



Information dissemination and adoption of improved sweetpotato production in Nigeria

*Mmeremikwu, I.A.

National Root Crops Research Institute Umudike, PMB, 7006 Umuahia Abia State, Nigeria.

DOI: [10.5281/zenodo.14415926](https://doi.org/10.5281/zenodo.14415926)

Submission Date: 10 Jan. 2023 | Published Date: 15 Feb. 2023

*Corresponding author: **Mmeremikwu, I.A.**

National Root Crops Research Institute Umudike, PMB, 7006 Umuahia Abia State, Nigeria

Abstract

Information is a processed and organized data for meaningful purpose which could be in different forms and from different sources. The roles of information for sweetpotato production and processing is of essentials since the crop has moved up from the minor status to an enviable position of being the fourth most important root and tuber crop in Nigeria after cassava, yam and cocoyam. The crop has comparative advantage as high yielding and fast-growing crop and has frequently been used as crisis response crop following natural disasters in Africa. In the light of this, the paper reviewed the Sources of Information on Crop Production in Nigeria, Adoption of Sweetpotato Production and Processing Technologies in Nigerian and Constraints to Adoption of Sweetpotato Improved Technologies.

Keywords: information communication, sweetpotato, adoption, processing, constraints.

Introduction

Sweetpotatoes (*Impomea Batatas*) is an important traditional crop that is grown customarily by farmers in many countries mainly for household consumption. According to Issah, Bonaventure, Eli, and Kusi (2017), sweetpotato is believed to be typically grown and consumed by resource poor households. It is one of the most important staple carbohydrate foods in Sub-Saharan Africa and are grown in most parts of Nigeria in diverse agro-ecological zones. The crop has moved up from the minor status to an enviable position of being the fourth most important root and tuber crop in Nigeria after cassava, yam and cocoyam (Ejechi, Ode, and Sugh, 2020). It can be boiled, fried or roasted. In the semi-arid zone, its flour is popularly used as sweetener, used in making local dishes and beverages like kunu, while in the urban markets of the humid south, the fried chips are produced and marketed as snacks (Dian-Adi, 2015). In Nigeria, cassava and sweetpotatoes are often grown on the same farm or same region, and farmers frequently turn to sweetpotatoes when cassava fails due to pest and disease attacks (Nanbol and Otsanjugu, 2019). As an economic crop, Kaguongo, Ortmann, Wale, Darroch, and Low, (2012) indicated that sweetpotato can be harvested piecemeal as needed, as well as offer a flexible source of food and income to rural households that are mostly vulnerable to crop failure and consequently fluctuating cash income.

According to Heck, Hugo, Barker, Okello, Arun, Erick, Lynn, and Ekin (2020), sweetpotato have comparative advantage as high yielding and fast-growing crops and have frequently been used as crisis response crops following natural disasters in Africa. Sweetpotatoes are highly adaptable to relatively marginal soils and erratic rainfall and has high productivity per unit (Okeke and Mbah, 2021) and guarantees high yield under adverse weather conditions. Sweetpotato assortments exist in many shades of skin and flesh, ranging from white to purple, however, the white and yellow-orange flesh are the most widely recognized. According to Egwuonwu and Ozor (2020), the fresh sweetpotato can be boiled, roasted, baked and fried as chips which may be sold as snacks or salted and eaten as sweetpotato crisp in Nigeria. Also, they can be fed to livestock, and processed industrially into alcohol, starch, noodles, and flour (Nsa, Udoh and Esseini, 2018). Sweetpotato is inadequately utilized as a food in Nigeria. Therefore, Food and Agriculture Organization (FAO) (2020) advised that the production of sweetpotatoes should be increased in both quantity and quality. Egwuonwu *et al.*, (2020); and Onuwa, Folorunsho, Binuyo, Emefiene and Ifenkwe (2020), on the other hand, opined that the insignificant use of sweetpotato in Nigeria is clearly due to the non-accessibility of satisfactory sweetpotato-based recipes that fulfill the food propensity for users in Nigeria.

Consequently, the National Root Crops Research Institutes (NRCRI), embarked on a thorough and dynamic research into the genetic improvement, production, processing, storage, utilization, and socio-economies of root and tuber crops of economic importance in Nigeria (NRCRI, 2014). In a bid to actualize their mandate, the National Root Crops Research Institutes provided the necessary environment for the production, processing and marketing of value-added products of various root and tuber crops towards food security, income generation, beneficial business and quick industrial turn of events. Okeke and Mbah (2021), reported that these research efforts by the National Root Crops Research Institutes have led to the introduction of improved varieties of sweetpotato such as TIS 87/0087, TIS 2532, OP.1.13, TIS 8441 and TIS 8164 which are high yielding and tolerant to prevalent pests, notably sweet potato weevil, *Cylas* spp and with wide adaptation across Nigeria.

