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CONSTRAINTS TO ADOPTION AND UTILIZATION OF CASSAVA PRODUCTION TECHNOLOGIES AMONG FARMERS IN IMO STAE, NIGERIA

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Abstract

The study analyzed cassava farmers' adoption and utilization of cassava production technologies in Imo State, Nigeria. Purposive and multi-stage random sampling techniques were used to select one hundred and twenty (120) cassava farmers. Data were collected through a structured questionnaire and analyzed with descriptive statistics such as: frequency counts, mean scores and percentages. The result revealed that 60% of the respondents were males, with mean ages of 51.2 years, 35% acquired secondary education, mean farming experience of 26.7 years, mean annual farm income of ₦278, 275.00 and extension contact ($\bar{X}$= 2.2) times in a month. Result reveals that farmers adopted cassava agronomic practices as; improved cassava cuttings ($\bar{X}$=4.7), ridge/mound making technologies practices ($\bar{X}$= 4.6), site selection /land clearing and weeding interval technologies ($\bar{X}$= 4.3), pest and disease control ($\bar{X}$=4.2) and planting dates and time of harvest ($\bar{X}$=3.9) with a grand mean adoption score of 4.3. The farmers also adopted intercrop technologies as; cassava/maize/egusi ($\bar{X}$=4.3) and cassava/maize/telferia and cassava value addition ($\bar{X}$=4.2) with a grand mean adoption of 3.4. The levels of utilization of cassava production technologies on agronomic practices indicate that the respondents utilized site selection/land clearing and ridge/mound making ($\bar{X}$=2.8), improved cassava cuttings, fertilizer application and weeding technologies ($\bar{X}$=2.7) and pest and disease control and planting spacing ($\bar{X}$=2.4) with grand mean utilization score of 2.6. The farmers also utilized intercrop technologies as; cassava/maize/egusi technologies ($\bar{X}$=2.9), cassava value addition technologies ($\bar{X}$=2.5) with grand mean utilization score of 2.1. High wage rate, lack of credit, technology attributes, inadequate land and pest and diseases infestation were serious constraints affecting adoption and utilization of cassava production technologies. Increased extension contact, access on improved varieties and subsidy on farm inputs were advocated for adoption and utilization of cassava production technologies in the study area.
Key words**:** *constraints, adoption, utilization, cassava, technologies*

INTRODUCTION

Cassava, *Manihot esculenta (crantz)*, is a perennial woody shrub with an edible root, which grows in tropical and subtropical areas of the world. It can tolerate drought and can grow in low-nutrients soils. In Africa, cassava provides a basic daily source of dietary energy, it roots are processed into a wide variety of granules, pastes, flours and among others; or consumed when freshly boiled [14]. Cassava often referred to as "poor man crop" produces acceptable yields on poor depleted soils where other crops will yield virtually nothing; therefore it can be used to take advantage of marginal soils [3]. The Federal Government of Nigeria, recognizing the need to develop agricultural innovations that are appropriate to the Nigerian environment, has set up a number of agricultural related research institutes to develop innovations appropriate to crops and animal husbandry in different ecological zones in Nigeria [9].The agricultural scientists in research institutes as well as the universities have been concerned about demonstrating that their innovations actually work and that their improved crop varieties out-yields local varieties and their new methods of farming is far better than the traditional methods of farming. Little or no efforts have been made by the researchers to investigate how their innovations are compatible with the farmer's social and economic environment. [10] recommends the incorporation of social and economic assessment into evaluations of agricultural innovations and the results of the assessment should be taken into consideration before

agricultural innovations are recommended to farmers for acceptance. According to [5], the factors related to determinants of adoption and utilization (financial, times and resources) and the complexity, visibility, profitability, divisibility, and the extent the innovation can be adopted in components, compatibility, agreeability to the existing culture, utility and group action. Adaptability and appropriateness of a technology determine its adoption.

The level of adoption of new technologies may be influenced by factors such as effectiveness of the extension agencies, net value of technology, economic strength and educational status of farmers, integrated package of farm support measure, age of farmers and size of holdings [11]. This calls for improved cassava farming technologies and other information needed for improved production level. According to [2], the following recommended cassava production technologies have been developed and disseminated over the years in Nigeria are; Improved cassava varieties that are low in HCN levels and resistant to various diseases, Plastic mulch for nursery, Plant population density of 10,000 plants/ha, fertilizer application NPK 15:15:15, intercrop cassava with component arable crops, maize or cowpea, and spacing: 0.9 m x 0.9 or 1 m x 1 m. Others include; planting date: cassava can be planted alone from April to October but July gives best yield in rain forest zones. When planted with maize, it should be dome in early march or April. If intercrop with cowpea, planting should be done in July or August, weed control (early weeding at least twice 30 days after planting), herbicides application (Flumetoron or Diuron at 2.0 mg/ha (pre-emergence) and use of pesticides (Aldrin, Carbuforan or Nuvacron).

