economic Survey on Nigeria. NBS, Abuja. National Horticultural Research Institute (NIHORT), (2022). Ibadan.
- Newton, M., Morara, N. Linda P., Aslihan S., Mark, R. (2022). Farmers' Attitudes and Perceptions of Adoption of Agricultural innovations in Kenya: A Mixed Methods Analysis *Journal of Agriculture and Rural Development in the Tropics and Subtropics*. (121),1.pp.147–160 <https://doi.org/10.17170/kobra.202204216055> ISSN: 2363-6033 (online); 1612-9830 (print) – website: www.jarts.info
- Okwu, O.J. A.A. Kuku, & Aba, J.I. (2007). An assessment of use of radio in agricultural information dissemination: A Case Study of Radio Benue in Nigeria.
- Rogers, E. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.
- Sahel Research Newsletter (2017). The Tomatoes Value Chain in Nigeria: 15; Pp 1-8. June 2017.
- Sharma, R. (2008). The Digital Paradigm in Radio Nepal. *International Radio of Iran*. 29- 52023 retrieved.
- Soola, E.O. (2002). *'Development communication' the past, the present & the future in soola,*

- E.O. (ed) *Communication for Development Purposes*. Ibadan: Kraft Books Limited.
- Udoaka, N. (1998). *Development Communication*. Lagos, Nigeria: Stirling-Horden Publishers Nig. Ltd.
- Yahaya, M. K. (2002). *Development Communication: Lessons from Change & Climate Engineering Project*. Ibadan: Corporation Graphics Ltd.