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Determinants of Adoption of Cassava Technologies by Male Farmers in Nasarawa State, Nigeria

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Abstract

The study investigated determinants of adoption of recommended cassava production technologies among male farmers in Nasarawa State. Multi-stage sampling technique was employed for the selection of the respondent. Structured questionnaire was used for data collection. The data were collected from 60 male cassava farmers selected from 6 out of 13 LGAs in the State. They were Karu, Kokona, Akwanga, NasarawaEggon, Lafia and Obi. Data were analysed with both descriptive and inferential statistics. Descriptive statistics such as frequency tables, and percentage were used to describe socio-economic characteristics of the respondents. Logit regression model was used to estimate the determinants of adoption of these practices. The results showed that awareness and adoption of these practices were very high (Awareness of all the practices ranges from 90% to 98.3% while the adoption is from 63.3% to 90%). Factors that positively and significantly influenced adoption by male farmers were income (p=0.01) and extension contact (p=0.1). The conclusion was that men made remarkable contribution in cassava production. It was recommended that Governments at all levels formulate policies aimed at encouraging and motivating male cassava farmers. Provision of loans to male farmers and subsidizing of inputs should be ae necessary. Cassava processing industries should be established to add value and increase income.

Keywords: Adoption, Cassava Technologies, Male farmers.

Introduction

Cassava plays a key role in Africa development as famine reserve crop, rural food staple, cash crop for urban consumption, and raw materials for livestock and industry (Nweke et al,. 2002).Cassava does well on poor and marginal soils in comparison with other crops (Alabi and Alabi, 2002). It has become the most important root crop in tropical Africa providing food for over 200 million people (IITA, 1992). Almost all the cassava produced in Nigeria is used for human consumption and less than 5% goes for industrial raw materials (Ajayi and Onuche, 2005). Cassava is of great economic importance in Nigeria as it serves as a major staple food. Cassava is processed

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into various forms such as gari, fufu, cassava flour and starch (Odurukwe *et al.*, 2003,). Apart from its use as food, cassava is an important industrial raw material for the production of alcohol, pharmaceutical gum and confectionaries (Okonkwo, 2002). As a result, demand presently outstrips production.

Furthermore, Cassava for a long time has been a versatile staple food crop for the people of Nasarawa state. It is well adapted to the traditional farming systems of the area. Small-scale farmers, majority of who are rural youths, play a major role in cassava production in study Area. A number of recommended practices such as timely planting, fertilizer application, timely weeding, herbicide application, insecticide application and planting of stems inclined on ridges which will produce tuberous roots in the same direction to make harvesting easier, have been introduced in an attempt to increase yield per hectare of cassava production Institute for Agricultural Research and Training (IAR&T, 2005).

The improvement in the yield of cassava is vigorously pursued through the development of improved varieties by National Root Crops Research Institute, Umudike and International Institute for Tropical Agriculture (IITA), Ibadan, as well as through Agricultural Extension (Agbarevo and Obinne 2008).

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 (African rice centre, 2007). Similarly, Emenyonu *et al.* (2005) reported significant difference between cassava yield of farmers adopting improved cassava production technologies and those not adopting the recommendations in Delta state. However, for a successful adoption of a technology, farmers must not only know about it, but must be able to follow the recommendation given (Adekoya and Tologbonse 2005). A thorough knowledge of the target group in the development and dissemination of the technology is a prerequisite to adoption of the technology in question.

Male farmers play a central role in cassava production, processing and marketing. They are responsible for cassava production which provides additional income earning opportunities, and enhances their ability to contribute to household food security (Ojuekaiye, 2001).

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However, in the face of the present food insecurity facing the country, the need to sustain cassava production is unarguable. Cassava has vast food derivatives and many uses; some of its food values include: tapioca, fufu, tuwo and High Quality Cassava flour. The yield of the crop is influenced by the quality of planting material and management practices. Okeke and Eke-okoro (2006) reported high cassava yield from use of improved Nigerian cultivars. But better yields are obtained when improved cassava genotypes are used with suitable cultural practices (Udealor and Asiegbu, 2006).

Cassava was traditionally grown by males in Nasarawa state but recent time there is increasing involvement of females in its production. With the low productivity of cassava farmers and efforts of Nigerian government to increase its production through extension services of the ADPs and technology adoption among farmers, more information on gender adoption of improved cassava production technology is desirable. Therefore, there is need to ascertain the adoption behaviour by male farmers of the various components of the cassava production technology among farmers in the study area.