The International Institute for Tropical Agriculture (IITA) and National Root Crop Research Institute Umudike has also played a leading role in the development of improved cassava varieties which are disease and pest resistant, low in cyanide content, drought resistant, early maturing, and high yielding. The improved varieties have been introduced throughout Africa's cassava belt. Varieties with resistance to the major diseases give sustained yield of about 50% more than the local ones. Today, 60% of the area cropped with cassava in Nigeria is planted with improved varieties and Nigeria is the current world leader in cassava production [16]. Despite the effort by these organizations in the development of these cassava recommended production technologies in the state, it is not certain whether the farmers efficiently adopted and utilized these technologies let alone its adoption and use.

The objectives of the study were to:

(i)describe selected socio-economic characteristics of farmers in the study area.

(ii)ascertain the respondents levels of adoption of cassava production technologies in the study area.

(iii)ascertain the respondents level of utilization of cassava production technologies in the study area.

(iv)identify constraints to adoption and utilization of production technologies by farmers in the study area.

MATERIALS AND METHODS

The study was carried out in Imo State. The state lies within latitudes 40 45'N and 70 15'N, and longitude 60 50'E and 70 25'E. It occupies the area between the lower River Niger and the upper and middle Imo River. The state is bounded on the North by Anambra State, while Rivers state lies to the South. It is also bounded to the West by River Niger and Delta state and to East by Abia state. The state is located within the rainforest belt of Nigeria, and the temperature ranges between 20^{o} C and 30^{o} C. Agriculture is the major occupation of the people. The major food produced includes cassava, yam, cocoyam, maize, and melon. Imo state is made up of 27 Local Government Areas (LGAs) and three Agricultural zones of Okigwe, Owerri and Orlu [7]. The population for this study comprised all the cassava farmers in the three agricultural zones of the state. Purposive and multistage random sampling techniques were adopted in the study. Purposive sampling was used to select Agricultural Development Programme contact

farmers who were involved in cassava cultivation were chosen for the study. First, the three agricultural zones that make up Imo state namely; Owerri, Orlu and Okigwe were selected for the study. Two blocks each were randomly selected from the three agricultural zones to give a total of 6 blocks (Owerri – Owerri North and Owerri South blocks: Orlu – Orlu and Nkwerre blocks and Okigwe – Obowo and Isiukwuato blocks). Also, 2 circles each were randomly selected from the selected blocks which gave a total of 12 circles. Finally, ten cassava farmers each were randomly selected from each of the selected circles to give a sample size of 120 cassava farmers. Descriptive statistics such as frequency counts, percentages and means were used to analyze objective i, ii and iii, while the hypothesis was tested with Z - test analysis.

Measurement of variables

(i) The levels of adoption cassava production technology among famers in the study area were achieved using adoption scale analysis. A 5-point type Likert scale of; Aware = 1; Interest = 2; Evaluation = 3; Trial = 4; Accept= 5 was used. Farmers with adoption score of 3.0 and above were regarded as having reached mean adoption score of technology and below at any level of adoption.

Decision Rule

1.0 – 1.49 = Awareness stage of the technology.

1.50 – 1.99 = Interest stage of the technology.

2.0 – 2.49 = Evaluation stage of the technology.

2.50 – 2.99 = Trial stage of the technology.

3.0 and above = Adoption of the technology.

(ii) The levels of utilization of cassava intercrop technologies was captured using a 3-point Likert type rating scale namely; always=3, occasionally = 2 and never = 1. The bench mark was obtained thus; 3+2+1 = 6 divided by 3 to give 2.0

The following decision rule was obtained

1.00- 1.50 (low)

1.51- 1.99 (moderate)

2.0 and above (high)

(iii) Constraints to adoption and use of production technologies by farmers in the study area were rated on a 4-point Likert type scale "High constraints" = 4: "Medium constraint" =3: "Low constraint" =2: and "No constraint" =1: The mean score is derived by adding 4+3+2+1=10 and dividing by 4 to give 2.5The mean of the response values which is 2.5 was used as the cutoff point. Thus constraints with mean score of 2.5 and above were considered serious while those with mean score below 2.5 are not serious constraints.