The components of the sweetpotato production and processing technologies are: use of improved sweetpotato of different varieties such as TIS 87/0087, TIS 8164, TIS 2532.OP.1.13, Ex-Igbariam; seed bed preparation (ridges or mounds; never flats); use of correct spacing (30cm x 100cm on ridges; 25cm x 100cm on mounds on both sole and intercrops); correct length of vine cuttings (2.5 nodes); use of insecticides/fungicides and herbicides; planting material (vine cutting containing 5-6 nodes); application of fertilizer (45kg N, 15kg P, 40kg K - 400kg or 8 bags of NPK 20:10:10); time of planting (late May to June); weed control/use of herbicide (2.5kg /ha of Primextra super) at 4 to 6 weeks after planting; earthening up (at weeding, 4-6 weeks after planting); pest and disease control (timely harvest, use of resistant varieties, use of neem leaves dust, crop rotation and use of clean planting materials); and time of harvest of 3–4 months after planting (Egwuonwu, *et al.*, 2020; Federal Agricultural Research and Training Station, 2015).

Technological innovation in agriculture has over the years transformed the farming systems among smallholder farmers, leading to the realization of economic incentives of higher outputs, profits, and sustainability (Tsinigo and Behrman, 2017). It is assumed that notable improvements can be recorded in Nigeria agricultural sector, if the available technologies are accepted and adopted by the farmers. However, the success of any technology depends on its dissemination among the potential users, which ultimately is measured by the level of adoption of that technology (Ibrahim, Mustapha and Nuhu, 2012). The adoption of improved sweet potatoes processing technologies can lead to improved food security through the enhancement of value addition. Adoption as described by Rogers (2015), refers to a decision to make full use of an innovation as the best course of action available. Similarly, Eneh (2010), defined “adoption” as the stage in which a technology is selected for use by an individual. It is defined as the integration of new technologies into existing practices and is usually proceeded by a period of trying and some degree of adaptation (Mwangi and Kariuki, 2015). Mudzingwa and Kabote (2014) on the other hand, indicated that technology adoption can be described as a process that begins with awareness of the technology and progresses through a series of steps that end in appropriate and effective usage. Thus, technology adoption can be looked at as an evolutionary process where the old is upgraded or replaced by new to align the solution to emerging problems or solving old problems in a better way.

Sources of Information on Crop Production in Nigeria

Information is a processed and organized data for meaningful purpose which could be in different forms and from different sources (Adio, Abu, Yusuf, and Nansoh, 2016). They are the various sets of information and messages that are relevant to agricultural production activities to farmers such as crop production and protection, animal production and management of natural resources and conservation. To many, and every rational person needs some form of information for his/her daily activities. Therefore, emphasis on agricultural information cannot be overruled, since information had been described as a man’s accumulated knowledge in all subjects, in all forms and from all sources that could help users of such information to improve and develop intellectually. Hence, agricultural information is supposed to be made available to research scientists, extension workers, farmers and others, so that they can all engage in food production (Udemezue, 2019). According to a research conducted by Ugonna (2020), it was revealed that the major sources of agricultural information was through friends and co-workers, meanwhile the knowledge and skills possessed for accessing agricultural information were generally low. Lack of accessibility to extension and credit services have been reported in many parts of sub-saharan Africa as well as other developing countries as the limiting factors for increased agricultural productivity (Garba, 2016).

Ariyo, Okelola, and Oni (2013) in the assessment of the roles of mass media in dissemination of agricultural technologies among farmers in Kaduna State, reported that information is an essential ingredient needed for effective transfer of technology that is designed to boost broiler production. And for farmers to benefit from such technology they must have access to them and learn how to effectively utilize them in their poultry system management and practice. Information sources are seen as an institution or individuals that create or brings about message and the characteristics of a good information source includes its relevance, timelessness, accuracy, cost effective, reliability, usability, exhaustiveness and aggregation level. In essence, farmers in various categories of crop and animal production need a wide variety of information on most suitable seeds, crops and animal diseases, input and output prices, weather related information, market information, pre and post-harvest management technologies, among others. According to Wanyama, Mathenge and Mbaka (2015), if all these information sources are properly used, agricultural information can significantly contribute

towards overall economic development through improved productivity and incomes. However, achieving the desired goal for agricultural information can only be realized if farmers have adequate access and know how to apply these innovations to their potential.

In view of the above, information must be seen as an essential path to modern agriculture to achieve farmers' needs. The advent of computers and improvements in telecommunications offer farmers and extension workers ample opportunities to obtain technical information quickly and use them effectively during decision-making processes. Modern farmers are the entrepreneurs who strive to grow right crops and animals in the most profitable way. The amount of information a farmer can and should use for his management decision is increasingly growing. Previously, the mass media gave generalized advice to farmers, but with modern information technology, extension agents can provide for each farmer without visiting farm personally (Wanyama, Mathenge and Mbaka, 2015). Through information dissemination, farmers are able to acquire and have access to knowledge on new technologies or agronomic systems, when to cultivate and harvest, crops or animal to rise and where to sell them.

