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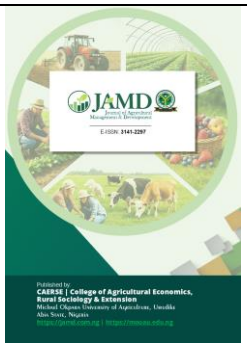

Adoption of Improved Cassava Production Technologies by Cassava-Based Farmers in Abia State, Nigeria

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ABSTRACT

The main objective of the study is to examine the adoption of improved cassava production technologies by cassava-based farmers in Abia State, Nigeria. The specific objectives are to: identify the cassava production technologies available to farmers in Abia State; and determine the levels of adoption of improved cassava production technologies by cassava-based farmers in Abia State. Multistage random sampling technique was employed in the selection of locations and respondents for the study and a sample of ninety-six (96) rural farm households was selected for this study. The study made use of primary data, obtained with the use of pre-tested structured questionnaire which was administered to the chosen farm households. Objectives i was analyzed using descriptive statistics such as means, percentages, and frequencies. Objective (ii) was analyzed using mean score from adoption score index. Results show that cassava production technologies available to the cassava-based farmers in Abia State are sixteen, but they adopted only five. There is a low level of adoption of improved cassava production technologies in Abia State. Therefore, incentives should be made available to the cassava-based farmers by the government and other interested stakeholders, to encourage the farmers to adopt all the available cassava production technologies in the state. In addition to this, the capacity of Agricultural Extension Services in Abia State should be strengthened to reach out to all farmers in the State.

Introduction

Cassava is one of the fastest expanding staple food crops in Nigeria and has continued to gain prominence among farmers, while the industrial demand is also rising consistently (FAO, 2018).

Nigeria, can only experience economic growth and social process if their agricultural systems were revolutionized. Such revolution requires not only the development, but the transfer and adoption of improved cassava technologies that are proven to increase productivity. The improved varieties adopted include high-yielding mosaic resistant varieties namely TMS 50395, 63397, 3055, 4(2) 1425, 30572, IBA 961632 (farmers pride), and IBA980505 (fine face).

The demand for cassava root products is high and fast rising, but the current production is far from being able to meet the needs of the population (Poverty Oxford and Human Development Initiative, 2017 and FAO, 2018). Consequently, there is threat of hunger and poverty. Small holder farmers constitute about 80% of all farm holdings with inefficient production. There is a widening gap between domestic food supply and demand. Food deficit has not only remained but has been on the rise, so citizens are food poor. Increasing bills of food imports, increasing prices, declining foreign exchange earnings from agricultural export are the order of the day.

The failure of the current cassava output to meet domestic and industrial demand could be attributed in part to failure to accept and adopt available cassava production technologies. Inadequate adoption of contemporary innovations and technologies have constrained cassava productive efficiency to less than 60% in most countries, including Nigeria (Ajibefun, 2015).

In view of the problems highlighted in the preceding discussion, this study provided answers to the following questions: What are the cassava production technologies available to farmers in Abia State? What is the level of adoption of improved cassava production technologies by the cassava-based farmers in Abia State? Which cassava production technologies are adopted by the farmers?

The main objective of the study is to examine the adoption of improved cassava production technologies by cassava-based farmers in Abia State, Nigeria. The specific objectives are to: (i) identify the cassava production technologies available to farmers in Abia State; (ii) determine the levels of adoption of improved cassava production technologies by cassava-based farmers in Abia State; and (iii) identify the improved cassava production technologies adopted by the farmers.

In this study, the adoption and diffusion theory was used, because it has something to do with innovation decision process. The theory states that the factors that influence innovation process are the social system, personal characteristics of the farmers and the technical characteristics of the innovation. The social system consists of various interactions within the society. It is made up of political, economical, socio-cultural, education, etc subsystems. Social system involves the norms, values, social status, taboo etc, these features of the social system influence the behavior of individual to utilize or not utilize an innovation. Personal characteristics of the extension agents and that of the farmer affect their ability to transfer and to utilize an agricultural technology.