RESULTS AND DISCUSSIONS

Selected Socio-economic Characteristics of Farmers

The socio-economic characteristics of respondents are shown in Table 1. The result showed that most (60%) of the respondents were females. This infers that cassava farming dominated by females in the study area and is in tandem with the findings [1]. The result indicates that 30.17% of the farmers fell within the age bracket of 50 – 60 years with mean ages of 51.2 years. The implication of this result is that older farmers dominate cassava production in Imo state and this makes them not to be receptive to new innovations especially in cassava production technologies. This result is in agreement with Asadu [4] that cassava farming is dominated by older farmers in Enugu state, Nigeria. The mean farming experience for the farmers was 26.7 years. Farming experience has shown to enhance participation and adoption of improved farming practices by farmers thereby assuring farmers decision on technology utilization [13]. The result shows that 35% of the respondents acquired secondary education. [15] noted that education will enhance the adoption of modern farm technologies thereby increase in production. The result reveals that farmers had 2.2 contacts with extension in a month. The mean annual farm income of the respondents was ₦278,275.00. The income levels of the farmers depend largely on the enterprise combination and farm size. Extension contact enhances farmers' production through adoption and utilization of agricultural innovations.

Table 1. Distribution of Respondents according to Socio-economic Characteristics

Variables	Frequency	Percentage
Gender		
Male	49	40
Female	71	60
Age (years)		
20 – 30	6	5.00
31 – 40	15	12.50
41 – 50	32	26.67
51 – 60	47	30.17
61 – 70	20	16.66
Mean		**51.2**
Education (years)		
No formal Education	10	8.33
Primary Education	42	34.17
Secondary Education	41	35.00
Tertiary Education	27	22.50
Farming Experience (years)		
1 - 10	18	15.00
11 - 20	25	20.83
21 - 30	53	41.67
31 - 40	27	22.50
Mean		**26.67**
Farm Size (hectares)		
0.1 – 1.0	44	36.67
1.1 – 2.0	62	51.67
2.1 – 3.0	8	6.66
Mean		**2.6**
Annual Farm Income (₦)		
50,000 – 150, 000	11	9.19
151,000 – 250, 000	13	19.83
351, 000 – 450, 000	78	65.00
251,000 – 350,000	11	9.97
451, 000 – 550, 000	7	5.83
Mean		**278, 275.83**
Extension Contact (numbers)		
1 – 2	55	45.83
3 – 4	29	25.84
No Contact	34	28.33
Mean		**2.2**

Source: Field Survey, 2015
IUSD = 175 Nigeria Naira (NGN) @ time of the Research

Levels of Adoption of Cassava Production Technologies

Result in Table 2 shows levels of adoption of agronomic practices and technology components/intercrop of cassava production technologies in the study area. The result indicates that the respondents adopted improved cassava cuttings and ridge/mound making technologies practices with mean scores of 4.7 and 4.6 respectively. Also, site selection and fertilizer application ($\bar{X}$=4.4), site selection/land clearing and weeding interval technologies ($\bar{X}$= 4.3) and pest and disease control ($\bar{X}$=4.2) were adopted by the farmers as against planting dates and time of harvest (3.9) with a mean adoption score of 3.4 indicating high adoption of the technology. For cassava intercrop combination technologies, the farmers adopted Cassava/maize/*egusi* ($\bar{X}$=4.3) and cassava/maize/*telferia* and cassava value addition ($\bar{X}$=4.2) respectively. Furthermore, the respondents assert that cassava/maize single alternate row ($\bar{X}$=2.9) and cassava/maize/sweet potatoes ($\bar{X}$=2.8) were at the trial stages of adoption while, cassava/maize double alternate row ($\bar{X}$=2.1) were at the evaluation stages of adoption. The mean adoption scores for technology components/intercrop was 3.4 indicating high adoption. Adoption of improved production practices by farmers leads to improved yields of crops. Studies have shown positive correlation between adoption of extension recommendations by farmers and crop yields which translate into increased income and improved quality of life of farmers [3].

