

**COMPARATIVE ANALYSIS OF FACTORS AFFECTING THE ADOPTION OF TWO IMPROVED CASSAVA VARIETIES (TMS 30572 AND NR 8082) IN ABIA STATE, NIGERIA.**

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**ABSTRACT**

The study focused on comparative analysis of factors affecting the adoption of two improved cassava varieties (TMS 30572 and NR 8082) in Abia State, Nigeria. A total of 130 respondent farm families were selected for the study. A linear regression model was used to evaluate the factors affecting the level of adoption of the improved cassava varieties. Three of the eight socio-economic variables included in the model were found to have positively and significantly ( $P < 0.01$ ) influenced the adoption of TMS 30572. These included perceived yield advantage; labour use in cassava production and perceived compatibility of improved cassava variety to the farmer's production system. Farm size was found to have a negative relationship with the adoption of TMS 30572, but its effect was significant ( $P < 0.01$ ). On the other hand, four of the socio-economic variables were found to have significantly influenced the adoption of NR 8082 var. Of these variables, source of information on improved cassava variety, labour use in cassava production and perceived compatibility of improved cassava variety to the farmer's production system all had positive and significant influence. Farm size, however, had a negative influence ( $P < 0.01$ ) on the adoption of this cassava variety. Majority of the farmers (88.2% and 94% respectively) agreed that their awareness of such qualities of the improved cassava varieties as "early maturity" and higher yield potentials influenced their decisions to adopt the improved cassava varieties (TMS 30572 and NR 8082 respectively). Also, about 64.1% and 90.6% of the farmers respectively agreed that their awareness of such other qualities of the improved cassava varieties as "high in garri quality and quantity" as well as "disease resistance" influenced their adoption decisions. However, 50.8% and 54.2% of the farmers respectively maintained that unavailability of improved planting materials as well as inputs were major problems militating against the adoption of these improved cassava varieties.

**Key words:** adoption, cassava varieties, yield.

**INTRODUCTION**

Cassava is a major food crop, which is widely grown in Nigeria. It is widely consumed in various processed forms such as garri, chips/flour, and fermented paste, starch, etc. (Anuebuwa, *et al.* 1998, George, *et al.* 2000). Cassava is an extremely important food crop in Africa, with the continent accounting for more than half of the crop's world production (Bokanga, 1996, Lekule and Sarwat (2006). Nigeria is the largest producer of cassava in the world at present (Nwosu (2005). Cassava production is known to be on the increase in Abia State and Nigeria at large. The major reason for the increasing trend in cassava production is the availability of improved cassava varieties.

Improved cassava varieties became available in Nigeria from the mid 1970's (IITA, 1994). However, the distribution of improved cassava planting materials by the National Seed Service (NSS) through the Agricultural Development Projects (ADPs) started in 1986 (IITA, 1994, NRCRI, 2006). Cassava farmers in various producing zones all over the state are known to have been using some local or unimproved cassava varieties before the improved cassava varieties got diffused to those producing zones/centres. Two of the new varieties introduced to the farmers were TMS 30572 and NR 8082 by the National Root Crops Research Institute, (NRCRI), Umudike in collaboration with the International Institute of

Tropical Agriculture (IITA), Ibadan (Anuebunwa, *et al* 1998). These varieties possess qualities that are capable of significantly increasing the level of cassava production. The diffusion (spread) to the producing centres and adoption of the improved cassava varieties by farmers have been influenced by a number of variables. It is pertinent therefore to comparatively analyse the factors affecting the adoption of the improved cassava varieties in the study area.

The overall purpose of this study was to comparatively analyse the factors affecting the adoption of improved cassava varieties (TMS 30572 and NR 8082) by farmers in Abia State, Nigeria.

## **METHODOLOGY**

### **The Study Area**

Each of the States of Federation is organized in agricultural zones. In Abia State there are three agricultural zones, which coincide with the senatorial districts of Abia North, Central and South. The study was conducted in Abia North Agricultural Zone. Abia North comprises five Local Government Area (LGAs), namely Bende, Isuikwuato, Umunneochi, Ohafia and Arochuku. Farming is the major occupation of the people of Abia North, with cassava production being prominent among the farmers.

### **Sample Selection**

Each of the five constituent LGAs that make up the zone was regarded as a stratum. From each LGA, two prominent cassava producing communities were randomly selected, and 13 subjects (families) were randomly selected from each of the communities to make up a total of 130 respondents. Data collection was by the use of structured questionnaire designed for the purpose.

