ADOPTION OF CASSAVA-BASED TECHNOLOGIES BY FARMERS IN THE NIGER DELTA AREA OF NIGERIA.

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ABSTRACT
To what extent are recommended technologies adopted? The study targeted adoption of cassava-based technologies by farmers in the Niger Delta area of Nigeria. It surveyed adoption levels of eleven items of cassava-basedrecommended technologies using the Sigma Method of adoption, and examined the adoption level of the various selected Niger Delta States. The study population was ADP cassava farmers in AkwaIbom, Bayelsa and Delta States from where a sample size of 180 farmers were drawn anddedicated to the study.Questionnaire was used to elicitfacts from respondents. It was discovered that from the results obtained, recommended adopted agricultural practices in specific states indicated that Delta and Akwa Ibom states had the highest adoption mean score in cassava production (4.76), while Bayelsa is 4.43 mean score. The level of adoption across the selected states of the Niger Delta area was a pooled mean of 4.65 at medium capacity. Across the Niger Delta area, the study concluded that of the recommended adoption technologies, were high (27.3%), medium (36.4%) and low (36.4%) levels respectively. It was recommended that more training sessions be given to the areas with low and medium levels of adoption technologies and that follow up events be conducted to sustain best practices for those with high levels of adoption.
Keywords: Adoption, Cassava, Farmers, Technologies, Niger-Delta

INTRODUCTION
Adoption of agricultural technologies is synonymous to best practices. Best Agricultural Practices (BAPs), project ownership, usage, maintenances and future plans are features of sustainability. In order to guarantee the long term continuity of green vegetation in the Niger Delta, it would be necessary to establish the economic tree species between strips or stands of other forest trees in order to enhance biodiversity and make nutrient cycling more efficient (Aweto, 2002). Rural development researchers have identified a number of factors that affect sustainable agricultural development among the rural community (Uzokwe, Ogbekene. and Ovharhe, 2015).
In Fadama III extension approaches, agricultural technologies include any changes, innovations, ideas and methods that are useful in farming advancement, income generation and environmental friendliness. Some of these agricultural technologies are length of stem cuttings, minimum tillage, planting distance, mulching, fertilizer application techniques, cropping techniques, mixed farming techniques, compost manure preparation and stem storage techniques. In recent times, the problems with farmers' adoption of technologies are mostly associated with their socio-economic characteristics posture (Ovharhe, 2014 and Ovharhe, 2015). The research questions that guided this study were: what were the differences in adoption level of cassava based technologies provided by extension workers to concerned farmers? Which of the States recorded better performance in adoption levels? Consequently, the study examined adoption levels of eleven items of cassava-based technologies using the Sigma Method of adoption, and the adoption level categories of the various selected Niger Delta States.

METHODOLOGY
Selection of Farmers
Cassava farmers' records were obtained from both Fadama and the Agricultural Development Programme (ADP) offices of the three states: Akwa Ibom, Delta and Bayelsa States Agricultural Zones/ Local Government Areas are shown in Table 1. From the list of farmers registered among different LGAs,sixLocal Government Areas (LGAs)were preferredfrom each state because of their active involvement in cassava production. This give rise to to18 LGAs for thestudy. There was a random sampling of 60 farmers respectively selected from AkwaIbom, Bayelsa and Delta States (Table 1 in Appendix). This summed up to a sample size of 180 which was conveniently used for the study.

Method of Data Collection
A simple questionnaire was used to gatherprimary information from respondents which was used for data entry. Secondary information was obtained from ADP offices in the various states.

Measurement of Variables
The key variable of the study measured wastechnology adoption levels of respondents.
Technology adoption
The adoption of agricultural techniques and recommendations tofarmers was assessed using a dichotomous scale of 'yes' or 'no' to elicit information from respondents. In measuring the adoption level, the Sigma method was employed as used by Agbamu (2006). For instance, if 35% of farmers adopted mechanical tillage, the adoption score is calculated as follows: 100% - 35/2 = 82.5. Next, using the statistical table of normal deviate, 82 in the vertical row under column 5 gives 0.935. A constant, 2, is added to this result and multiplied

by the same constant in order to increase the magnitude of the value from the table of normal deviates. In other words, the sigma score for the adoption of mechanical tillage is $(0.935 + 2)2 = 5.87$. Since the sigma method of scoring assigns weights in a reverse relation on a 10 point scale, the actual mechanical tillage adoption score will be 10 - 5.87 which is 4.13. In this study, *a score ranging from 5.5 - 10 will be considered as high level of adoption; 4.1 - 5.4 is medium level of adoption and 0.0 - 4.0 is low level of adoption.*

RESULTS AND DISCUSSION
Adoption of Cassava-based Technologies by Farmers

Results in Table 2 showed that in all the agronomic practices, Akwa Ibom cassava farmers (80%) and Delta State cassava farmers (98.3%) recorded highest adoption levels in use of standard cassava cuttings. Seventeen percent of Cassava farmers in Akwa Ibom recorded lowest adoption level in tuber storage techniques, while those in Delta States (8.3%) recorded lowest adoption level in heaps preparation. In Bayelsa State, eighty percent of cassava farmers exhibited highest adoption level in minimum tillage, while 13.3% of the farmers recorded lowest adoption level in tuber storage techniques. The result on compost preparation and usage (3.75) by farmers is similar to the findings of Ebewore, Ovharhe and Ureigho (2015). They reported that there was low adoption rate in manure usage for crop production activities by farmers in Delta State.