Technical characteristics of an innovation helps to determine the rate of adoption/utilization of an innovation, those innovations that are relatively simple and compatible with the previous-experience are usually faster in the transfer and adoption process than the more complicated ones. There are five main characteristics upon which innovation is judged which affect their rate of utilization and dissemination. These characters are relativity, compatibility, complexity, trialability and observability.

These characteristics will be there before the farmer passes through the various stages of awareness, interest, evaluation, trial and final adoption stage. Hence the theories of social change were exclusively considered in course of this study. Such theories were; the Social System Theory, Functional Theory and Marxist/ Conflict Theory.

The Social System Theory insists that it is only when units are properly integrated that organizational goals can be achieved (Olantunji, 2005 and Ironkwe, 2011). It is on this premise that the REFILS approach was created for development, transfer and adoption of appropriate agricultural technologies to increase production and income of the farmers. The Functional theory views society as a social system that is made up of different parts' which are inter-dependent and

interrelated (Igbo, 2003). These different parts of society perform various functions toward the maintenance, stability, as well as survival of the social system, and they are held together by value consensus. Therefore, one part of the system cannot succeed in the production functions without the other. The proponents of this theory further believed that individuals tend to identify with those who share the same views or ideas with themselves, leading to technological transfer and adoption (Collinson, 2001).

Marxist Theory states that conflict is a normal feature of society because economic and social groups with conflicting interest and values are bound to clash from time to time (Ironkwe, 2011). Hence the theory considered change as constant and unavoidable characteristics of a society, even in technology development and adoption process (Igbo, 2003).

The intensity of adoption is the degree of use of the improved technology, while the rate of, adoption is the relative speed with which an improved technology is adopted by a producer (Rogers, 1983). The five main characteristics of the improved technology that explains the rate and intensity of adoption, are: awareness, compatibility, complexity, complexity, trainability and observability. The steps in the diffusion process are **a**wareness of the new idea, interest, trial, evaluation, rejection and adoption.

A number of studies have been carried out on the level of adoption of cassava production technologies. Onwusiribe *et al* (2022) studied the levels of adoption of improved cassava production technologies and its impact on output, income and poverty status of male and female cassava farmers in Abia State, Nigeria. Multi-stage random sampling techniques was adopted in selection of two hundred and sixteen (216) respondents, mainly 108 male and 108 female headed cassava farm households. The level of adoption of selected cassava production technologies by the male and female respondents showed that cassava production technologies adopted by the male and female headed cassava farm households were improved cassava varieties such as NR 8082 (X= 3.68 for males and X=3.58 for females) and UMUCASS 43 (X= 3.75 for males and X=3.69 for females) ploughing and ridging before planting (X=4.37 and X=4.19). Other technologies were application of recommended fertilizer to improve soil fertility (X= 4.69 for males and X=4.79 for females), improved cassava stem cuttings (X= 4.25 for males and X=4.39 for females) and weeding at least two times in a year (X= 4.02 for males and X= 4.68 for females).

Ayedun *et al*, (2019), determined the effects of adoption of cassava production technologies on farmers from southern zones of Nigeria. Data were obtained using structured questionnaires from 480 farming households from the three southern geographical zones of Nigeria using a multistage sampling technique. Data were analyzed using descriptive statistics, budgetary analysis. P-Alpha measures of Poverty (FGT) and log it model. Result showed that of all production technologies disseminated, awareness and adoption of improved cassava production technologies, both in intervention villages (IVs) and non-intervention villages (NIVs) were the highest processes of diffusion. The IVs had 93% awareness rate and 72% adoption rate while NIVs had 81% awareness rate and 64% adoption rate on improved cassava varieties.

Ezike *et al* (2022) studied factors affecting farmers' adoption of improved agricultural technologies in Kuje area council, Abuja. Adoption of improved technology in the study area shows that 50% of the farmers adopted improved cassava varieties. Proper spacing was adopted by 50% of the farmers. Proper weeding was adopted by 56% of the farmers. Herbicides and Pesticides were adopted by 45% of the farmers. The least adopted technology was fertilizer. This shows that majority of the farmers do not use fertilizer in production of cassava which may cause low yield.