### **Analytical Technique**

A linear regression model was used to evaluate the factors that determine the level of adoption of each improved cassava variety. The model was chosen because it provided a good fit on the basis of which socio-economic variables affecting the adoption of the improved cassava varieties were assessed. The implicit form of the model is specified as follows:  $Y=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e) \dots (1)$

Where:

Y = Level of adoption of improved cassava variety.

It is a dummy with value of 1 for adoption and 0 for non-adoption of TMS 30572 or NR 8082.

- X1= Level of education determined by number of years spent in school
- X2= Farm size, measured in hectares (ha)
- X3= Years of experience in cassava production
- X4= Total number of farm lands owned by farmer
- X5= Source of information on improved cassava variety a dummy with value of 1 if source is Research /Extension and 0 otherwise.
- X6= Perceived yield advantage of improved cassava variety measured in terms of income earned from the sale of cassava and cassava products (N).
- X7= Labour use in cassava production measured in man-days
- X8= Perceived compatibility of improved cassava variety to the farmers' production system a dummy with value of 1 if improved cassava was compatible with the farmers' production system and 0 if otherwise.

The socio-economic variables specified in this study have reportedly been observed in several other studies to influence adoption decision of farmers for improved agricultural technologies (Zainnah *et al*, 1993; Strauss *et al*, 1991; Onyenweaku, 1991).

## *Adoption of Improved Cassava Varieties*

### **RESULTS AND DISCUSSION**

Table 1 summarizes the level of farmer's awareness of the qualities of the improved cassava varieties. Majority of the farmers agreed that they were aware that the improved cassava varieties were both early maturing (88.2% and 94.5% respectively) and also have higher yield potentials (94.5% and 87% respectively) for TMS 30572 and NR 8082). Also, majority of the farmers agreed that they were aware that the improved cassava varieties were disease resistant (90.6% and 86.4%) and also have high garri quality and quantity (64.7% and 64.4% respectively for TMS 30572 and NR 8082). What this implied is that farmers' decision to adopt the improved cassava varieties was influenced by their level of awareness of the desirable qualities of the improved cassava varieties.

However, some of the farmers (50.8% and 53.2% respectively for TMS 30572 and NR 8082) maintained that non-availability of improved planting materials was a major problem militating against the adoption of the improved cassava varieties. While majority of the farmers (74.2% and 76% respectively for TMS 30572 and NR 8082) agreed that they were aware of the use of fertilizers as part of the technology package that encouraged the adoption of the improved cassava varieties, most of them maintained that non-availability of inputs (including fertilizers) especially at the appropriate time (farming season) militated against adoption of the improved cassava varieties.

Some of the farmers (33.6% and 35.2%) respectively agreed that the improved cassava varieties took much space in the farm, making movement within the farm difficult. This quality of the improved cassava varieties was not likely to favour their adoption by some farmers. The implication is that in spite of the limitation posed on adoption by unavailability of improved planting materials, as well as inputs, farmers awareness of the inherent desirable qualities of the improved cassava varieties appeared to enhance their adoption decisions.

#### **Level of Adoption of Improved Cassava Varieties**

Table 2 shows the percentage distribution of farmers by level of adoption of the improved cassava varieties in the study area. The results indicate that 25% and 3.9% of the farmers were unaware of the existence/availability of TMS 30572 and NR 8082 varieties respectively. It further showed that 75% and 96.1% of the farmers were aware of the availability of the improved cassava varieties (TMS 30572 and NR 8082 respectively). The results further revealed that 70.3% and 65.6% of the farmers in the area had adopted TMS 30572 and NR 8082 varieties respectively.

It was however observed that some of the farmers (25%) were unaware of the existence/availability of the TMS 30572. Perhaps this may be as a result of the fact that this cassava variety was one of the earliest to be diffused to farmers, during the National Accelerated Food Production Project (NAFPP) era, with the effect that some farmers now have difficulties differentiating between it and other cassava varieties.

#### **Factors Affecting Adoption**

From the results of the regression analysis, the coefficient of determination ( $R^2$ ) was 57% for TMS 30572 and NR 8082 cassava varieties respectively, indicating that changes in the socio-economic characteristics of farmers in the study area explained about 57% variation in the adoption of the improved cassava varieties under study. The F-statistic was significant at 1% level for both TMS 30572 and NR 8082 cassava varieties, showing that the specified model provided a good fit.