Specifically, the study was designed to:

1. describe the socio economics characteristics of the respondents in the study area.
2. ascertain the level of awareness and adoption of cassava technologies.
3. identify the determinant of adoption of cassava technologies.

Methodology

This study was conducted in Nasarawa State in 2012. Purposive sampling technique was employed. Six out of thirteen LGAs in Nasarawa State were selected for the study. They were Karu, Kokona, Akwanga, Nasarawa eggon, Lafia and Obi. Two villages were selected from each of the LGAs and five male cassava farmers were selected in each of these villages making a total of 60 farmers. Focus Group Discussion and interview schedule with well structured questionnaire were used to elicit information from the respondents. Data were collected on socio-economic characteristics of respondents and improved agronomic practices involved in the production of cassava which include (1) use of improved varieties of cassava, (2) use of herbicide (such as Atrazine and Paraquat), (3) use of fertilizer (NPK), (4) appropriate plant spacing at 1m x 1m, (5)

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planting time (June-July), (6) use of tractor for tillage, (7) use of insecticides, (8) harvesting time (9-12 months).

Frequencies, percentage, were used for objective one and two and logit regression model was use to achieve objective 3.

The logit model was expressed implicitly as

$Y=F(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_9,X_{10},X_{11},X_{12},X_{13},X_{14})$

Explicitly the model is specified as

$$Y(\text{Adoption})=b0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8+b_9X_9+b_{10}X_{10}+b_{11}X_{11}+b_{12}X_{12}+b_{13}X_{13}+b_{14}X_{14}+U$$

Where,

Y (Adoption) = (1 for adoption, 0 otherwise)

X_1: Age of farmers (in years)

X_2: Sex (male=1, Female=0)

X_3: Marital Status (Married=1, Not married=0)

X_4: Household size (Number of people feeding from the same pot)

X_5: Educational status (years of formal schooling)

X_6: level of annual income (naira)

X_7: Farming experience (years)

X_8: Membership of cooperative associations (membership=1, Non=0)

X_9: Total farm size (hectares)

X_{10}: Contact with extension staff (months)

X_{11}: Complexity of the technology (complex= 1, non complex=0)

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X_{12}: Profitability(profitable=1,non profitable=0)

X_{13}: Adaptability (Adaptable 1, non adaptable= 0)

X_{14}: Compatibility (Compatible1, incompatible=0)

Where:

Y & X_1–X_{14} as defined above.

b_0 = constant

b_1 –b_{14} = coefficient to be estimated.

U: Error term.

Results and Discussion

Socio-economic characteristics of respondents

The result in Table1 show that the majority (63.3%) of male farmers were within 41-60 years of age. The mean age of farmers was 46.7. This result implied that farmers were still at their productive age (41-60) and dominated cassava production in the study area. However, according to Nwaru (2004), the ability of a farmer to reduce risk, be innovative decreases with age, there was likely to be a high prospect for increased adoption of improved cassava production technologies among the middle aged farmers. Majority (95%) of the farmers were married. Marriage in African culture connotes respect and responsibility to demand in terms of income to meet family needs as well as increase in family labour. Enitan (2010) in similar studies found out that majority of married people are into agricultural production. For educational level, 38.3% of male farmers had one form of tertiary education or the other, 18.3% had secondary education, 20% had primary education, 15% had quaranic education, while 8.3% had no education. The farmers in the study area having more tertiary education were expected to have access to information, be more receptive to improved farming technique and have more ability and willingness to adopt technologies. The result on land area cultivated by farmers revealed that majority (55%) of the farmers cultivated land between 1-4ha, 41.7% cultivated 5 ha and above while only 1.7% cultivated below1ha. The

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mean for land area was 3.6. The size of land available to the farmer is likely to have positive influence on adoption (Ironkwe, 2005) this is because the farmers with larger size of farm could afford to invest relatively small portion to venture into an uncertain enterprises and hence adoption becomes possible. For farming experience, the result showed that (35%) of farmers had less than 11years cassava farming experience, 28.4% had between 11-20 years experience, 25% had between 21-30years and 11.7% of the male farmers had above 30 years Cassava farming experience. The mean for farming experience was 18. This result implies that experienced farmers are in cassava production in the study area with more experience in farming, the farmers could be less averse to the risk involved in adopting new innovation. Hence, there would be an increase adoption of technology among male farmers; this is because the farmer's previous experience with other innovations either positive or negative would influence his perception of the importance of the technology (ghandin and panel, 1999).