Table 2. Distribution of Respondents according to their Levels of Adoption of Cassava Production Technologies

Cassava Production Technologies	Mean Adoption Score
Agronomic Practices	
Site selection/ land clearing	4.4
Ridge/mound making	4.6
Use of improved cassava cutting	4.7
Planting date and spacing (1m x 1m at angle 45^0)	3.9
Fertilizer application	4.4
Pest and disease control	4.2
Weeding interval	4.3
Grand Mean	4.3
Intercrop combination	
Cassava/maize/*egusi*	4.3
Cassava/maize/*telferia*	4.2
Cassava/maize/sweet potato	2.8
Cassava/maize single alternate row	2.9
Cassava/maize double altérante row	2.1
Cassava value addition technologies	4.2
Grand Mean	3.4

Source: Field Survey, 2015

Levels of Utilization of Cassava Production Technologies

The distribution of respondents according to levels of utilization of cassava production technologies is shown in Table 3. The utilization of cassava production technologies is grouped into agronomic practices and

technology components/intercrop. The result indicate that farmers utilized site selection/land clearing and ridge/mound making with mean scores of 2.8 respectively. Again, the respondents utilized improved cassava cuttings, fertilizer application and weeding technologies respectively with mean score 2.7. Furthermore, the farmers utilized pest and disease control and planting spacing with mean ratings of 2.4. The grand mean utilization score for agronomic practices was 2.6, indicating that the technologies were highly utilized.

Table 3. Distribution of Respondents according to levels of Utilization of Cassava Production Technologies

Cassava Production Technologies	Mean Utilization Score
Agronomic practices	
Site selection/ land clearing	2.8
Ridge/mound making	2.8
Use of improved cassava cutting	2.7
Planting date and spacing (1m x 1m at angle 45^0)	2.4
Fertilizer application	2.7
Pest and disease control	2.4
Weeding interval	2.7
Time of harvest	2.5
Grand Mean	**2.6**
Technology Components/Intercrop	
Cassava/maize/*egusi*	2.6
Cassava/maize/*telferia*	2.9
Cassava/maize/sweet potato	1.7
Cassava/maize single alternate row	1.8
Cassava/maize double alternate row	1.3
Cassava value addition technologies	2.5
Grand mean	**2.1**

Source: Field survey, 2015

On technology components/intercrop, farmers utilized cassava/maize/*egusi* technologies with mean score of 2.9, and cassava value addition technologies ($\overline{X}$=2.5). The grand mean ($\overline{X}$= 2.1) shows that the technologies were utilized. The high utilization of these technology may be due to the extensively cultivation of cassava as an annual crop in tropical and sub-tropical regions for its edible starchy tuber roots. According to [6], cassava is the third largest source of carbohydrates for meal in the world. Its high resilience and adaptability to a wide range of ecological conditions has sustained its production through many generations in sub-Saharan African. The adoption of these packages may be due to the marketing potentials the products possess when processed.

Constraints to Adoption and Use of Cassava Production Technologies

Result in Table 4 shows the mean scores of constraints to adoption and utilization of cassava production technologies in the study area. Result reveals that high wage rate ($\overline{X}$=3.8) and $\overline{X}$= 3.7 for adoption and utilization of cassava production technologies were serious constraints. However, lack of credit (($\overline{X}$= 3.8 and $\overline{X}$= 3.5) constrained utilization and adoption of cassava production technologies respectively, inadequate land ($\overline{X}$=3.7 and $\overline{X}$=3.3), technology attributes ($\overline{X}$= 3.6 and $\overline{X}$= 3.5) and poor extension contact ($\overline{X}$=3.3 and $\overline{X}$=2.7), inadequate land (($\overline{X}$= 3.3), pest and diseases ($\overline{X}$= 3.2) were also serious constraints to adoption and utilization of cassava production technologies in the study area. [8] in his study of community-based farmers involved in Abia and Cross River States identified these serious constraints as affecting arable crop production.

Table 4. Distribution of Respondents according to Constraints to Adoption and Utilization of Cassava Production Technologies among Farmers in the Study Area

Constraints	Mean Adoption	Mean Utilization
Inadequate land	3.7*	3.3*
Lack of farm credit	3.5*	3.8*
Disease and pest infestation	3.2*	3.2*
Marketing problems	3.0*	2.6*
Poor extension contact	3.3*	2.7*
Attributes of technology	3.6*	3.5*
High wages of labour	3.8*	3.7*
Poor income from cassava farming	2.9	2.4
Illiteracy	2.8	2.4
Gender sensitiveness of the technology	2.9	2.4

Source: Field Survey 2015
*Constraint

Improper packaging of research results thus leading to misinterpretations, release of vague technologically not feasible, economically unviable and culturally incompatible technologies in existing farming systems as factors impeding cassava production in the study area [12].