According to Adio, Abu, Yusuf, Sheriff and Nansoh (2016), it is through agricultural information that farmers know where to acquire bank loans and other farming inputs as well as how to control pest and diseases. Consequently, increasing production and improvement of the standard of living of farmers. Therefore, information is an essential resource for individual growth and survival, an informed mind is an enriched mind and if one is not informed, he will be deformed. Information source is a medium in which knowledge or information is stored (Adio, *et al.*, 2016). Information sources are various means through which information is recorded and disseminated for use by an individual or organizations. Sources of information includes but not limited to radio, television, extension workers, cooperative, friends and relatives, newspapers and magazines, books/leaflets, phones, libraries and institutions. Also, observation of people organization, speeches, documents, picture and art work can also be described as information sources (Adio *et al.*, 2016).

Agricultural information sources are important factor that interacts with other production factors. Productivity of these other factors, such as land, labor, capital and managerial ability, can arguably be improved by a reliable and useful information (Vidanaphirana, 2019). Information supplied by extension, research, education and agricultural organizations helps farmers make better decisions. Therefore, there is urgent need to understand the functioning and roles of a particular agricultural information source or system in order to manage and improve it. Research conducted by Udemezue (2014) in Anambra State, observed that majority (77.5%) of the respondents sourced information on improved technologies from friends/neighbours, 70.0% sourced information from cooperatives, 54.2% of the respondents also sourced information from radio, while 48.3 percent and 42.5% of the farmers sourced information on improved technologies from their fellow farmers. Similarly, 32.2%, 25.8% and 21.7% of the farmers sourced information on improved production technologies from community leaders, extension agents, and NGOs respectively.

In a study conducted by Garba (2016), it was revealed that a greater proportion (40%) of the Irish potato farmers have access to information through the extension agents. The primary goals of these information sources are to create awareness by diffusing innovation among potential adopters and this has been the major reason agricultural extension workers constitute the most important source of information to farmers. In Okeke (2018), it was revealed that the majority of the sweetpotato farmers sourced information from research institute and fellow farmers while some other farmers did not source information from any source rather, they relied strongly on their farming experience. This implies that many of the farmers did not source their information from any source but depend on their personal knowledge and experience. Therefore, it is an indication that no single source of information could be effectively deliver extension message to farmers in her study area, rather all sources of information are required to effectively deliver information to the farmers and processors there by increasing the performance of the farmers in food production.

Adoption of Sweetpotato Production and Processing Technologies in Nigeria

In a research study of the adoption of improved sweet potato production technologies among small scale farmers in South East, Nigeria, conducted by Okeke, *et al.*, (2020), it was stated that the use of new improved varieties, Ex- Igbariam had the highest mean adoption score of 4.79, butter milk had 4.55, UMUSPO/2 had 3.73, UMUSPO/1 had 3.19 and TIS-87/0087 had mean adoption score of 2.86. The grand mean adoption score was 3.95 with adoption index of 0.79. Meanwhile, 30cm x 100cm on ridges had mean adoption score of 4.22 and spacing at 25cm x 100cm on mounds had mean adoption score of 3.92. The grand mean adoption score was 4.22 with adoption index of 0.81. The result further showed that the mean adoption score of 4 node cuttings and 2 nodes inserted into the soil was 4.07 while 8 node cuttings and 4 nodes inserted into the soil had mean adoption score of 4.01. The grand mean score was 4.04 while the adoption index was 0.81. Also, the result of study showed that the mean adoption score of fertilizer application at 4-6 weeks of planting was 4.53. The grand mean score of fertilizer application was 4.53 while the adoption index was 0.91. In addition, it was revealed that the use of hoe, digger and hand fork for harvesting of sweet potato had mean adoption score of 4.67, 4.32 for time of harvesting (3-4 months after planting), 3.07 for careful harvesting of the roots to avoid injury or bruises

and 2.18 for allowing the bruises to heal before storage. Also, the grand mean score was 3.56, while the adoption index was 0.71.

In the adoption of improved sweet potato production technologies among farmers in Ohaji/Egbema Local Government Area of Imo State, by Egwuonwu *et al.*, (2020), it was indicated that majority (51.6%) of the farmers have adopted improved sweet potato variety TIS 8164, this implies that the farmers are in adoption stage. The improved variety with bland taste such as TIS 87/0087 was at the adoption stage, that is, 46.7 % of sweet potato farmers were using it already. Also, 56.7% of the respondents adopted improved variety TIS 2532. Few (18.3%) of the respondents adopted the variety of Orange-fleshed sweet potato on their farms and 51.7% rejected the orange sweet potato this is because it is a new variety which is still under research in Umudike and Imo ADP. On the seed bed preparation, the result shows that the majority (51.6%) of the farmers were at the adoption stage. This implies that the sweet potato farmers had adopted the NRCRI's recommended seed bed preparation of either using ridges or mounds and not flat bed. The result further shows that majority (53.3%) of the farmers adopted the recommended time for planting of sweet potato. This implies that sweet potato farmers decided to use the recommended time of planting sweet potato around late May to June.