Methodology

This study was conducted in Abia State, Nigeria. The state is located in the South East geopolitical zone of Nigeria. It lies between latitudes 5°6'N and 5°24'N of the equator and longitudes 7°18'E and 7°24'E of the Greenwich meridian. The state covers a land mass of about 5,243.7km², approximately 5.6 percent of total land area of Nigeria. The state has a population of 2,833,998 persons (NPC, 2006). The state is located in the rain forest zone of Nigeria with temperature range of 20°C to 31°C and a mean temperature of 27°C. It is low lying with heavy

rainfall of about 2400mm/year, intense between the months of April and October. The relative humidity is usually high throughout the year between 70.0% and 80.0%. The state comprises of seventeen local government arcas (LGAs). (Aba South, Aba North, Obingwa, Osisisioma Ngwa, Ugwunagbo, Ukwa East, and Ukwa West, Arochukwu, Bende, Isuikwuato, Ohafia, Ikwuano, Isialangwa south, Isialangwa North, Umuahia North and Umuahia South and Umunneochi), with Umuahia as its capital.

Agriculturally, the state is divided into three (3) Agricultural zones namely; Aba, Ohafia and Umuahia zones with thirty-eight (38)Agricultural extension blocks (Aba Agricultural zone has 12 blocks, Ohafia Agricultural has 13 blocks and Umuahia Agricultural zone has 13 blocks). Aba. Agricultural zone has 96 circles and 768 sub circles, Ohafia Agricultural zone has 104 circles and 832 sub circles; Umuahia Agricultural zone has 104 circles and 832 sub circles (Abia ADP. 2012). Abia State as an agrarian state, is richly endowed with land suitable for growing various tropical crops. Primary occupation of inhabitants of Abia state is farming. Arable crops cultivated include yams, cassava, maize, cocoyam, potato, plantain, banana, ginger, rice and garden egg. Major tree crops cultivated are oil palm, cocoa, rubber and citrus. Small herds of sheep, pigs, goats and poultry are kept.

According to International Institute of Tropical Agriculture (IITA), cultivating cassava comes with a lot of convenience. Some of which include: its ability to do well in poor soils, its labour requirements are low, it can be inter-cropped with other crops, it matures within a period of 6 months-3 years after planting. According to Hauser et al. (2014), the most preferred precipitation for cassava plant is an annual rainfall of 1000 mm or more. It thus implies that an average of 50mm rainfall per month spreading over a period of 6 months can sufficiently meet the water need of cassava plant. The plant does not tolerate extremely stony or sandy, clayey, salt affected, waterlogged and shallow soils, but performs excellently well on well-drained soils rich in aluminum and manganese. Notwithstanding, cassava is highly tolerant to erratic weather condition including a range of rainfall (El-Sharkawy, 2003).

Multistage random sampling technique was employed in the selection of locations and respondents for the study. Stage 1 involved a random selection of two (2) blocks from each of the Agricultural zones that make up Abia state to give a total of six (6) extension blocks. Stage 2 involved a random selection of two (2) circles from each of the selected blocks to give a total twelve (12) circles. Stage3 involved random selection of two (2) sub-circles from the selected circles to give a total a total of twenty-four (24) sub circles. Finally, four (4) cassava-based farm households were randomly selected from each of the selected sub circles to give a sample of ninety-six (96) rural farm households for this study.

Objectives (i) was analyzed using descriptive statistics such as means, percentages, and frequencies. Objective (ii) was analyzed using adoption score index and 7-point Likert type scale. Adoption score index was achieved with the aid of a 7-point Likert scale graded thus; unaware = 0, Aware = 1, interest = 2, evaluation= 3, trial = 4, accept = 5 and satisfaction = 6. In accordance with Okoye *et al.* (2007 and 2009). The mean adoption level was determined as follows:

$$\bar{X} = \frac{0 + 1 + 2 + 3 + 4 + 5 + 6}{7} = \frac{3.0}{7}$$

Decision rule: Mean score ($\bar{X}$) Less than 1.0 = Unaware stage, 1.0- 1.49 = Awareness stage of, 1.5 – 1.99 = interest stage, 2.0 – 2.49 = Evaluation stage, 2.5 – 2.99 = trial stage, 3.0 – 3.49 = adoption stage.