CONCLUSIONS

Results show that there was high adoption and utilization of cassava production technologies among farmers in the study area. High wage rate, lack of credit, technology attributes, inadequate land and pest and diseases infestation were serious constraints affecting adoption and utilization of cassava production technologies in the study area. The study therefore recommends; intensive extension campaign on adoption and utilization of cassava production technologies, provision and access and subsidy of improved varieties and inputs, while technologies that are at the trial stages need to be properly demonstrated by extension agents to facilitate adoption and utilization.

REFERENCES

[1]Adegbite, D. A., Oloruntoba, O. A., Adubi, K. O., Sobanke, S. B., 2008, Impact of National Fadama Development Project II on Small Scale Farmers Income in Ogun State. Implications for Agricultural Financing in Nigeria. Journal of Sustainable Development in Africa, 10(3) 20 - 28.

[2] Ajeih, P. C., 2014, Adoption of Improved Cassava production and processing technologies in Oshimili North Local Government Area of Delta State. African Journal of Agricultural Extension, 3(2):15-22.

[3]Alabi, O. O., Alabi, O. A., 2002, Economics of Cassava Production in Kogi State. A Case Study of Yagba West LGA of Kogi State, Nigeria. Savannah Journal of Science and Agriculture, 1(1): 105 – 109.

[4]Asadu, A.N., Agwu, A.E., Chah, J.M., Enwelu, I. A., 2014, Factors Influencing Adoption of Improved Cassava Processing Technologies by Rural Women in Enugu State, Nigeria. International Journal of Agricultural Science, Research and Technology in Extension and Education Systems, 4(4):205-210.

[5]Asiabaka, C. C., 2002, Agricultural Extension: A Handbook for Development Practitioners. Omoku: Molsystem United Services Port Harcourt, Rivers State, Nigeria.

[6]Audu, S., Haruna, S. K., Idehen, O. E., Jamilu, A. A., 2014, Adoption of recommended cassava production practices among farmers in Edo state, Nigeria. Proceedings of the 19th Annual National Conference of Agricultural Extension Society of Nigeria held at Federal University of Technology Owerri, Imo State, Nigeria, 27th – 30th April : 23 – 29.

[7]Imo State Planning Commission (ISPC) (2006). Imo State Economic Empowerment Development Strategy Report.

[8]Nwaobiala, C. U., 2013, Socio-economic Determinants of Upland and Swamp Rice Farmers in Ebonyi State, Nigeria. Journal of Applied Food Research (JAFR) 5(1):32- 40.

[9]Nwaobiala, C. U., 2015, Determinants of Rice Output among ADP Contact Farmers in Mining and Non Mining Locations of Ivo Local Government Area of Ebonyi State, Nigeria. The Nigerian Agricultural Journal, 46(1&2): 292 – 313.

[10]Nwaobiala, C. U., 2017, Effect of Agricultural Extension Delivery Methods on Arable Crop Farmers' Cropping Systems in Kaduna State, Nigeria. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development 17 (3): 225 – 230.

[11]Nwaobiala, C. U., Uchechi, T. N., 2016, Utilization of Cocoyam Production Technologies among Women Farmers in Abia State, Nigeria. Journal of Agricultural Extension, 20(1):13 - 26.

[12]Nwaobiala, C. U., Nzeakor, F. C., 2015, Constraints to Adoption of Recommended Fish Technologies among Homestead Catfish Farmers in Ebonyi State, Nigeria. Nigerian Journal of Rural Extension and Development, 9(1): 67 – 71.

[13]Nwaobiala, C.U., 2014, Farmers' Participation in IFAD/FGN/NDDC/
Community - Based Natural Resource Management Programme Technologies in Cross River State, Nigeria. Journal of the Science of Agriculture, Food Technology and the Environment. 13(1):119-124.

[14]Nweke, F. I., Spencer, O. S. C., Lynam, J. K., 2002, The Cassava Transformation: Africa Best Kept Secret.

[15]Ogunbameru, B. O., 2001, Practical Agricultural Communication, Daily Graphic Publications. Ibadan Oyo State, Nigeria.

[16]Okanade, E.O., Olaniyi, O. A., Ogunleye, K. Y., 2005, Adoption of Improved cassava Techniques among Farmers in Surulere Local Government Area of Oyo State. Proceedings of 39th Annual Conference of Agricultural Society of Nigeria, (ASN), Benin 2005. Pp15.