Furthermore, of the 11-item cassava based recommended practices, it was observed that the rate of technologies adoption were high (27.3%), medium (36.4%) and low (36.4%) levels respectively..

Adoption means for cassava farmers in selected Niger Delta States

The summary of means (Table 3) for recommended adopted agricultural practices in specific states indicated that Delta and Akwa Ibom states had the highest adoption mean score in cassava production (4.76). There was a pooled mean of 4.65 recorded as medium level of adoption across the selected states of the Niger Delta.

CONCLUSION AND RECOMMENDATIONS

There were High levels of adoption in stem cuttings, minimum tillage and planting distance. While, a medium levels of adoption in mulching, fertilizer application techniques, mixed cropping techniques, mixed farming techniques, compost manure preparation, and low levels of adoption in stem storage techniques, Heaps preparation and tuber storage techniques.

RECOMMENDATIONS

Based on the findings from this study, the following recommendations are obvious:

i. More training sessions should be directed to the areas where recommended adoption technologies were low.
ii. Follow up activities should be design to sustain best practices with high levels of adoption, and
iii. At state levels, efforts should be made to improve cassava farmers from medium levels of adoption to higher levels.

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APPENDIX
Table 1: Distribution of Sample Size by Stages of Sampling

State Stage 1	LGAs Stage 2	Farmers Stage 3
Akwa Ibom	6	60
Bayelsa	6	60
Delta	6	60
3 States	**18 LGAs**	**180**

Table 2: Respondents adoption level of cassava-based technologies in the Niger Delta States using Sigma Method of adoption scores (n=180)

S/№	Cassava-based recommendation	Akwa Ibom (n=60) No. & % of adopters	Akwa Ibom Adoption Score	Bayelsa (n=60) No. & % of adopters	Bayelsa Adoption Score	Delta (n=60) No. & % of adopters	Delta Adoption Score	Total no. of adopters & its %	Pooled Adoption Score (n=180)	Adoption Level
1	Stem cuttings (25 – 30)cm	48 (80.0)	5.49	46 (76.7)	5.4	59 (98.3)	5.95	153 (85.0)	5.61	High
2	Minimum tillage (30 – 40)cm	41 (68.3)	5.18	48 (80.0)	5.49	55 (91.7)	5.95	144 (80.0)	5.54	High
3	Planting distance (1 by 1)m	47 (78.3)	5.75	46 (76.7)	5.40	41 (68.3)	5.40	134 (74.4)	5.52	High
4	Mulching	55 (91.7)	5.70	37 (61.7)	5.00	48 (80.0)	5.49	140 (77.8)	5.40	Medium
5	Fertilizer application techniques (NPK 15:15:15)	41 (86.3)	5.65	38 (63.3)	5.04	42 (70.0)	5.23	121 (67.2)	5.31	Medium
6	Mixed cropping techniques	24 (40.0)	4.32	22 (36.7)	4.19	46 (76.7)	5.40	92 (51.1)	4.64	Medium
7	Mixed farming techniques	24 (40.0)	4.32	19 (31.7)	4.14	37 (61.7)	5.00	80 (44.4)	4.49	Medium
8	Compost manure preparation	22 (36.7)	4.19	12 (20.0)	3.44	14 (23.3)	3.61	48 (26.7)	3.75	Low
9	Stem storage techniques (Tree shed method)	14 (23.3)	3.61	12 (20.0)	3.44	12 (20.0)	3.44	38 (21.1)	3.50	Low
10	Heaps preparation (50 – 70)cm	19 (31.7)	4.14	12 (20.0)	3.44	5 (8.3)	2.52	36 (20.0)	3.37	Low
11	Tuber storage techniques	10 (16.7)	3.23	8 (13.3)	2.99	13 (21.7)	3.53	31 (17.2)	3.25	Low
	Pooled means		**4.76**		**4.43**		**4.76**			
	Overall Adoption Level								**4.65**	

Note: Figures in parentheses imply percentages.

Table 3:   Summaryof adoption means for cassava farmers in selected Niger Delta States

State	Cassava Adoption means	Adoption Level
Akwa Ibom	4.76	Medium
Bayelsa	4.43	Medium
Delta	4.76	Medium
Pooled mean	**4.65**	**Medium level of adoption**