Adeola, Ogunleye, and Adewole (2020) in the adoption intensity determinants for improved sweet potato varieties among farmers in Nigeria, revealed that TIS 87/0087 was adopted by 64.5% of the respondents while 47.4% of the farmers adopted TIS 8164 and 32.6% reported the adoption of TIS 2532 OP 1.13. Orange-fleshed (01/1371 and 01/1368) sweet potato varieties were the least adopted by 27.7% of the respondents. The improved varieties of sweet-potato identified in the study were introduced to the farmers in the study area by the Oyo State Agricultural Development Programme. Similarly, in a study of comparative adoption of improved sweetpotato production technologies in Ikwuano and Umuahia North Local Government Area, conducted by Okoji (2021), it was revealed that there was a significant difference in the level of adoption of improved sweet potato production technologies by farmers in Ikwuano and Umuahia North L.G.As. The sweet potatoes farmers' level of adoption of the improved sweet potato production technologies was higher in Umuahia North than in Ikwuano L.G.A. Age, gender, household size, and income were significant determinants of adoption of improved sweet potato production technologies in Ikwuano L.G.A. Whereas, on the other hand, age, farming experience and level of income were the determinants of adoption of the improved technologies in Umuahia North L.G.A.

Tsado, Ojo, Yisa, and Ajayi (2014) in farmer's adoption of the improved techniques of sweet potato production in Niger state, Nigeria, indicated that the following technologies were highly adopted, fertilizer use (M=3.6), weeding regime (M=3.7) and harvesting techniques (M=3.9). With regard to extent of adoption of the sweetpotato production practices, Selahkwe, Nformi, Lengah, Nchanji and Fotang (2021), reported that the majority (37.9%) of the farmers adopted the use of ridges and mounds, as well as improved sweet-potato varieties, while majority (40.2%) of them rejected the recommended plant spacing of 30cm x 100cm on ridges and 25cm x 100cm on mounds for both sole and intercropped systems. Most (34.2%) of the farmers used the 2-node and 5/6-node vine cuttings as planting materials, as well as time for planting of sweet-potato, weeding regime of one major weeding at 4-6 weeks after planting, inorganic fertilizer application of 400kg of NPK 20:10:10, timely harvest of root tubers and pest and disease control measures.

Constraints to Adoption of Sweetpotato Improved Technologies

According to Tsado, *et al.*, (2014), some of the constraints to improved technology adoption include but not limited to small farm size (63.3%), high cost of technology (56.7%), inadequate extension contact (60.0%) complexity of technology (68.7%) and inadequate credit (74.7%). Also, Egwuonwu *et al.*, (2020), indicated in their study that low consumer preference associated with sweet potato products, lack of capital, unavailability of land for cultivation, high cost of labour and lack of market to sell increase quantity of sweetpotato were the major constraints to adoption of improved sweetpotato in the area. Tijjani, Umar, Abubakar and Aliyu (2018), reported that the most important problems associated with adoption of improved pearl millet production practices in the study area were unavailability of improved seeds, inaccessibility to farm credit and lack of extension support. Researches has undoubtedly proven that one major reason for non-adoption of improved technologies is because that they are finalized before farmers get to see and have access to them; this implies that the technologies are not compatible to the farmer's conditions or need are rejected (Olawuyi and Mushunje, 2019). Therefore, non-adoption of recommended technology could be caused by factors such as social, psychological, cultural and economic problems.

A study conducted by Okeke, Mba and Yanjoh (2020), it was of the view that the respondents were highly constrained by inadequate processing equipment, high cost of processing produces, inadequate knowledge of modern sweet potato, processing techniques, inadequate capital for start-off, high cost of labor, poor credit facility and scarcity of processing materials such as sweetpotato tubers. According to a study conducted by Okoji (2021), it was reported that constraints to adoption of improved sweetpotato production were lack of fertilizer, poor extension contact, lack of fund, lack of chemicals, and old age. Therefore, it is pertinent to say that extension contact and basic attributes of improved varieties are significant motivating factors for adoption of improved varieties among cropfarmers. Similarly,

Adebayo, Oyawole, Sanusi and Afolami (2021) found that some constraints to technology adoption in Niger State includes small farm size, high cost of technology, inadequate extension contact, complexity of technology and inadequate credit facility.