Results and Discussion

Identified Cassava Production Technologies in the Study Area

The farmers were asked to identify the cassava production technologies available to them. Their responses are recorded on Table 1 (See the Appendix). The cassava production technologies

available to the cassava-based farmers in Abia State are sixteen technologies, as shown on Table 1 in the Appendix. This shows that the ADP is effective in making available improved cassava production technologies to farmers in the study area.

Levels of Adoption of Improved Cassava Production Technologies by Cassava-based Farmers in Abia State

Distribution of the cassava farmers according to the levels of their adoption of improved cassava production technologies is presented in Table 3.2, in the Appendix. Using a bench mark score of 3.0, the cassava production technologies fully adopted by the farmers in Abia State, arranged from the technology with the highest level of adoption to the least, with their respective Likert Scale mean scores shown are: use of pesticides (3.64), use of insecticides (3.57), application of fertilizer (3.28), use of improved varieties of cassava (3.09) and use of rodenticides (3.01).

On the other hand, the cassava production technologies poorly adopted by the cassava farmers scored below the bench mark score of 3.0. The technologies and their respective scores are: application of herbicides (2.97), correct spacing (2.95), correct weeding (2.94), optimum plant population (2.88), timely harvest (2.84), (crop geometry (2.82), and line planting (2.75), ridging (2.56), harrowing (2.41) and ploughing (2.20).

The overall grand mean adoption score was 2.93, indicating low adoption of improved cassava production technologies among the farmers. The result is in tandem with finding of Nwaobiala *et al.* (2018), who found that cassava farmers in Abia State adopt improved production technologies such as improved varieties of cassava, fertilizer application and pest and disease control. Ijioma and Osondu (2013) reported low adoption of improved cassava production technologies among Nigerian farmers. They attributed it to factors such as insufficient extension personnel, poor extension service and inadequate finance.

Conclusion

The study concludes that there is low level of adoption of improved cassava production technologies in Abia State. The grand mean adoption score was 2.93, as against a bench mark score of 3.0. The cassava-based farmers adopted five, out of available sixteen cassava production technologies in the state. Therefore, incentives should be made available to the cassava-based farmers by the government and other interested stakeholders, to encourage the farmers to adopt all the available cassava production technologies in the state. In addition to this, the capacity of Agricultural Extension Services in the Abia State should be strengthened to reach out to all farmers in the state.

References

Abdoulaye, T., Abass, A., Maziya-Dixon, B., Tarawali, G., Okechukwu, R., Rusike, J., Alene, A., Manyong, V., & Ayedun, B. (2014). Awareness and adoption of improved cassava varieties and processing technologies in Nigeria. *Journal of Development and Agricultural Economics, 6*(2), 67–75.

Adetomiwa, K., & Adeyera, J. K. (2020). Welfare and productivity impact of adoption of bio-fortified cassava by smallholder farmers in Nigeria. *Research Square, 2*(4), 1–7. https://doi.org/10.21203/rs.3.rs-47869/v1

Andrew, J., Shehu, U. A., & Ahmed, F. F. (2023). Economic effects of cassava value addition on the income of small-scale farmers in Oshimili North, Delta State, Nigeria. *Journal of Arid Zone Economy, 1*(2), 89–102.

Asmelash, Y. (2014). Determinants of adoption of upland rice varieties in Fogera District, South Gondar, Ethiopia. *Journal of Agricultural Extension and Rural Development, 8*(12), 332–338.

Birthal, S. P., Joshi, P. K., & Gulati, A. (2005). Vertical coordination in high-value food commodities: Implications for smallholders (Paper No. 85). *International Food Policy Research Institute*, 25–34.

Ezike, D. N., Sennuga, S. O., & Afolayan, O. A. (2022). Factors affecting farmers' adoption of improved agricultural technologies in cassava production and processing in Kuje Area

Council, Abuja. *Journal of Agricultural Research, Pesticides and Biofertilizers, 3*(4), 1–6. https://doi.org/10.2022/1.1063

Food and Agriculture Organization. (2017–2018). *Poverty: Oxford and Human Development Initiative*. FAO.