**Table 1: Distribution of Farmers by Level of Awareness of Agronomic Characteristics/Technical Requirements of Improved Cassava Varieties**

Agronomic Characteristics/ Technical Requirements/ Qualities of Varieties	Varieties					
	TMS 30572			NR 8082		
	Agreed %	Undecided %	Disagree %	Agree %	Undecided %	Disagree %
Early maturity	88.2	0.9	0.8	94.5	1.3	4.2
High Yield	94.5	5.5	-	87	3.1	8.9
Uses too much space	33.6	35.1	28.1	35.2	32.4	32.4
Requires fertilizers	74.2	24.2	1.6	76	20.5	3.5
Poor in-ground storage	11.9	50.5	37.5	20.3	33.2	46.5
Disease resistance	90.6	4.7	2.3	86.4	6.2	6.4
High in garri quality and quantity	64.7	31.2	3.1	64.4	28.5	6.1
Unavailability of planting materials	50.8	26.6	21.8	53.2	22.4	23.3
Technology difficult to understand	17.1	31.3	49.2	20.5	38.7	40.8
Non-availability of inputs	47.6	30.1	21.6	50.2	33.1	16.6

Source: Field survey

**Table 2: Distribution of Farmers by Level of Adoption of the Improved Cassava Varieties**

LEVEL OF ADOPTION	TMS 30572	NR 8082
	%	%
Unaware	25	3.9
Aware	75	96.1
Interested	-	5.46
Evaluation	0.8	4.68
Trying out	3.9	19.53
Adopted	70.3	65.6

Source: Field Survey

**Table 3: Socio-Economic Determinants of Adoption of TMS 30572 and NR 8082**

Cassava Variety	Coefficients of Explanatory Variables								R <sup>2</sup>	F-ratio	
	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>			
TMS 30572	.083 (1.31)	-0.354** (-4.98)		-0.055 (-.86)	.129 (1.91)	.125 (-1.69)	.316** (2.49)	.458** (3.99)	.221** (3.28)	.569	20.302
NR 8082	-0.50 (-79)	-0.251** (-3.52)		-0.042 (-.65)	-0.011 (-.15)	.331** (4.56)	.117 (1.10)	.326** (2.82)	.258** (3.80)	.565	19.958

The figures in parenthesis are T-ratios

\*\* Significant at 1%

Source: Derived from field survey

## ***Adoption of Improved Cassava Varieties***

As the data in Table 3 indicate, 'perceived yield advantage of improved cassava variety' X6, 'labour use in cassava production' (X7), 'perceived compatibility of improved cassava variety with the farmer's production system' (X8), were positively related to the adoption of TMS 30572, while 'farm size' (X2) was negatively related to it.

The negative relationship between the farm size and adoption may be explained by at least two factors. First, the improved cassava varieties were relatively more expensive than the traditional varieties. Thus, the larger the area cultivated, the higher the cost of cultivating the improved varieties. Increasing cost of cultivation may have negative effect on adoption. This explanation finds support in the fact that the majority of the farmers were resource poor, with fragmented small farm holdings scattered at different locations.

There was also the fact that farmers grew different varieties of cassava on the same plot at the same time. Thus, the relationship between farm size and adoption of any variety would depend on the relative contribution of the variety to the composition of the mixture of varieties. The relative contribution of a particular variety to the mixture may not increase as farm size increased depending on the cost and availability of the variety. The socio-economic variables that had positive relationship with the adoption of NR 8082 were 'source of information on improved variety' X5, 'labour use in cassava production' X7, and 'perceived compatibility with the farmer's production system' X8. Again, farm size had a negative effect on adoption.

Apparently, the difference between the two varieties with respect to the factors affecting adoption was that 'perceived yield advantage' which was significant for TMS 30572, was replaced by 'source of information on improved cassava variety' as an explanatory variable with respect to NR 8082. This may be due to the fact that NR 8082 was among the recently released improved cassava varieties by NRCRI/IITA (Anuebunwa *et al*, 1998). As a result, the extension agency responsible for its diffusion within the cassava producing centre were likely to have placed all relevant information that will facilitate its adoption at the disposal of the farmers.

## **CONCLUSION AND RECOMMENDATIONS**

From the results presented in this paper, the socio-economic determinants of adoption for TMS 30572 and NR 8082 were similar. The only difference, as indicated earlier, was that while 'perceived yield advantage' was significant for TMS 30572, 'source of information applied to NR 8082.

Farmers' awareness of such qualities of improved cassava varieties as 'early maturing', 'high yield potentials', 'disease resistance' were some of the factors that appeared to have influenced their decision to adopt the improved varieties. The level of adoption of the improved varieties within the study area was high. However, the problems that militated against the adoption of the varieties included unavailability of improved planting materials as well as inputs.

The following recommendations are made. The Research Institute (NRCRI) as well as the extension agency should be funded adequately by the Government. This will enhance their effectiveness in developing and disseminating these technologies to farmers.

Government should also continue to subsidize the cost of improved planting materials and inputs. This will enable the farmers not only to increase their farm holdings but also to cultivate more of the improved varieties

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