On the other hand, research conducted by Emilia, Blessing and Flora (2020), it was said that the major constraints encountered by both male and female sweetpotato farmers in the study area were high cost of sweetpotato processing equipment (91.67%), low farmers knowledge on sweetpotato value addition (72.92%), inadequate finance (87.50%), inadequate extension service (62.50%) and inadequate credit access (68.75%). Similarly, Udemezue, Obasi, Chinaka, Oyibo, Awa and Onyiba (2018) reported that too much attention was given to other crops with a weighted mean score 2.74, high perishability of the crop ranked second, inadequate finance with a weighted mean score 2.60, pest/disease infestation (2.48), high cost of sweet potato processing equipment (2.48) farmers' low knowledge (2.45), inadequate storage facilities (2.44), and inadequate extension services were the major constraints to sweet potato production and processing technologies in the area. In research conducted by Sugri, Maalekuu, Gaveh and Kusi (2017), it was shown that the five most prioritized constraints were access to seed, cost of chemical fertilizers, short shelf life, field pests and diseases, and declining soil fertility. Whereas, in the profitability and constraints to sweet potato production in Nigeria, Udemezue (2019) reported that the major culprit for the low output were inadequate supply of good quality seed potato to farmers. More so, Ugonna, *et al.*, (2013) identified a number of factors that limit sweet potato production and these are; inadequate supply of good quality seeds, inadequate storage facilities, poor disease and pest management, high cost of production, climatic limitations, activities of middle-men, marketing problems, inadequate funding of research work, and lack of agricultural equipment.

References

1. Adebayo, S.T., Oyawole, F.P., Sanusi, R.A. & Afolami, C.A. (2021). Technology adoption among cocoa farmers in Nigeria: What drives farmers' decisions? *Forests, Trees and Livelihoods*, 31(1), 1-12.
2. Adeola, R.G., Ogunleye, K.Y., & Adewole, W.A. (2019). Adoption intensity determination for improved sweetpotato varieties among farmers in Nigeria. *International Journal of Agricultural Management and Development*, 9(3), 303-211.
3. Adesina, B. A., Abdurrasheed, M. D., Okoye, A. C., Ekah, E.O., Anedo, E. O. & Afuape, S. (2017). Farmers' willingness to pay for quality orange fleshed sweet potato vines in North Central Nigeria: A case of Benue and Nasarawa States, Nigeria. *Agricultural Journal*, 48(1), 110 - 121
4. Adio, E.O., Abu, Y., Yusuf, S.K., & Nansoh, S. (2016). Use of agricultural information sources and services by farmers for improved productivity in Kwara state. *Library philosophy and practice (e-Journal)*. <http://digitalcommon.unl.edu.libphilprac/1456>.
5. Ariyo, M.O., Okelola, O.E., Oni, O.B. (2013). Assessment of the role of mass media in dissemination of agricultural technologies among farmers in Kaduna North Local Government Area of Kaduna State, Nigeria.
6. Atungwu, J.J., Ozuzu, L. & Tijjani, I. (2013). Categorisation of 10 sweet potato (*Ipomoea batatas* (L.) Lam.) varieties for resistance to *Meloidogyne* spp. in organic field, *Archives of Phytopathology And Plant Protection*, 46(3), 253-260
7. Barkessa, M.K.E (2018). A review on sweet potato (*Ipomea batatas*) viruses and associated diseases. *International Journal of Research in Agriculture and Forestry*, 5(9), 1 – 10.
8. Chah, J. M., Anugwa, I.Q & Nwafor, I.M. (2020). Factors driving adoption and constraining the non-adoption of biofortified orange flesh sweet potato among farmers in Abia State, Nigeria. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 121(2), 173 – 183.
9. City-population (2016). *Anambra State population*. Retrieved on the 16/01/2019 from <https://www.citypopulation.de/php/nigeria-admin.php?adm1id=NGA004>
10. Dian-Adi, A.E. (2015). Added value improvement of taro and sweet potato commodities by doing snack processing activities. *Procedia Food Science*, 3(2&3), 262 – 273.
11. Egwuonwu, H.A. & Ozor, C.P. (2020). Assessment of adoption of improved sweet potato production technologies among farmers in Ohaji Egbema Local Government Area of Imo State, Nigeria. *Journal of Agriculture and Food Science*, 18(1), 50 – 58.
12. Ejechi, M.E., Ode, I.O. & Sugh, E.T. (2020). Empirical analysis of production behavior among small-scale sweet potato farmers in Ebonyi State, Nigeria. *Nigerian Agricultural Journal*, 51(1), 17 – 21.
13. El-Sheikha, A.F., & Ray, R.C. (2017). Potential impacts of bioprocessing of sweetpotato: Review. *Crit Rev Food Sci & Nutr*, 57, 455–471.
14. Emilia, A., Blessing, U., & Flora N., N. (2020). Gender analysis in the adoption of sweetpotato value addition technologies by rural farmers in Imo State, Nigeria. *JCCR | Journal of Community & Communication Research*, 1-8.
15. Eneh, O.C. (2010). Technology transfer, adoption and integration: A review. *Journal of Applied Sciences*, 10(16), 1814 – 1819