Ijioma, J. C., & Osondu, C. K. (2013). Adoption of improved rice varieties in Bende Local Government Area of Abia State, Nigeria. *Journal of Agriculture, Forestry and the Social Sciences, 11*(2), 204–215.

Ironkwe, A. G., Asiedu, R., & Unamma, R. P. A. (2007). Adoption of yam minisett technology by women farmers in Abia State, Nigeria. *Journal of Agriculture and Social Research, 7*(2), 95–105.

National Population Commission. (2006). *Details of the breakdown of the national and state population totals: 2006 census*. Federal Republic of Nigeria Official Gazette, 94(24), 126.

Nwaobiala, C. U. (2018). Farmers' adoption of cassava agronomic practices and intercrop technologies in Abia and Imo States, Nigeria. *Journal of Agricultural Extension, 22*(2), 82–96. https://doi.org/10.4314/jae.v22i2.8

Oluwatusin, F. M., & Adesakin, M. F. (2017). Assessment of the adoption of improved agricultural technologies among cassava farmers in Ondo State, Nigeria. *Life Science Journal, 14*(3), 72–79.

Omoare, M. A., Fakoya, E. O., Fapojuwo, O. E., & Oyediran, W. O. (2014). Awareness of value addition of sweet potato (*Ipomoea batatas* (L.) Lam) in Osun State, Nigeria. *International Journal of Agricultural, Biosystems and Engineering, 8*(1), 537–540.

Onwusiribe, C. S., Nmerengwa, J. K., & Amadi, P. E. (2022). Impact of adoption of improved cassava production technologies on output, income, and poverty status of male- and female-headed cassava farm households in Abia State, Nigeria. *Journal of Community and Communication Research, 7*(1), 214–226.

Opeyemi, E. A., Adewumi, M. O., Ajewole, O. O., & Ologunde, O. O. (2017). Determinants of adoption of vitamin A bio-fortified cassava variety among farmers in Oyo State, Nigeria. *Croatian Journal of Food Science and Technology, 9*(1), 1–10.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed., p. 11). Free Press.

Uchemba, V. U., Nenna, G. M., & Obianefo, A. C. (2021). Adoption of improved cassava production technologies among small-scale farmers in Anambra State, Nigeria. *Journal of Plant Sciences, 9*(4), 119–127. https://doi.org/10.11648/j.jps.20210904.11

World Bank. (2008). *World development report 2008: Agriculture for development*. World Bank, 13–16.

Appendix

Table 1: Cassava Production Technologies identified as available in Abia State, Nigeria (Sample Size = 96)

Improved Cassava Production Technology	**No. of persons who identif80ied it as available to them**
Improved Technologies	
Ploughing	80
Harrowing	88
Ridging	92
Improved varieties of cassava	88
Fertilizer application	91
Use of Insecticide	94
Use of pesticide	95
Use of rodenticide	91
Application of herbicides	88
Optimum plant population	88
Line planting	87
Correct spacing	93
Crop geometry	91
Timely weeding	87
Timely harvest	78

Source: Field Survey, 2024

Table 2: Levels of adoption of improved cassava production technologies among the sampled farmers (n = 96)

Improved Technologies	Total	Mean Score	Rank
Use of pesticide	9	3.64	1
Use of Insecticide	343	3.57	2
Fertilizer application	315	3.28	3
Improved varieties of cassava	297	3.09	4
Use of rodenticide	289	3.01	5
Application of herbicides	285	2.97	6
Correct spacing	283	2.95	7
Timely weeding	282	2.94	8
Optimum plant population	276	2.88	9
Timely harvest	273	2.84	10
Crop geometry	271	2.82	11
Line planting	264	2.75	12
Ridging	249	2.56	13
Harrowing	231	2.41	14
Ploughing	211	2.20	15
Grand mean		**2.93**	

Source: Field Survey, 2024. MS = Mean score. Decision Rule Mean score value of 3.0 and above = Adoption; 2.50 – 2.99 = Trial stage; 2.0 – 2.49 = Evaluation stage; 1.5-1.99 = Interest stage; 1.0 – 1.49 = Awareness stage. Figures in parentheses are Likert scores multiplied by frequencies.