Table1: Distribution of respondents on socio-economic variables.

Socio-economic Variables	Percentage(n=60)	Mean
Age		
< 20	3.3	46.7
21-40	20.0	
41-60	63.6	
>60	13.3	
Marital Status		
Single	5.0	
Married	95.0	
Level of Education		
No formal Education	8.3	
Quaranic Education	15.0	
Primary Education	20.0	
Secondary Education	18.3	
Tertiary Education	38.3	
Farm size		
>1ha	1.7	3.6
1-2ha	20.0	
3-4ha	34.0	
5ha and above	43.4	
Farming Experience		
<11 years	35	18
11-20	28.4	
21-30	25	
>30	11.7	

Source: Field Survey, 2012

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Adoption level of cassava production technologies

Table 2 shows the level of adoption of recommended production technologies, higher adopters constituted (63.3%) while lower adopters constituted (36.3%). For the eight technologies studied, any respondent that adopts six technologies and above is regarded as higher adopter while any respondent that adopts less than six technologies is regarded as lower adopter.

Table 2: Distribution of respondents by level of adoption of cassava production technologies

Adoption level	Percentage	Mean Score
High adopters	63.3	6
Low adopters	36.3	
Total	**100**	

Source: Field Survey, 2012.

Awareness and adoption of cassava production technologies

Table 3 explains that all the farmers in the study area were aware of the eight cassava production practices studied. These includes use of improved cassava varieties (90%), use of fertilizer (76.7%), herbicide(63.3%), and insecticide (63.3), appropriate plant spacing (1mx1m) (66.7%), planting time (June/July) (85%), use of tractor (43.3%) and harvesting time (78.3%).The adoption level for use of tractor by the male cassava farmers was low (43.3%).This may be attributed to high cost of procuring tractor or unavailability of it.

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Table 3: Distribution of respondents on awareness and adoption of cassava production technologies.

Production technologies	Aware (n=60) percentage	Adopted (n=60) Percentage
Improved cassava	98.3	90
Use of herbicide	98.3	86.7
Use of fertilizer	93.3	76.7
Use of insecticide	91.7	63.3
Appropriate plant spacing	90	66.7
Planting time	95	85
Use of tractor	90	43.3
Harvesting time	93.3	78.3

Source: Field Survey, 2012

Determinant of adoption of cassava production technologies

The result of the logit regression analysis (Table 4) revealed that income and number of extension contact are positive and significant to adoption of cassava technologies at varying degree of significance. This implies that income of the farmer significantly influenced the adoption of cassava technologies. As income increases, adoption also increases. Number of extension contact also increases adoption rate. According to Okonkwo *et al*. (2009). Adoption of improved technologies increases with increase in the number of extension contacts. This is because the farmers are likely to receive more valuable information about technologies from the extension agents during such visit.

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Table 4: Logit estimates of determinant of adoption of cassava production technologies

Variable	Coefficient	Standard Error	Z value
Age	.0205	.0328126	0.63
Household size	-.0788	.1441918	-0.55
Education	.0396	.0429924	0.92
Income	3.19e-*	1.79e-06	1.78
Experience	-.0263	.0546349	-0.48
Cooperative	.7376	.8812638	0.84
Farm size	.3643	.5006137	0.73
Extension contact	.7306***	.2062525	3.54
Technically Complexity	-.3193	.8942661	-0.36
Constant	-5.0779	3.010661	-1.69
X^2 0.000			
Total Sample	60		

***P <0.01, *P < 0.10
Source: Data analysis, 2012.

Conclusion and Recommendation

It can be concluded that awareness and adoption level of cassava technologies were quite high in the study area. (Awareness of all the practices ranges from 90% to 98.3% while the adoption is from 63.3% to 90%). Also, that man made remarkable contribution in cassava production. It was therefore recommended that Farmers should adhere strictly to recommended packages by extension agents for increased output. Also, agricultural inputs should be made available to farmers at subsidized rates and timely too. This will improve cassava production in the study area.

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Processing centers should also be established to enhance value addition to cassava which will increase income of cassava farmers in the study area.

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