16. Federal Agricultural Research and Training Station (2015). Research Programmes 2014 – 15 of the Federal Agricultural Research and Training Station, Umudike, Umuahia. Federal Ministry of Agriculture and Natural Resources.
17. Food and Agricultural Organisation (FAO), 2020. Coronavirus Disease (2019). (COVID-19); Addressing the Impacts of COVID-19 in Food Crises (April – December) Mat Update, Rome.
18. Hayati, M., Sabaruddin, Efendi & Anhar, A (2020). Morphological characteristics and yields of several sweet potato (*Ipomoea batatas L.*) tubers. *IOP Conference Series: Earth and Environmental Sciences*, 425(1), 1 - 7
19. Heck, S., Hugo C., Barker I., Okello, J., Arun B., Erick B., Lynn B., & Ekin B. (2020). Resilient agricultural food systems for nutrition amidst COVID-19: Evidence and lessons from food-based approaches to overcome micronutrient deficiency and rebuild livelihoods after crises; *Food Security*, 823-830.
20. Ibrahim, A.A., Mustapha, S.B., & Nuhu, S.H. (2012). Effects of adoption of rice production technologies on farmers' income in Borno State, Nigeria. *Journal of Agriculture and Veterinary Sciences*, 1(4), 19 – 22
21. Issah, S., Bonaventura, K., Eli, G., & Kusi, F. (2017). Sweet potato value chain analysis; opportunities for increased income and food security in northern Ghana. *Advances in agriculture; hindawi*.
22. Kaguongo, W., Ortmann, G., Wale, E., Darroch, M. & Low, J. (2012). Factors influencing adoption and intensity of adoption of orange flesh sweet potato varieties: Evidence from an Extension Intervention in Nyanza and Western Provinces, Kenya; *African Journal of Agricultural Research* 7(3) 493-503.
23. Kanu, R.U., Nwachukwu, I. and Olojede, J.C. (2016). Effectiveness of technology transfer method of MOUAU extension centre among adopted village farmers in Ikwuano and Umuahia LGAs of Abia State, Nigeria. Proceedings of Society for Community and Communication Development Research (SCCDD), *International Conference on corporate social responsibility and community development*.
24. Mbanaso EO (2010) *Adoption and dis-adoption of sweetpotato Production and processing technologies by farmers in South-Eastern Nigeria*. Ph.D thesis, department of agricultural extension, University of Nigeria, Nsukka. Pp. 1-104.
25. Mbanaso, E.O., Agwu, A.E., Anyanwu, A.C. & Asumugha, G.N. (2012). Assessment of the extent of adoption of sweet potato production technologies by farmers in the South-East agro-ecological zone of Nigeria. *Journal of Agriculture and Social Research (JASR)*, 12(1), 124 – 136.
26. Mbusa, H.K., Ngugi, K., Olubayo, F.M., Kivuva, B.M., Muthomi, J.W & Nzuve, F.M. (2018). Agronomic performance of Kenyan orange fleshed sweet potato varieties. *Journal of Plant Studies*, 7(2), 11 – 19
27. Mohanray, R. & Sivasankar, S. (2014). Sweet Potato (*Ipomoea batatas (L.) Lam*) - A valuable medicinal food: A review. *Journal of Medicinal Food*, 17(7), 733 – 741.
28. Mudzingwa, P. & Kabote, F. (2014). Exploring modern technology adoption in Zimbabwe's beauty therapy industry. *Journal of Humanities and Social Sciences*, 19(5), 44 – 48
29. Mwangi, M. & Kariuki, S. (2015). Factors determining adoption of new agricultural technology by smallholder farmers in developing countries. *Journal of Economics and Sustainable Development*, 6(5), 208 – 213
30. Mwanja, Y.P., Goler, E.E. & Gugu, F.M (2017). Assessment of root and vine yields of sweet potato (*Ipomoea batatas (L.) Lam*) landraces as influenced by plant population density in Jos-Plateau, Nigeria. *International Journal of Agricultural Research*, 12(2). 88-92.
31. Mwololo, J.K., Mburu, M.W.K. & Muturi, P.W (2012). Performance of sweet potato varieties across environments in Kenya. *International Journal of Agronomy and Agricultural Research (IJAAR)*, 2(10), 1 – 11.
32. Nanbol, K. and Otsanjugu, N. (2019). The contribution of root and tuber crops to food security: a review. *Journal of Agricultural Science and Technology*, 9(1), 221 – 233.
33. National Root Crops Research Institutes (NRCRI) (2014). National Root Crops Research Institutes bulletin. Retrieved on 18th of May 2020 from <https://nrcri.gov.ng/>
34. Neela, S., & Fanta, S. W. (2019). Review on nutritional composition of orange-fleshed sweet potato and its role in management of vitamin A deficiency. *Food science & nutrition*, 7(6), 1920–1945.
35. Ngailo, S., Shimelis, H., Sibiya, J. & Mtunda, K. (2013). Sweet potato breeding for resistance to sweet potato virus disease and improved yield: Progress and challenges. *African Journal of Agricultural Research*, 8(25), 3202 – 3215.
36. Nolte, K. & Ostermeier, M. (2017). Labour market effects of large-scale agricultural investment: Conceptual considerations and estimated effects. *World Development*, 98(1), 430-446.
37. Nsa, S.O., Udoh, U.O. & Esseini, E.N. (2018). Processing and packaging of secondary products of root and tuber crops for industrial and domestic consumption: A step towards recovery from economic recession in Nigeria. *African Journal of Educational Assessors*, 6(1), 11 – 25.
38. Nwaobiala, C.U. (2018). Farmers' adoption of cassava agronomic practices and intercrop technologies in Abia and Imo state, Nigeria. *Journal of Agricultural Extension*, 22(2), 82 – 96.
39. Nwaobiala, C.U., Alozie, E.N. & Anusiem, C.N. (2019). Gender differentials in farmers involvement in cassava production activities in Abia State, Nigeria. *Agrosearch*, 19(1), 72 – 86.
40. Ofoedu, S.I., Ugwumba, C.O. & Chidebelu, S.A. (2018). Potentials and marketing of fresh African breadfruit (*Treculia Africana*) seeds in Anambra State, Nigeria. *International Journal of Business and Industrial Marketing*, 3(2), 28 – 33

41. Okeke, M. N., Mbah, E. N., & Yanjoh, E. T. (2020). Analysis of constraints to adoption of sweet potato processing technologies among actors in South East, Nigeria. *Asian Journal of Agricultural and Horticultural Research*, 6(1), 34-42.
42. Okeke, M.N (2014). Assessing the activities of women cooperatives in cassava processing in Anambra State. M.Sc Dissertation in the department of agricultural economics and extension, Faculty of agriculture, Anambra State University, Nigeria.
43. Okeke, M.N., Mbah, E.N., Madukwe, M.C., and Nwalieji, H.U. (2020). Adoption of improved sweet potato production technologies among small scale farmers in South East, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology* 37(4) 1-13.
44. Okeke, M.N., Onwubuya, E.A., Ogbonna, O.I. and Nwalieji, H.U (2014). Emerging roles of women farmers cooperatives in cassava processing in Anambra State, Nigeria. *The State of Agricultural Extension in Nigeria. Proceedings of the 19th Annual Conference of the Agricultural Extension Society of Nigeria held at the Federal University of Technology Owerri, Imo State. 27-30th April, 2014*, pp. 222- 230
45. Okoji, A (2021). Adoption Of Improved Sweet Potato Production Technologies In Ikwuano And Umuahia North L.G. As Comparative Study . Repository.mouau.edu.ng: Retrieved Jun 19, 2022, from <https://repository.mouau.edu.ng/work/view/adoption-of-improved-sweet-potato-production-technologies-in-ikwuano-and-umuahia-north-lgas-comparative-study-7-2>
46. Okonkwo, J.C., Amadi, C.O., &Nwosu, K.I (2009). Potato production, storage, processing and utilization in Nigeria. *National Root Crops Research Institute, Umudike, Nigeria*. Pp 67-69.
47. Olagunju, F.I., Fakayode, S. B., Babatunde, R.O., & Ogunwole-Olapade, F. (2013). Gender analysis of sweet potato production in Osun State, Nigeria. *AJAEES*, 2(1), 1-13.
48. Oluwayi, S.O. & Mushunye, A. (2019). Determinants of adoption and use-intensity of soil and water conservation. *African Journal of Food Agriculture, Nutrition and Development*, 19(3), 14571 – 14586.
49. Onuwa, G.C., Folorunsho, S.T., Binuyo, G., Emefiene, M., & Ifenkwe, O.P. (2020). Economics of sweet potato production in Bokokos local government area of Plateau state, Nigeria. *African Journal of Sustainable Agricultural Development*, 1(3), 33 – 44.
50. Oyebanji, A.O., Ibrahim, M.H, Okanlawon, S.O,&Awagu, E.F. (2011). Moisture content, mouldiness,insect infestation and acceptability ofmarket samples of dried “tatase pepperand tomato in Kano, Nigeria. *Journal ofStored Products Postharvest Research*, 2(10), 200-207.
51. Paltasingh, K.R., &Goyari, P. (2018). Impact of farmer education on farm productivity under varying technologies: A case of paddy growers in India. *Agric Econ* 6(7), 1 – 19.
52. Rogers, E. M. (2015). *Diffusion of Innovation*. 4th edition. New York: Free Press, pp24-26.
53. Sanusi, M. M.I, O. I. Lawal, R. A. Sanusi and A. O. Adesogan (2016). Profitability of Sweet Potato Production in Derived Savannah Zone of Ogun State, Nigeria. *Journal of Agriculture and Social Research (JASR)* Vol. 16, No. 1, 2016
54. Saraswati, P., Soplanit, A., Syahputra, A T., Kossay, L., Muid, N., Ginting, E. & Lyons, G. (2013). Yield trial and sensory evaluation of sweetpotato cultivars in Highland Papua and West Papua Indonesia. *Journal of Tropical Agriculture*, 5(1), 74-83
55. Selahkwe, C., Nformi, M.I., Lengah, T.N., Nchanji, E.B.& Fotang, C. (2021). Factors that determine the adoption of improved Irish Po-tato technologies by farmers in WesternRegion of Cameroon. *Agricultural Sciences*, 12, 1404-1413.
56. Sial, M.H., Awan, M.S., & Waqaz, M. (2011). Roles of institutional credits on agricultural production: A time series analysis of Pakistan. *International Journal of Economics and Finance*, 3(2), 126 – 132.
57. Spore (2015). Feeding Africa’s livestock, fodder and forage solutions. Publication no. 174, pp. 15-17.
58. Sugri, I., Maalekuu, B.K., Gaveh, E. & Kusi, F. (2017). Sweetpotato value chain analysis reveals opportunities for increased income and food security in Northern Ghana. *Advances in Agriculture*, 2017(1), 1 – 14.
59. Tijjani, H., Umar, B.F., Abubakar, B.Z. Aliyu, U. (2018). Socio-economic determinants of adoption of improved milled production practices and farmers in Borno State, Nigeria. *Agrosearch*, 18(2), 86 – 100.
60. Tsado, J.H., Ojo, Yisa, E.S., & Ajayi, O.J. (2014). Farmer's adoption of improved techniques of sweet potato production in Niger state, Nigeria. *International Journal of Physical and Social Sciences*, 4, 97-110.
61. Tsinigo, E. & Behrman, J.R. (2017). Technological priorities in rice production among smallholder farmers in Ghana. *Wageningen Journal of Life Sciences*, 83(1), 47 – 56
62. Udemezue, J. C (2014). Adoption of FARO-44 rice production and processing technologies by farmers in Anambra State, Nigeria. M.Sc Thesis, department of agricultural extension, University of Nigeria, Nsukka, Pp 24
63. Udemezue, J.C. (2019). Profitabilities and constraints to sweet potato production in Nigeria. *Current Trends Biomedical Engineering & Biosciences*, 19(2), 0037 - 0041
64. Udemezue, J.C. (2019). Profitability and constraints to sweet potato production in Nigeria. *Current Trends Biomedical Eng. & Biosci*, 19(2), 1-14.

65. Udemezue, J.C., Obasi, M.N., Chinaka, E.C., Oyibo, M.N., Awa, N. & Onyiba, P.O. (2018). Limitations and processing technologies of sweet potato production by farmers in Anambra State, Nigeria. *Universal Journal of Agricultural Research*, 6(2), 51 – 56.
66. Ugonna, C.U., Jolaoso, M.O., Onwualu, A.P., (2013). A technological appraisal of potato value chain in Nigeria. *International Research Journal of Agriculture, Science and Soil Science* 3(8), 767-769.
67. Ume, S. I., Onunka B. N., Nwaneri, T. Cand Okoro, G. O. (2016). Socio-economic Determinants of Sweet Potato Production among Small Holder Women Farmers in Ezza South Local Government Area of Ebonyi State, Nigeria. *Global Journal of Advance Research*, 3(9), 972 – 883.
68. Ume, S.I., Onunka, B.N., Ochiaka, C.D. & Achebe, U (2020). Economic efficiency of orange fleshed sweet potato (OFSP) varieties by farmers in Anambra state, Nigeria. (Stochastic frontier production function approach); implication to public health in rural Nigeria. *International Journal of Science and Healthcare Research*, 5(3), 518 – 528
69. Uzuegbunam, C.O., Okeke M.N. and Nwalieji H.U (2015). *Assessment of women cooperative in cassava processing in South- East, Nigeria*. A final research project report submitted to Chukwuemeka Odumegwu Ojukwu University and Tertiary Education Trust Fund (TETFUND) DESS/UNI/ULI/RP/Vol. iv- unpublished.

CITATION

Mmeremikwu, I.A. (2024). Information dissemination and adoption of improved sweetpotato production in Nigeria. In *Global Journal of Research in Agriculture & Life Sciences* (Vol. 3, Number 1, pp. 33–40). <https://doi.org/10.5281/zenodo.14415926>